

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-01  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: General Criteria; accomplish

2. REFERENCES:

2.1 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants

2.2 S0420-AA-RAD-010, Radiological Affairs Support Program Manual

3. REQUIREMENTS:

3.1 Report delays to the SUPERVISOR.

3.1.1 In the event difficulty is encountered in meeting requirements or difficulty is anticipated in complying with the contract schedule dates, notify the SUPERVISOR immediately by verbal means, followed on the next work day by an original and 2 copies of a letter stating pertinent details. Receipt of this notification by the SUPERVISOR is not to be construed as a waiver of the requirements, delivery schedule by the Government, or waiver of rights or remedies provided by law or under this Job Order or any other requirements in the Job Order relating to jeopardy of contract schedule dates.

3.2 Reports:

3.2.1 When a Work Item does not require a report, and one is determined to be necessary in order to produce a reliable or complete repair, submit one legible copy, in electronic media, of a report with supporting data as early as possible in the contract period. The goal is to have required work completed within the original contract period.

3.2.2 For required reports that could result in a change in work to be accomplished or additional material to be procured, complete the preliminary work and submit one legible copy, in electronic media, of the required report in a time frame to allow the SUPERVISOR to initiate early action, but no later than the first 20 percent of the availability.

3.2.3 Dry dock related inspection reports shall be submitted no later than the first 20 percent of the scheduled docking period. Dry dock related reports which contain readings (final, thickness, etc.), clearances, alignments, test results, or other such data for work that has to be completed prior to pre-flood/undocking, shall be submitted to the SUPERVISOR within 24 hours after recording the data but no later than 72 hours prior to pre-flood/undocking, whichever occurs first.

3.2.4 Reports shall contain the following information:

3.2.4.1 Name and hull number of ship or craft, the Job Order, Work Item, and paragraph numbers.

3.2.4.2 A description of the conditions found with supporting data. Include annotated sketches, graphs, and photographs when necessary to make a report clearly understandable to the SUPERVISOR. Identify actual readings/dimensions taken.

3.2.4.3 Recommendations and/or a list of material required.

3.2.4.4 Data required by, signature and title of the contractor's representative, and submission date.

3.2.5 Prepare and submit one legible copy, in electronic media, of a listing of all reports required by the **CNO/CMAV** Job Order to the SUPERVISOR no later than 15 days prior to the start of the **CNO/CMAV** availability. The listing shall be sequential by Work Item number, and include each applicable paragraph number, report due date, completion date, and submission date.

3.2.5.1 The report shall be revised and provided weekly throughout the availability to include additions, deletions, modifications, progress, and completions.

3.2.6 Where one legible copy of a report in hard copy or electronic media is required, or where sketches, graphs, or photographs are required, the electronic methods and file format shall be as agreed to by the SUPERVISOR.

3.3 Accomplish tests and checkouts.

3.3.1 Complete work that requires tests in time to allow correction of deficiencies prior to dock trials, sea trials, or other applicable milestones established in the Job Order.

3.3.2 Do not operate existing, newly installed, or repaired shipboard equipment. Ship's Force will accomplish such operation when required for test and checkout purposes. Such requirements will be coordinated by the SUPERVISOR.

3.4 Provide labor, material, equipment, and services (such as air, power, water, etc.) which are required to complete the Work Item, including

that which is indicated on drawings or test specifications as being provided by sources other than the contractor, unless specifically listed as Government Furnished Material (GFM) in paragraph 5 of the Work Items.

3.4.1 Manufacture parts that are not available from the vendor/manufacturer, utilizing NAVSEA approved drawings, technical manuals, templates, or sketches.

3.4.2 Submit one legible copy, in electronic media, of a status report, listing Contractor Furnished Material (CFM) required to accomplish the work in Work Items that is not already on hand, to the SUPERVISOR not later than 30 calendar days after the Job Order award, or 2 calendar days after availability start date, whichever occurs first. Update the report and submit revisions to the SUPERVISOR every 2 weeks up to availability start date, ***within 10 days after availability start date, then monthly thereafter to End of Availability (EOA).*** The reports are to contain the following:

3.4.2.1 Contract Work Item number

3.4.2.2 Contractor's purchase order number

3.4.2.3 Description of material

3.4.2.4 Quantity ordered

3.4.2.5 Date scheduled to be ordered

3.4.2.6 Date ordered

3.4.2.7 Date required to meet production schedule

3.4.2.8 Proposed receipt date

3.4.2.9 A summary listing any problem areas

3.4.2.10 Date submitted to the SUPERVISOR

***3.4.2.11 Alteration number***

***3.4.2.12 Drawing and piece number***

***3.4.2.13 Manufacturer***

***3.4.2.14 Manufacturer's part number***

***3.4.2.15 Date received***

3.4.3 Purchase Orders

3.4.3.1 Maintain a file of purchase orders for CFM for review by the SUPERVISOR upon request.

3.4.3.2 Submit one legible copy, in electronic media, of selected purchase orders to the SUPERVISOR upon request.

**3.5 Threads on externally threaded fasteners, after being installed and tightened, shall protrude a minimum of 2 threads to a maximum of 5 threads beyond the top of the nut with the exception of minimum thread protrusion for self-locking (plastic insert) nut installations. For those installations, bolt or stud end minimum thread protrusion shall be flush with the face of the nut. For self-locking nuts, the bolt or stud end shall protrude a maximum of 5 threads beyond the top of the nut after the nut is tightened.**

3.6 When a Work Item references Class and Hull specific configuration and Ship Alteration information, planning activity shall validate that reference information (Ship Alteration drawings, LARS, "as built drawings", Test Procedures, etc.) used is correct via the assigned Class Planning Yard.

3.7 Procure Military Specifications and Standards and Commercial Specifications and Standards.

3.7.1 Procure unclassified NAVSEA Standard Plans, Military Specifications and Standards, and Commercial Specifications and Standards referenced in the Work Items.

3.7.2 Classified Military Specifications are available at the office of the SUPERVISOR.

3.7.3 Work Items will normally reference the basic Government Specifications, Standards, or NAVSEA Standard Plans, without prefix zeros or suffix letters or numbers which identify revisions or amendments. Unless otherwise specified, the effective issue of these basic referenced documents, including revisions or amendments, shall be the most recent issue at the date of solicitation for a Job Order. Wherever specific dates for specifications, standards, and publications or amendments, revisions, or alterations thereto are specified in the Work Items, issues of those dates specifically shall apply in lieu of any other issue. Where industry standards such as ASTM and ANSI are referenced, the issue or revision in effect on the date specified for Government publication applies.

3.8 Work Items will normally reference technical manuals without suffix letters or numbers which identify revisions, change notices, or amendments. Unless otherwise specified, the effective issue of technical manuals, including revisions, change notices, or amendments, shall be the most recent issue at the date of solicitation for the Job Order.

3.9 Submit requests for deviations to the SUPERVISOR.

3.9.1 A deviation is defined as any action which is not in conformance with the Work Item requirements, including references thereto, no matter how minor.

3.9.2 Deviations from Work Items and references thereto will not be considered by the SUPERVISOR without a written request from the contractor.

3.9.3 Submit one legible copy, in electronic media, of requests for deviations to the SUPERVISOR within 24 hours of identifying the deviation. |

3.9.4 The Government does not have an obligation to approve any deviation; it may elect to do so if benefit to the Government can be shown. Accomplish deviation only when authorized in writing by the SUPERVISOR.

3.10 Accomplish the requirements of the contract.

3.10.1 Non-compliance/non-conformance with the requirements of the Job Order discovered by the Government will be reported to the contractor in writing.

3.10.2 Respond in writing to the report, indicating corrective action taken and, where applicable, the action to be taken to correct the cause of the deficiency. Written response shall be submitted to the SUPERVISOR.

3.11 Comply with security requirements.

3.11.1 In the event that the work required by the Job Order requires access to spaces or equipment that are classified, or use of technical manuals, references, or drawings that are classified, the specific security clearance requirements will be identified in the individual Work Item in addition to the requirements provided in the Invitation for Bid/Request for Proposal (IFB/RFP) by the Contract Security Classification Specification (DD Form 254).

3.11.2 Verify that personnel, including subcontractor's personnel, are cleared for the required level of security classification for handling, repair, installation, and testing of classified equipment and for access to areas of the ship which require a specific security clearance.

3.11.2.1 After selection of a subcontractor, prepare in triplicate a DD Form 254 for the subcontract and request the official designated in Paragraph 14.b of the DD Form 254 for the prime contract to approve and sign the DD Form 254 for the subcontract and to make the required distribution. In preparing the DD Form 254 for subcontracts, extract pertinent data from the DD Form 254 pertaining to the prime contract.

3.11.2.2 Prior to starting work on a Work Item that requires a security clearance, submit a list in triplicate of the names, badge numbers or other identification numbers, and security clearances of contractor and subcontractor personnel who will require access to classified information or areas in order to accomplish the work.

3.11.3 Verify that classified equipment removed from ship and classified documents, such as drawings, technical manuals, and test specifications, are marked or tagged and safeguarded at all times in accordance with the National Industrial Security Program Operating Manual (DOD 5220.22-M).

3.12 Comply with applicable federal, state, and local laws, codes, ordinances, and regulations in their entirety. Any reference to a specific portion of a federal, state, or local law, code, ordinance, or regulation in this or any other item shall not be construed to mean that relief is provided from any other sections of the law, code, ordinance, or regulation.

3.12.1 Provide appropriate notification to regional United States Environmental Protection Agency (EPA) in accordance with the requirements of 2.1. Also, comply with notification requirements of state and local air pollution control laws.

3.12.2 Submit one legible copy, in electronic media, of notification required in 3.12.1 that has been provided to any regulatory authority for work on board the vessel to the SUPERVISOR within 2 working days of providing such notice to the regulatory authority.

3.13 Submit one legible copy, in electronic media, of the Material Safety Data Sheet for each hazardous material that will be utilized aboard the ship and/or in a naval facility during the performance of this Job Order to the SUPERVISOR, 72 hours prior to the start of work.

3.13.1 Each MSDS requires a one-time submittal/acceptance unless **the MSDS changes or** this NAVSEA Standard Item and/or references change.

3.14 Comply with the requirements of 2.2 when using Nuclear Regulatory Commission (NRC) licensed radioactive material or machine sources of ionizing radiation on Government property.

3.14.1 Do not commence operating prototype or developmental systems using radioactive material or machine sources of ionizing radiation on Government property until authorized by NAVSEADET RASO, via the SUPERVISOR. NAVSEADET RASO's address/telephone number is:

Naval Sea Systems Command Detachment  
Radiological Affairs Support Office  
NWS P.O. Drawer 260  
Yorktown, VA 23691-0260  
(757) 887-4692

3.14.2 Contract personnel shall not be used as operators under a Navy Radioactive Material Permit (NRMP) issued to a naval facility. Navy personnel shall not be used as operators under a Nuclear regulatory Commission (NRC) or Agreement State License issued to a contractor.

3.14.3 For use of licensed radioactive material, submit one legible copy, in electronic media, of the applicable NRC or Agreement State license including procedures regarding system process and operation, to NAVSEADET RASO via the SUPERVISOR. In addition, Agreement State licensees shall provide evidence of NRC Form 241 (Report of Proposed Activities in a Non-Agreement State) with the copy of the license.

3.14.4 NAVSEADET RASO shall apprise the contractor, via the SUPERVISOR, of any radiation safety shortcomings to be rectified prior to commencing operations.

3.15 Correct errors in record keeping by drawing a single line through the error, recording the correct entry, initialing, dating, and printing the name of the person making the correction.

3.16 Record and Certification Signature Block or signature shall be legible and in ink. Erasures, write-overs, white-outs, ditto marks, continuation arrows, signature stamps, etc., are not acceptable.

3.16.1 Copying records to "make them neat" is not allowed.

3.17 Report verbally each accident/fire occurring on the vessel involving contractor/subcontractor personnel to the SUPERVISOR as soon as management becomes aware of such an event.

3.17.1 Submit one legible copy, in electronic media, of a formal written report, **Attachment A**, of the event to the SUPERVISOR within 24 hours of each accident requiring medical treatment, and each fire. **Provide daily updates within 24 hours upon request by the SUPERVISOR, until the final report is submitted.** The written report shall contain the name of each injured person, date and time of **incident**/fire, extent of each personal injury or property damage, contractor/subcontractor name, Job Order/**Work Item Number**, type of **incident**/fire, location of event (ship name and hull number, space, compartment), a brief description of the event including occurrences leading up to the **incident**/fire, **equipment involved, Contract Number, witness and/or individuals involved, short term and long term corrective action, and root cause analysis.**

#### 4. NOTES:

4.1 Labor or material progress payments on deficient Work Items will be withheld until each deficiency has been corrected.

4.2 For the purposes of this Job Order, the term "day" means 24 hours prior to or after the scheduled event.

4.3 Known sources for unclassified military specifications and standards are:

<http://stinet.dtic.mil>  
<http://assist.daps.dla.mil/quicksearch>

4.4 The term SUPERVISOR is defined as the local Government activity responsible for the execution and contract administration of Navy maintenance and modernization work.

*4.5 The term "Job Order" used herein and throughout the Standard Items is synonymous with the term "Contract."*



FOR OFFICIAL USE ONLY

**INCIDENT REPORT**

**Report #**

**TYPE OF INCIDENT:**

**NAME(S) OF INJURED** (if applicable):

**INCIDENT**

**DATE:**

**TIME:**

**COMPANY:**

**SUPERVISOR:**

**LOCATION OF INCIDENT:**

**TYPE OF INJURY OR FIRE:**

**CAUSE OF INCIDENT:**

**EQUIPMENT INVOLVED:**

**WORK ITEM NUMBER:**

**CONTRACT NUMBER:**

**WITNESS AND/OR INDIVIDUALS INVOLVED**

NAME(S)	DEPT.	COMPANY

**DESCRIPTION OF INCIDENT**

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**DISPOSITION OF INJURED (if applicable)**

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**IMMEDIATE CORRECTIVE ACTION**

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**INVESTIGATED BY (NAME):**

**TITLE:**

**SIGNATURE OF INVESTIGATOR:**

**DATE:**

**FOR OFFICIAL USE ONLY**

**INCIDENT REPORT**

**Report #**

**LONG TERM CORRECTIVE ACTION**

**ROOT CAUSE ANALYSIS**

**INVESTIGATED BY (NAME):**

**TITLE:**

**SIGNATURE OF INVESTIGATOR:**

**DATE:**

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### Incident Report Instructions

**REPORT NUMBER**- Unique tracking number created by contractor

**TYPE OF INCIDENT**- Injury, fire or near miss

**NAME(S) OF INJURED**- Self Explanatory

**INCIDENT DATE**: - Self Explanatory

**TIME**: - Self Explanatory

**COMPANY**: - Prime and subcontractors involved

**SUPERVISOR** – Supervisor of employee(s) involved

**LOCATION OF INCIDENT**: - Base/Yard, Ship name and hull number, space number and compartment name

**TYPE OF INJURY OR FIRE** – i.e. broken arm, laceration to head or Class A, B, C fires, smoldering

**CAUSE OF INJURY** – i.e. Equipment failure, PPE, process

**EQUIPMENT INVOLVED** – Equipment working on and equipment being used to cause incident

**WORK ITEM NUMBER** – Work Item being accomplished when incident occurred

**CONTRACT NUMBER**: - Contract Number assigned by government agency i.e. RMC, AIT Sponsor.

**WITNESS AND/OR INDIVIDUALS INVOLVED** – Name, company of witnesses and or individuals involved with the incident.

**DESCRIPTON OF INCIDENT OR NEAR MISS** – Short description of events leading up to incident and extent of injuries and or damage to equipment.

**DISPOSITION OF INJURED** – i.e. Transported to hospital via ambulance or POV, transported to clinic, released from hospital, name of hospital or clinic, limited duty or loss time (if known).

**IMMEDIATE CORRECTIVE ACTION** – i.e. Scene/space secured, ship notified (who and when), SERMC notified (who and when) clean up of blood, equipment secured fire debris cleaned up.

**INVESTIGATED BY** – Self Explanatory.

**TITLE** – Self Explanatory.

**SIGNATURE OF INVESTIGATOR** – Self Explanatory.

**DATE** – Self Explanatory.

**LONG TERM CORRECTIVE ACTION** – What action(s) were taken so that incident does not reoccur, i.e. training, safety stand down or process/policy change.

**ROOT CAUSE ANALYSIS** – Process by which you will identify the cause or contributing factors of the incident.

Note: Attach additional information as necessary.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-02  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Environmental Compliance Reports for Material Usage at Naval Facilities; provide

2. REFERENCES:

2.1 42 USC 7412(b), Clean Air Act, Section 112(b), List of Hazardous Air Pollutants

3. REQUIREMENTS:

3.1 Submit one legible copy, in electronic media, of reports as follows:|

3.1.1 Submit applicable permits for portable, registered, or rental emission units to the SUPERVISOR prior to start of work.

3.1.2 Establish a record-keeping program to reflect the manner in which the material records will be maintained and submitted to the SUPERVISOR.

3.1.3 Maintain facility specific records to ensure accurate reporting for all preservation, welding repairs, and fuel consumption for each individual portable internal combustion engine or portable emission unit. Provide the SUPERVISOR sufficient details to track usage of all paints, solvents, adhesives, welding rods, and fuel used for each individual portable internal combustion engine over 50-brake horsepower. Report any other materials used which contain chemicals listed in 2.1.

3.1.4 Maintain current usage records of materials listed in 2.1.

3.1.5 Negative reports are required.

3.1.6 Reports shall contain the following items based upon category of the material.

3.1.7 Paint, solvent, adhesive, and nonskid usage records are to be submitted monthly and shall include the following:

3.1.7.1 Product manufacturer, identification or color

3.1.7.2 Net daily paint usage in gallons, paint application method (airless spray, HVLP, brush, or roller) per paint type, amount of paint disposed as hazardous waste; density of mixed paint; net daily onsite solvent usage in gallons used for equipment cleaning and surface preparation; net amount of adhesives in unit of measure (ounces, quart, gallons or pound)

3.1.7.3 Product material safety data sheet (MSDS), technical data sheet, VOC certification for paint and nonskid product

3.1.7.4 Government site location, applicable local Air Pollution Control District (APCD) permit number, date, and ship's name

3.1.8 Abrasive blast grit materials used shall be submitted monthly and shall include:

3.1.8.1 Manufacturer of abrasive blast grit and MSDS

3.1.8.2 Abrasive blast grit usage certification if required by the cognizant state or local authorities

3.1.8.3 Amount and hourly usage of the abrasive blast grit

3.1.8.4 Permit associated with the abrasive blasting equipment if required by the cognizant state or local authorities

3.1.9 Welding operation report shall be submitted monthly and shall include welding rod manufacturer, specific product used in welding application, MSDS, usage in pounds, and type of welding application

3.1.10 Portable internal combustion (IC) engine greater than 50 brake horse power operation report shall be submitted monthly and shall include:

3.1.10.1 Amount of fuel used in gallons and the hours of operation

3.1.10.2 IC engine permit number and site location if required by the cognizant state or local authorities

3.2 Submit one legible copy, in electronic media, of each report required by 3.1 to the SUPERVISOR no later than 10 calendar days after the end of the month throughout the availability.

#### 4. NOTES:

4.1 Examples of paint and nonskid manufacturers may be Ameron, International, American Safety Technology, or others as applicable.

4.2 Examples of American Welding Society Classifications for welding rod may be E316-16, E7018-AL 308-16, or others. If there is no American Welding

Society (AWS) classification assigned, use the product name and circle the product on the MSDS.

4.3 Examples of welding applications may be Shielded Metal Arc Weld (SMAW), Gas Metal Arc Weld (GMAW), Flux Core Arc Weld (FCAW), and others.

NAVSEA  
STANDARD ITEM

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ITEM NO: 009-03  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Toxic and Hazardous Substances; control

2. REFERENCES:

2.1 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

3. REQUIREMENTS:

3.1 Identify materials that may contain toxic or hazardous substances as listed in Subpart Z of 2.1 that are to be used, removed, or disturbed during work operations.

3.1.1 Conduct and document an initial determination of potential personnel exposure to these materials prior to the start of work.

3.1.1.1 Provide a copy of the documentation, signed by a competent person as defined in 29 CFR 1915.4, to the SUPERVISOR upon request.

3.2 Ensure that work operations comply with the requirements of 2.1 for the use of toxic or hazardous substances and removal or disruption of existing toxic or hazardous substances.

3.3 Provide a notice to the SUPERVISOR and to the Commanding Officer's designated representative.

3.3.1 Post the notice at the ship's Quarterdeck and at all entrances to the work areas for each job or separate area of potential exposure to toxic or hazardous substances and hazardous operations at least 4 hours, but not more than 24 hours, prior to the start of work.

3.3.2 The notice shall contain the following information:

3.3.2.1 Ship's name and hull number

3.3.2.2 Work Item number

3.3.2.3 Compartment or frame number

3.3.2.4 Identification of hazard

3.3.2.5 Date and time of work process

3.3.2.6 Identification of engineering and work practice controls

3.3.3 Deliver notification of work planned over a weekend or Monday following that weekend to the Commanding Officer's designated representative not later than 0900 on the Friday immediately preceding that weekend.

3.3.4 Deliver notification of work planned on a Federal holiday and on the day following the Federal holiday to the Commanding Officer's designated representative not later than 0900 on the last working day preceding the Federal holiday.

3.3.5 The notice and procedure shall be submitted to the SUPERVISOR for review prior to commencement of the work operation. Authorization of the SUPERVISOR shall be obtained before proceeding with the work.

3.4 Provide for isolation and blanking of ship's ventilation systems in work areas to prevent toxic or hazardous substance contamination of ventilation systems or other compartments/spaces.

3.5 Establish regulated areas for monitoring and authorized personnel entry whenever concentrations of the toxic or hazardous substance are in excess of exposure limits as listed in 2.1.

3.6 Monitor the affected areas during work operations to ensure compliance with 2.1. Monitoring shall include adjacent spaces to ensure the work area containments and work practices are effective. Results of surveillance shall be documented and documentation shall be made available to the SUPERVISOR.

#### 4. NOTES:

4.1 The term "hazardous substance" means a substance, which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-04  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Quality Management System; provide

2. REFERENCES:

2.1 ANSI/ISO/ASQ Q9001-2000, Quality Management Systems - Requirements

2.2 ANSI/NC SL Z540-3, **Requirements for the Calibration of Measuring and Test Equipment**

2.3 **ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories**

3. REQUIREMENTS:

3.1 Establish, document, implement, and maintain a Quality Management System as a means of ensuring that product conforms to specified requirements. The system shall, as a minimum, comply with the requirements of 2.1 and all additional contract requirements. The Quality Management System (**Quality Manual, documented procedures required by 2.1 and 3.2**) shall be submitted to the SUPERVISOR for a document review and acceptance. The contractor shall have an acceptable documented Quality Management System, in accordance with this Standard Item, in place to receive an award of a Job Order. The Quality Management System shall be subject to periodic audits by the SUPERVISOR throughout the contract.

3.1.1 Submit any revisions to the accepted Quality Management System **identified in 3.1** to the SUPERVISOR within 7 days of contractor approval.

3.2 Include the following additional documented procedures:

3.2.1 Management Responsibility: Address all areas of Paragraphs 5.1 through 5.6.3, 6.1, 6.2.1, 6.2.2, and 8.5.1 of 2.1.

3.2.2 Customer Related Processes: Address all areas of Paragraphs 7.2.1 through 7.2.3 of 2.1.

3.2.3 Purchasing: Address all areas of Paragraphs 7.4.1 through 7.4.3 of 2.1.

3.2.3.1 Verification of Purchased Product: Identify, in the purchasing documents, verification arrangements at the subcontractor or vendors location/premises. Purchasing documents shall contain the following statement when the SUPERVISOR requests government inspection: "Government Inspection is required prior to shipment from your plant. Upon receipt of this order, promptly notify and furnish a copy to the government representative who normally services your plant so that appropriate planning for government inspection can be accomplished. In the event the government representative or office cannot be located, our purchasing agent shall be notified immediately."

3.2.3.2 Unless otherwise specified in a higher tier document, Receipt Inspection of contractor furnished materials shall be based on supplier performance history and one or more of the following: certificate of compliance, vendor material test certification data, manufacturer's mill certificate, or testing using sampling techniques.

3.2.3.3 Use of black-oxide coated brass threaded fasteners (BOCBTF) is not authorized in the accomplishment of any work under this contract.

3.2.4 Production and Service Provision: Address all areas of Paragraphs 7.5.1 - 7.5.5 of 2.1.

3.2.5 Monitoring and Measurement of Product: Address all areas of Paragraph 8.2.4 of 2.1.

3.2.6 Control of Monitoring and Measuring Devices: Address all areas of Paragraph 7.6 of 2.1, 2.2, **and 2.3.**

3.2.7 Measurement, Analysis, and Improvement: Address all areas of Paragraphs 8.2.1, 8.4, and 8.5.1 of 2.1.

3.3 The corrective and preventive action program shall require that a copy of the written responses to contractor generated corrective actions will be provided to the SUPERVISOR when requested.

3.4 Develop a Test and Inspection Plan incorporating each Work Item in the job order. Submit an initial copy of the Test and Inspection Plan to the SUPERVISOR prior to productive work for non-CNO availabilities and no later than 5 days prior to the availability start date for CNO availabilities. Submit one legible updated copy of the Test and Inspection Plan when requested by the SUPERVISOR.

3.4.1 A Test and Inspection Plan shall:

3.4.1.1 Be revised prior to the start of productive work and updated as work proceeds on each Work Item. It shall be available upon request by the SUPERVISOR. Supporting data for tests and inspections requiring government notification (G), including accept/reject criteria, shall be available at the location of each test and inspection. Include provisions for documenting the date, time, and identification of the SUPERVISOR's representative notified and government representative attending each (G)-Point on the Test and Inspection Plan.

3.4.1.2 Identify by paragraph and appropriate symbol(s) (see 3.7 and 3.8), each test and inspection required ***and invoked in the Requirements Section (paragraph 3) of*** the Work Item and the contractor to substantiate product conformance. Tests and inspections required by the Work Item that provide a report of conditions found are not required to be included in the Test and Inspection Plan unless specifically required by the Work Item.

3.4.1.3 Provide identification of the item to be inspected by name, number, and location (e.g., number 3 main feed pump, 5-180-0-E).

3.4.1.4 Provide identification of each characteristic of the items to be inspected and provide the criteria for acceptance for each characteristic (e.g., air test; 2 PSIG for 10 minutes; no drop).

### 3.5 Test and Inspection records shall:

3.5.1 Include the ship's name and hull number, Job Order and Work Item numbers, date, time, and signature of the contractor's authorized representative who witnessed or performed the test or inspection.

3.5.2 Be maintained at a contractor location accessible to the site of the work required by the Job Order.

3.5.3 Be documented within 24 hours of accomplishment or prior to the subsequent tests or inspections, whichever is less. Records shall be incorporated into the Test and Inspection Plan within 72 hours after completion of each test or inspection.

3.5.3.1 For tests and inspections involving (G)-points, records shall be documented upon acceptance or rejection and a hard copy provided to the SUPERVISOR at the conclusion of each (G)-Point.

3.5.4 Required reports resulting from tests or inspections shall include the appropriate design criteria for each attribute or measurement required by the Work Item.

3.6 The SUPERVISOR will consider the Work Item incomplete if the contractor's documentation and records are not complete.

3.7 Accomplish (I) and (V) test/inspection requirements as follows:

3.7.1 (I) inspections require verification and documentation by a separate individual, other than the person who has accomplished the work, who is qualified as an inspector.

3.7.2 (V) inspections require verification and documentation by the qualified tradesperson, trade supervisor, or inspector.

3.7.3 The authority to accomplish and document (I) and (V) inspections may be delegated to qualified subcontractor personnel.

3.8 Accomplish (G)-Point (government notification) as follows:

3.8.1 (G) is a symbol inserted in a Work Item to establish a point in the sequence of accomplishment of work at which time the SUPERVISOR shall be notified to permit observation of a specific test or inspection by the government.

3.8.2 Notify the SUPERVISOR's designated representative via FAX, hard copy, or by electronic method, as directed by the SUPERVISOR, during normal day shift working hours. Notification shall be at least 4 hours, but not more than one working day, prior to commencing the specific requirements in the paragraph annotated with the symbol (G). Notify the SUPERVISOR not later than 4 hours before the end of the last preceding day shift when tests or inspections following a (G) Point are scheduled after normal day shift working hours, on a weekend, or on a federal holiday. Notify the SUPERVISOR at least 48 hours, but not more than 72 hours, prior to commencing (G)-Points at contractor's/subcontractor's plants located in excess of 50 miles by the most direct roadway nearest to the place of performance of the contract. Document the date, time, and identification of the SUPERVISOR's representative notified.

3.8.2.1 For (G)-Points scheduled after normal day shift working hours, on a weekend, or a Federal holiday, notify the SUPERVISOR to cancel a scheduled test or inspection as soon as known, but no later than 2 hours prior to the scheduled event.

3.8.3 A qualified contractor representative shall be present to accept or reject tests or inspections annotated with the symbol (G).

3.8.4 When the symbol (G) precedes tests or inspections in a Work Item which are applicable to more than one action, the symbol (G) shall identify the action required, e.g., (G) "HYDROSTATIC TEST". When more than one unit is involved, the (G) notification requirement applies to each unit.

3.8.5 Proceed with the test or inspection if the SUPERVISOR is not present, provided the required advance notice has been furnished to the SUPERVISOR and the contractor has completed and documented the preceding tests and inspections.

3.8.6 A partial test or inspection requiring (G) notification may be accomplished in the event that all work cannot be completed and work progress would be delayed in waiting for total completion of work. Comply with the requirements of 3.8.2 when the incomplete work is completed and ready for the remainder of the test or inspection. Note partial inspections on the test or inspection form.

3.8.7 Invoke (G) notification requirements for tests or inspections involving a subcontractor in purchase orders such that the requirements of 3.8.2 are met.

3.8.7.1 Submit one legible copy, in electronic media, of the technical specification portion of those purchase orders which involve (G) notifications to the SUPERVISOR prior to the start of work by the subcontractor when requested by the SUPERVISOR.

3.8.7.2 Submit one legible copy, in electronic media, of those purchase orders for work being accomplished by subcontractors located outside a 50-mile radius of the place of contract performance to the SUPERVISOR prior to shipment of purchase order and equipment. For contractors with facilities outside the 50-mile radius, a report identifying the applicable information may be submitted in lieu of a purchase order.

3.8.8 The qualified contractor's representative shall witness or perform and document all tests and inspections within a 50-mile radius of the contractor's plant nearest to the place of performance of the contract.

3.8.8.1 The authority to witness or perform and document tests and inspections may be delegated to subcontractors who are MSRA or ABR agreement holders and have a current Quality Management System accepted by the SUPERVISOR. However, (G)-Point notification requirements shall not be delegated.

3.9 The contractor may delegate responsibility to subcontractors for tests and inspections performed at plants located outside a 50-mile radius of the contractor's plant nearest to the place of performance of the contract. However, the (G)-Point notification requirements shall not be delegated.

3.10 Maintain a current list for reference by the SUPERVISOR, designating the contractor's qualified inspectors who witness or perform and sign for symbol (I) inspections, indicating the type of tests and inspections for which each inspector is qualified. When subcontractors are delegated responsibility, the subcontractor's qualified inspectors shall be included on this list.

#### 4. NOTES:

4.1 ANSI/ISO/ASQ Q9001:2000 commercial third party registrar certification is not required.

4.2 Submittal of procedures and Process Control Procedures (NAVSEA Standard Item 009-09) invoked by NAVSEA Standard Items, MIL-STDs, drawings, ***technical publications***, and specifications, although an integral part of the Quality Management System, are to be submitted and approved by the SUPERVISOR independent of the Quality Management System.

4.3 The recommended Quality Management System structure is the Level A, B, and C hierarchy as described in ANSI/ISO/ASQC Q10013, Guidelines for Developing Quality Manuals.

4.4 The Quality Management System submitted in 3.1 requires a one-time submittal/acceptance unless this NAVSEA Standard Item and/or references change or contractor's status changes.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-05  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Temporary Accesses; provide

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-1689, Fabrication, Welding, and Inspection of Ships Structure

2.3 29 CFR 1915, Occupational Safety and Health Standards for Shipyard |  
Employment

3. REQUIREMENTS:

3.1 Submit one legible drawing or sketch of each proposed access cut and a list of each proposed bolted/riveted access removal to the SUPERVISOR 3 working days prior to making cut or removing bolted/riveted access. For a nuclear-powered vessel, submit drawing/sketch of proposed access cut to the SUPERVISOR 5 **working** days prior to making cut or removing bolted/riveted access.

3.1.1 The drawing or sketch shall include, as a minimum, the following information:

3.1.1.1 A plan and elevation view specifying the location of the access by deck, frame, and distance from the center line or deck edge and showing location of adjacent penetrations, bulkheads, framing, welds, and riveted joints within 12 inches of the proposed cut.

3.1.1.2 Location and number of previous cuts visible in each plate and the cutback of existing welds as required by 2.2.

3.1.1.3 Temporary structural reinforcement required to prevent distortion of ship structure.

3.1.1.4 Thickness and type of material of plating and structural members to be cut. Include source or document/drawing number which identifies material requirements.

3.1.1.5 A description of the temporary access closure or enclosure.

3.1.1.6 Include a copy of the weld procedure or approved weld procedure number with the proposed access sketch.

3.1.2 List of bolted/riveted access covers shall include location, designation, and classification as identified on ship's damage control charts.

3.1.3 Provide all drawing titles and numbers (including applicable sub-tier), and technical documentation used to accomplish the requirements of 3.1.

3.2 Ensure that access cut boundaries conform to the requirements of 2.2 and the following:

3.2.1 Boundaries may extend across one or more frames as required for size of opening.

3.2.2 Are sized and located to accomplish the requirements of the Job Order.

3.2.2.1 Use access requirements on NAVSEA drawings **for** guidance only.

3.2.3 Weld riveted plates using a single V-weld with glass cloth conforming to MIL-C-24576, Type One, Class One, to prevent fusion between backing member and plate.

3.2.3.1 Remove existing rivets within 6 inches of a cut and install new rivets in accordance with 2.2.

3.2.3.2 Round patches 2 feet in diameter or less shall be dished 1/16-inch to 1/8-inch.

3.2.4 Are at least 3 inches minimum to 6 inches maximum width for oblong cuts with circular ends and have a radius of one-half the width.

3.2.5 Are sized so that the smallest dimension of a square or rectangular cut is 12 inches. For cuts less than 24 inches, minimum radius of each corner shall be 3 inches; for cuts 24 inches and greater, minimum radius of each corner shall be 6 inches. Exception to this corner radius criteria is where cut terminates at an existing weld.

3.2.6 Utilize the same boundaries as used for prior cuts unless the requirements of this Standard Item have been violated.

3.2.6.1 Annotate violations on the drawing or sketch required by 3.1.



(V)(G) "INSPECT LAY OUT"

3.3 Lay out access on both sides of the structure to be cut, in accordance with reviewed drawing or sketch.

3.3.1 Prior to cutting access in the ship/vessel's **structure and after layout checkpoint**, accomplish positive verification of access parameters by the tapping method, heat method, or drilling of pilot hole in the path of the cut to be accomplished. For a nuclear-powered vessel, drilling a pilot hole is the only allowed method for positive verification.

3.4 Accomplish the requirements of 2.3 for guarding of access openings.

3.4.1 Remove temporary guarding after installation of access plates. Chip and grind surfaces flush in way of removals.

3.5 Install a temporary coaming with a minimum height of 4 inches around access cuts through decks. Tack-weld the coaming to the deck and seal the deck joint with caulking compound.

3.5.1 Remove the temporary coaming after installation of access plate. Chip and grind surfaces flush in way of removals.

3.6 Cut access in accordance with reviewed drawing or sketch.

3.7 Remove bolted/riveted access.

3.7.1 Clean and preserve gasket faying surfaces.

3.7.2 Chase and tap exposed threaded areas.

3.8 Protect ship from weather and contamination.

3.8.1 Fabricate temporary closures, using fire retardant material, prior to removing plates or cutting access openings.

3.8.1.1 Closures shall be constructed to protect the access from inclement weather and entry of contaminants.

3.8.1.2 Horizontal deck closures shall support a minimum of 150 pounds per square foot.

3.8.1.3 Closures shall be fitted with fasteners that permit rapid installation and removal.

3.8.2 Install closures whenever access is not in use.

3.9 Maintain watertight integrity of waterborne ship.

3.9.1 Fabricate and install watertight enclosures prior to removing plates or cutting access openings that do not provide a minimum of 4 feet of freeboard.

3.9.1.1 Maintain watertight integrity to a level 4 feet above the maximum anticipated draft.

3.10 Maintain watertight integrity of ship in dry dock.

3.10.1 Provide temporary access closure plates and fasteners prior to removing plates or cutting access openings below 4 feet of waterborne freeboard.

3.10.1.1 Closure plates shall be available on short notice for emergency sealing of the temporary access openings.

3.10.2 Seal access openings with closure plates when conditions warrant.

3.10.3 Secure openings at the end of each shift not immediately followed by another shift engaged in dry dock work.

3.11 Remove the temporary closures when no longer required.

3.12 Install the access plate in accordance with the reviewed drawing or sketch.

3.12.1 Accomplish the requirements of 009-12 of 2.1 for installation and inspection of the access plate.

3.12.1.1 Accomplish nondestructive testing with acceptance criteria for: new welds, existing welds extending 6 inches beyond cutbacks, 24 inches of riveted joints within 12 inches of new welds, and repaired riveted joints including 12 inches either side of the repairs. Acceptance criteria for the welds adjacent to the cutbacks shall be limited to an absence of crack indications. Nondestructive test requirements for closure shall include closure plates and small access plates.

3.12.2 Install the bolted/riveted access.

3.12.2.1 Use new gasket material conforming to MIL-PRF-900 and fastener material conforming to MIL-DTL-1222, Grade 304.

3.12.2.2 Install new rivets for riveted access plates in accordance with 2.2.

(V) "CHALK TEST"

3.13 Accomplish a chalk test on structural closure in way of temporary access. Chalk imprint shall be centered with 100-percent contact.

3.14 Accomplish the requirements of 009-25 of 2.1 for the water hose or local air hose test of each watertight/airtight closure. Allowable leakage: None.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-06  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Maintaining Protection and Cleanliness from Non-Radioactive Contaminate-Producing Operations; accomplish

2. REFERENCES:

2.1 Standard Items

3. REQUIREMENTS:

3.1 Observe the following requirements, in addition to the specific requirements of the Job Order, for maintaining cleanliness of the ship, ship's equipment, components, and spaces for the duration of the availability.

3.1.1 Accomplish an inspection of the work area prior to installation of protective covering to identify the current condition of equipment, systems, and components, including any exposed cables, penetrations, stuffing tubes, bolted cover plates, and antennas.

3.2 Prevent contamination and damage of the ship's equipment, components, and spaces during contamination-producing operations.

3.2.1 Plug, blank, wrap, cover, seal, and mask equipment, components, cables, wireways, boots, and openings using fire retardant/water repellent material, and prevent entry of contaminants to machinery, winches, rigging, machinery surfaces, weapons systems, electrical equipment, electronic equipment, valves, vents not in use, and other openings.

3.2.1.1 Ensure plugging and blanking does not result in flooding or damage to ship's equipment.

3.2.1.2 Install Herculite or canvas covering conforming to A-A-55308, and/or fire retardant plywood conforming to Category 2, Type II, of MIL-L-19140, or other NAVSEA-approved fire retardant industrial protective material.

3.2.2 Install fire retardant industrial filter material on the intake of supply and exhaust end of ventilation systems that will be in use.

3.2.2.1 Remove existing and install new filter or clean the filter material when air flow is restricted.

(V) "VERIFY PROTECTIVE MEASURES"

3.2.3 All protective measures are to be in place prior to start of any contamination-producing operations and shall remain in place until the contamination-producing operations are complete.

3.2.4 Install double curtain baffles at the entrance of each access door where airborne contamination could occur during contamination-producing operations. Install a dirt collecting mat on the deck directly inside each door. The SUPERVISOR will select a maximum of 4 doors. Tag out doors not designated for access.

3.2.5 Temporary coverings shall not be removed during contamination-producing operations without permission of the SUPERVISOR.

(V) "INSPECT PROTECTIVE COVERING"

3.3 Inspect the integrity of the protective covering at the beginning of each shift in which contamination-producing operations will be accomplished. Ensure that equipment and machinery have not been infiltrated by contaminants. Notify the SUPERVISOR immediately by verbal means, followed on the next work day in writing, if contamination or surface damage has occurred. Reseal to prevent further entry of contaminants or surface damage.

3.4 Maintain cleanliness of the work site, including bilges, free from accumulation of industrial debris caused by contractor and/or subcontractor employees on a continuous basis throughout the availability. Work spaces include those areas immediately under and adjacent, and those areas where service lines are run, and bilge areas in vicinity of the work site.

3.4.1 Cleaning shall be accomplished no later than at the end of each shift, on a daily basis.

3.4.2 Remove and dispose of industrial debris from the ship on a daily basis.

3.5 Accomplish a cleanliness inspection on a daily basis whenever work is in progress. The inspection shall be made jointly with the SUPERVISOR and the Commanding Officer's designated representative. During inspection the responsible party shall be assigned. A written report of any unclean work sites/spaces shall be prepared by the contractor and copies distributed to the SUPERVISOR and Commanding Officer's designated representative within 4 hours after completion of the inspection. The inspection report shall list the responsible activity (contractor, ship, etc.) for each unclean site/area. Unclean sites/areas determined as contractor responsible shall be immediately cleaned.

3.5.1 Accomplish inspections and reporting during the daily fire prevention and housekeeping inspections in accordance with 009-07 of 2.1.

(V)(G) "FINAL CONTAMINATION/DAMAGE INSPECTION"

3.6 Remove protective covering *installed in 3.2* upon completion of contamination-producing operations. Accomplish a final inspection of the work area to identify the presence of contamination and/or damage created by contamination-producing operations. Contamination/damage shall be documented on the inspection record.

3.7 Remove from the ship and dispose of debris and foreign matter generated as a result of work being accomplished. Comply with the requirements of federal, state, and local laws, codes, ordinances, and regulations or as specified elsewhere in the Job Order.

#### 4. NOTES:

##### 4.1 Definitions:

4.1.1 Cleanliness means the removal of all industrial debris (industrial trash, waste material, weld rods/tips, fasteners, rags, lagging waste, job scrap, wire, litter, rubbish, etc.) at the end of each shift, leaving the areas broom clean and electronic spaces vacuum clean. Adjacent/surrounding machinery, equipment, etc., left exposed during debris producing operations shall be cleaned free of all resulting debris.

4.1.2 Daily means 7 days per week, 24 hours per day.

4.1.3 Non-radioactive contaminate-producing operations include but are not limited to:

4.1.3.1 Operations liable to produce particulates to become airborne during accomplishment of the work scope, i.e., abrasive blasting, mechanical cleaning, spray painting, and air blowdowns.

4.1.3.2 Operations liable to produce fluid contamination of equipment as a result of external leakage of piping systems during testing.

4.1.3.3 Operations liable to produce fluid contamination of equipment as a result of external leakage of piping systems during waterjetting.

4.2 The SUPERVISOR will coordinate operation of ventilation systems, as requested by the contractor, to maintain a positive pressure within the vessel's envelope and to create an outward flow of air through crevices or around penetrations.

4.3 The cleanliness goal is to turn over all areas of the ship in the same condition or better as at beginning of the availability.

#### 4.4 Ship's Force responsibility:

4.4.1 Ship's Force is responsible for dust that collects as a matter of course throughout the availability and for any Ship's Force job site maintenance including monitoring job sites being worked by intermediate maintenance activities, AIT teams, and any contractor services that the ship has arranged.

4.4.2 Ship's Force is responsible to maintain cleanliness of their areas of responsibility broom clean at the end of each shift, on a daily basis.

4.4.3 The ship will raise concerns to the SUPERVISOR prior to any cleanliness condition getting out of control. The ship is expected to inspect any suspect area to first ascertain if it is their responsibility before contacting the SUPERVISOR.

4.4.4 Ship's Force will work continually throughout the availability to keep bilges and other general areas of the ship clean where the Contractor is not working.

4.5 Ship's Force and the Contractor will familiarize each other with their scope of work (any other work being performed on board the ship not pursuant to contractor authorized work under the Job Order is considered Ship's Force work). The affected locations and aspects of the work and/or ship conditions (i.e., blasting, grinding, preservation, hot work, insulation removals, decking replacement, hydroblasting, weight tests, electrical cable replacement, etc.) will be identified. Each responsible party will clean site in locations where both parties will be working, on a daily basis. Communications must be continuous and active 2 ways.

4.6 Diligence in inspection will ensure that action is taken by the responsible party prior to any area becoming unsatisfactory.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-07  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Confined Space Entry, Certification, Fire Prevention and Housekeeping; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

2.3 29 CFR Part 1910.134, Occupational Safety and Health Standards, Respiratory Protection

2.4 NFPA Standard 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

2.5 NFPA Standard 312, Standard for Fire Protection of Vessels During Construction, Repair, and Lay-up

3. REQUIREMENTS:

3.1 Comply with the requirements of 2.2 through 2.5 and this item to determine whether or not an explosive or other dangerous atmosphere exists in tanks, spaces, and associated piping, including adjacent tanks, spaces, and piping aboard the ship and control hot work and entry to those spaces to preclude damage to the ship or injury to personnel during the accomplishment of this Job Order.

3.1.1 Submit one legible copy, in electronic media, of a list of tanks or spaces to be opened or certified to the SUPERVISOR at least 24 hours prior to commencement of work.

3.1.1.1 Comply with additional requirements of 009-88 of 2.1 when accomplishing work in Collection, Holding and Transfer (CHT) and Mogas tanks, spaces, or associated piping.

3.1.2 Provide initial and annual update training for Competent Persons by utilizing a National Fire Protection Association (NFPA) Certified



Marine Chemist or NFPA training program meeting the requirements of Section 1915.7 of 2.2. The length of the initial training class shall be at least 24 hours. Annual update training shall be at least 8 hours.

3.1.3 Post a copy of the Marine Chemist's certificate (MCC), Certified Industrial Hygienist's test/inspection record, or Competent Person's test/inspection record at each access to the affected space while work in the space is in progress. A copy of the MCC or test/inspection record shall also be delivered to a location designated by the SUPERVISOR. In the event that the space is found to be NOT SAFE FOR WORKERS/NOT SAFE FOR HOT WORK, the space shall be posted accordingly and the SUPERVISOR and ship shall be notified immediately. The posted copy shall be clearly visible and legible.

3.1.3.1 Initial certification of spaces that require a Certified MCC or Certified Industrial Hygienist's test/inspection record in support of work operations shall be effective until conditions change which would void the certificate or test/inspection record.

3.1.3.2 For those certified spaces which employees will enter, a Competent Person shall visually inspect and test each space certified as ENTER WITH RESTRICTIONS or SAFE FOR WORKERS as often as necessary, and as a minimum, prior to entry by employees on a daily basis. If a space is not to be entered on any given day, it is not required to be inspected and tested by a Competent Person. The initial MCC remains valid if conditions have not changed, unless noted on the MCC.

3.1.3.3 For those certified spaces affected by hot work, a Competent Person shall visually inspect and test each space certified as SAFE FOR HOT WORK as often as necessary and, as a minimum, daily prior to commencement of hot work to ensure that conditions established by the certificate are maintained. When hot work is continuous, the affected spaces shall be visually inspected, tested, and recorded on a daily basis to maintain the SAFE FOR HOT WORK certification.

3.1.3.4 If a Competent Person finds that the conditions within a certified space fail to meet the applicable requirements for which it was certified, work in the space shall be stopped and may not be resumed until the space has been recertified by a Marine Chemist.

3.1.3.5 For those spaces where only Competent Person tests and inspections are required in accordance with 2.2, a Competent Person shall visually inspect and test each space as often as necessary and, as a minimum, daily prior to entry or commencement of hot work to ensure that conditions are safe.

3.1.3.6 After the Competent Person has determined initially that a space is safe for entry and finds subsequently that the conditions within the tested space fail to meet the requirements of 2.2, work shall be stopped until the conditions in the tested space are corrected, the space is retested, and a new record of tests/inspections is recorded and posted.

3.1.4 Tank cleaning personnel shall be trained annually on safety practices to include a discussion of safety information found in Subparts A, B, and Section 1915.152 of Subpart I of 2.2.

3.1.5 Maintain current copies of the documents listed in 3.1.5.1 through 3.1.5.4 for reference by the SUPERVISOR. Submit one legible copy, | in electronic media, of specific documents when requested by the SUPERVISOR.

3.1.5.1 A roster of designated Competent Persons, along with contractor certification that the training in 3.1.2 has been completed within the past year. Update the roster each time Competent Persons are added, deleted, or retrained.

3.1.5.2 A list of Competent Person(s) and tank cleaning personnel who will enter or work in confined spaces, including company name, badge number, and date training was provided in accordance with 3.1.2 and 3.1.4.

3.1.5.3 A list of the names of the Shipyard/Plant Rescue Team Members, along with contractor certification that training requirements of Subpart B of 2.2 have been accomplished and are current for each Rescue Team Member, or documentation of arrangements made for an outside rescue team to respond promptly to a request for rescue service in a contractor facility. At a naval facility, the Navy will respond.

3.1.5.4 A copy of the program to be utilized to train fire watches in accordance with the requirements of 2.2 and 2.4, including steps to be taken by the fire watch and hot work operator prior to accomplishment of hot work, proper selection and use of fire extinguishing equipment and other safety equipment, relationship between the fire watch and hot work operator, proper fire reporting procedures and other sounding of fire alarms, and reporting of fires to the ship's Quarterdeck. This training shall include theory and practical (hands-on) fire suppression techniques. This training shall be provided to all newly assigned fire watches, with annual updates provided to personnel. Provide visible means of identifying trained fire watches, i.e., badge, sticker, vest, etc.

3.1.6 Spaces that are determined to contain Immediately Dangerous to Life or Health (IDLH) atmospheres shall never be entered except for emergency rescue or for short duration for installation of ventilation equipment in accordance with 2.2 and 2.3. When entering IDLH spaces for the purpose of installing ventilation, notify the SUPERVISOR prior to entry. Notifications of rescue shall be made as soon as possible.

3.1.7 Confirm that all personnel have exited the space prior to closure of tanks, voids, and cofferdams. Designate one person to account for all personnel who may have entered the space.

3.2 Provide a written notice for each job or separate area of hot work aboard ship.

3.2.1 The notice shall state a description of the work to be done, the specific location of the hot work and compartments adjacent to decks, bulkheads, and similar structures upon which hot work is to be accomplished, the time hot work will commence, current gas-free status of the area (if required), the absence or existence of combustible material within 35 feet in any direction of the operation (or further, if affected by the operation), and if combustible material exists, what action shall be taken to protect the material from fire, the provision and assignment of a fire watch, and the affirmation that conditions at the work site (ventilation, temporary lighting, accesses) permit the fire watch(es) to have a clear view of and immediate access to all areas included in the fire watch.

3.2.2 The notice shall affirm that a suitable, fully-charged fire extinguisher shall be available at the job site and provide for an inspection of the area 30 minutes after completion of the hot work or the cessation of hot work at the job site unless the contractor's Hot Work Supervisor surveys the affected work area and determines that there is no further fire hazard as the final action to complete the notice.

3.2.3 The notice shall be signed by a supervisor specifically designated as responsible for coordination of the hot work and the fire watch requirement.

3.2.4 One copy of each notice shall be given to the SUPERVISOR and one copy to the Commanding Officer's designated representative, and at a minimum, one copy of each notice shall also be conspicuously posted at the location where the hot work is being accomplished.

3.2.4.1 The notice to the Commanding Officer's designated representative shall precede the initiation of the actual hot work in order to permit the Commanding Officer to designate a member of the crew to observe the operation, if desired.

3.2.4.2 Deliver written notification of hot work planned Tuesday through Friday to the Commanding Officer's designated representative at least 30 minutes and not more than 24 hours preceding start of work.

3.2.4.3 Deliver written notification of hot work planned over a weekend or Monday following that weekend to the Commanding Officer's designated representative no later than 0900 on the Friday immediately preceding that weekend.

3.2.4.4 Deliver written notification of hot work planned on a federal holiday and on the day following the federal holiday to the Commanding Officer's designated representative no later than 0900 of the last working day preceding the federal holiday.

3.2.4.5 The notice shall be effective for 24 hours unless a shorter period is specified in the contract or the gas-free status of the work area or system requires stopping the work. A new notice is required if work is interrupted due to loss of gas-free status.

3.3 Provide fire watches, trained as outlined in 3.1.5.4, at all affected areas where hot work is being accomplished. Provide fire extinguishing equipment as described in 2.2, 2.4, and 2.5. Fire watches and equipment shall meet the following requirements, as a minimum:

3.3.1 A fire watch must be posted if during hot work any of the following conditions are present:

3.3.1.1 Slag, weld splatter, or sparks might pass through an opening and cause a fire.

3.3.1.2 Fire-resistant guards or curtains are not used to prevent ignition of combustible materials on or near decks, bulkheads, partitions, or overheads.

3.3.1.3 Combustible material closer than 35 feet (10.7 meters) to the hot work in either the horizontal or vertical direction cannot be removed, protected with flame-proof covers, or otherwise shielded with metal or fire-resistant guards or curtains.

3.3.1.4 The hot work is carried out on or near insulation, combustible coatings, or sandwich-type construction that cannot be shielded, cut back, or removed, or in a space within a sandwich-type construction that cannot be inerted.

3.3.1.5 Combustible materials adjacent to the opposite sides of bulkheads, decks, overheads, metal partitions, or sandwich-type construction may be ignited by heat conduction or radiation.

3.3.1.6 The hot work is close enough to cause ignition through heat conduction or radiation on the following: (a) insulated pipes, bulkheads, decks, partitions, or overheads; or (b) combustible materials and/or coatings.

3.3.1.7 The hot work is close enough to unprotected combustible pipe or cable runs to cause ignition.

3.3.1.8 A Marine Chemist or a Competent Person, as defined in 2.2, requires that a fire watch be posted.

3.3.1.9 Equipment cannot be protected from falling sparks.

3.3.1.10 Ducts and conveyor systems cannot be blanked off, protected, or shut down.

3.3.2 Each fire watch attending worker(s) accomplishing hot work shall be equipped with a fully-charged and operable fire extinguisher, and shall remain at the job site for 30 minutes from the time the hot work is completed unless the contractor's Hot Work Supervisor surveys the affected work area and determines that there is no further fire hazard.

3.3.2.1 The fire watch shall not accomplish other duties while hot work is in progress.

3.3.3 Where several workers are accomplishing hot work at one site, the fire watch shall have a clear view of and immediate access to each worker accomplishing hot work.

3.3.3.1 No more than 4 workers shall be attended by a single fire watch.

3.3.4 In cases in which hot material from hot work may involve more than one level, as in trunks and machinery spaces, a fire watch shall be stationed at each level unless positive means are available to prevent the spread or fall of hot material.

3.3.5 In cases where hot work is to be accomplished on a bulkhead or deck, combustible material shall be removed from the vicinity of the hot work on the opposite side of the bulkhead, overhead, or deck, and a fire watch shall be posted at each location.

3.3.5.1 If multiple blind compartments are involved in any hot work job, fire watches shall be posted simultaneously in each blind area.

3.4 Locate oxygen, acetylene, fuel gas, or gas supply systems off the ship. Manifolds connected to pierside supply systems may be placed on board ships as long as they are located on a weather deck and equipped with a shutoff valve located on the pier. The pierside shutoff valve shall be in addition to the shutoff valve at the inlet to each portable outlet header required by 2.2.

3.4.1 ***Fuel gas and oxygen hoses must be positively identified by durable unique markings at each end of the hose.***

3.4.2 Liquid oxygen (LOX) tanks used for fuel gas/oxygen operations shall be stored to prevent collisions by trucks, forklifts, falling objects, etc.

3.4.3 LOX tanks shall be staged in designated locations on the quay wall/pier to be determined jointly by the contractor, Ship's Force, and the SUPERVISOR.

3.4.4 When gas cylinders are in use on board ship, they shall be located on the weather decks or in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR and shall be secured and in an

upright position. The number of in-use cylinders shall be limited to those which are required for work in progress and which have pressure regulators connected to the cylinder valves. On-board reserve gas cylinders shall not exceed one-half the number of in-use cylinders and shall be located in a remote area of the weather decks or in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR. Reserve acetylene cylinders shall be secured in an upright position.

3.4.5 When not in use, gas cylinders and manifolds on board shall have valves closed, lines disconnected, protective cover (cap) in place, and shall be secured. Acetylene cylinders shall be secured in an upright position.

3.4.5.1 Unattended fuel gas and oxygen hose lines or torches are prohibited in confined spaces.

3.4.5.2 Unattended, charged fuel gas and oxygen hose lines or torches are prohibited in enclosed spaces for more than 15 minutes.

3.4.5.3 All fuel gas and oxygen hose lines shall be disconnected at the supply manifold at the end of each shift.

3.4.5.4 All disconnected fuel gas and oxygen hose lines shall be rolled back to the supply manifold or to open air to disconnect the torch; or extended fuel gas and oxygen hose lines shall not be reconnected at the supply manifold unless the lines were given a positive means of identification when they were first connected and the lines are tested using a drop test to ensure the integrity of fuel gas and oxygen burning system. Alternate procedures must be approved by the SUPERVISOR.

3.4.6 Upon completion of oxygen-fuel gas system hook-up, accomplish a pressure drop test to include the torch, hoses, and gages.

3.4.6.1 Apply pressure to the system. Back off pressure by turning off the valve supplying gases to the system. If the pressure on the gage drops, a leak in the system exists. If the pressure on the gage does not drop, the system is tight.

3.4.6.2 After applying pressure, wait 2 minutes to ensure pressure does not drop.

**3.5 *Inert gas/oxygen depleting (OD) hoses must be positively identified by durable unique markings at each end of the hose.***

3.5.1 Unattended inert gas/OD hose lines or torches are prohibited in confined spaces.

3.5.2 Unattended, charged inert gas/OD hose lines or torches are prohibited in enclosed spaces for more than 15 minutes.

3.5.3 All inert gas/OD hose lines shall be disconnected at the supply manifold at the end of each shift.

3.5.4 All disconnected inert gas/OD hose lines shall be rolled back to the supply manifold or to open air to disconnect the torch; or extended inert gas/OD hose lines shall not be reconnected at the supply manifold unless the lines were given a positive means of identification when they were first connected and the lines are tested using a drop test to ensure the integrity of inert gas/OD systems. Alternate procedures must be approved by the SUPERVISOR.

3.5.5 Upon completion of inert gas/OD gas system hook-up, accomplish a pressure drop test to include the torch, hoses, and gages.

3.5.5.1 Apply pressure to the system. Back off pressure by turning off the valve supplying gases to the system. If the pressure on the gage drops, a leak in the system exists. If the pressure on the gage does not drop, the system is tight.

3.5.5.2 After applying pressure, wait 2 minutes to ensure pressure does not drop.

3.6 Use fire retardant materials aboard or immediately adjacent to the ship for staging, screening, temporary covers, shelters, deck covering, and ventilation ducts. Proper documentation of fire retardancy shall be available for review upon request.

3.6.1 Lumber, except that used for pallets, shall be fire retardant in accordance with Category One, Type I, of MIL-L-19140. Plywood and staging boards shall be Category Two, Type II, of MIL-L-19140.

3.6.2 Storage of material aboard ship shall be limited to that which is required for work in progress. Materials, trailers, temporary lights, flammable liquids, fueling of vehicles, and the rigging of hoses/welding leads/temporary lights aboard the ship shall comply with the following: Material, including that stowed in bins that are placed and held temporarily on hangar decks, well decks, or tank decks shall not exceed 8 feet in height. A 20-foot-wide lane shall be maintained the length of hangar decks to act as a fire break. Material shall occupy a deck space not to exceed 25-feet by 25-feet with adjacent 6-foot-wide aisles on each side for ready hose line access.

3.6.3 Prior to bringing equipment or working material aboard ship, its crating and packing shall be removed. If the equipment or material may be damaged during handling, the crating and packing shall be removed immediately after the equipment or working material is brought aboard and taken ashore for disposal. A small quantity of pallets may be staged in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR aboard ship for use in materials handling operations.

3.6.4 Trailers placed aboard the ship shall be equipped with an automatic or manual sprinkler system designed to provide 0.1 GPM per square foot of floor area and an audible alarm that will sound when the sprinkler system is activated. Tool issue shacks or other walk-in enclosures placed aboard the ship shall be constructed of fire retardant material, provided with at least one fire extinguisher of appropriate size and class at each access. The enclosure shall be supported at least 10 inches above the deck.

3.6.4.1 Smoke alarms, approved by Underwriter's Laboratory, shall be installed in enclosures and shall be audible outside the enclosures.

3.6.5 Temporary lights shall have 3-conductor cable, guard or shield, hook, and lamp holder. Exposed non-current-carrying metal parts of the fixture shall be grounded either through a third wire in the cable containing the current conductors, or through a separate wire that is grounded at the fixture's voltage source.

3.6.6 Flammable or combustible liquids with a flash point of 150 degrees Fahrenheit or less, including degreasers, solvents, and fuels, shall be kept in safety cans when not in actual use or when left unattended. These liquids shall be limited to one day's supply for on board use.

3.6.7 Fueling of vehicles or transfer of fuel between containers shall be accomplished at designated sites on weather decks or in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR. Notify ship's Officer of the Deck prior to the fueling or transfer operation. When fuel is transferred between containers, the containers shall be bonded and grounded to prevent static discharge.

3.6.7.1 Provide a minimum of 2 dry chemical portable extinguishers, each with an Underwriter's Laboratory rating of at least 60-B:C at the fueling site.

3.6.8 Rigging of hoses, welding leads, and temporary lights shall be kept clear of the decks on temporary trees or brackets and be arranged to minimize tripping and other safety hazards and to allow free access through doors, hatches, and passageways.

3.7 Accomplish temporary access requirements as follows:

3.7.1 Temporary access cuts may be made in fire zone boundaries provided they are equipped with fume-tight steel closures when installed. Boundary degradation by use of temporary access cuts or passage of service lines shall be permitted only upon granting of a written waiver by the SUPERVISOR, in conjunction with the Commanding Officer's designated representative, for a limited time.

3.7.1.1 Submit one legible copy, in electronic media, of a | record of boundary openings and their locations to the SUPERVISOR and one additional copy to the Commanding Officer's designated representative.



Resubmit boundary opening data when any changes, additions, or deletions of boundary openings occur.

3.7.2 Ensure at least one unobstructed access on ships designed with 3 or fewer accesses to each main and auxiliary machinery space and at least 2 unobstructed accesses on ships designed with 4 or more accesses to each main and auxiliary machinery space.

3.8 Accomplish a fire prevention and housekeeping inspection on a daily basis whenever work is in progress. The inspection shall be made jointly with the SUPERVISOR and the Commanding Officer's designated representative.

3.8.1 Submit one legible copy, in electronic media, of a written | report of the discrepancies and corrective actions, **using Attachment A**, to the SUPERVISOR and the Commanding Officer's designated representative within 4 hours after completion of the inspection.

3.9 Determine fire zone boundaries as follows:

3.9.1 The SUPERVISOR, Ship's Force, and the contractor shall establish fire zone boundaries prior to start of production work.

3.9.1.1 Existing transverse watertight, airtight, and fume-tight bulkheads shall be used as fire zone boundaries on ships built prior to the requirements for fire zones.

3.9.1.2 For ships having fire zones by design, the designated bulkheads shall be used as fire zones.

3.9.2 Fire zone boundaries shall be continuous through the vertical extent of the ship, from the keel up to the highest weather deck, excluding the superstructure.

3.9.2.1 For ships that have established fire zone boundaries that run from keel up through the superstructure, the fire zone boundaries as depicted on the ship's damage control diagrams shall be observed.

3.9.2.2 On aircraft carriers, provide for closing of hangar division doors in case of fire in the event division doors being repaired by the contractor are mechanically inoperative. As a minimum, rig chain falls to manually close doors in the event of fire. Exceptions shall be permitted only upon execution of a written waiver approved by the SUPERVISOR.

3.9.3 Ships under 600 feet in length shall have a minimum of 2 fire zone boundaries. Ships 600 feet and over in length shall have a minimum of 3 fire zone boundaries.

3.9.3.1 Indicate each fire zone by installing a sign adjacent to each entrance.

3.9.3.2 Service line(s) shall not be run through fire zone boundaries unless quick disconnects are installed in temporary service lines within 10 feet of the opening, door, or closure. The quick disconnects shall be marked with international orange tape and all service line(s) must be able to be secured and pulled back within 3 minutes. Fuel gas/oxygen/compressed gas hoses, steam lines, high pressure hoses (above 90 PSI), or hoses carrying hazardous/toxic/flammable materials shall not be run through fire zone boundaries unless expressly authorized in writing by the SUPERVISOR. Hose numbers or sizes shall not restrict free and easy access or closure of fire zone boundary doors.

3.10 Develop and implement a written fire safety plan in accordance with 2.2. Review the plan with contractor employees and subcontractors.

4. NOTES:

4.1 Hydrogen sulfide (H<sub>2</sub>S) may be found in AFFF, seawater, and firemain systems.

4.2 Booklet of General Plans and Tank Sounding Tables are available for review at the office of the SUPERVISOR.

**Fire Zone Boundaries**ATTACHMENT A  
ESH Discrepancy and Corrective  
Action Log**Attendees**

Ship name/hull number:

Location:

Prime Contractor:

**Date:****Time:**

No.	Point of Contact	Date Corrected	Location	Discrepancy	Corrective Action	Code

Type Codes: 1-Housekeeping, 2-Fire Prevent./Fire Equipment, 3-Hot Work., 4-FZ Boundary, 5-Electrical, 6-compress gas/hoses/bottles/manifolds, 7-Scaffolding, 8-Egress/Exit, 9- Walking/Working Surfaces, 10-PPE, 11- Containment, 12- Unguarded/Edges/Holes/Openings/Fall Protection, 13-Confined/Enclosed Spaces, 14-Lines & Leads Hazards, 15-Equip. Adrift & Rollback, 16-Ventilation, 17-Machine guarding/hand tools, 18-Crane/Rigging, 19-Environmental & Hazardous Material/Communication, 20-Environmental protection, 21-General Safety

## ATTACHMENT A

### ESH DISCREPANCY AND CORRECTIVE ACTION LOG INSTRUCTIONS

- 1- Fire Zone Boundaries: List the designated Fire Zone Boundaries.
- 2- Attendees: List Company and or Command and names of personnel present for walk thru.
- 3- Ship Name/hull Number: Indicate ship name and hull number of the location of the walk thru.
- 4- Location: Indicate location where ship is moored or docked, i.e. name of contractor facility or pier at Naval Base or Station.
- 5- Prime Contractor: Indicate prime contractor who has the contract with the SUPERVISOR.
- 6- Date: Indicate date of walk thru being accomplished.
- 7- Time: Indicate start time (24 hour clock) of walk thru being accomplished.
- 8- No. (number): List sequentially, each discrepancy noted during the walk thru. Number will continue where the numbering left off the previous day, until the end of the availability.
- 9- Point of Contact: Indicate Company/Command identified with the discrepancy.
- 10- Date Corrected: Date condition was corrected. If condition is not corrected, condition will be carried over to the next walk thru until condition is corrected.
- 11- Location: Indicate location of the condition, i.e. space number or frame number.
- 12- Discrepancy: Indicate condition that needs corrective action, be specific as necessary.
- 13- Corrective Action: Indicate corrective action taken to correct the condition and who is responsible for the corrective action.
- 14- Code: Indicate code, located at the bottom of ATTACHMENT A that condition can be grouped with, i.e. lines on deck causing trip hazard would use code 14- Lines and Leads Hazards.

Type Codes: 1-Housekeeping, 2-Fire Prevent./Fire Equipment, 3-Hot Work., 4-FZ Boundary, 5-Electrical, 6-compress gas/hoses/bottles/manifolds, 7-Scaffolding, 8-Egress/Exit, 9- Walking/Working Surfaces, 10-PPE, 11- Containment, 12- Unguarded/Edges/Holes/Openings/Fall Protection, 13-Confined/Enclosed Spaces, 14-Lines & Leads Hazards, 15-Equip. Adrift & Rollback, 16-Ventilation, 17-Machine guarding/hand tools, 18-Crane/Rigging, 19-Environmental & Hazardous Material/Communication, 20-Environmental protection, 21-General Safety

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-08  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Fire Protection at Contractor's Facility; accomplish

2. REFERENCES:

2.1 NFPA Standard 312, Standard for Fire Protection of Vessels During Construction, Repair, and Lay-up

2.2 NFPA Standard 1962, Standard for the Care, Use, and Service Testing of Fire Hose Including Couplings and Nozzles

2.3 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

3. REQUIREMENTS:

3.1 Provide fire protection in accordance with the requirements of 2.1 through 2.3 and this item.

3.2 Primary fire protection equipment shall consist of:

3.2.1 Fire pumps capable of providing the gallons per minute (GPM) flow specified in Attachment A at 100 PSIG with 2-1/2 inch fire hoses to ensure that GPM flow in Attachment A is uninterrupted for the entire availability. Flow and pressure shall be measured at the connection point to the ship's fire main.

3.2.1.1 Verify by the Pitot tube method or an in-line flow meter that the water supply specified in Attachment A is available. Water flow tests shall be accomplished prior to availability start date, each time the vessel shifts berths, and annually thereafter should the contract extend beyond one year.

3.2.2 Lighting provided for the ship/berthing barges topside area in the vicinity of each gangway. The term "ship" as used herein is synonymous with, and has the same definition as the term "vessel" as defined in 2.3.

3.2.3 Devices in place to alert contractor and local fire department. Devices shall also be in place on board the ship in the vicinity of each gangway, at convenient locations in the superstructure, main and auxiliary machinery spaces, and on the pier in close proximity to the ship.

3.2.4 A portable 300 KW diesel generator with associated cables, lugs/plugs to supply emergency power during transits to and from dry dock when ship's emergency power cannot be used.

3.3 When the ship's fire main is out of service, temporary primary fire protection shall consist of:

3.3.1 Fire pumps capable of providing the gallons per minute (GPM) flow specified in Attachment A at 100 PSIG with 2-1/2 inch hoses to ensure that GPM flow in Attachment A is uninterrupted for the entire availability. Flow and pressure shall be measured at the connection point to the temporary hose valve manifold stations.

3.3.2 Two and one-half inch fire hose and hose valve manifolds on the vessel and dry dock or marine railway so that all parts of the vessel and dry dock or marine railway can be reached by at least 2, one and one-half inch 100-foot hoses. The 100-foot hoses shall be pre-connected and faked on racks nearby.

3.4 Emergency fire protection equipment, in addition to that required by 3.2 or 3.3, shall consist of:

3.4.1 Fire pumps capable of providing 500 GPM at 100 PSIG to hose valve manifolds located on the vessel. Flow and pressure shall be measured at the manifolds.

3.4.2 Two and one-half inch fire hoses and hose valve manifolds on the vessel and dry dock or marine railway so that all parts of the vessel and dry dock or marine railway can be reached by at least 2, one and one-half inch 100 foot hoses. The 100 foot hoses and nozzles shall be pre-connected and faked on racks nearby.

3.4.2.1 The manifold stations shall be clearly identified, with sources of water and operating instructions.

3.4.2.2 Emergency fire protection shall be provided in the areas prior to placing any fire main section out of commission.

3.4.3 Water supply shall be available within 3 minutes of loss of primary source of fire main flow/pressure.

3.4.4 Emergency lighting and power, other than existing ship's emergency backup, shall be available for emergency lighting throughout the ship/barge and emergency devices using a separate source of energy or power line.

3.5 Primary, temporary primary, and emergency fire protection equipment shall consist of:

3.5.1 Fire hoses equipped with one and one-half inch combination straight stream and spray pattern nozzle. Charged hoses shall have recirculation capability which will prevent freezing of water in each hose.

3.5.2 Fire hoses shall be inspected and service-tested in accordance with 2.2 within 90 days before being placed in service for the first time and at least annually thereafter.

3.5.3 Portable communication devices shall be provided for use during fire fighting operations between site and fire and contractor's key control center.

3.5.4 Portable lighting devices shall be in place to assist in fire fighting operation when normal and emergency shipboard power fails.

3.5.5 Emergency backup support equipment (crane, forklift, trucks, pumps) to assist in securing or providing temporary services shall be provided.

3.5.6 Dewatering equipment (100 GPM minimum).

3.5.7 Portable fire pumps capable of a total of 500 GPM at 100 PSIG on board ship during berth shifts, including transits to and from dry dock, when ship's system cannot be used.

3.5.8 Install gages at connection to the ship's fire main and on all temporary and emergency fire main manifolds, and ensure that 100 PSIG is maintained at each gage uninterrupted for the entire availability.

3.6 Maintain available for review, prior to commencement of work, a fire safety plan meeting the requirements of 2.3. In addition to the requirements of 2.3, the plan shall identify:

3.6.1 The integrated fire protection system which will be in effect during the performance of the Job Order.

3.6.2 Total fire prevention program used, along with the types and frequency of tests of equipment and devices.

3.6.3 Detailed communication links (telephones, drop boxes, alarms, horns) location, testing interval, and their interface with municipal systems.

3.6.4 Normal and emergency sources of electric power, fire fighting water and lighting, testing interval, and their interface with municipal systems.

3.6.5 The location of all the normal and emergency backup support equipment to be used in support when combating a fire, and the equipment's testing cycle.

3.6.6 The shipyard organization to be used and their:

3.6.6.1 Designation and responsibility for all shifts

3.6.6.2 Training

3.6.6.3 Anticipated response times

3.6.6.4 Interface with municipal units

3.6.7 The general procedures directing contractor employees on:

3.6.7.1 Fire reporting

3.6.7.2 Fire responses

3.6.7.3 Fire fighting actions

3.6.7.4 Prolonged fire fighting responsibilities

3.6.8 The frequency testing cycle of the fire protection system.

3.7 The requirements of 3.6.7.1 shall be posted on the quarterdeck.

3.8 A fire fighting and fire prevention conference shall be conducted within 5 calendar days after arrival of the ship at the contractor's facility. The conference schedule shall be established at least 5 calendar days prior to the arrival of the ship. This conference shall familiarize Ship's Force with the contractor's fire safety plan for fire prevention and fire fighting and with the procedures that will be in use by municipal fire fighting organizations, as well as familiarize the contractor and the municipal fire fighting organizations with the ship arrangement, shipboard fire prevention, and fire fighting systems, equipment, and organization, and familiarize all parties with the scope of work and aspects of the work or ship conditions that have significance in fire prevention and fire fighting.

3.8.1 The conference shall specifically address the following matters:

3.8.1.1 Fire alarm and response procedures

3.8.1.2 Contractor fire fighting capability and procedures

3.8.1.3 Municipal fire fighting capability and procedures



3.8.1.4 Fire fighting jurisdictional cognizance

3.8.1.5 Communication system for fire reporting and control of fire fighting efforts

3.8.1.6 Shipboard arrangement including access routes, availability of fire fighting systems (installed and temporary), and communication systems

3.8.1.7 Shipboard fire fighting organization, systems, drills, and equipment

3.8.1.8 Ship, space, and equipment security consideration

3.8.1.9 Compatibility of ship, contractor, and municipal fire fighting equipment

3.8.1.10 Industrial work scope, including location of ship, and effect on fire fighting systems, access, and communications

3.9 A tour of the ship shall be conducted for municipal fire department personnel, the SUPERVISOR, Ship's Force, and contractor key personnel assigned specific responsibilities during fires to familiarize personnel concerned with the ship's normal access and anticipated condition while industrial work is in progress.

4. NOTES:

4.1 None.

ATTACHMENT A  
FIRE PROTECTION WATER SUPPLY REQUIREMENTS

<u>SHIP TYPE</u>	<u>FLOW (GPM) *</u>	
AD	Destroyer Tender	1500
ADG	Degaussing Ship	500
AE	Ammunition Ship	1500
AF	Store Ship	1500
AFS	Combat Store Ship	1500
AG	Miscellaneous Auxiliary Ship	1500
AGEH	Hydrofoil Research Ship	500
AGF	Miscellaneous Flagship	2000
AGFF	Frigate Research Ship	1000
AGM	Missile Range Instrumentation Ship	1500
AGMR	Major Communications Relay Ship	1500
AGOR	Oceanographic Research Ship	500
AGP	Gunboat Support Ship	2000
AGS	Surveying Ship	1000
AH	Hospital Ship	1000
AK	Cargo Ship	1500
AKS	Store Issue Ship	1500
AKR	Vehicle Cargo Ship	1500
ANL	Net Laying Ship	500
AO	Oiler	1500
AOE	Fast Combat Support Ship	1500
AOG	Gasoline Tanker	1000
AOR	Fleet Replenishment Oiler	1500
AP	Transport Ship	1000
APB	Self-propelled Barracks Ship	500
AR	Repair Ship	1500
ARB	Battle Damage Repair Ship	500
ARC	Cable Repair and Laying Ship	1000
ARG	Internal Combustion Engine Repair Ship	1500
ARL	Landing Craft Repair Ship	1000
ARS	Salvage Ship	500
ARSD	Salvage Lifting Ship	500
ARST	Salvage Tender	1000
ARVA	Aircraft Repair Ship	1000
ARVE	Aircraft Engine Ship	1000
ARVH	Helicopter Tender	1500
AS	Submarine Tender	1500
ASR	Submarine Rescue Ship	600
ATA	Ocean Tug	500
ATF	Ocean Tug Fleet	500
ATS	Salvage and Rescue Tug	500
AVM	Guided Missile Ship	1500
CV, CVN	Aircraft Carrier	3000
CG, CGN	Guided Missile Cruiser	1000
DD	Destroyer	1000

ATTACHMENT A  
FIRE PROTECTION WATER SUPPLY REQUIREMENTS (Con't)

<u>SHIP TYPE</u>		<u>FLOW (GPM)</u>	*
DDG	Guided Missile Destroyer	1000	
FF	Frigate	1000	
FFG	Guided Missile Frigate	1000	
FFR	Radar Picket Frigate	1000	
IX	Unclassified Miscellaneous	1500	
LCC	Amphibious Command Ship	1000	
LFR	Inshore Fire Support Ship	500	
LHA	Amphibious Assault Ship	2500	**
LKA	Amphibious Cargo Ship	1500	
LPA	Amphibious Transport Ship	1500	
LPD	Amphibious Transport Dock	1500	***
LPH	Amphibious Assault Ship	2500	**
LPR	Amphibious Transport-Small	500	
LSD	Landing Ship Dock	2000	***
PTF	Fast Patrol Crafts	500	
YRB	Repair and Berthing Barge	500	
YRBM	Repair, Berthing and Messing Barge	500	
YRBL	Repair, Berthing and Messing Barge (large)	500	
LST	Landing Ship Tank	1500	***
MCS	Mine Countermeasures Ship	1000	
MSC	Minesweeping Coastal Ship	500	
MSF	Fleet Minesweeper Ship	500	
MSH	Minesweeper-Hunter	500	
MSI	Minesweeper-Inshore	500	
MSO	Minesweeper-Ocean	500	
MSS	Minesweeper-Special	1000	
PCH	Hydrofoil Patrol Craft	500	
PG	Patrol Combatants	500	
PGH	Hydrofoil Gunboat	500	
PHM	Hydrofoil Missile Patrol Combatants	500	

\* All flows are from the pier or dry dock outlet and are available at adequate residual pressures from those systems in compliance with present design criteria for dry docks and piers as reflected in NAVFAC design manuals (DM-29 and DM-25).

\*\* Includes supply to operate 2 hangar sprinkler groups and 2, 2-1/2-inch hoselines.

\*\*\* Includes supply to operate one sprinkler group and 2, 2-1/2-inch hoses.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-09  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Process Control Procedure (PCP); provide and accomplish

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Submit one legible copy, in electronic media, of each PCP not later than 7 working days prior to start of the process required by the procedure to the SUPERVISOR. The procedure shall contain the following minimum information:

3.1.1 Contractor's name and address

3.1.2 Process title, number, and date developed

3.1.3 Description of process, including critical factors which have direct bearing on the process quality and safety

3.1.4 Qualification requirements for the personnel performing the work

3.1.5 Inspection and documentation forms

3.1.6 Acceptance and rejection criteria

3.1.7 The method utilized to ensure personnel accomplishing the procedure have direct knowledge of the requirements prior to beginning work. A copy of the procedure shall be at the work site during the performance of work.

3.1.8 The method utilized to control the procedure

3.1.9 Identification of hazardous materials which will be used in the process or hazardous waste that will be generated by the accomplishment of the process and the methodology which will be utilized to minimize the

quantity of these materials which will require control and disposal. State if no hazardous material or waste is generated or used.

3.1.10 Approval signature and title of the contractor's representative, date of submission, and scheduled start date of PCP.

3.1.11 Government notification (G) for start of procedure (3.5)

3.2 Ensure process control documentation provides a record of the data required to control and determine satisfactory completion of the process.

3.3 Submit updated or changed procedures to the SUPERVISOR at least 3 working days prior to implementation.

3.4 Participate in a joint Ship's Force and SUPERVISOR personnel safety brief, when directed by the SUPERVISOR, prior to start of recommended PCP.

(V)(G) or (I)(G) "START OF PROCEDURE"

3.5 Accomplish the requirements of the reviewed PCP.

4. NOTES:

4.1 Attachment A is provided as an aid to PCP development.

## ATTACHMENT A

### Process Control Procedure (PCP) Checklist

#### Identification

- Include the Process Title and Procedure Number with revision, as appropriate.
- List the Work Item and paragraph that the PCP fulfills.
- Include contractor/subcontractor's name and address.
- Include space for the Approval Signature and title of the contractor's representative.
- Include spaces for the Date Developed and Date of Submission.
- Attach an approval letter from a previous SUPERVISOR or Government review, if appropriate.

#### Personnel Qualifications

- List the qualifications of the personnel performing the work.
- Include a statement that a briefing will be conducted prior to beginning work to ensure personnel have direct knowledge of the requirements of the procedure and the safety requirements of the job.

#### Process Description

- List any specialized or critical equipment needed to perform the work.
- List any specialized or critical personnel safety equipment.
- State that Government Notification (V)(G) or (I)(G) will be made at the start of the process as applicable.
- Describe the process as related to the sequence of work.
- List the acceptance and rejection criteria used for determining satisfactory process completion.
- Provide inspections required for the process, to include (V), (I), and (G) symbols invoked by the Work Item applicable to the process.
- Provide inspection and documentation forms applicable to the process.
- Include a statement that a copy of the PCP will be provided at the work site during the performance of the work.

#### Hazardous Material

- State if no hazardous material/waste will be used or generated.
- Identify any hazardous material/waste used or generated during the performance of work. Include a Material Safety Data Sheet for each hazardous material that will be used aboard ship.
- Describe the methodology to limit the quantity that will require control.
- Describe the methods of the disposal of hazardous material or hazardous waste.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-10  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Shipboard Asbestos-Containing Material (ACM); control

2. REFERENCES:

2.1 29 CFR 1915.1001, Occupational Safety and Health Standards for Shipyard Employment, Asbestos

2.2 MIL-STD-769, Thermal Insulation Requirements for Machinery and Piping

2.3 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants

3. REQUIREMENTS:

3.1 Consider insulation, lagging, deck tile, underlayment, gasket, shipboard cabling (see 4.2), and mastic to be asbestos-containing material (ACM) until it can be established by laboratory analysis, or other reliable method(s), that the material does not contain asbestos, in accordance with 2.1. This includes reusable covers as defined in 2.2.

3.2 Apply the following requirements for the removal, disturbance, or disposal of all asbestos containing materials during the initial monitoring, daily monitoring, and control of ACM throughout the work areas, and to Class I, II, III, or IV activities as defined in 2.1.

3.2.1 Ensure that responsibilities for personnel safety and environmental control of ACM existing or damaged during accomplishment of work are assigned and implemented.

3.2.2 Maintain written substantiation of the credentials of the Qualified Person.

3.2.2.1 The Qualified Person shall take airborne samples, monitor work practices, maintain daily logs, conduct on-site inspections, set up regulated areas, be capable of specifying the necessary protection and precautions to be taken during work with ACM, and accomplish the other requirements in accordance with Class I, II, III, and IV activities as defined

in 2.1. The Qualified person shall have successfully completed an initial EPA or state approved 40-hour Asbestos Supervisor's Course and annual refreshers.

3.2.2.2 Individuals performing airborne asbestos analysis must have successfully completed a NIOSH 582 course or equivalent and be rated proficient in either AIHA's PAT program or AAR program. Persons performing analysis of fiber type on bulk samples must have completed a McCrone Course in analysis of bulk asbestos samples and be rated proficient in either the NVLAP or AIHA's asbestos program.

3.2.2.3 Copies of certifications, licenses, notifications (such as advance notification to OSHA of new or modified control technology to be used to reduce exposure), and other documentation required by federal, state, and local regulatory authorities, shall be maintained at the worksite.

3.2.3 Identify removal routes and steps to be taken to protect insulation, repair damaged insulation, and to avoid asbestos contamination along those routes and obtain SUPERVISOR approval prior to proceeding.

3.2.4 Submit one legible copy, in electronic media, of notifications made to regulatory authority, regarding ACM removal, to the SUPERVISOR within 2 working days of providing such notices to the regulatory authority.

3.2.5 Submit a written notice to the SUPERVISOR and to the Commanding Officer's designated representative, and post at the Ship's Quarterdeck or other designated location for each job or separate area of ACM removed or damaged aboard ship where there may be ACM at least 4 hours, but not more than 24 hours, prior to the start of work. The notice shall contain the following information:

3.2.5.1 Ship's name and hull number

3.2.5.2 Work Item number

3.2.5.3 Compartment

3.2.5.4 Class of activity and type of insulation, lagging, deck tile, underlayment, and mastic, i.e., ACM or possible ACM (provide basis for determination)

3.2.5.5 Date and time to start to work

3.2.5.6 Deliver notification for work planned over a weekend or Monday following that weekend to the Commanding Officer's designated representative no later than 0900 on the Friday immediately preceding that weekend.

3.2.5.7 Deliver notification of work planned on a federal holiday and on the day following the federal holiday to the Commanding



Officer's designated representative no later than 0900 of the last working day preceding the federal holiday.

3.2.6 Personnel accomplishing ACM work shall have a direct knowledge of the requirements of this procedure prior to beginning work. All training shall be under the direct supervision of a Qualified Person.

3.2.7 Monitor the affected areas daily to ensure compliance with 2.1. Monitoring shall include adjacent spaces to ensure the work area containments and work practices are effective. Results of surveillance shall be documented and the documentation shall be provided to the SUPERVISOR.

3.2.8 Submit one legible copy, in electronic media, of a list of regulated areas, decontamination areas, and engineering controls to be established in accordance with 2.1, to the SUPERVISOR.

3.2.8.1 Identify configuration of critical barriers or isolation methods.

3.2.8.2 Identify location/configuration of decontamination areas, including the equipment room, shower (if necessary), and clean change room.

3.2.8.3 Identify ventilation and filtration requirements, including the negative pressure enclosure(s) if necessary.

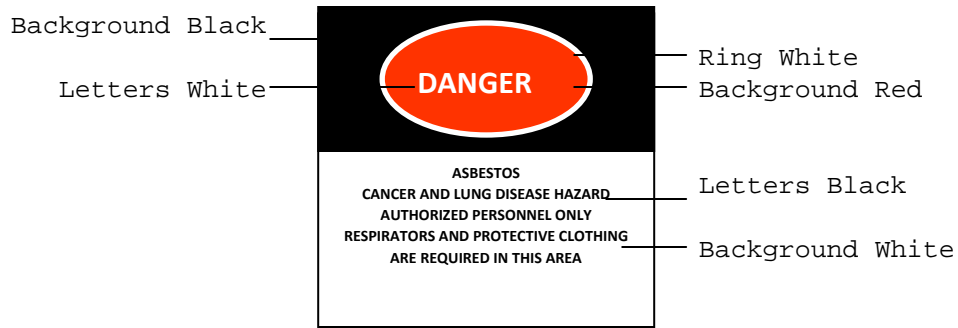
3.2.9 Isolate or blank the ship's ventilation systems in work areas to prevent asbestos contamination.

3.3 Post prominent caution signs as required by 2.1 outside of affected areas.

3.3.1 In addition to caution signs required by 2.1, provide danger signs at the entrance to affected areas.

3.3.1.1 Danger signs shall be 14 inches by 20 inches and be painted black and red for the top 5 inches and white for the remaining 9 inches.

3.3.1.2 The lettering shall be as follows with 3-inch minimum letters with an oval ring around them for the first line and one-inch minimum letters for the remaining lines:



### 3.4 Monitor work areas.

3.4.1 Determine areas of airborne concentrations and potential personnel exposure to airborne asbestos fibers in accordance with the requirements of 2.1.

3.4.2 Take air samples and monitor regulated areas in the vicinity of access openings that are not tightly secured.

3.4.2.1 If the airborne concentration of asbestos fibers is at, or exceeds, 0.1 fiber, longer than 5 micrometers, per cubic centimeter of air, corrective action shall be taken to reduce the concentration to less than 0.1 fiber, longer than 5 micrometers, per cubic centimeter of air.

### 3.5 Accomplish ACM removal as follows:

3.5.1 Secure and tag out ventilation systems securing the work area.

3.5.1.1 Blank ventilation systems to prevent contamination of the ventilation systems and other compartments.

3.5.2 Air discharged to the environment from any containment zone shall have passed through a HEPA filter and otherwise conform to 2.3. A negative pressure will be maintained in the containment area where possible.

3.5.3 Remove materials which may contain ACM, using wet work practices and engineering controls that will minimize airborne contamination in and adjacent to the work area.

3.5.3.1 Removal tools and work practices shall minimize the generation of airborne contamination and the deposit of ACM in the work area.

3.5.3.2 Equip vacuum cleaners used to help prevent the dispersion of asbestos fibers with HEPA filters.

3.5.3.3 Clear the work area of loose ACM, including ACM dust, prior to returning the area to normal status.

3.5.4 Contain edges of insulation exposed by removal operations by cutting the exposed surface true and square and sealing the surface. Encapsulate exposed ACM surfaces with insulating cement conforming to ASTM C 195.

3.6 Dispose of ACM by bag method described below:

3.6.1 Collect and dispose of ACM waste, scrap, debris, and special clothing consigned for disposal, which may produce airborne concentrations of asbestos fibers, in sealed, impermeable polyethylene bags (minimum thickness, 6 mils). Prior to placing in bags, asbestos waste shall be wet down to reduce airborne concentrations of asbestos fibers.

3.6.2 Bag ACM scrap, debris, and waste at the worksite.

3.6.3 ACM shall be placed in sealed, 6-mil or heavier, impermeable polyethylene bags before removal from the work area. Pieces of insulation too large to fit into bags shall be encased in 6-mil, or heavier polyethylene film with edges sealed with tape conforming to MIL-C-20079.

3.6.4 Vacuum outer surfaces of bags containing ACM in affected areas immediately after removal from and adjacent to the worksite.

3.6.5 Place the ACM waste while wet in leak-tight double bags.

3.6.6 Affix a danger label, in accordance with 2.3, to each bag prior to removal from affected areas. Label shall read as follows:

DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD

3.6.7 Affix a legible label to each bag stating the contractor's name, the name of the ship the asbestos was removed from, the name of the facility where the work was performed and date of the removal. The label shall be in permanent waterproof marking.

3.6.8 Dispose of bags containing ACM waste in accordance with applicable federal, state, and local regulations. Provide a copy of the completed Waste Shipment Record to the SUPERVISOR within 15 working days after initial shipment.

3.7 Monitor the area for asbestos upon completion of work and after cleanup.

3.7.1 The airborne concentration of asbestos fibers after work and cleanup shall be less than 0.1 fiber, longer than 5 micrometers, per cubic centimeter of air on an 8-hour, time-weighted average basis. The workspace shall not be released for entry of unprotected personnel until verification

has been provided to the SUPERVISOR that the airborne level of asbestos is less than the 0.1 fiber level.

3.7.1.1 Submit one legible copy, in electronic media, of the lab analysis listing results of air monitoring certifying the area to be less than 0.1 asbestos fiber longer than 5 micrometers per cubic centimeter of air, to the SUPERVISOR.

3.8 Remove ACM from salvage or scrap equipment, piping, and structural components prior to delivery to the GOVERNMENT.

4. NOTES:

4.1 See additional notification requirements of NAVSEA Standard Item 009-01.

4.2 Shipboard cabling as used in 3.1 refers to all shipboard cabling, with the exception of low smoke, coaxial cables, and lamp cord cabling.

4.3 The term "asbestos fibers" is defined in 2.1.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-11  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Insulation and Lagging Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-769, Thermal Insulation Requirements for Machinery and Piping

2.3 804-5959212, Surface Ship Machinery Insulation - Installation Details

2.4 804-5959214, Piping Insulation - Installation Details

2.5 804-5773931, Insulation for Compartments, Acoustic and Thermal Installation Details

2.6 804-5773932, Insulation for Ducts, Acoustic and Thermal, Installation Details

2.7 46 CFR Part 164, Materials

2.8 4823-C-3160935, Fasteners for Insulation and Lagging

3. REQUIREMENTS:

3.1 Install new insulation, lagging, and reusable covers in accordance with 2.2 through 2.6, and the following:

3.1.1 Use of elastomeric foam conforming to MIL-P-15280 and polyphosphazene conforming to MIL-I-24703 is not permitted.

3.1.2 MIL-PRF-22344 insulation shall not be installed on hot piping above one-inch nominal pipe size (nps) and shall be installed only on piping with a vertical orientation or in low traffic areas.

3.1.3 Install Armstrong NH Armaflex, K-Flex ECO, or Electric Boat Corporation Specification No. 4013 Anti-Sweat and Refrigerant Insulation

Systems (EB Spec. 4013) on anti-sweat and refrigeration systems that have an operating temperature range of minus 20 degrees to 180 degrees Fahrenheit.

3.1.3.1 Install with adhesive conforming to Armstrong 520 or Rubatex 373.

3.1.3.2 Install rewettable fibrous glass cloth lagging conforming to MIL-C-20079, Type I, Class 6 or 8, in high traffic areas. In addition to the requirements of MIL-C-20079, rewettable lagging shall meet the requirements of Section 164.009-3 of 2.7, unless otherwise approved by NAVSEA.

3.1.4 Utilize Polyimide foam insulation conforming to DOD-I-24688, Type I, for piping and machinery systems other than systems listed in 3.1.3, and with a maximum operating temperature of 400 degrees Fahrenheit.

3.1.5 Accomplish the requirements of 009-12 of 2.1.

3.1.6 Accomplish the requirements of 009-32 of 2.1 for surfaces to be insulated.

3.1.7 Secure reusable covers using snap fasteners or laced with copper, brass or soft steel galvanized wire through hooks or rings in accordance with 2.8.

3.1.7.1 Stamp the surface of the lacing washers, piece 200 of 2.7, on the reusable cover with one quarter inch high letters, NO AB, located close to the outer edge of the washer and visible when the reusable cover is installed.

3.2 Accomplish the requirements of 009-32 of 2.1 for new insulation, lagging, and reusable covers to match surrounding areas.

#### 4. NOTES:

##### 4.1 Known source for EB Spec. 4013:

General Dynamics Company  
Dept. 447 Material Services  
Attn: K. Hamler  
75 Eastern Point Road  
Groton, CT 06340-4899  
Tel: 860-433-2373

##### 4.2 Known sources for rewettable fibrous glass cloth lagging:

BGF Industries, Inc.  
3802 Robert Porcher Way  
Greensboro, NC 27410  
Tel: 800-925-1961

Alpha Associates  
Two Amboy Avenue  
Woodbridge, NJ 07095  
Tel: 732-634-5700

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-12  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Welding, Fabrication, and Inspection Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-1689, Fabrication, Welding, and Inspection of Ships Structure

2.3 American Bureau of Shipping (ABS) Rules for Building and Classing  
Steel Vessels

2.4 0900-LP-060-4010, Fabrication, Welding, and Inspection of Metal Boat  
and Craft Hulls

2.5 T9074-AQ-GIB-010/248, Requirements for Welding and Brazing Procedure  
and Performance Qualification

2.6 0900-LP-001-7000, Fabrication and Inspection of Brazed Piping Systems

2.7 S9074-AR-GIB-010/278, Requirements for Fabrication Welding and  
Inspection, and Casting Inspection and Repair for Machinery, Piping,  
and Pressure Vessels

2.8 MIL-STD-22, Welded Joint Design

2.9 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.10 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.11 DOD-STD-2185, Requirements for Repair and Straightening of Bronze  
Naval Ship Propellers

2.12 S9221-C1-GTP-010/020, Repair and Overhaul, Main Propulsion Boilers

2.13 MIL-STD-2191, Repair, Welding, Weld Cladding, Straightening, and Cold  
Rolling of Main Propulsion Shafting

### 3. REQUIREMENTS:

3.1 Utilize specific requirements of 2.2 through 2.12 listed in Tables One, 2, 3, and 4 of this item for determining the welder and brazer qualifications, electrodes, weld design, welding requirements, brazing requirements, welding procedures, brazing procedures, welding parameters and controls, inspection standards, and acceptance criteria.

3.2 Ground welding machines, for purposes of providing a return path for welding current, using a grounding bar or lead which shall be connected directly from the machine ground return connection to the ship's hull, sized on the basis of 1,000,000 Circular Mils per 1,000 amps per 100 feet, but in no event using less than a Number One cable (85,037 Circular Mils).

3.2.1 Welding machines used for welding on machinery, pressure vessels, or piping, rotating ordnance, electronic, or fire control equipment shall have the ground return connection in the immediate vicinity of the work to ensure that current does not flow through bearings, pipe hangers, or other areas where arcing or high resistance paths exist. For ships constructed of non-magnetic materials, the ground return cables shall be connected directly to the component being welded - as close to the weld zone as feasible.

3.2.2 Shipboard power distribution system shall not be used as the power source for welding equipment. External power source shall be used.

3.3 Accomplish the requirements of 009-09 of 2.1 for specific welding, brazing, and inspection operations as follows:

3.3.1 Class A-F, A-1, A-2, A-3, A-LT, P-1, P-LT, M-1, and T-1 welding, as defined by 2.7. These procedures shall include, as a minimum, the information required by Paragraph 4.1.3 of 2.7. Joint numbers shall not be duplicated on ship during the availability.

3.3.2 Class P-3a special category silver brazing, as defined by 2.6. The procedure shall include, as a minimum, the information required by Sections 4, 5, 6, 7, 8, and 9 of 2.6.

3.3.2.1 All brazing of steam piping shall conform to 2.6, Class P-3a special category, including ultrasonic inspection, regardless of pipe size, including any (existing) copper to (new) copper-nickel transition joints.

3.3.2.2 In steam systems, where brazed piping and fittings are to be reused, or piping has to be sized to achieve proper fit-up, the option for a 5X visual inspection for cracks listed in Sections 5.5.3, 5.10.1, and 5.10.2 of 2.6 shall not be used; liquid penetrant inspection shall be required.

3.3.3 For propellers other than bronze, using 2.7 for guidance.



3.3.4 For propulsion shafting and rudder stocks, using 2.13 for guidance.

3.3.5 For titanium-based materials, using 2.7 for guidance.

(I) or (I)(G) "NONDESTRUCTIVE TESTING"

3.4 Accomplish nondestructive testing in accordance with the following:

3.4.1 Manufacture, installation, and repair (welding, brazing, machining, **or** lapping) of Level I fittings or components:

3.4.1.1 Nondestructive Testing Visual Inspection - (I)

3.4.1.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.4.1.3 Nondestructive Testing Radiographic - (I)

3.4.2 Welding/brazing of P-1, P-LT, P-3a **pip**ing systems or Class **A-F**, A-1, A-2, A-3, A-LT, M-1, T-1 welding, **and P-2 steam service**:

3.4.2.1 Nondestructive Testing Visual Inspection - (I)

3.4.2.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.4.2.3 Nondestructive Testing Radiographic - (I)

3.4.3 Welding on ship hull or structure when record retention is required by the fabrication document (e.g., 3/5 midship):

3.4.3.1 Nondestructive Testing Visual Inspection - (I)

3.4.3.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.4.3.3 Nondestructive Testing Radiographic - (I)

3.4.4 Weight handling equipment manufacture **and** repair:

3.4.4.1 Nondestructive Testing Visual Inspection - (I)

3.4.4.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant - (I)(G)

3.4.4.3 Ultrasonic Testing (Final Only) - (I)(G)

3.4.4.4 Nondestructive Testing Radiographic - (I)

3.4.5 Corrective maintenance within the certified boundaries of cranes (as defined in NSTM 589):

3.4.5.1 Nondestructive Testing Visual Inspection - (I)

3.4.5.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant - (I)(G)

3.4.5.3 Ultrasonic Testing (Final Only) - (I)(G)

3.4.5.4 Nondestructive Testing Radiographic - (I)

3.4.6 Maintenance on aircraft launch and recovery equipment:

3.4.6.1 Nondestructive Testing Visual Inspection - (I)

3.4.6.2 Nondestructive Testing Magnetic Particle, Liquid Penetrant and Ultrasonic Testing (Final Only) - (I)(G)

3.4.6.3 Nondestructive Testing Radiographic - (I)

(I)(G) "EVALUATION OF RT FILMS"

3.5 Accomplish RT film interpretation.

3.5.1 Provide the cognizant Government representative designated by the SUPERVISOR the evaluated radiographs and records within 2 working days of the (G) point.

3.6 Do not deposit ferritic welds on welds made with austenitic or non-ferrous electrodes. Where the base material is ferrous and the existing weld is austenitic or non-ferrous, that weld shall be completely removed prior to welding with ferritic electrodes. The welding shall be accomplished in accordance with 2.2.

3.7 Utilize Attachment A to define combatant and non-combatant vessels and applicable table.

3.8 Where requirements in the repair and testing instructions for propulsion boilers conflict, 2.12 shall take precedence.

4. NOTES:

4.1 None.

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

L I N E	COLUMN	A	B	C	D		E
	SITUATION EVOLUTION	CLASS P-1, P-2 AND P-LT PIPING	CLASS P-3a SPECIAL CATEGORY, OTHER CLASS P-3a, AND P-3b PIPING	HARD FACING VALVE PARTS	CLASS A PRESSURE VESSEL	** PROPULSION BOILERS	*PROPELLERS (BRONZE)
1	WELDER AND BRAZER QUALIFICATION	S9074-AQ-GIB-010/248, PARAGRAPH 5	0900-LP-001-7000, SECTION 4	S9074-AQ-GIB-010/248, PARAGRAPH 5		S9221-C1-GTP-010/020	
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, PARAGRAPH 4	NOT APPLICABLE	S9074-AQ-GIB-010/248, PARAGRAPH 4		S9221-C1-GTP-010/020	DOD-STD-2185, PARAGRAPH 4
3	BRAZING PROCEDURE	NOT APPLICABLE	0900-LP-001-7000, SECTION 4	NOT APPLICABLE			
4	WELDING REQUIREMENTS	S9074-AR-GIB-010/278, PARAGRAPH 6	NOT APPLICABLE	S9074-AR-GIB-010/278, PARAGRAPH 6			MIL-STD-2185, PARAGRAPH 5
5	FILLER MATERIAL	S9074-AR-GIB-010/278, PARAGRAPH 5	0900-LP-001-7000, SECTION 5	S9074-AR-GIB-010/278, PARAGRAPH 5		S9221-C1-GTP-010/020	DOD-STD-2185, PARAGRAPH 5
6	JOINT DESIGN	S9074-AR-GIB-010/278, PARAGRAPH 9 MIL-STD-22	0900-LP-001-7000, SECTION 5	NOT APPLICABLE	S9074-AR-GIB- 010/278, PARAGRAPH 9 MIL-STD-22	S9221-C1-GTP-010/020	

\* - PARAGRAPH 3.3.3 APPLIES  
\*\* - PARAGRAPH 3.7 APPLIES

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

L I N E	COLUMN	A	B	C	D		E
	SITUATION EVOLUTION	CLASS P-1, P-2 AND P-LT PIPING	CLASS P-3a SPECIAL CATEGORY, OTHER CLASS P-3a, AND P-3b PIPING	HARD FACING VALVE PARTS	CLASS A PRESSURE VESSEL	** PROPULSION BOILERS	*PROPELLERS (BRONZE)
7	HEAT TREATMENT	S9074-AR-GIB-010/278, PARAGRAPH 6	0900-LP-001-7000, SECTION 5	S9074-AR-GIB- 010/278, PARAGRAPHS 6 AND 11.6	S9074-AR-GIB- 010/278, PARAGRAPH 6	S9221-C1-GTP-010/020	S9074-AR-GIB- 010/278, PARAGRAPH 6  DOD-STD-2185, PARAGRAPH 5
8	WORKMANSHIP REQUIREMENTS	S9074-AR-GIB-010/278, PARAGRAPH 7	0900-LP-001-7000, SECTION 5	S9074-AR-GIB- 010/278, PARAGRAPHS 7 AND 11.6	S9074-AR-GIB- 010/278, PARAGRAPH 7	S9221-C1-GTP-010/020	S9074-AR-GIB- 010/278, PARAGRAPH 7
9	VISUAL INSPECT JOINT FIT-UP	S9074-AR-GIB-010/278, PARAGRAPH 9 MIL-STD-22	0900-LP-001-7000, SECTION 7  FOR CLASS P-3a SPECIAL CATEGORY	NOT APPLICABLE	S9074-AR-GIB- 010/278, PARAGRAPH 9 MIL-STD-22	S9221-C1-GTP-010/020	DOD-STD-2185, PARAGRAPH 5
10	VISUAL INSPECTION	S9074-AR-GIB-010/278, PARAGRAPH 10  MIL-STD-2035, PARAGRAPH 4	0900-LP-001-7000, SECTION 7 AND 8  FOR CLASS P-3a SPECIAL CATEGORY	S9074-AR-GIB- 010/278, PARAGRAPH 11.6.3  MIL-STD-2035, PARAGRAPH 4	S9074-AR-GIB-010/278, PARAGRAPH 10  MIL-STD-2035, PARAGRAPH 4		MIL-STD-2035, PARAGRAPH 4
11	RADIOGRAPHIC INSPECTION (RT)	S9074-AR-GIB-010/278 PARAGRAPH 10 T9074-AS- GIB-010/271, PARAGRAPH 3  MIL-STD-2035, PARAGRAPH 5 (NORMALLY ONLY P-1 AND P-LT)	NOT APPLICABLE		S9074-AR-GIB-010/278 PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 3  MIL-STD-2035, PARAGRAPH 5		NOT APPLICABLE

\* - PARAGRAPH 3.3.3 APPLIES  
\*\* - PARAGRAPH 3.7 APPLIES

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

L I N E	COLUMN	A	B	C	D		E
	SITUATION EVOLUTION	CLASS P-1, P-2 AND P-LT PIPING	CLASS P-3a SPECIAL CATEGORY, OTHER CLASS P-3a, AND P-3b PIPING	HARD FACING VALVE PARTS	CLASS A PRESSURE VESSEL	** PROPULSION BOILERS	*PROPELLERS (BRONZE)
12	ULTRASONIC INSPECTION (UT)	NOT APPLICABLE	0900-LP-001-7000, SECTIONS 6,7,8 AND 9 FOR CLASS P-3a SPECIAL CATEGORY PIPING ONLY	NOT APPLICABLE			S9245-AR-TSM- 010/PROP, PARAGRAPH 5-7.5.2
13	LIQUID PENETRANT INSPECTION (PT)	S9074-AR-GIB-010/278, PARAGRAPH 10  T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7 (NORMALLY ONLY P-1 AND P-LT)	0900-LP-001-7000, SECTION 7 AND 8  FOR CLASS P-3a SPECIAL CATEGORY SEE 3.3.2.2	S9074-AR-GIB- 010/278, PARAGRAPH 11.6.3  MIL-STD-2035, PARAGRAPH 7	S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7		MIL-STD-2035, PARAGRAPH 7  T9074-AS-GIB- 010/271, PARAGRAPH 5
14	MAGNETIC PARTICLE INSPECTION (MT)	S9074-AR-GIB-010/278, PARAGRAPH 10  T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035, PARAGRAPH 6 (NORMALLY ONLY P-1 AND P-LT)	NOT APPLICABLE		S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035 PARAGRAPH 6		NOT APPLICABLE

\* - PARAGRAPH 3.3.3 APPLIES  
\*\* - PARAGRAPH 3.7 APPLIES

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

L I N E	COLUMN	F	G	H	I	J
	SITUATION EVOLUTION	MACHINERY CLASS M	TURBINE PARTS	CASTINGS	FORCED DRAFT BLOWERS	REDUCTION AND STEAM TURBINE DRIVEN AUXILIARY GEARS
1	WELDER AND BRAZER QUALIFICATIONS	S9074-AQ-GIB-010/248, PARAGRAPH 5				
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, PARAGRAPH 4				
3	BRAZING PROCEDURE	NOT APPLICABLE				
4	WELDING REQUIREMENTS	S9074-AR-GIB-010/278, PARAGRAPH 6				
5	FILLER MATERIAL	S9074-AR-GIB-010/278, PARAGRAPH 5				
6	JOINT DESIGN	S9074-AR-GIB-010/278, PARAGRAPH 9, AND MIL-STD-22				
7	HEAT TREATMENT	S9074-AR-GIB-010/278, PARAGRAPHS 6 AND 8				
8	WORKMANSHIP REQUIREMENTS	S9074-AR-GIB-010/278, PARAGRAPH 7				
9	VISUAL INSPECT JOINT FIT-UP	S9074-AR-GIB-010/278, PARAGRAPH 10, AND MIL-STD-22				
10	VISUAL INSPECTION	S9074-AR-GIB-010/278, PARAGRAPH 10  MIL-STD-2035, PARAGRAPH 4	S9074-AR-GIB-010/278, PARAGRAPH 14	S9074-AR-GIB-010/278, PARAGRAPH 13  MIL-STD-2035, PARAGRAPH 4	S9074-AR-GIB-010/278, PARAGRAPH 16	S9074-AR-GIB-010/278, PARAGRAPH 15
11	RADIOGRAPHIC INSPECTION (RT)	S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 3  MIL-STD-2035, PARAGRAPH 5	S9074-AR-GIB-010/278, PARAGRAPH 14 T9074-AS-GIB-010/271, PARAGRAPH 3  MIL-STD-2035, PARAGRAPH 5	S9074-AR-GIB-010/278, PARAGRAPH 13	S9074-AR-GIB-010/278, PARAGRAPH 16 T9074-AS-GIB-010/271, PARAGRAPH 3  MIL-STD-2035, PARAGRAPH 5	NOT APPLICABLE

TABLE 1  
WELDING, FABRICATION, AND INSPECTION OF PIPING, PRESSURE VESSELS, PROPELLERS, AND MACHINERY

L I N E	COLUMN	F	G	H	I	J
	SITUATION EVOLUTION	MACHINERY CLASS M	TURBINE PARTS	CASTINGS	FORCED DRAFT BLOWERS	REDUCTION AND STEAM TURBINE DRIVEN AUXILIARY GEARS
12	ULTRASONIC INSPECTION (UT)	S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 6  MIL-STD-2035, PARAGRAPH 8	S9074-AR-GIB-010/278, PARAGRAPH 14	S9074-AR-GIB-010/278, PARAGRAPH 13	S9074-AR-GIB-010/278, PARAGRAPH 16	S9074-AR-GIB-010/278, PARAGRAPH 15
13	LIQUID PENETRANT INSPECTION (PT)	S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7	S9074-AR-GIB-010/278, PARAGRAPH 14 T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7	S9074-AR-GIB-010/278, PARAGRAPH 13 T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7	S9074-AR-GIB-010/278, PARAGRAPH 16 T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7	S9074-AR-GIB-010/278, PARAGRAPH 15 T9074-AS-GIB-010/271, PARAGRAPH 5  MIL-STD-2035, PARAGRAPH 7
14	MAGNETIC PARTICLE INSPECTION (MT)	S9074-AR-GIB-010/278, PARAGRAPH 10 T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035, PARAGRAPH 6	S9074-AR-GIB-010/278, PARAGRAPH 14 T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035, PARAGRAPH 6	S9074-AR-GIB-010/278, PARAGRAPH 13 T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035, PARAGRAPH 6	S9074-AR-GIB-010/278, PARAGRAPH 16 T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035, PARAGRAPH 6	S9074-AR-GIB-010/278, PARAGRAPH 15 T9074-AS-GIB-010/271, PARAGRAPH 4  MIL-STD-2035, PARAGRAPH 6

TABLE 2  
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (COMBATANT)

L I N E	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS) AND (HTS)	*HIGH STRENGTH STEEL (HY-80/100, HSLA-80 AND STS)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
1	WELDER QUALIFICATION	S9074-AQ-GIB-010/248, PARAGRAPH 5					
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, PARAGRAPH 4					
3	ELECTRODE	MIL-STD-1689, PARAGRAPH 10 TABLE X	MIL-STD-1689, PARAGRAPH 10 TABLE XI	MIL-STD-1689, PARAGRAPH 10 TABLE XVI	MI-STD-1689, PARAGRAPH 10 TABLES XII AND XIII	MIL-STD-1689, PARAGRAPH 10 TABLES XIV AND XV	S9074-AR-GIB- 010/278, TABLE II
4	JOINT DESIGN	MIL-STD-22 MIL-STD-1689, PARAGRAPH 11					
5	WELDING REQUIREMENTS	MIL-STD-1689, PARAGRAPH 13					
6	WORKMANSHIP REQUIREMENTS	MIL-STD-1689, PARAGRAPHS 12 AND 14					
7	VISUAL	MIL-STD-1689, PARAGRAPHS 6, 7, AND 8 MIL-STD-2035, PARAGRAPH 4 T9074-AS-GIB-010/271, PARAGRAPH 8					
8	RADIOGRAPHIC INSPECTION (RT)	MIL-STD-1689, PARAGRAPHS 6, 7, AND 8 MIL-STD-2035, PARAGRAPH 5 T9074-AS-GIB-010/271, PARAGRAPH 3					

\* - PARAGRAPH 3.5 APPLIES



TABLE 2  
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (COMBATANT)

L I N E	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS) AND (HTS)	*HIGH STRENGTH STEEL (HY-80/100, HSLA-80 AND STS)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
9	ULTRASONIC INSPECTION (UT)	MIL-STD-1689, PARAGRAPHS 6, 7, AND 8 MIL-STD-2035, PARAGRAPH 8 T9074-AS-GIB-010/271, PARAGRAPH 6					
10	LIQUID PENETRANT INSPECTION (PT)	MIL-STD-1689, PARAGRAPHS 6, 7, AND 8 MIL-STD-2035, PARAGRAPH 7 T9074-AS-GIB-010/271, PARAGRAPH 5					
11	MAGNETIC PARTICLE INSPECTION (MT)	MIL-STD-1689, PARAGRAPH 6 MIL-STD-2035, PARAGRAPH 6 T9074-AS-GIB-010/271, PARAGRAPH 4		NOT APPLICABLE			

\* - PARAGRAPH 3.5 APPLIES

TABLE 3  
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (NON-COMBATANT) \* \*\*

L I N E	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS)	*** HIGH STRENGTH STEEL (HY-80/100)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
1	WELDER QUALIFICATION	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
2	WELDING PROCEDURE	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
3	ELECTRODE	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
4	JOINT DESIGN	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
5	WELDING REQUIREMENTS	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
6	WORKMANSHIP REQUIREMENTS	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
7	VISUAL	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
8	RADIOGRAPHIC INSPECTION (RT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1					

TABLE 3  
WELDING, FABRICATION, AND INSPECTION OF SURFACE SHIP HULLS (NON-COMBATANT) \* \*\*

L I N E	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS)	*** HIGH STRENGTH STEEL (HY-80/100)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
9	ULTRASONIC INSPECTION (UT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
10	LIQUID PENETRANT INSPECTION (PT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1					
11	MAGNETIC PARTICLE INSPECTION (MT)	ABS RULES, PART 2, CHAPTER 4, SECTION 1		NOT APPLICABLE			

\* - IDENTIFICATION OF "SURVEYOR" IN ABS RULES SIGNIFIES SUPERVISOR OF SHIPBUILDING (SUPERVISOR) ACTION. THE SUPERVISOR MAY USE MIL-STD-1689 FOR GUIDANCE WHERE ADDITIONAL DIRECTION IS NECESSARY. SUCH GUIDANCE MAY BE USED TO: ESTABLISH NDT REQUIREMENTS, ESTABLISH WELDING/NDT PROCEDURE AND PERSONNEL QUALIFICATION REQUIREMENTS, OR TO DEFINE OTHER ATTRIBUTES LISTED IN THE "MATERIAL EVOLUTION" LINE OF TABLE 3.

\*\* - THE SUPERVISOR MAY ALSO ALLOW THE SHIPBUILDER TO CHOOSE FROM THE FOLLOWING OPTIONS, PROVIDING:

- THE SHIPBUILDER'S UTILIZATION OF THE FOLLOWING OPTIONS SHALL RESULT IN NO ADDITIONAL COST TO THE GOVERNMENT.
- THE SHIPBUILDER SHALL UTILIZE THE FABRICATION DOCUMENT SELECTED FOR THE ENTIRE AVAILABILITY AND SHALL NOT SWITCH BACK AND FORTH BETWEEN DOCUMENTS.
- THE SHIPBUILDER SHALL NOTIFY THE SUPERVISOR OF WHICH FABRICATION DOCUMENT HAS BEEN SELECTED.

OPTIONS:

- A) MIL-STD-1689 MAY BE UTILIZED BY THE SHIPBUILDER AT THE SHIPBUILDER'S DISCRETION. THE REQUIREMENTS OF TABLE 2 ABOVE WOULD THEN APPLY.
- B) FOR DETERMINATION OF NDT METHOD(S) AND EXTENT OF NDT INSPECTION WHEN REPAIRS ARE TO BE ACCOMPLISHED, THE SHIPBUILDER MAY REQUEST TO UTILIZE THE SAME NDT REQUIREMENTS THAT WERE INVOKED IN CONSTRUCTION OF THE VESSEL. IN SUCH CASES, THE SHIPBUILDER SHALL BE RESPONSIBLE TO DETERMINE THE ORIGINAL NDT REQUIREMENTS AND SUBMIT EVIDENCE SUCH AS DRAWINGS OR SPECIFICATIONS WHICH DETAIL THE REQUIREMENTS TO THE SUPERVISOR ALONG WITH A REQUEST FOR APPROVAL.
- C) THE SHIPBUILDER MAY REQUEST TO UTILIZE PRE-ESTABLISHED WELDING AND/OR NDT PROCEDURES AND PERSONNEL QUALIFICATION PROGRAM(S) WHICH HAVE BEEN PREVIOUSLY UTILIZED IN THE PERFORMANCE OF SIMILAR ABS-ACCEPTED WORK. IN SUCH CASES, THE SHIPBUILDER SHALL SUBMIT EVIDENCE OF SUCH ABS ACCEPTABILITY TO THE SUPERVISOR ALONG WITH DESCRIPTIVE DETAILS AND SUPPORTING DOCUMENTATION FOR THE PROPOSED PROGRAM(S). SUCH DOCUMENTATION SHALL INCLUDE THE WELDING/NDT PROCEDURES AND METHODS OF WELDING/NDT PERSONNEL QUALIFICATION THAT WERE UTILIZED IN FORMER ABS-ACCEPTED WORK. THE SHIPBUILDER SHALL ALSO SUBMIT OTHER SUPPORTING EVIDENCE THAT MAY BE REQUESTED BY THE SUPERVISOR TO ESTABLISH THAT THE PROPOSED PROGRAMS HAVE BEEN PREVIOUSLY UTILIZED FOR SIMILAR ABS-ACCEPTED WORK.

\*\*\* - PARAGRAPH 3.3 APPLIES.

TABLE 4  
WELDING, FABRICATION, AND INSPECTION OF METAL BOAT AND CRAFT HULLS

L I N E	COLUMN	A	B	C	D	E	F
	MATERIAL EVOLUTION	CARBON STEEL (MS)	*HIGH STRENGTH STEEL (HY-80/100)	ALUMINUM ALLOY	CHROMIUM NICKEL STEEL (STAINLESS)	COPPER AND/OR NICKEL BASE ALLOYS	SILICONE BRONZE ALUMINUM BRONZE
1	WELDER QUALIFICATION	S9074-AQ-GIB-010/248, PARAGRAPH 5					
2	WELDING PROCEDURE	S9074-AQ-GIB-010/248, PARAGRAPH 4					
3	ELECTRODE	0900-060-4010, SECTION 10, TABLE 10-1	0900-060-4010, SECTION 10, TABLES 10-2 AND 10-3	0900-060-4010, SECTION 10, TABLE 10-7	0900-060-4010, SECTION 10, TABLE 10-4	0900-060-4010 SECTION 10, TABLES 10-5 AND 10- 6	S9074-AR-GIB- 010/278, TABLE II
4	JOINT DESIGN	MIL-STD-22 0900-060-4010, SECTION 11					
5	WELDING REQUIREMENTS	0900-060-4010, SECTION 13					
6	WORKMANSHIP REQUIREMENTS	0900-060-4010, SECTION 14					
7	VISUAL	0900-060-4010, SECTIONS 6, 7, AND 8 T9074-AS-GIB-010/271, PARAGRAPH 8					
8	RADIOGRAPHIC INSPECTION (RT)	0900-060-4010, SECTION 6, TABLE 6-1 AND SECTIONS 7 AND 8 T9074-AS-GIB-010/271, PARAGRAPH 3					
9	ULTRASONIC INSPECTION (UT)	T9074-AS-GIB-010/271, PARAGRAPH 6					
10	LIQUID PENETRANT INSPECTION (PT)	0900-060-4010, SECTIONS 6, 7, AND 8 T9074-AS-GIB-010/271, PARAGRAPH 5					
11	MAGNETIC PARTICLE INSPECTION (MT)	0900-060-4010 SECTION 6 T9074-AS-GIB-010/271, PARAGRAPH 4		NOT APPLICABLE			

\* - PARAGRAPH 3.5 APPLIES

ATTACHMENT A

COMBATANT SURFACE SHIPS

WARSHIPS

TABLE

Aircraft Carriers:

Aircraft Carrier .....	CV.....	2
Aircraft Carrier (nuclear propulsion) .....	CVN.....	2

Surface Combatants:

Guided Missile Cruiser .....	CG.....	2
Guided Missile Destroyer .....	DDG.....	2
Guided Missile Frigate .....	FFG.....	2
Littoral Combat Ship .....	LCS.....	2

Patrol Combatants:

Patrol Coastal .....	PC.....	2
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AMPHIBIOUS WARFARE SHIPS

Amphibious Command Ship .....	LCC.....	2
Amphibious Assault Ship (general purpose) .....	LHA.....	2
Amphibious Cargo Ship .....	LKA.....	2
Amphibious Transport Dock .....	LPD.....	2
Dock Landing Ship .....	LSD.....	2
Amphibious Assault Ship (general purpose) .....	LHD.....	2

AUXILIARY SHIPS

Ammunition Ship .....	AE.....	2
Combat Store Ship .....	AFS.....	2
Oiler .....	AO.....	2
Fast Combat Support Ship .....	AOE.....	2
Replenishment Oiler .....	AOR.....	2

MINE WARFARE SHIPS

Mine Countermeasures Ship .....	MCM.....	2
Coastal Minehunter .....	MHC.....	2

ATTACHMENT A

(Con't)

COMBATANT SURFACE CRAFT

AMPHIBIOUS WARFARE CRAFT

TABLE

Landing Craft, Air Cushion .....	LCAC.....	4
Landing Craft, Mechanized .....	LCM.....	4
Landing Craft, Personnel, Large .....	LCPL.....	4
Landing Craft, Utility .....	LCU.....	2
Landing Craft, Vehicle, Personnel .....	LCVP.....	4
Light Seal Support Craft .....	LSSC.....	4
Amphibious Warping Tug .....	LWT.....	4
Medium Seal Support Craft .....	MSSC.....	4
Swimmer Delivery Vehicle .....	SDV.....	4
Side Loading Warping Tug .....	SLWT.....	4
Special Warfare Craft, Light .....	SWCL.....	4
Special Warfare Craft, Medium .....	SWCM.....	4

PATROL CRAFT

Mini-Armored Troop Carrier .....	ATC.....	4
Patrol Boat .....	PB.....	4
River Patrol Boat .....	PBR.....	4
Patrol Craft (fast) .....	PCF.....	4
Fast Patrol Craft .....	PTF.....	4

NON-COMBATANT SURFACE SHIPS

AUXILIARY SHIPS

Auxiliary Crane Ship .....	ACS.....	3
Missile Range Instrumentation Ship .....	AGM.....	3
Oceanographic Research Ship .....	AGOR.....	3
Ocean Surveillance Ship .....	AGOS.....	3
Surveying Ship .....	AGS.....	3
Hospital Ship .....	AH.....	3
Cargo Ship .....	AK.....	3
Auxiliary Cargo Barge/Lighter Ship .....	AKB.....	3
Auxiliary Cargo Float-On/Float-Off Ship .....	AKF.....	3
Transport Oiler .....	AOT.....	3
Barracks Craft .....	APL.....	3
Cable Repairing Ship .....	ARC.....	3
Salvage Ship .....	ARS.....	3
Submarine Tender .....	AS.....	3
Fleet Ocean Tug .....	ATF.....	3
Aviation Logistic Support Ship .....	AVB.....	3

ATTACHMENT A  
(Con't)

NON-COMBATANT SURFACE CRAFT

SERVICE CRAFT

TABLE

Small Auxiliary Floating Dry Dock (non-self-propelled) ...AFDL...	3
Medium Auxiliary Floating Dry Dock (non-self-propelled) ..AFDM...	3
Medium Auxiliary Repair Dry Dock (non-self-propelled) ....ARDM...	3
Causeway Section, Powered .....	CSP... 3
Causeway Section (non-self-propelled) .....	CSNP... 3
Unclassified Miscellaneous .....	IX... 3
Open Lighter (non-self-propelled) .....	YC... 3
Aircraft Transportation Lighter (non-self-propelled) .....	YCV... 3
Cargo Semi-Submersible Barge .....	YCSS... 3
Floating Crane (non-self-propelled) .....	YD... 3
Diving Tender (non-self-propelled) .....	YDT... 3
Ferryboat or Launch (self-propelled) .....	YFB... 3
Covered Lighter (non-self-propelled) .....	YFN... 3
Large Covered Lighter (non-self-propelled) .....	YFNB... 3
Dry Dock Companion Craft (non-self-propelled) .....	YFND... 3
Lighter (special purpose) (non-self-propelled) .....	YFNX... 3
Floating Power Barge (non-self-propelled) .....	YFP... 3
Salvage Lift Craft, Light .....	YLC... 3
Gasoline Barge (non-self-propelled) .....	YOGN... 3
Fuel Oil Barge (non-self-propelled) .....	YON... 3
Oil Storage Barge (non-self-propelled) .....	YOS... 3
Patrol Craft (self-propelled) .....	YP... 4
Floating Workshop (non-self-propelled) .....	YR... 3
Repair and Berthing Barge (non-self-propelled) .....	YRB... 3
Repair, Berthing and Messing Barge (non-self-propelled) ...YRBM..	3
Floating Dry Dock Workshop (hull) (non-self-propelled) ....YRDH..	3
Floating Dry Dock Workshop (machine) (non-self-propelled) .YRDM..	3
Radiological Repair Barge (non-self-propelled) .....	YRR... 3
Seaplane Wrecking Derrick (self-propelled) .....	YSD... 3
Large Harbor Tug .....	YTB... 4
Small Harbor Tug .....	YTL... 4
Torpedo Trials Craft .....	YTT... 4
Water Barge (non-self-propelled) .....	YWN... 3

NOTES:

Letter prefixes to classification symbols may add identification:

- E -- Prototype ship or craft in an experimental or developmental status.
- T -- Assigned to MSC (Military Sealift Command)
- F -- Being Constructed for a foreign government.
- X -- Often added to existing classifications to indicate a new class whose characteristics have not been defined.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-13  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Meter; repair and ***certify calibration***

2. REFERENCES:

2.1 S9300-A6-GYD-010, Electrical Workmanship Inspection Guide for Surface Ships and Submarines

2.2 NAVSEA OD 45845, Metrology Requirements List

2.3 ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, First Edition

2.4 ANSI/NCSL Z540-3, ***Requirements for the Calibration of Measuring and Test Equipment***

2.5 NAVSEA 04-04734, Naval and Marine Corps Calibration Laboratory Audit/Certification Manual

2.6 NAVAIR 17-35TR-8, Technical Requirements for Calibration Labels and Tags

2.7 Calibration Requirements List (CRL) for Shipboard Installed Instrumentation

3. REQUIREMENTS:

***3.1 Prior to the installation of meters, ensure they are in calibration and have greater than two-thirds of their calibration life remaining.***

***3.1.1 If new meters require calibration, proceed to 3.6.***

***3.2 Disconnect and remove each meter and associated impeders, reactors, resistor boxes, and shunts.***

***3.2.1 Record and retain hook-up data and mounting hardware.***



(V) "CONDITION OF WIRE LEADS"

3.2.1.1 Inspect lead wires and insulation; broken or partially broken lead wires shall be cut back to remove damaged/questionable portions of the wire and new terminal ends installed in accordance with 2.1.

3.2.2 Remove existing and install new **conductor identification sleeving** in place of **conductor identification sleeving** found to be illegible or missing. New **conductor identification sleeving** shall conform to SAE-AMS-DTL-23053, Class One, white, marked with indelible ink.

3.3 Disassemble and clean equipment to remove loose paint and foreign matter.

3.4 Repair each meter and associated equipment to manufacturer's specifications.

3.4.1 Remove existing and install new components in place of those found to be missing or defective.

3.4.2 Free-up and adjust moving parts.

3.4.3 Restore unit cases to original finish.

3.5 Assemble equipment. Install new seals and gaskets conforming to manufacturer's specifications.

3.6 Calibrate and adjust each meter, including associated accessories, to manufacturer's specifications, using appropriate calibration procedures and test equipment in accordance with 2.2.

3.6.1 Calibration laboratories shall be accredited to either 2.3 or 2.4 by a Commercial Accreditation Activity, or certified by a Navy Certification Activity to 2.5 **and the scope of accreditation must cover the appropriate measurement parameters and ranges of the calibrations performed.**

3.6.2 In the absence of manufacturer's specifications, tolerances shall be in accordance with Section 1 of 2.2.

3.6.3 Affix a calibration label to the face of each meter, denoting the name and location of the calibration facility, the NAVSEA Lab Code **if assigned**, the date of calibration, and date of next calibration. Department of the Navy standards, calibration activities, and TAMS custodians shall use calibration labels and tags in accordance with 2.6.

3.6.4 The calibration interval assigned for shipboard installed instrumentation shall be in accordance with 2.7. All other meters shall have a calibration interval assigned in accordance with 2.2.

3.7 Install and connect each meter, including associated accessories, using hook-up data and mounting hardware retained in 3.2.1.

3.7.1 Install new fasteners in place of those found to be missing or defective, conforming to ASTM A 449, Type I, zinc coated for bolts; ASTM A 563, zinc coated for nuts; or selected and identified in accordance with SAEJ 2280.

3.7.2 Fasteners requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.8 Ensure correct indication of each meter during operational test of equipment.

3.9 Submit one legible copy, in electronic media, of the calibration data to the SUPERVISOR within 5 working days of the calibration.

3.9.1 Provide the following data for each meter calibrated:

- Manufacturer of meter
- Model
- Serial Number, if assigned
- Tolerance
- As found condition
- Procedure used
- Final calibration results
- Calibration interval
- Calibration due date
- Location of installed meter

4. NOTES:

4.1 The SUPERVISOR will supply the contractor with a copy of the CRL provided by the Ship's Chief Engineer.

4.2 The SUPERVISOR will provide a copy of the calibration data to the Ship's Force Calibration Coordinator for the purpose of updating the ship's RECALL list.

4.3 Contact NAVSEA 04RM3 for information on commercial accreditation in accordance with 2.3 and 2.4 by NAVSEA approved commercial Accrediting Bodies (AB).

4.4 Contact one of the following Navy Certification Activities for certification requirements in accordance with 2.5:

Mid-Atlantic Regional Maintenance Center  
Laboratory Certification Branch (Code 222)  
Phone: (757) 443-3872 Ext 2553  
FAX: (757) 443-3666

Southwest Regional Maintenance Center  
Laboratory Certification Branch (Code 222)  
Phone: (619) 556-2662 or (619) 726-5838  
FAX: (619) 556-1359

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-14  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Gages and Thermometers; repair and ***certify calibration***

2. REFERENCES:

2.1 NAVSEA OD 45845, Metrology Requirements List

2.2 ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, First Edition

2.3 ANSI/NC SL Z540-3, ***Requirements for the Calibration of Measuring and Test Equipment***

2.4 NAVSEA 04-04734, Naval and Marine Corps Calibration Laboratory Audit/Certification Manual

2.5 NAVAIR 17-35TR-8, Technical Requirements for Calibration Labels and Tags

2.6 Calibration Requirements List (CRL) for Shipboard Installed Instrumentation

3. REQUIREMENTS:

***3.1 Prior to the installation of gages and thermometers, ensure they are in calibration and have greater than two-thirds of their calibration life remains.***

***3.1.1 If new gages or thermometers require calibration, proceed to 3.7.***

**3.2** Disconnect and remove each gage and thermometer.

**3.2.1** Remove sealed gages as a complete unit.

**3.3** Clear gage lines from instrument side of root connection of obstructions by blowing clean, dry air through the lines.

**3.4** Disassemble and clean equipment to remove loose paint and foreign matter.

**3.4.1** Do not disassemble sealed gage unit.

3.5 Repair the gages and thermometers to manufacturer's specifications.

3.5.1 Remove existing and install new components in place of those found to be missing or defective.

3.5.2 Free-up and adjust moving parts.

3.5.3 Restore unit cases to original finish.

3.6 Assemble equipment.

3.7 Calibrate and adjust each gage and thermometer, including associated accessories, to the manufacturer's specifications, using appropriate calibration procedures and test equipment in accordance with 2.1.

3.7.1 Calibration laboratories shall be accredited to either 2.2 or 2.3 by a Commercial Accreditation Activity, or certified by a Navy Certification Activity to 2.4 **and the scope of accreditation must cover the appropriate measurement parameters and ranges of the calibrations performed.**

3.7.2 In the absence of manufacturer's specifications, tolerances shall be in accordance with Section 1 of 2.1.

3.7.3 Affix a calibration label to the face of each meter, denoting the name and location of the calibration facility, the NAVSEA Lab Code **if assigned**, the date of calibration, and date of next calibration. Department of the Navy standards, calibration activities, and TAMS custodians shall use calibration labels and tags in accordance with 2.5.

3.7.4 The calibration interval assigned for shipboard installed instrumentation shall be in accordance with 2.6. All other instrumentation shall have a calibration interval assigned in accordance with 2.1.

3.8 Install and connect each unit. Install new seals, gaskets, and fasteners.

3.8.1 Fasteners shall conform to ASTM A 449, Type I, zinc coated for bolts; ASTM A 563, zinc coated for nuts; or selected and identified in accordance with SAEJ 2280.

3.8.1.1 Fasteners requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.9 Ensure correct indication of each gage and thermometer during operational test of equipment.

3.10 Submit one legible copy, in electronic media, of the calibration data to the SUPERVISOR within 5 working days of the calibration.

3.10.1 Provide the following data for each gage or thermometer calibrated:

Manufacturer of gage or thermometer  
Model  
Serial Number, if assigned  
Tolerance  
As found condition  
Procedure used  
Final calibration results  
Calibration interval  
Calibration due date  
Location of installed gage or thermometer

4. NOTES:

4.1 The SUPERVISOR will supply the contractor with a copy of the CRL provided by the Ship's Chief Engineer.

4.2 The SUPERVISOR will provide a copy of the calibration data to the Ship's Force Calibration Coordinator for the purpose of updating the ship's RECALL list.

4.3 Contact NAVSEA 04RM3 for information on commercial accreditation in accordance with 2.2 and 2.3 by NAVSEA approved commercial Accrediting Bodies (AB).

4.4 Contact one of the following Navy Certification Activities for certification requirements in accordance with 2.4:

Mid-Atlantic Regional Maintenance Center  
Laboratory Certification Branch (Code 222)  
Phone: (757) 443-3872 Ext 2553  
FAX: (757) 443-3666

Southwest Regional Maintenance Center  
Laboratory Certification Branch (Code 222)  
Phone: (619) 556-2662 or (619) 726-5838  
FAX: (619) 556-1359

4.5 This item does not apply to Oxygen gages.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-15  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Rotating Machinery; balance

2. REFERENCES:

2.1 S9245-AR-TSM-010/PROP, Marine Propeller Inspection, Repair and Certification

**2.2 MIL-STD-167, Mechanical Vibration of Shipboard Equipment**

3. REQUIREMENTS:

3.1 Measure and record the maximum eccentricity of the rotor shaft and installed components relative to the points of support using dial indicators.

3.2 Balance rotating machinery assemblies or components in accordance with the following requirements and procedures:

3.2.1 Except for propellers, if the design operating speed of the component to be balanced is less than 150 revolutions per minute (RPM), the rotor including shaft shall be balanced by symmetrically supporting the rotor on 2 knife edges and applying a correction to attain a gravity balance.

3.2.2 Except for propellers, if the design operating speed of the component to be balanced is equal to or greater than 150 RPM, the rotor including shaft shall be balanced with equipment which requires rotation of the work piece.

3.2.3 Propellers shall be balanced in accordance with 2.1.

3.2.4 Types of correction:

<u>TYPES OF CORRECTION</u>	<u>N</u>	<u>1/</u>	<u>ROTOR CHARACTERISTIC</u>	<u>1/</u>
Single-plane	0 - 1000		L/D	Less than or Equal to 0.5
	0 - 150		L/D	Greater than 0.5
2-plane	Greater than 1000		L/D	Less than or Equal to 0.5
	Greater than 150		L/D	Greater than 0.5

TYPES OF CORRECTION	N	1/	ROTOR CHARACTERISTIC	1/
Multi-plane			Flexible:	Unable to correct by 2-plane balancing

1/

L = Length of rotor mass, exclusive of shaft  
D = Diameter of rotor mass, exclusive of shaft  
N = Maximum operating RPM

3.2.5 Allowable unbalance: The values determined by **Paragraph 5.2.2.2 of 2.2** are permitted in each plane of correction.

3.2.6 When the computation for converting displacement measurements to ounce-inches of force unbalance is an approximation, verification shall be made by adding a trial weight to the rotor, equal and opposite to the calculated ounce-inches of force. If putty is used as a trial weight, it shall be removed, weighed and a permanent compensating weight shall be installed in its place.

3.3 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.1 and 3.2 to the SUPERVISOR. The report shall include the following information:

3.3.1 Ship's name and hull number

3.3.2 Contractor and subcontractor

3.3.3 Job Order and Work Item number

3.3.4 Unit and component identification

3.3.5 Manufacturer and model number of balance machine

3.3.6 Date of last calibration, by whom it was calibrated, and when the next calibration is due for the balancing machine

3.3.7 Maximum total indicated runout of rotor or balancing arbor

3.3.8 Weight of rotor assembly in pounds

3.3.9 Design operating RPM of rotor

3.3.10 Computation of allowable unbalance in ounce-inches

3.3.11 Measured unbalance, prior to and after balancing, in ounce-inches



3.3.12 Computations or procedures for converting displacement measurements to ounce-inches of unbalance force, when the machine used to balance components indicates displacement measurements in lieu of direct unbalance forces.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-16  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Electronic Equipment; repair

2. REFERENCES:

2.1 Equipment Technical Manual

2.2 407-5291780, Standard Electromagnetic Interferences (EMI) Survey Procedures

2.3 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB), Section VI, Electronics Installation and Maintenance Book - General Maintenance (Source CD: N0002400003)

2.4 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB), Section IX, Installation Standards (Source CD: N0002400003)

2.5 S9300-A6-GYD-010, Electrical Workmanship Inspection Guide for Surface Ships and Submarines

2.6 IA PUB-5239-31, Information Assurance Shipboard Red/Black Installation Publication

2.7 NSTISSAM TEMPEST/2-95, Red/Black Installation Guidance (FOUO)

2.8 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety

3. REQUIREMENTS:

3.1 Disassemble equipment for cleaning, inspection, and repair, using 2.1 for guidance.

(V) "VISUALLY INSPECT"

3.1.1 Visually inspect components prior to cleaning to detect evidence of casualties and deteriorating conditions that may not be apparent after cleaning.

3.1.2 Clean equipment and remove foreign matter.

3.1.3 Dry equipment, removing moisture and cleaning solvents.

3.1.4 Inspect equipment for applicable electromagnetic interference (EMI) fixes using Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) Technical Assist Network (STAN) in accordance with 2.2.

3.1.4.1 Submit one legible copy of a report, in electronic media, listing the applicable EMI fixes not installed and EMI fixes that have been improperly installed, to the SUPERVISOR.

(V) "INSPECT AND TEST TO DESIGN CHARACTERISTICS"

3.2 Inspect and test electrical and mechanical components, assemblies, subassemblies, equipment enclosures, internal circuitry, and enclosure hardware to design characteristics and determine missing and defective components, circuitry, and enclosure hardware in accordance with 2.1.

3.2.1 Remove existing and install new electrical and mechanical components, assemblies, subassemblies, internal circuitry, and enclosure hardware in place of those found to be missing or defective. New material shall conform to the requirements of 2.1.

3.2.1.1 Soldering, desoldering, and removal of components and circuitry shall be in accordance with Section 4 of 2.3.

3.2.1.2 Miniature and microminiature repair of printed circuit boards shall be in accordance with Sections 5 and 6 of 2.3.

3.2.1.3 New wiring shall conform to MIL-DTL-16878. Wire size and color code shall be in accordance with 2.1. Individual wires in harnesses and chassis wiring may be plain white conductors with **conductor identification sleeving** at each end, stenciled with indelible ink to indicate color coding.

(V) "INSPECT SHIELDING TERMINATIONS"

3.3 Inspect braided wire shielding terminations for conformance to Paragraph 2-19.3 of 2.4.

3.3.1 Remove existing and install new grounding sheath connectors in place of those found to be missing or defective. Installation shall be in accordance with Paragraph 2-14 of 2.4.

(V) "INSPECT WIRE CONNECTIONS"

3.4 Inspect terminal board wire connections for termination with lugs conforming to SAE-AS7928 of each conductor at the terminal board connections.

3.4.1 Remove existing and install new lugs in place of those found to be missing or defective, using 2.5 for accept or reject criteria. New lugs shall conform to SAE-AS7928.

(V) "INSPECT WIRE MARKERS"

3.5 Inspect for missing and defective **conductor identification sleeving**.

3.5.1 Remove existing and install new **conductor identification sleeving** in place of those found to be missing or defective, using 2.5 for accept or reject criteria. New **conductor identification sleeving** shall conform to SAE-AMS-DTL-23053, Class One, white, marked with indelible ink.

3.5.1.1 **Conductor identification sleeving** shall be marked in accordance with 2.1.

3.6 Correct discrepancies found in terminal board connections in accordance with 2.1 and as modified by applicable field changes identified on the field change accomplished plate.

(V) "INSPECT FOR SLACK"

3.7 Inspect existing cabling and cable harnesses between hinged parts and between chassis and parts which are subject to removal for slack to prevent breaking of individual wires by repeated flexing and for chafing protection.

3.7.1 Provide slack in accordance with Paragraph 2-15 of 2.4 to prevent breaking of individual wires.

3.7.2 Install new chafing protection in accordance with Paragraph 2-15 of 2.4.

3.8 Tie loose harness lacing in accordance with Paragraph 2-15.2 of 2.4.

3.9 Secure loose wiring harness clamps and install new plastic clamps where found to be missing or defective, in accordance with Paragraph 2-15.3 of 2.4.

3.10 Adjust relays and burnish contacts in exposed type relays and switches.

3.11 Remove high spots on pinion and gear teeth by stoning.

3.12 Adjust and align mechanical components in accordance with 2.1.

3.13 Assemble equipment, using 2.1 for guidance.

3.13.1 Tighten loose controls and hardware. Free-up binding in moving parts, controls, switches, chassis slides, and runners.

3.13.2 Lubricate equipment in accordance with 2.1.

3.13.3 Install heat-dissipating tube shields conforming to MIL-DTL-24251.

3.14 Bond and ground equipment in accordance with 2.6 through 2.8.

3.15 Energize the equipment; calibrate, adjust, and align to achieve optimum operational characteristics in accordance with 2.1.

3.16 Update field change accomplished plate to indicate completed field changes when the Work Item directs the installation of new field changes.

4. NOTES:

4.1 Equipment technical manual will be listed in the invoking Work Item.

4.2 Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) Technical Assist Network (STAN) referred to in 3.1.4 is available at [www.semcip.com](http://www.semcip.com).

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-17  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Rotating Electrical Equipment; repair

2. REFERENCES:

2.1 Standard Items

2.2 Equipment Technical Manual

2.3 S9086-KC-STM-010/CH-300, Electric Plant - General

2.4 S9086-KE-STM-000/CH-302, Electrical Motors and Controllers

2.5 S9086-KN-STM-010/CH-310, Electrical Power Generators and Conversion Equipment

2.6 S9086-HN-STM-010/CH-244, Propulsion Bearings and Seals

2.7 S6260-BJ-GTP-010, Electrical Machinery Repair, Electric Motor Repair, Shop Procedures Manual

2.8 S9310-AC-HBK-010, Commutator/Slip Ring Maintenance Handbook

2.9 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety

3. REQUIREMENTS:

3.1 Accomplish preliminary repair preparations as follows:

3.1.1 Prior to disconnecting equipment:

3.1.1.1 Record and retain electrical hook-up data. Record and retain air gap readings. Record and retain bearing clearances for sleeve bearing equipment only.

3.1.1.2 Inspect couplings for cracks, broken segments, wear, and misalignment in excess of tolerances specified in 2.2.

3.1.2 Disconnect the equipment electrically and mechanically, using 2.2 for guidance.

3.1.2.1 Matchmark, identify, and retain chocks, shims, shock mounts, sound damping pads, and other accessories associated with equipment.

3.1.2.2 Record shaft thrust and run out readings.

3.2 Remove equipment including rotating components connected directly to the shaft.

3.3 Inspect foundations for cracks, areas of distortion, and deterioration in excess of 25 percent of the thickness of each member of the structure.

3.4 Submit one legible copy, in electronic media, of a report listing inspection results, missing parts, defective parts, and measurements taken in 3.1 and 3.3 to the SUPERVISOR.

3.5 Matchmark, disassemble, and inspect the equipment removed in 3.2, using 2.2 through 2.7 for guidance.

3.6 Accomplish 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.3 for guidance. Record data.

3.6.1 Disconnect solid-state devices and ground temperature-sensing leads prior to measuring insulation resistance of windings.

3.7 Accomplish a DC resistance test of windings, using a Wheatstone or Kelvin bridge, or with an ohmmeter capable of resolving one milliohm (0.001 ohm). Record phase balance for multi-phase equipment, using Paragraph 5.22 of 2.7 for guidance. Record data.

3.8 Accomplish a voltage surge test in accordance with Paragraphs 300-3.5.4 through 300-3.5.5 of 2.3. Record data.

3.9 Accomplish a DC HI POT test in accordance with Paragraph 300-3.5.2 through 300-3.5.2.3.4 of 2.3. Record data.

3.10 Accomplish a Polarization Index Test in accordance with Paragraph 300-3.4.12 of 2.3. Record data.

3.11 Measure resistance value of each winding temperature detector, heater, and heater strip using low voltage ohmmeter. Record data.

3.12 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.5 through 3.11 to the SUPERVISOR.

3.13 Clean the equipment and windings in accordance with Paragraphs 300-4.5.1 through 300-4.5.5 of 2.3.

3.13.1 Dry the equipment by placing it in an oven in accordance with Paragraph 300-5.3.2.3 of 2.3.

3.14 Allow to cool to ambient temperature and accomplish a 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.3 for guidance. Record data.

3.15 Accomplish a DC HI POT test in accordance with Paragraphs 300-3.5.2.3 through 300-3.5.2.3.4 of 2.3. Record data.

3.16 Repeat cleaning, drying, and testing in 3.13 through 3.15 if DC HI POT test readings are questionable, or if insulation resistance readings are not in accordance with the following:

3.16.1 DC generators and motors (except propulsion and auxiliary generators for submarines) including exciters, Table 300-3-4 of 2.3.

3.16.2 DC propulsion generators and motors and DC auxiliary generators for submarines, Table 300-3-5 of 2.3.

3.16.3 AC generators and motors other than propulsion, Table 300-3-6 of 2.3.

3.16.4 AC propulsion generators and motors, Table 300-3-7 of 2.3.

3.17 If satisfactory readings are not obtained after the second cleaning, repeat 3.13 through 3.15.

3.18 Notify the SUPERVISOR if satisfactory readings are not obtained after a third cleaning.

3.19 Accomplish a DC resistance test of windings, using a Wheatstone or Kelvin bridge, or with an ohmmeter capable of resolving one milliohm (0.001 ohm). Record phase balance for multi-phase equipment, using Paragraph 5.22 of 2.7 for guidance. Record data.

3.20 Accomplish a voltage surge test in accordance with Paragraphs 300-3.5.4 through 300-3.5.5 of 2.3. Record data.

3.21 Submit one legible copy, in electronic media, of a report listing winding defects such as opens, grounds, shorts, reversed or unbalanced coil groups or phases, incorrect connections, cracked or brittle insulation, and loose bands, fillers, wedges, and connections to the SUPERVISOR.

3.21.1 Include test results from 3.14 through 3.17, 3.19 and 3.20.

3.22 Protect the windings and machined surfaces and clean the equipment housing exterior, including fan(s), and interior and exterior of end bells to bare metal.



3.22.1 Prime equipment housing, fan(s), and end bells with one coat F-84 alkyd zinc molybdate TT-P-645 (1.5 mils dry film thickness).

3.23 Inspect and test non-wound rotors for loose or cracked bars, localized overheating, and rubbing in accordance with 2.7. Inspect wound rotors, slip ring leads, and armatures for insulation damage and burns/hot spots. Inspect for loose coils and slot wedges. Inspect slip rings and commutators for damage and for wear limits, using 2.2 for criteria. Record data.

3.24 Inspect and dimensionally measure end bells, frame, rabbet fits, shaft, sleeve and pedestal bearings, keyways, fan and running surfaces for wear, eccentricity, and other defects, using 2.2 for accept or reject criteria, and 2.6 for location and type of measurements to be taken. Record data.

3.25 Inspect brush rigging for cracks, chips, worn areas, distortion, spring condition, and insulating material for cracks and arc paths. Record data.

3.26 Inspect leads and terminal lugs for damage and defects. Identify and tag leads with aluminum wrap-around bands with metal stamped or embossed markings. Record data.

3.27 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.23 through 3.26 to the SUPERVISOR.

(V) "VARNISH TEMPERATURE, VISCOSITY, AND GEL TIME TESTS"

3.28 Select the proper insulating process based on winding insulation classifications and to meet state or local air pollution standards.

3.28.1 Select varnish methods and material, using Paragraphs 300-4.5.8 through 300-4.5.8.2 of 2.3 for guidance.

3.28.1.1 Maintain the varnish in accordance with Paragraphs 300-4.5.8.3 through 300-4.5.8.3.3 of 2.3 and the varnish manufacturer's instructions.

3.28.1.2 Maintain a current revision of the varnish manufacturer's instructions on storage, maintenance, and use of the type of varnish to be applied.

3.28.1.3 Maintain a record of varnish temperature, viscosity and, for solventless varnish, gel time tests. Tests must show varnish is within varnish manufacturer's recommendations and have been accomplished in the intervals specified by the varnish manufacturer. The record must also show that the varnish is being stored as recommended by the varnish manufacturer.

3.29 Varnish windings in accordance with Paragraphs 300-4.5.8.2 of 2.3 and the varnish manufacturer's instructions.

3.29.1 Do not immerse the leads.

3.29.2 Wipe surfaces that affect assembly, such as rabbet fits and mounting flanges, with a cloth moistened with a solvent after draining and before baking.

3.30 Remove excess varnish run-off from the component locations described in 3.29.2, after baking. Apply a thin coat of air-dry varnish to metal surfaces exposed by the removal process in accordance with Paragraph 300-4.5.8.5 and 300-4.5.8.6 of 2.3.

3.31 Repeat tests described in 3.14, 3.15, 3.19, and 3.20.

3.32 Accomplish an AC HI POT test in accordance with Paragraphs 300-3.5.3 through 300-3.5.3.2.9 of 2.3. Record data.

3.33 Accomplish a 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.3 for guidance. Record data.

3.34 Measure resistance value of each winding temperature detector, using a low voltage ohmmeter. Record data.

3.35 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.31 through 3.34 to the SUPERVISOR.

3.36 True the commutator or collector rings. Eccentricity shall not exceed the requirements of 2.8. Resurface or machine each individual collector ring to the same exact diameter to allow symmetrical brush holder to ring clearance spacing. Ensure metal shavings are not permitted to contaminate the rotor or stator assembly.

3.36.1 Each cut shall not exceed 0.010 inch. Finish thickness shall not be less than design wear tolerance as shown in 2.2.

3.36.2 Undercut the mica between the commutator bars with the edge of the mica not exceeding a depth of 5/64-inch below the bars.

3.36.3 Chamfer the bar edges and remove rough surfaces in accordance with Paragraph 5-2-4 of 2.8.

3.36.4 Burnish the commutator with a very fine commercial burnishing stone conforming to A-A-58052. Polish collector rings to a mirror finish.

3.37 Accomplish the requirements of 009-15 of 2.1 for each rotating assembly.

3.38 Accomplish the following for the brush rigging:

3.38.1 Disassemble the brush rigging.

3.38.2 Remove foreign matter.

3.38.3 **Replace** existing cadmium-plated parts with zinc in accordance with ASTM A 153.

3.38.4 Recondition threads of plated parts.

3.38.5 Assemble brush rigging.

3.39 Repair lightly scored areas of frame, end bells, and shaft by manual methods. Recondition threads and fit key to keyway. Step keys shall not be used.

3.39.1 Apply a thin coat of petrolatum to unpainted mating surfaces except for explosion-proof motors, which shall have clean, dry mating surfaces.

3.40 Prepare and refinish equipment. Protect machine surfaces, windings, and nameplates from being painted or otherwise damaged.

3.40.1 Accomplish the requirements of 009-32 of 2.1 for each housing, fan, and interior and exterior of each end bell.

3.41 Accomplish the requirements of 009-32 of 2.1 for the foundations of the equipment removed in 3.2.

3.42 Accomplish the following on equipment having other than sleeve-type bearings unless otherwise specified in the invoking Work Item, using 2.7 for guidance.

3.42.1 Except as indicated in 3.42.1.1, install new bearings, seals, fittings, lock washers, and locknuts conforming to 2.2, using 2.6 and Chapter 6 of 2.7 for guidance.

3.42.1.1 Install Type 111, Class 8 (double seal), bearings in motors meeting the criteria identified in Chapter 6 of 2.7. Only double seal bearings identified in Chapter 6 of 2.7 are acceptable for use.

3.42.1.2 For vaneaxial and tubeaxial fan motors not meeting the criteria of Chapter 6 of 2.7, if not originally furnished or already accomplished during previous repair, install Type 111, Class 8 (double seal), bearings with a C3 (greater than normal) radial internal clearance in place of the Type 111 bearing originally furnished. Install Type 120 bearings in vaneaxial and tubeaxial fan motors originally furnished with Type 120 bearings.

3.42.1.3 Install new label plates with the inscription "DO NOT LUBRICATE" on equipment using double seal bearings (Type 111, Class 8, or Type 120).

3.42.1.4 For equipment converted from re-lubricable bearings to double seal bearings, install pipe plugs on all grease fills and drains.

3.42.2 For equipment not using double seal bearings, lubricate bearings with grease conforming to DOD-G-24508 as required in Paragraphs 244-1.7.7.1 and 244-1.7.7.3 of 2.6.

3.43 Assemble the equipment disassembled in 3.5, using 2.2 through 2.7 for guidance.

3.43.1 Do not use materials containing silicone in the repair and assembly of equipment with commutator or collector rings.

3.43.2 Install new fasteners conforming to MIL-DTL-1222, Type I or II, Grade 5, zinc coated.

3.43.3 Fasteners requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.43.4 Install new gaskets on covers, inspection plates, and between the external connection box and the frame. Gaskets shall conform to MIL-PRF-1149 unless otherwise specified in 2.2.

3.43.5 Set brush holders not less than 1/16-inch or more than 1/8-inch from commutator or collector rings unless otherwise specified in 2.2.

3.43.6 Set brush holders in electrical neutral plane and stagger brushes for maximum coverage of the commutator, in accordance with Paragraph 300-4.7.7.1.10 of 2.3.

3.43.7 Center the brush holder over the collector rings.

3.43.7.1 Ensure the brushes do not extend beyond the edge of the collector rings.

3.43.8 Install new brushes in accordance with 2.2. Sand new brushes to fit curvature of the commutator or collector rings, using Paragraph 4-4-4.2 through 4-4-4.4 of 2.8 for guidance.

3.43.8.1 Brushes shall have a surface contact of 100 percent and shall not be chipped, cracked, or broken.

3.43.8.2 Remove sand, carbon, and other foreign matter resulting from fitting new brushes.

3.43.9 Adjust spring tension of brushes in accordance with 2.2.

3.43.10 Adjust air gap as specified in 2.2, plus or minus 10 percent.

3.43.11 Rotate shaft by hand a minimum of 3 revolutions. Rubbing or binding of the rotating assembly not allowed.

3.43.12 Install label plates conforming to MIL-DTL-15024 for those found to be missing or damaged.

(V) "NO-LOAD SHOP TEST"

3.44 Accomplish a no-load shop test of the motor for a minimum of one-half hour.

3.44.1 Verify proper direction of rotation.

3.44.2 After one-half hour, record current and voltage in each phase, speed and bearing temperature rise measured on the equipment's exterior near each bearing.

3.44.3 Submit one legible copy, in electronic media, of the recorded data to the SUPERVISOR.

3.45 Install equipment removed in 3.2.

3.45.1 Remove existing and install new foundation fasteners conforming to MIL-DTL-1222, Type I or II, Grade 5, zinc coated, and self-locking hexagon nuts conforming to NASM-25027, excluding body-fitted bolts and studs.

3.45.2 Remove existing galled or distorted body-fitted bolts and studs and install new fitted bolts and studs conforming to MIL-DTL-1222, Type I, Grade 5.

3.45.3 Fasteners, body-fitted bolts, and studs requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.45.4 Align equipment in accordance with 2.2. Measure and record facial and peripheral coupling data.

3.45.4.1 Install chocks, shims, shock mounts, and sound damping pads.

3.45.4.2 Accomplish the requirements of 009-58 of 2.1 for driver and pump shafts.

3.45.5 Connect electrical cables to equipment, using data retained in 3.1.1.1.

3.45.6 Bond and ground equipment in accordance with 2.9, using new ground straps.

3.45.7 Rotate shaft by hand a minimum of 3 revolutions. Rubbing or binding of rotating assembly not allowed.

3.45.8 Measure and record the air gap and bearing clearance (sleeve bearing equipment only), insulation resistance (at 500 volts DC), and thrust.

(V)(G) "OPERATIONAL TEST"

3.46 Accomplish an operational test of the equipment at full nameplate load or maximum system capacity for a minimum of one hour after temperatures stabilize, unless otherwise specified in the invoking Work Item.

3.46.1 Verify proper direction of rotation.

3.46.2 Verify/establish oxide film coating of the commutator/collector rings, using 2.8 for guidance

3.46.3 Record current, voltage, frame and bearing temperature rise, and speed at 15-minute intervals.

3.46.3.1 Bearing temperatures shall not exceed 180 degrees Fahrenheit, unless otherwise specified in the invoking Work Item or equipment technical manual.

3.46.4 Measure and record hot insulation resistances of windings to ground immediately upon completion of test, using a 500-volt megger.

3.47 Submit one legible copy, in hard copy or electronic media, of a report listing data recorded in 3.45.4, 3.45.8, 3.46.3, and 3.46.4 to the SUPERVISOR.

#### 4. NOTES:

4.1 Equipment technical manual and drawings will be listed in the invoking Work Item.

4.2 Shop test of generator will be addressed in the invoking Work Item.

4.3 The use of silicone is not allowed on any rotating electrical machinery containing brushes.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-18  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Magnetic Material; control

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Provide and implement a procedure for maintaining a maximum permeability factor of 2.0 on board mine warfare ships and craft for material and equipment installed, repaired, or relocated during the accomplishment of work required by the Job Order. The procedure shall have been reviewed and accepted by the SUPERVISOR prior to the implementation.

3.1.1 The procedure requires a one-time submittal/acceptance unless Standard Items and/or references change or are updated.

3.1.2 Describe a receipt inspection system to verify Government, contractor, and subcontractor furnished material is in compliance with the permeability limits.

3.1.3 Describe controls used in fabrication work to ensure compliance with the permeability limits after fabrication.

3.1.4 Describe the method used to determine magnetic content of materials removed from or brought on board the ship or craft including monitoring station locations.

3.1.5 Identify type of instrumentation, conforming to Method 3 of ASTM A 342, used to measure the magnetic permeability of material.

3.1.6 Describe the record and reporting system utilized to list material required, but determined to have exceeded the permeability factor 2.0 after fabrication and the maximum dimension of the part exceeds 2 inches or the maximum dimension of all parts having a similar function in a 30 foot section of the ship exceeds 60 inches. This list shall include material and equipment removed, repaired, installed, or relocated. The record and reporting system shall contain description, magnetic dimensions, approximate weight, location installed on board ship or craft, and a record verifying that the

item is contained in the current "Location of Magnetic Material Book" or a record of waiver granted for installation.

3.2 Submit a request for deviation to the SUPERVISOR for items not having a ship specific waiver and not contained in the current "Location of Magnetic Material Book" prior to installation of any new or existing material and/or equipment required but determined to exceed the permeability limit described in 3.1.6.

3.2.1 Submit one legible copy, in electronic media, of a report furnishing documentation provided by supplier, as required by 3.1.6.

#### 4. NOTES:

4.1 The magnetic field of mine warfare ships and craft consists of the superposition of the magnetic field from 4 basic sources: ferrous field, eddy current field, ship service stray field, and minesweep generator stray field. The stray field sources are the electric currents in cables and wiring associated with the operation of the equipment of the ship or craft. The ferrous field and eddy current field sources are as follows:

4.1.1 Ferrous Field Source: The ferrous field sources are the items on or part of the ship or craft which use a material in their construction that exhibits a relative magnetic permeability different than 1.0, the relative magnetic permeability of air. Each ferrous field source acts like a bar magnet whose magnetic field depends upon the material's relative magnetic permeability, volume (not mass), and shape of the earth's magnetic field. At a point or location external to a ferrous field source, the magnetic field of this source is essentially the same whether the source is hollow (such as a block or pedestal). A material whose relative magnetic permeability is 2.0 or less is arbitrarily defined to be nonmagnetic when used in conjunction with mine warfare ships and craft; otherwise, the material is said to be magnetic. Whether the material of an item is classified magnetic or nonmagnetic, according to the above arbitrary definition, a change in relative magnetic permeability of the material will, in general, result in a change in the magnetic field associated with this item.

4.1.2 Eddy Current Field Source: The eddy current field sources are the items on or part of the ship or craft which use a material in their construction that exhibits an electrical conductivity. A material whose electrical conductivity is less than 10.0 percent of the electrical conductivity of copper ( $1.7241 \times 10^{-6}$  ohm-cm at 20 degrees Centigrade) is arbitrarily defined to be nonconductive when used in conjunction with mine warfare ships and craft; otherwise, the material is said to be electrically conductive. Each eddy current field source acts like a generator when it oscillates in the earth's magnetic field due to the rolling and pitching of the ship or craft. The current in this source, resulting from the generator action, has associated with it a magnetic field - an eddy current field. The magnitude of this field is dependent upon the conductivity of the material, the size of the electrical path in the material, the cross-sectional area of



the electrical path, and the orientation of the source with respect to the earth's magnetic field due to the rolling and pitching of the ship or craft.

4.1.3 If an item is both highly magnetic and electrically conductive, such as mild steel or steel, the ferrous field will mask out the eddy current field. If an electrically conductive item is located inside a highly magnetic enclosure, such as mild steel or steel, the enclosure will mask the magnetic effects of its contents and will appear as if it were a solid magnetic block.

4.2 The SUPERVISOR will provide written direction for accomplishment of one of the following prior to reinstallation of temporarily removed existing or new material/equipment as a result of the deviation request.

4.2.1 Authorization for deviation request.

4.2.2 Identification and authorization of an acceptable Contractor Furnished Material (CFM) substitute material or equipment.

4.2.3 Receipt of an acceptable Government Furnished Material (GFM) substitute material or equipment.

4.2.4 Technical direction and information for manufacturing of acceptable material or equipment.

4.2.5 Other direction as determined acceptable by the ship class planning yard or higher authority.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-19  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Provisioning Technical Documentation (PTD); provide

2. REFERENCES:

2.1 9090-1500, Policies and Procedures Manual, Provisioning, Allowance, and Fitting Out Support (PAFOS), Chapter 4, Provisioning

2.2 Interactive Computer Aided Provisioning System (ICAPS)

3. REQUIREMENTS:

3.1 Provide Provisioning Technical Documentation (PTD) in accordance with 2.1, for all new and/or modified Contractor Furnished (CF), Allowance Parts List (APL) worthy, Hull, Mechanical, and Electrical (HM&E) and/or Electronics components. PTD shall include a Provisioning Parts List (PPL) and Engineering Data for Provisioning (EDFP).

3.1.1 PPL shall identify each part subject to failure/replacement, or required for maintenance of the component, and shall include the following MIL-PRF-49506 Data Product Deliverables (DPDs):

3.1.1.1 0870 Provisioning Contract Control Number (PCCN)

3.1.1.2 0890 Provisioning List Item Sequence Number (PLISN)

3.1.1.3 0370 Indenture Code for non-electronic components

3.1.1.4 1030 Reference Designation for electronic components

3.1.1.5 0140 Commercial and Government Entity (CAGE) Code

3.1.1.6 1050 Reference Number

3.1.1.7 0480 Item Name

3.1.1.8 0930 Quantity Per Assembly (QPA)

3.1.1.9 0950 Quantity Per End Item (QPEI)

3.1.1.10 1470 Unit of Issue (UI)

3.1.1.11 1500 Unit of Issue Price (UI Price)

3.1.1.12 S008 Component Identification Data (CID): Enter all available data

3.1.2 Ship Level Provisioning Parts List (SLPPL) shall include items determined not to be APL worthy in accordance with Appendix G of 2.1, and shall include the MIL-PRF-49506 DPDs identified in 3.1.1.

3.1.3 Statements of Prior Submission (SPS) shall be submitted in lieu of PTD, whenever PTD that meets the requirements of the contract has previously been furnished to the Government. An SPS certifies that all replacement parts are identical to those provided by the previously furnished PTD. The SPS shall apply to the end item or to any component thereof and shall include:

3.1.3.1 End item part number

3.1.3.2 Manufacturer's CAGE

3.1.3.3 Manufacturer's drawing number and revision

3.1.3.4 RIC (APL number)

3.1.3.5 Certification statement certifying that all replacement parts are identical to those identified by the APL or previously furnished PTD

3.1.4 If there are any changes to replacement parts, a PTD package (PPL and EDFP) that identifies the changes shall be submitted in lieu of an SPS.

3.2 An EDFP shall be provided with each PPL and SLPPL submittal. EDFP shall be marked with Distribution Statements in accordance with DoD Directive 5230.24.

3.3 Provide a Contractor Furnished Material (CFM) report and a copy of the Purchase Order and receipt document for each procurement of equipment or components for which PTD or SPS is required. The report shall include:

**3.3.1 Contract Work Item number**

**3.3.2 Contractor's purchase order number**

**3.3.3 Description of material**

**3.3.4 Quantity ordered**

**3.3.5 Date scheduled to be ordered**

**3.3.6 Date ordered**

**3.3.7 Date required to meet production schedule**

**3.3.8 Proposed receipt date**

**3.3.9 A summary listing any problem areas**

**3.3.10 Date submitted to SUPERVISOR**

**3.3.11 Alteration number**

**3.3.12 Drawing and piece number**

**3.3.13 Manufacturer**

**3.3.14 Manufacturer's part number**

**3.3.15 Date received**

**3.3.16** Submit one legible copy, in electronic media, of the CFM report to the SUPERVISOR **no later than 30 calendar days after the Job Order award, every 2 weeks up to availability start date, within 10 days after availability start date, then monthly thereafter to End of Availability (EOA).**

3.4 Submit data for PPLs and SLPPLs via 2.2, or in accordance with the ICAPS compatible format identified in Appendix K of 2.1. Submit SPSSs in electronic format (spreadsheet or document) via 3.5-inch diskettes, compact disks, or electronic mail within 20 calendar days after the installation of the contractor's component or equipment.

3.4.1 Submit PTD via the SUPERVISOR to:

NSWCCD-SSSES  
Attn: Code 9451  
5001 S. Broad St.  
Philadelphia, PA 19112-5083  
E-mail: Charles.R.Simmons@navy.mil

4. NOTES:

4.1 EDFP is required for all systems or equipment that are acquired for Navy use and for which PTD is being acquired. EDFP is the data acquired to support Line Material Item supportability analysis. It is the technical data that provides definitive identification of dimensional, material, mechanical, electrical, or other characteristics adequate for provisioning of the support items of the end article(s) on contract. EDFP consists of but is not limited to data such as specifications, standards, drawings, photographs, sketches and descriptions, and the necessary assembly and general arrangement drawings, schematics, drawings, schematic diagrams, wiring and cable diagrams, etc.

This data is necessary for the assignment of Source, Maintenance, and Recoverability (SMR) codes to assignment of Item Management Codes, prevention of proliferation of identical items in the Government inventory, maintenance decisions, and item identification necessary in the assignment of a National Stock Number (NSN).

4.2 2.1 is available at:

<http://www.nslc.navsea.navy.mil/nslcprod/pafos.nsf>

4.3 2.2 is available for download from:

<https://icaps.navsea.navy.mil>

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-20  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Government Property; control

2. REFERENCES:

2.1 Federal Acquisition Regulation (FAR) Part 45, Government Property

2.2 Defense FAR Supplement (DFARS) Part 245, Government Property

3. REQUIREMENTS:

3.1 Provide and maintain a property control system for government property in accordance with 2.1 and 2.2. The property control system shall include the following functional elements, modified by the additional requirements in the following paragraphs:

- 3.1.1 Property Management
- 3.1.2 Acquisition
- 3.1.3 Receiving
- 3.1.4 Identification
- 3.1.5 Records
- 3.1.6 Movement
- 3.1.7 Storage
- 3.1.8 Physical Inventories
- 3.1.9 Reports
- 3.1.10 Consumption
- 3.1.11 Utilization
- 3.1.12 Maintenance

3.1.13 Subcontractor Control

3.1.14 Disposition

3.1.15 Contract Property Close-out

3.2 Provide for receipt of Government Furnished Property (GFP) as follows:

3.2.1 Submit the names and signatures of persons authorized to receive and account for GFP to the SUPERVISOR.

3.2.2 Inspect GFP immediately upon receipt for possible shipping damage.

3.2.2.1 Note any damage on carrier's copy of the Government Bill of Lading and notify the SUPERVISOR.

3.2.2.2 Forward one signed copy of the Shipping Document (DD Form 1348-1) and one copy of the Government Bill of Lading to the SUPERVISOR.

3.2.3 Inspect GFP within 5 working days of receipt to verify conformance with description and requirements.

3.2.4 Submit one legible copy, in electronic media, of a report within 2 working days after inspection to the SUPERVISOR listing product quality deficiencies, including the following:

3.2.4.1 Date discovered

3.2.4.2 National Stock Number (if applicable)

3.2.4.3 Nomenclature

3.2.4.4 Manufacturer

3.2.4.5 Manufacturer's Part Number/Identification Number

3.2.4.6 Contract Number

3.2.4.7 Item condition (new or overhauled/repaired)

3.2.4.8 A specific description of the defect(s), listing drawing or technical manual dimensions, required and actual

3.2.4.9 If material is defective due to mishandling, rust, or moisture

3.3 Maintain records for GFP, containing the following information:

3.3.1 Ship's name and hull number

3.3.2 Job Order and Work Item numbers

3.3.3 Date received

3.3.4 Shipping document or Bill of Lading number

3.3.5 Date issued

3.3.6 Unit price and quantity

3.4 Dispose of government property as follows:

3.4.1 Return material purchased from the Government under the Cash Sale (Bailment) procedure and not incorporated into the end product being procured under the contract, or consumed directly in the performance of such contract, to the Government at the contractor's expense in the same condition as received. Submit one legible copy, in electronic media, of turn-in document (DD 1348-1) showing material returned for credit, to the SUPERVISOR.

3.4.2 Process material permanently removed from the ship for replacement, substitution, or elimination, whether serviceable or not, including equipment units, parts, and items determined by the SUPERVISOR to be of value to the Government as follows. A written certification shall accompany the inventory schedule submitted to the SUPERVISOR for equipment that has been purged of fluorocarbon or halon materials.

3.4.2.1 Inventory, identify, and tag or otherwise mark such property. Identification shall include ship's name and hull number, Job Order and Work Item numbers, part number/stock number, and item description.

3.4.2.2 Assemble equipment prior to delivery to the Government except as specifically directed in the Work Item.

3.4.2.3 Remove valves or drill holes in empty gas cylinders prior to delivery to the Government.

3.4.2.4 Remove the chemicals from fire fighting bottles, remove valves/stems, triple rinse the bottle, and stencil the bottle "Triple Rinsed".

3.4.2.5 Clean each item to be disposed of free of grease and/or substances considered to be hazardous in nature prior to delivery to the Government.



3.4.2.6 Submit one legible copy, in hard copy or electronic media, of the inventory to the SUPERVISOR. The inventory shall be signed by the contractor's representative and submitted when directed by the SUPERVISOR, or in any case, immediately following the completion of each Job Order.

3.5 Submit Final Termination of Inventory Report within 14 days after completion of availability.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-21  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Logistics and Technical Data; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Complete Attachment A for all Government Furnished Material (GFM) and Contractor Furnished Material (CFM) equipment or components installed or permanently removed. This applies to all configuration changes, including alterations and repairs.

3.1.1 Provide individual Attachment A forms for each piece of equipment or component, including contractor submission and SUPERVISOR receipt signatures.

3.1.2 Submit data required by Attachment A, in electronic format (spreadsheet or word processing document), via 3.5-inch diskettes, compact disks, or electronic mail, to the SUPERVISOR no later than 5 working days after installation or removal of GFM and CFM equipment or components.

3.2 Submit all copies of technical manuals, Maintenance Index Pages (MIP), and Maintenance Requirements Cards (MRC) received with GFM and CFM equipment to the SUPERVISOR no later than 5 working days after receipt of equipment.

3.3 Data received in 3.2 required for installation and testing will be provided to the contractor.

4. NOTES:

4.1 The technical point of contact for the requirements contained in this NAVSEA Standard Item is the local NSA logistics representative.

ATTACHMENT A  
EQUIPMENT/COMPONENT LOGISTICS AND TECHNICAL DATA  
NAVSEA STANDARD ITEM 009-21

DATE: \_\_\_\_\_

ALL DATA FIELDS ARE MANDATORY FILL. WRITE "NONE" WHERE NOT APPLICABLE.

SHIP NAME: \_\_\_\_\_ HULL: \_\_\_\_\_

SPEC PKG. NO.: \_\_\_\_\_ AUTHORITY (WORK ITEM): \_\_\_\_\_

ACTION: \_\_\_\_\_ RIC: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

VALVE MARK/ELECTRICAL SYMBOL NUMBER: \_\_\_\_\_

QUANTITY: \_\_\_\_\_ **SHIPBOARD** LOCATION: \_\_\_\_\_

RIC NOMENCLATURE: \_\_\_\_\_

TM(S) RECEIVED: \_\_\_\_\_

PMS MIP/MRC'S RECEIVED: \_\_\_\_\_

OBRP(S) RECEIVED: \_\_\_\_\_

INSTALLATION DRAWING NO: \_\_\_\_\_

RIC CHARACTERISTICS:

1. MFR - \_\_\_\_\_

2. MFR DWG - \_\_\_\_\_

3. MFR ID - \_\_\_\_\_

4. NSN - \_\_\_\_\_

CIRCLE ONE: GFM or CFM

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

REPORTING CONTRACTOR: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

RECEIVING SUPERVISOR: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-22  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Shipboard Electric Cable; test

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Accomplish an insulation resistance test of each electric cable conductor using a 500 volt, direct current megger.

3.1.1 Disconnect low voltage equipment associated with circuits to be tested to prevent damage during tests.

3.1.2 Minimum acceptable readings of each cable conductor to ground and between conductors:

Lighting Circuit	0.5 Megohm
Power Circuit	1.0 Megohm
Degaussing Circuit	0.1 Megohm
Interconnecting Control Circuit	1.0 Megohm
Interior Communication Circuit	0.2 Megohm
Sound Powered Telephone Circuit	
(with telephone disconnected)	0.05 Megohm

3.1.3 Minimum acceptable reading of coaxial cable:

<u>LENGTH (FEET)</u>	<u>INSULATION RESISTANCE (MEGOHMS)</u>
100 (or less)	40,000
200	20,000
500	8,000
1,000	4,000

3.1.4 Discharge coaxial cable to ground following insulation resistance test.

3.2 Test each cable conductor for continuity and complete circuit. Ensure terminal connections are tight.

3.3 Submit one legible copy, in hard copy or electronic media, of a report listing results of the requirements of 3.1 and 3.2, including circuit number, lead numbers, and readings obtained, to the SUPERVISOR within 48 hours of completion of tests.

3.3.1 Identify defective cables by circuit number, lead numbers, type, size, approximate length, and readings obtained.

4. NOTES:

4.1 A new circuit is defined as a cable not previously installed.

4.2 Pulled-back cables are those which are disconnected and physically removed from a wireway, conduit, or cableway to protect the cable from industrial work.

4.3 Reused cables are those cables disconnected from the equipment to facilitate equipment removal.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-23  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Interferences; remove and install

2. REFERENCES:

2.1 Standard Items

2.2 0948-LP-045-7010, Material Control Standard

2.3 0924-LP-062-0010, Submarine Safety (SUBSAFE) Requirements Manual

2.4 S9086-CJ-STM-010/CH-075, Fasteners

2.5 S9086-RK-STM-010/CH-505, Piping Systems

3. REQUIREMENTS:

3.1 Do not remove components from the following systems as interferences, except when the scope of work requires repairs to components of these systems or when specified in the Work Item:

3.1.1 Main steam and catapult systems

3.1.2 Gaseous oxygen piping systems which operate at pressures higher than 100 PSIG, liquid oxygen piping from oxygen plant to the liquid oxygen charging carts, and the overboard drain piping from the liquid oxygen storage plant and spillage drain

3.1.3 Degaussing systems

3.1.4 Electric cables which cannot be removed without cutting

3.1.5 Hydraulic systems

3.1.6 High pressure air systems. High pressure air systems are those systems designed for pressures of 1000 PSIG or greater.

3.1.7 Life support systems

3.1.8 Cryogenic systems

3.1.9 Spring hangers

3.1.10 Ship's strength members involving structural integrity

3.1.11 Halon systems

3.1.12 LEVEL I systems in accordance with 2.2

3.1.13 Sonar dome pressurization system

3.1.14 Passive countermeasure materials

3.1.15 Ballistic plating - DDG-51 Class only

3.1.16 Waveguides

3.1.17 For submarines and SUBSAFE capable ships only, in addition to the systems identified above, SUBSAFE components/systems in accordance with 2.3

3.1.18 For nuclear-powered ships only, in addition to the systems identified above, steam plant systems that carry steam, water, or gas and which introduce these fluids either directly or indirectly into the steam generators, including:

3.1.18.1 Main Steam

3.1.18.2 Steam Generating

3.1.18.3 Feed

3.1.18.4 Condensate

3.1.18.5 Auxiliary Steam/Reduced Pressure Steam

3.1.18.6 Auxiliary Exhaust Steam

3.1.18.7 Gland Seal and Exhaust Steam

3.1.18.8 Bleed Steam

3.1.18.9 High Pressure Drain

3.1.18.10 Reserve Feed (except for reserve feed day tanks in surface ships)

3.1.18.11 Fresh Water Drain/Low Pressure Drain/Turbine Drain Catapult Steam Drain (up to catapult fill/charging valves and associated high-pressure drain system)

3.1.18.12 Catapult Trough Heating and Drain Systems

3.1.18.13 Main Steam Supply to reboiler and reboiler drains to the Deaerating Feed Tank (DFT)

3.1.18.14 Heating steam and condensate return piping to and from distilling units and lithium bromide air conditioners

3.1.18.15 Those portions of the propulsion plant makeup water distribution system downstream of the distiller output or reverse osmosis outlet demineralizer used to supply water directly or indirectly to the steam plant

3.1.18.16 Nitrogen supply system used for sparging of aircraft carrier steam generators

3.1.18.17 Reactor Plant Fresh Water System (RPFW), Propulsion Plant Fresh Water System (PPFW), and Steam Generator Cooldown

3.1.18.18 Support systems (such as nitrogen systems, hydrostatic test rigs, and temporary steam generator makeup systems), which add water, steam, or gas directly or indirectly into steam generators

3.1.18.19 Any other systems or components governed by NAVSEA Instruction C9210.4

3.2 Submit one legible copy, in electronic media, of a report of components of the systems listed in 3.1 that must be removed as interferences and the work is not required by the Work Item, to the SUPERVISOR. The report shall list the following information:

3.2.1 Identification of the item to be removed or disturbed

3.2.2 Necessity for the action

3.2.3 Protective measures which will be taken to protect equipment from damage or contamination

3.2.4 Alignment procedures and details for tests that will be accomplished to verify acceptability after reinstallation

3.3 The SUPERVISOR will review and respond to the report required by 3.2 and if removal of the components is approved, an appropriate change to the Work Item will be prepared.

3.4 Visually examine interferences prior to and during removal for previous damage and deterioration.

3.4.1 Submit one legible copy, in electronic media, of a report listing previously damaged and deteriorated interferences to the SUPERVISOR within 5 working days after removal.



3.5 Material containing asbestos that requires removal as an interference shall not be reinstalled.

3.5.1 Submit one legible copy, in electronic media, of a report listing location and system identification of asbestos removed and non-asbestos installed which has not been identified elsewhere in the Job Order, to the SUPERVISOR.

3.6 Remove interferences.

3.6.1 Protect interferences from damage or loss and prevent contamination of removed components and remaining parts of the system.

3.6.2 Install identification tags on interferences to indicate company name, ship's name, hull number, location, and Work Item number prior to removal from system or shipboard location. Tags must endure the repair process, and must stay attached and be readable until the interference is reinstalled.

3.6.3 Inspect each fastener for wear and defects, using Paragraph 075-8.3 of 2.4 for accept or reject criteria.

3.6.4 Submit one legible copy, in electronic media, of a report listing interferences removed to the SUPERVISOR within 5 working days of removal.

3.7 Reinstall interferences.

3.7.1 Install interferences that were neither reported as previously damaged or deteriorated nor rendered unsuitable for reinstallation during removal.

3.7.2 Install interferences reported in 3.4.1 in the as-found condition or after authorized repairs have been accomplished.

3.7.3 Install new material in place of material rendered unsuitable for reinstallation during removal or storage.

3.7.3.1 New material shall be equal in composition, strength, design, type, and size as existed prior to removal of the interferences.

3.7.4 Accomplish the requirements of 009-12 of 2.1.

3.7.5 Accomplish the requirements of 009-71 of 2.1 for non-mechanical joints.

3.7.5.1 Test pressure and test medium shall be in accordance with 2.5.

3.7.6 Accomplish the requirements of 009-37 of 2.1.

3.7.7 Reusable or portable insulation covers and pads shall not be replaced unless the cover or pad is missing or damaged.

3.7.7.1 Install new reusable covers and/or reusable pads in way of missing or damaged as designated by the SUPERVISOR.

3.7.7.2 Accomplish the requirements of 009-11 of 2.1.

3.7.8 Install new silicone coated aluminized cloth spray shields on mechanical joints and components in accordance with ASTM F 1138 in place of those removed as interference.

3.7.9 Install new gaskets and assemble in accordance with Section 5 of 2.5 when reinstalling interferences.

3.7.9.1 Reuse existing fasteners if the acceptance criteria of Paragraph 075-8.3 of 2.4 is met.

3.7.10 Accomplish the requirements of 009-32 of 2.1 for new and disturbed surfaces.

3.7.11 Restore compartment, equipment, and systems labeling.

3.7.12 ***Accomplish the requirements of 009-26 of 2.1 for deck covering removed or damaged as interference.***

3.7.12.1 New material shall be equal to existing in color and composition.

(V)(G) "STRENGTH, TIGHTNESS, AND OPERATIONAL TESTS"

3.8 Align and accomplish appropriate strength, tightness, system cleanliness, and operational tests and ensure that the reinstalled interferences perform their normal functions within the system.

3.8.1 Tests shall be incorporated into the contractor's Test and Inspection Plan.

#### 4. NOTES:

4.1 An interference is any part of a ship, whether installed or portable, that must be moved or disturbed in the accomplishment of work specified in the Job Order.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-24  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Authorization, Control, Isolation, Blanking, and Tagging Requirements; accomplish

2. REFERENCES:

**2.1 Standard Items**

2.2 Joint Fleet Maintenance Manual (JFMM)

2.3 0905-LP-485-6010, Control of Testing and Ship Conditions

2.4 S0400-AD-URM-010/TUM, Tag-Out Users Manual

2.5 845-4612172, Hydrostatic Test Blanks

2.6 MIL-STD-777, Schedule of Piping, Valves, Fittings, and Associated Piping Components for Naval Surface Ships

2.7 802-5959353, MIL-STD-777 Modified for DDG-51 Class, Schedule of Piping, Valves, Fittings, and Associated Piping Components

3. REQUIREMENTS:

3.1 Accomplish the requirements of Volume IV, Chapter 10 of 2.2, for administration, work authorization procedure, transfer of non-nuclear systems and nuclear instrumentation and control systems, work authorization form revisions, and barrier criteria. For submarines only, accomplish the requirements of Volume IV, Chapter 10 of 2.2 for safety of ship maintenance item identification, listing, and control, or the requirements of 2.3 for Ship's Plan of the Day (SPOD).

3.1.1 Individuals who perform shipboard work shall be indoctrinated in the basic purpose, use, and restrictions of 2.4.

3.1.2 Accomplish a pre-job brief prior to commencing work for any maintenance or evolution listed on the Safety of Ship Maintenance Item Identification, Listing and Control (SOSMIL) or SPOD (Submarines only).

3.1.3 Submit one legible copy, in hard copy or electronic media, of the Work Authorization Form (WAF), Appendix A of 2.2, to the Commanding

Officer's designated representative for authorization to start work, for each Work Item, when required by 2.2, in the Job Order.

**3.1.3.1 When 009-106 of 2.1 is invoked, submit properly filled out Work Authorization Forms (WAF) and Technical Work Documents (TWD) to the Work Authorization Form Coordinator (WAFCOR) at least 14 days prior to the actual start date of shipboard work.**

3.1.4 Submit one legible copy, in hard copy or electronic media, of new or formal revisions to authorized WAFs for changes to the scope of the existing job description, tag out boundary, or system transfer boundary **in accordance with 3.1.3.**

3.2 Accomplish the requirements of 2.4 for equipment, systems, circuits, components, piping, and valves that require isolation.

**3.3 Contractor shall use the company's lockout/tag-out process for unmanned craft and barges.**

3.3.1 Position equipment to achieve required isolation, deenergization, drainage of the isolated area, and depressurization, and install tags when tag-out of equipment, systems, circuits, components, piping, or valves is required.

3.4 Verify use of sufficient tags to prevent operation of equipment, systems, circuits, components, piping, or valves from all stations that could exercise control.

3.4.1 Ensure the isolation, deenergization, drainage of the isolated area, and depressurization of mechanical, electrical, electronics, and pressure systems has been accomplished.

3.4.2 Contractor's designated representative shall legibly sign on a ship's tag-out record sheet and tags after installation, indicating repair activity satisfaction with the completeness, accuracy, and adequacy of the tag-out and alerting personnel removing tags that contractor concurrence is required.

3.4.3 Train and qualify contractor's designated representative in the WAF and Tag-Out process in accordance with 2.2 and 2.4.

3.4.3.1 Maintain a current copy of the plan utilized to train and qualify contractor's designated representatives in accordance with 2.2 and 2.4 for reference by the SUPERVISOR.

3.4.3.2 Notify the SUPERVISOR of revisions to the plan as they occur.

3.5 Post warning signs and barriers and install temporary positive means to prevent closure or movement of components that create a safety hazard at hull and deck openings.

3.6 Install and maintain blanks and plugs, painted blaze orange, on piping, valves, equipment, ventilation systems, on components being stored, installed, or removed, on openings aboard ship resulting from the removals, immediately upon each removal, and on openings requiring isolation to accomplish work in the Work Items including tanks. The use of cloth, polyvinyl sheet, paper, tape, and rubber sheeting as blanks is prohibited on non-pressurized systems. DC plugs, wood, or wood products are prohibited as blanks on pressurized systems, but may be used on non-pressurized systems.

3.6.1 Blanks installed on equipment, valves, and piping openings in systems which are subject to pressure shall be in accordance with 2.5 to withstand maximum system pressure and secured in place with gaskets and fasteners in accordance with 2.6 and 2.7.

3.6.1.1 Pressure blanks shall have a positive means of attachment for affixing tags. Tags must endure the repair process, and must stay attached and be readable until the blanks are removed.

3.6.2 Blanks/plugs installed on openings in equipment, valves, and piping systems not subject to pressure shall preclude entry of foreign material and protect flanges and threaded areas.

3.6.3 Remove blanks/plugs installed in 3.6 immediately prior to installing piping, valves, or equipment and when work requiring isolation is complete.

3.6.4 Provide and maintain a written record of temporary blanks/plugs used, documented on a signed and dated check-off sheet verifying installation and removal. Include system/equipment name or tank number and location (frame, port, starboard, below or above water line).

3.6.4.1 Maintain the list for the duration of the availability.

3.6.4.2 Submit one legible copy, in hard copy or electronic media, of the temporary blank/plug record and check-off sheet to the SUPERVISOR. For tanks, this submittal must take place prior to final closing and shall be at the job site.

3.6.5 Piping, ventilation, and equipment components designated as scrap prior to removal do not need to be blanked to maintain cleanliness. However, precautions shall be taken to preclude spillage of system contents.

3.7 Install identification tags on each removed piping section, valve, ventilation system, and equipment **to indicate** company name, ship's name, hull number, system, location, and Work Item number prior to removal from system. Tags must endure the repair process, and must stay attached and be readable until the removed piping section, valve, ventilation system, or equipment is reinstalled.

3.8 Tape and insulate cable ends disconnected from equipment to prevent shorting out or grounding in the event a system is accidentally energized.

3.8.1 Tag each cable indicating circuit number and location of panel and fuse box-energizing cable.

3.8.2 Install dust covers on equipment connectors following disconnection of cable plugs.

3.9 Do not disturb, modify, remove, energize, or operate any switch, fitting, valve, or other equipment affixed with a ship's isolation or DANGER tag.

3.9.1 Do not remove or relocate ship's isolation or DANGER tags.

3.9.2 Verify removal and clearance of all isolation or DANGER tags in accordance with ship's instruction before the equipment is operationally tested or operated.

**3.10 Upon completion of work, WAF(s) shall be signed as complete and processed through the WAFCOR (where assigned) prior to clearing the tag(s).**

3.11 Notify the Commanding Officer's designated representative immediately when the contractor's work is complete and the system, piping, or circuit is ready for activation to accomplish removal of tags.

3.11.1 The contractor's representative shall sign the ship's tag-out log sheet to show concurrence in tag removal and clearance before removal.

3.11.2 Ship's Force personnel will remove tags after contractor's concurrence and clearance has been recorded and removal is authorized by the Commanding Officer's designated representative.

#### 4. NOTES:

4.1 When a component is tagged more than once, a DANGER tag takes precedence over other tags.

4.2 The term "Shipyard(s)" as used in 2.4 means a public Naval Shipyard or a NAVSEA 04XQ approved new construction shipyard.

4.3 Repair Activity (RA) is any activity (public or private) other than Ship's Force involved in the construction, testing, repair, overhaul, refueling, or maintenance of the ship. Repair Activities include the prime contractor, all subcontractors, government provided contractors or agencies, Alteration Installation Teams, Fleet Maintenance Activities, Naval Shipyards, and others.

4.4 Ship's Force personnel will position equipment to achieve required isolation, deenergization, drainage of the isolated area, and

depressurization, and install tags when tag-out of equipment, systems, circuits, components, piping, or valves is required.

4.5 Where use of the Shift Operations Management System (SOMS) is required by ship's instruction, a Local Standard Item shall be invoked in the Job Order.

4.6 JFMM (2.2) and TUM (2.4) are available on-line at:

<http://www.submepp.navy.mil/jfmm/index.htm>

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-25  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Structural Boundary Test; accomplish

2. REFERENCES:

2.1 MIL-STD-777, Schedule of Piping, Valves, Fittings, and Associated Piping Components

2.2 802-5959353, MIL-STD-777 Modified for DDG-51 Class, Schedule of Piping, Valves, Fittings, and Associated Piping Components

3. REQUIREMENTS:

3.1 Accomplish a preliminary air test of spaces in accordance with the following:

3.1.1 Install 2 independent pressure gages.

3.1.1.1 Gage range shall be such that the test pressure is in the middle third of the scale.

3.1.2 Install 2 relief valves set at 15 percent above test pressure.

3.1.3 Install one vent valve.

3.1.4 The air source shall not exceed 25 PSIG and shall have a supply capability less than the exhaust capability of either relief valve.

3.1.5 Apply a soap solution to the opposite side of the structure and inspect for leakage.

3.1.6 Submit one legible copy, in electronic media, of a report listing results of the preliminary air test, to the SUPERVISOR.

(V) "VISUAL INSPECTION"

3.1.7 Accomplish a visual inspection of disturbed mechanical joints for leakage upon completion of filling each tank. Allowable leakage: None.



(I) "UNOBSTRUCTED FLOW"

3.1.8 Accomplish unobstructed airflow test of air escape and overflow piping.

(I)(G) "AIR TEST"

3.2 Accomplish an air test of spaces in accordance with the following:

3.2.1 Install 2 independent pressure gages.

3.2.1.1 Gage range shall be such that the test pressure is in the middle third of the scale.

3.2.2 Install 2 relief valves set at 15 percent above test pressure.

3.2.3 Install one vent valve.

3.2.4 The air source shall not exceed 25 PSIG and shall have a supply capability less than the exhaust capability of either relief valve.

3.2.5 Apply a soap solution to the opposite side of the structure, associated tank piping, overflow and air escape piping, and inspect for leaks.

(V) "VISUAL INSPECTION"

3.2.6 Accomplish a visual inspection of disturbed mechanical joints for leakage upon completion of filling each tank. Allowable leakage: None.

(I) "UNOBSTRUCTED FLOW"

3.2.7 Accomplish unobstructed airflow test of air escape and overflow piping.

(I)(G) "AIR HOSE TEST"

3.3 Accomplish a local air hose test in accordance with the following:

3.3.1 Air hose nozzle shall be as close as possible and pressure directed at the structure under test in a manner most likely to disclose leaks.

3.3.1.1 The minimum nozzle diameter shall be 3/8 inch and the nozzle pressure shall be 90 PSIG.

3.3.2 Apply a soap solution to the opposite side of the structure and inspect for leakage.

(I)(G) "WATER HOSE TEST"

3.4 Accomplish a water hose test in accordance with the following:

3.4.1 Use a one and one-half inch hose with a minimum nozzle diameter of one-half inch at 50 PSIG nozzle pressure at a maximum distance of 10 feet from the surface being tested.

3.4.2 The stream of water shall be directed against the structure in a manner most likely to disclose leaks. The opposite side of the structure shall be inspected to detect and locate leaks.

(I)(G) "VACUUM BOX TEST"

3.5 Accomplish a local vacuum box test in accordance with the following:

3.5.1 Apply a soap solution to the structure being tested.

3.5.2 Install a vacuum box with a clear cover over the entire joint or fitting being tested.

3.5.2.1 Install the vacuum box so that the pressure differential is in the direction of an air test.

3.5.3 Draw a vacuum of at least 10.2 inches of mercury and inspect for leaks.

**3.6 Repaired areas requiring a structural boundary test shall remain uninsulated and unpainted until completion of successful inspection and test.**

4. NOTES:

4.1 Associated piping is defined as, "An assembly of pipe, tubing, valves, fittings, and related components forming a whole or a part of a system which starts or terminates in subject area, thus being common to and associated with same."

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-26  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Deck Covering Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S9086-VG-STM-010/CH-634, Deck Coverings

3. REQUIREMENTS:

3.1 ***Maintain a current copy of*** the NAVSEA-approved Shipbuilders and Marine Paints and Coatings Product/Procedure Data Sheet (ASTM F718) for the NAVSEA-approved deck covering system specified in the invoking Work Item ***for reference by the SUPERVISOR***. Where the ASTM F718 does not exist for a product, ***maintain a copy of the manufacturer's technical data sheets. Submit one legible copy, in electronic media, of specific documents when requested by the SUPERVISOR.***

3.2 Deck covering materials shall be stored in a cool, dry place, not exposed to freezing temperatures or direct sunlight, and shall be stored in accordance with NAVSEA-approved manufacturer's instructions.

3.3 Comply with the NAVSEA-approved manufacturer's instructions and procedures submitted in 3.1 for safety and health precautions during the removal, handling, and application of deck covering products.

3.3.1 Ensure that harmful vapors, fumes, and mists are ventilated to the exterior of the vessel.

3.4 Accomplish an unobstructed flow test of each deck drain, using clean fresh water prior to the disturbance of existing deck covering. Verify that all deck DC fittings are free, removable, and operational.

3.4.1 Blank or plug drains to prevent entry of contaminants.

3.5 Accomplish removal of the existing deck covering in its entirety (including base cove where installed) for locations requiring installation of a complete deck covering system.

3.5.1 Remove unused remnants, clips, brackets, and weldments from decks and vertical surfaces receiving new deck coverings. Chip and grind surfaces flush and smooth in way of removals.

3.6 Accomplish a visual inspection of each exposed piping penetration, deck drain, deck plating and bulkheads for structural integrity, deterioration, pitting, cracks, and areas of damage or distortion.

3.6.1 Submit one legible copy, in electronic media, of a report listing defects found in 3.6 to the SUPERVISOR.

3.6.2 Accomplish the requirements of 009-32 of 2.1 for surface preparation and primer application to each deck surface, including the adjacent vertical surfaces intersecting the deck up to one inch above the deck covering level. For this Standard Item, the term "Primer" shall refer to either the bond coat of the qualified deck covering or underlayment system (i.e., listed on the applicable Qualified Products List [QPL]), or a single coat of paint primer conforming to MIL-PRF-23236. The minimum surface preparation level shall be power tool clean to bare metal (SSPC-SP-11).

3.6.3 Install new rings and/or collars around each sounding tube and deck drain. New rings shall be CRES Grade 316, 3/8-inch high by 3/8-inch thick and installed 1/4-inch peripherally to sounding tube or deck drain. Seal each ring and/or collar to the deck, using epoxy compound conforming to MIL-PRF-24176.

3.6.4 Vacuum and solvent wipe the deck surfaces using the deck covering manufacturer's approved solvent and clean, lint-free rags. Allow deck surfaces to dry prior to proceeding with primer installation.

(I) "VISUAL INSPECTION"

3.7 Accomplish a visual inspection of the exposed base coat or underlayment surfaces (after removing the top coats in accordance with the applicable Attachment) for a deck covering system repair that requires resurfacing or partial replacement and not a complete installation.

3.8 Install epoxy underlayment conforming to MIL-PRF-3135, Type III or IV, in way of low spots, dish pans, and high points that cannot be ground flush, to provide a smooth and fair surface. Slope and fair as required to ensure positive draining to deck drains where installed. See additional requirements in the applicable Attachment. Underlayment shall be installed in accordance with NAVSEA-approved manufacturer's instructions and procedure submitted in 3.1.

***3.8.1 The MIL-PRF-3135 specification is being updated. Until it is released, applicators may substitute Type I or II products from the QPL that meet the following:***

**3.8.1.1 MIL-PRF-3135, Type III: General use, ultra-lightweight underlay materials weighing no greater than 1.0 pound per square foot (lb/sf) at 0.25-inch thickness.**

**3.8.1.2 MIL-PRF-3135, Type IV: General use, lightweight polymeric underlayment materials weighing no greater than 1.6 lbs/sf at 0.25-inch thickness that perform the functions normally provided by separate primer, underlayment, waterproof, and crack suppression membrane materials in one single, trowel, or spray applied product.**

3.9 Install a waterproof membrane in accordance with Attachment A or B, in each wet space (as defined in 4.1.10 through 4.1.15).

(I) "VISUAL INSPECTION"

3.9.1 Accomplish a visual inspection of the completely installed and cured waterproof membrane. Ensure that the waterproof membrane is installed in accordance with the applicable Attachment and is uniform and free of defects.

3.10 Accomplish the requirements of Attachment A for the installation of new Unglazed Porcelain Tile Deck Covering System, using 2.2 for guidance.

3.11 Accomplish the requirements of Attachment B for the installation of new Wear Resistant Deck Tile Covering System, using 2.2 for guidance.

3.12 Accomplish the requirements of Attachment C for the installation of new, or the resurface of existing, Cosmetic Polymeric Deck Covering System, using 2.2 for guidance.

3.13 Accomplish the requirements of Attachment D for the installation of new Electrical Grade Sheets and Matting Deck Covering System, using 2.2 for guidance.

3.14 Accomplish the requirements of Attachment E for the installation of new Carpeting Deck Covering System, using 2.2 for guidance.

3.15 Accomplish the requirements of Attachment F for the installation of new Vinyl Tile Deck Covering System, using 2.2 for guidance.

3.16 For the installation of new Fatigue Reducing Deck Tile Covering System conforming to MIL-PRF-32170 Class 2, refer to Manufacturer Technical Specification Documents.

3.17 For the installation of new Mastic (Concrete) Deck System, refer to Manufacturer Technical Specification Documents.

3.18 Newly installed deck covering systems shall be allowed to stabilize at room temperature for 24 hours prior to foot traffic and must not be washed for 48 hours.

(I) "VISUAL INSPECTION"

3.19 Accomplish a visual inspection of the completely installed and cured deck covering system. Ensure that each deck covering system is in accordance with the applicable Attachment, and is uniform and free of defects. Deck coverings with a sealer coat installed shall have a continuous surface, free of blotchy areas, puddling, air bubbles, ridge marks or runs, with no surface contaminants embedded. Imperfections that may cause premature failure or do not meet the above requirements shall be corrected before the surfaces are accepted.

(I) "UNOBSTRUCTED FLOW TEST AND POSITIVE DRAINING INSPECTION"

3.19.1 Remove blanks and plugs installed in 3.4.1 and accomplish an unobstructed flow test of each deck drain (where installed), using clean, fresh water at dockside water pressure. No obstruction allowed. For wet space decks, accomplish a positive draining inspection, using a sufficient amount of clean, fresh water throughout each deck surface to ensure that new deck covering system slopes to the drains. Water shall flow to drains and not stand or puddle.

3.19.2 Upon completion of deck covering installation, verify all deck DC fittings are free, removable, and operational.

4. NOTES:

4.1 The following are the only types of deck covering systems approved for use in the spaces listed and provide the best balance between highest service life and lowest maintenance. The first system listed is preferred. Selection of one of the **unapproved** systems may result in reduced service life or require additional steps to maintain. The selection of Cosmetic Polymeric deck covering materials can result in a significant weight increase over other deck types (i.e. deck tiles, etc.). NAVSEA authorization is required to install non-preferred materials, including in spaces where other deck covering types were installed or specified in Ship's Class Drawings. This listing supersedes Table 634-2-1 of 2.2. THE INSTALLATION OF ANY UNAPPROVED DECK COVERING MATERIAL, OR THE INSTALLATION OF A NON-PREFERRED MATERIAL NOT LISTED HEREIN FOR A GIVEN SPACE WILL REQUIRE NAVSEA APPROVAL AS A MAJOR DEPARTURE FROM SPECIFICATION.

4.1.1 Dry interior spaces (living and working spaces, including offices, berthing, medical spaces, manned storerooms and passageways serving those spaces): A) Wear Resistant Deck Tile; B) Cosmetic Polymeric Type I or Type II, Class 2; C) Cosmetic Polymeric Type III; D) Vinyl Tile.

4.1.2 Pilot House and Control Stations, Chart Room, Combat Information Center, Barber Shop, and Ship's Store: A) Fatigue Reducing Deck Tiles; B) Cosmetic Polymeric Type I or Type II, Class 2; C) Cosmetic Polymeric Type III; D) Wear Resistant Deck Tiles; E) Vinyl Tile.

4.1.3 Dry interior spaces (Flag Quarters, CO and XO Quarters, other quarters of equivalent rank (such as Troop CO Quarters), Wardroom and CPO Lounges, and Chapel): A) Carpet; B) Wear Resistant Deck Tile.

4.1.4 Messing areas: A) Porcelain Tile; B) Wear Resistant Deck Tile; C) Cosmetic Polymeric Type I or Type II, Class 2; D) Cosmetic Polymeric Type III; E) Vinyl Tile.

4.1.5 Laboratory and electrical/electronic workshops (electrical grade sheets are required in all designated electrical areas such as CCTV Control Rooms, Electric Power Conversions, IC and Gyro Rooms, Radar Rooms, and Control Rooms; electrical mats are required in all non-designated electrical areas where specific electrical hazards may exist): A) Electrical Grade Sheet; B) Wear Resistant Deck Tile (except in spaces where petroleum products are used), with Electrical Grade Mats in Electrical/Electronic Workshops; C) Cosmetic Polymeric, Type I or Type II, Class 2, with Electrical Grade Mats in Electrical/Electronic Workshops; D) Cosmetic Polymeric, Type III, with Electrical Grade Mats in Electrical/Electronic Workshops.

4.1.6 Carpenter and machine shops, and other shops spaces: A) High Durability deck paint, with nonskid in front of machinery in accordance with 009-32 of 2.1.

4.1.7 Side passageways only serving shop spaces (not main passageways): A) High Durability deck paint in accordance with 009-32 of 2.1.

4.1.8 Machinery spaces (excluding bilges): A) High Durability deck paint in accordance with 009-32 of 2.1, with nonskid in working areas around machinery and electrical grade mats around electrical switchboards.

4.1.9 Dry goods store rooms with storage racks installed: A) High Durability deck paint in accordance with 009-32 of 2.1.

4.1.10 Sanitary spaces (washrooms, water closets and showers): A) for all surface ships, Porcelain Tile with a waterproof membrane (3x3 inch tiles).

4.1.11 Small enclosed spaces attached to sanitary spaces (e.g., closets containing hot water heaters): A) Porcelain Tile; B) High Durability deck paint in accordance with 009-32 of 2.1.

4.1.12 Food service spaces (galley, scullery, butcher shop, bakery, meat preparation rooms, food service lines): A) Quarry Tiles; B) Porcelain Tile (6x6 or 8x8 inch); C) Cosmetic Polymeric, Type I or II, Class 2; D) Cosmetic Polymeric, Type III.

4.1.13 Trash compactor rooms: A) Porcelain Tile (6x6 or 8x8 inch); B) Mastic (concrete) deck system.

4.1.14 Other wet working spaces (Nixie Rooms, etc): A) High Durability deck paint with nonskid in walking areas in accordance with 009-32 of 2.1.

4.1.15 Laundry facilities: A) Porcelain Tile (6x6 or 8x8 inch) with Waterproof Membrane and Epoxy Adhesive and Grout only; (B) Cosmetic Polymeric, Type I or Type II; C) Cosmetic Polymeric, Type III.

4.1.16 Unmanned spaces (wet or dry): A) High Durability deck paint in accordance with 009-32 of 2.1.

4.2 The SUPERVISOR will select type, color, and pattern of deck coverings (with input from Ship's Force when possible), using all available samples supplied by the manufacturer.

4.3 The exact location of work will be indicated in the invoking Work Item, including the type (and grade or class) of deck covering, the location (space name and number and if entire space, within the coaming, not under furniture, etc.) and the required Table, Line, and Column from 009-32 of 2.1 for surface preparation. Locations that are to receive partial replacement or resurfacing/resealing shall also be indicated as such in the invoking Work Item (e.g., replacing carpet over existing underlayment, etc.).

4.4 The intent of 3.19.2 is to verify that deck drain covers, remote operating gear deck box covers, and other DC fittings have not been sealed over during the installation of sealer coats and/or deck covering installation and are removable and operational.



ATTACHMENT A  
UNGLAZED PORCELAIN TILE

1. Porcelain tile shall be installed in locations listed in 4.1, including the Bakery, CO Pantry, Galley and Scullery, Solid Waste Processing Room, Filter Cleaning Shop, Plastic Waste Equipment Room and Storeroom, sanitary spaces, storerooms where heavy condensation is common, Mess rooms, small enclosed spaces attached to sanitary spaces (e.g., closets containing hot water heaters), Trash Compactor Rooms, Laundry Facilities, and all other difficult to clean wet spaces.

A. Porcelain tile shall meet the requirements of ANSI A137.1 and be unglazed, with a minimum coefficient of friction (COF) of 0.7 dry and 0.6 wet when tested in accordance with ASTM D 2047 or ASTM C 1028.

B. Adhesive and grout shall both be epoxy, chemical resistant, and water cleanable, in accordance with ANSI A118.3.

C. The underlayment shall be either Type III or Type IV, and listed on QPL-3135.

D. Waterproof membrane. If MIL-PRF-3135, Type III underlayment is selected, an epoxy based waterproof membrane shall be applied between the underlayment and the tile in all wet spaces. The membrane shall be in accordance with ANSI A118.10, and be certified by the manufacturer to be compatible with both the underlayment and the installed deck covering. The membrane shall be one continuous barrier covering the entire deck, including the cove base 100 mm (4 inches) up each vertical surface. MIL-PRF-3135, Type IV underlayment does not require application of a waterproof membrane.

E. Concrete.

(1) Fabricate and install box units around hard to reach areas, i.e., vent ducting, stuffing tubes, and pipe brackets.

(2) Apply concrete (DEX-O-TEX A-70 or DEX-O-TEX A-70 (VLW)) by pouring into boxed area to produce slope towards deck drains and to provide vertical surfaces and square corners that suit application of cove tiles.

(3) Remove box units when concrete is cured sufficiently in accordance with 2.2.

F. Mortar and tile.

(1) Apply an ANSI A118.3 epoxy mortar to the deck and on vertical surfaces up 4 inches from the deck.

(2) Porcelain tiles 75 mm by 75 mm (3-inch by 3-inch) shall be installed in all sanitary spaces.

(3) Porcelain tiles with 150 mm or 200 mm (4-inch by 4-inch or 6-inch by 6-inch) squares shall be installed in other spaces.

(4) Ceramic cove base and bull nose top pieces shall be used on the vertical portions of the tile system.

(5) The tiles must be stored flat.

(6) The application and installation of mortar and tile may have to be accomplished in sections if the area is so large as to prevent laying tiles within mortar pot-life.

(7) Periodically lift a set tile and inspect to ensure that 100 percent contact between mortar and tile is achieved and that there is no entrapped air in the mortar.

(8) Tiles, mortar and deck shall be allowed to stabilize to a temperature as close as practicable to room temperature, but in all cases between 64 degrees Fahrenheit and 81 degrees Fahrenheit for a period of 24 hours before, during, and after installation.

(9) The deck should be protected from traffic for 24 hours after installation, and decks must not be washed for 48 hours.

#### G. Grout.

(1) Mix and apply an ANSI, A118.3 epoxy grout by working it into tile seams to ensure air pockets are eliminated.

(2) Clean epoxy grout residue from the surface of the tile.

(3) Protect tile from foot traffic for a minimum of 24 hours.

H. Deck drain sealant installation. In the area between the tile, mortar, and collar joint, install a waterproof sealant conforming to SAE-AMS-S-8802, Class B, MIL-S-24340, 3M 5200 Fastcure Marine Sealant, or NAVSEA-approved equivalent, around the entire circumference of the deck drain to the tile and mortar interface.

ATTACHMENT B  
WEAR RESISTANT DECK TILE

1. Wear resistant deck tiles shall be installed in locations listed in 4.1, including all living and working spaces, including: Offices, Battle Dressing Stations, Barber Shop, Automated Data Processing Rooms, Bunkrooms, Pilot House and Control Stations, Training Room/ Library, Chart Room, Living Spaces, Recreation Rooms, Ship Store, Lounges, Issue Rooms, Labs, Morgue, Staterooms, One-man Baths (e.g., Flag Quarters, CO and XO Baths), Manned Storerooms, and passageways serving those spaces.

A. Wear resistant deck tiles shall be a Chlorine Free Tile System certified to meet the performance requirements of MIL-PRF-32170, Class 1.

(1) Type I - Deck tile system for general use

(2) Type II - Deck tile system for use onboard submarines.

B. For locations adjacent to wet space bulkheads where the coaming to deck joint is not 100 percent seam welded, and any other locations identified in the individual Work Item, where there is an increased likelihood of water penetration under the deck covering (e.g., around refrigerated vending machine foundations, AC spot cooler drains, etc.), a waterproof membrane meeting ANSI 118.10 or MIL-PRF-3135 Type IV underlayment shall be applied along the joint between the vertical surfaces and the deck. The membrane shall be applied in a continuous stripe a minimum of 100 mm (4 inches) up the vertical surfaces and 100 mm (4 inches) away from the joint along the deck. This membrane or Type IV underlayment shall be applied before installation of any other underlayment required to fair the deck in 3.8.

C. The adhesive shall be as recommended by the manufacturer. For adhesive application, the substrate temperature shall be between 64 degrees Fahrenheit and 81 degrees Fahrenheit, with a relative humidity maximum of 75 percent. The temperature and relative humidity shall be stabilized 24 hours prior to and after installation.

D. Tile:

(1) Tiles, adhesive, and sub-floor should be allowed to stabilize to a temperature as close as practicable to room temperature, but in all cases shall be between 64 degrees Fahrenheit and 81 degrees Fahrenheit for a period of 24 hours before, during, and after tile installation.

(2) The tiles must be stored flat.

(3) The deck should be protected from traffic for 24 hours after tile installation, and decks shall not be washed for 48 hours.

(4) Do not spring wear resistant deck tiles into position. Tiles requiring hand cutting must not be cut oversize and then sprung (forced) into position. The tile shall be cut such that they fit neatly into position without a gap between them and not requiring

bending or application by force. Tiles can be taped together with masking tape to pull joints together during curing of the adhesive.

(5) The deck should be rolled initially by hand with a vinyl seam roller. Two to 4 hours after application of the adhesive, but prior to adhesive setting, the tiled surface should be rolled with a 100 lb. floor tile roller to ensure a good bond between the tiles, adhesive, and sub-floor.

(6) Clean away excess adhesive before it is allowed to dry. For water based adhesive use a soft cloth moistened with denatured alcohol. Do not use mineral spirits, which will cause swelling and have a tendency to curl.

E. Seal all edges of the tile including penetrations for pipes, foundations, vents, and other structures with a waterproof sealant conforming to SAE-AMS-S-8802, Class B, MIL-S-24340, 3M 5200 Fastcure Marine Sealant, or NAVSEA-approved equivalent.

F. Tile system imperfections found, which may cause premature failure, shall be corrected before the tile system is accepted. Slight imperfections in the tile system are allowable, as long as they will not result in premature failure of the tile system in the immediate vicinity of the imperfection. Such slight imperfections should be left intact, as trying to correct them could result in damage to the surrounding tile system.

ATTACHMENT C  
COSMETIC POLYMERIC DECK COVERING

1. Cosmetic polymeric deck coverings shall be installed in locations listed in 4.1, including all living and working in areas where moisture is to be expected and a level of clinical cleanliness must be maintained such as Casualty Decontamination Station, Cleaning Gear Lockers, Medical and Dental Spaces (including Triage, Surgical Pre-Op, Scrub Room, and Medical X-ray Exposure Room), Oil and Water Test Laboratory, Laundry, and Explosive Ordnance Disposal Work Center. Medical and Dental Spaces, only Type I, Class 2 or Type II, Class 2 cosmetic polymeric deck types shall be used.

A. All cosmetic polymeric products shall conform to the appropriate Type and Class of MIL-PRF-24613. A 50 mm to 100 mm (2-inch to 4-inch) high cove shall be installed.

- Type I has a primary matrix consisting of epoxy resin and aggregate or topping material of suitable size such that it need not be ground before the applications of the sealer coats.
- Type I, Class One, is an epoxy matrix material and colored quartz aggregate.
- Type I, Class 2, is an epoxy matrix material and color flake topping.
- Type I, Class 3, is an epoxy matrix material and marble as the primary aggregate.
- Type I, Class 4, is an ultra-lightweight epoxy matrix combination underlayment and finish deck covering system with a decorative color scheme that can be applied in a single step prior to sealing.
- Type II has a primary matrix consisting of urethane resin and aggregate or topping material of suitable size such that it need not be ground before the applications of the sealer coats.
- Type II, Class One, is a urethane matrix and colored quartz aggregate.
- Type II, Class 2, is a urethane matrix and color flake topping.
- Type III has a primary matrix consisting of polymeric resin (such as epoxy, polyester or polyurethane) and is applied as a single trowel step, requiring no sealer or topcoat.
- Type III, Class 1, is a flexible, waterproof combination underlayment and finish deck covering system with a decorative color scheme that can be applied in a single step.

B. An aggregate (e.g., white aluminum oxide or glass beads) shall be included in the final seal coat to provide slip resistance for all cosmetic polymeric deck types. The aggregate shall provide a slip

resistance minimum coefficient of friction (COF) of 0.7 dry and 0.6 wet when tested in accordance with ASTM D 2047 for all cosmetic polymeric deck types.

C. The materials must be stored and mixed at a temperature between 60 degrees Fahrenheit and 80 degrees Fahrenheit for best mixing and application properties.

D. Maintain deck surface and room temperature in accordance with the NAVSEA-approved manufacturer's instructions and procedures submitted in 3.1 for proper curing during application and for at least 24 hours after installation.

E. For complete installations, apply base coat, color coat, color chips and sealer (as applicable for the Type being installed) in accordance with NAVSEA-approved manufacturer's instructions. For color-flake systems, installation of the color chips shall be approximately 20 percent of the color coat area. When the NAVSEA-approved manufacturer's instructions require multiple coats of sealer to be applied, lightly sand the entire deck surface before applying the final seal coat to remove high points (remove all sanding residue prior to application of the final seal coat).

F. For resurface installations, mechanically abrade the existing sealer, color coat and color chips, exposing the base coat. Repair torn, punctured or defective base coat areas with primer (see 3.6.2) and new base coat. Apply new color coat, color chips (20 percent of the color coat area) and sealer coats in accordance with the NAVSEA-approved manufacturer's instructions and procedures submitted in 3.1. Lightly abrade the entire deck surfaces between sealer coats to remove high points (remove all sanding residue before applying the next coat of sealer).

G. Resealing operations shall be conducted in accordance with the NAVSEA-approved manufacturer's instructions and procedures submitted in 3.1.

ATTACHMENT D  
ELECTRICAL GRADE SHEETS AND MATTING

1. Electrical grade sheets shall be installed in locations listed in 4.1, including all designated electrical areas. Electrical grade mats shall be installed in locations listed in 4.1, including all non-designated electrical areas where electrical hazards may exist.

A. Electrical grade sheet deck covering shall conform to MIL-DTL-15562, Type I, and the fire resistance requirements of MIL-STD-1623.

B. Seams shall not be within 914 mm (3 ft) of electrical/electronic equipment, panels, and workbenches. If this is unavoidable, electrical grade sheet, 2 meters (79 inches) wide of MIL-DTL-15562, Type I, shall be installed; and heat-weld or chemically seal the seams to provide a continuous surface free of seams, craters, or porosities.

C. Chemically sealed seams shall be backed with 20 mil thick polyvinyl chloride tape, with a high-tack adhesive, 7 kN/m (40 lb/in) breaking strength, a dielectric strength of 20,000 volts in accordance with ASTM D 1000, and with a 50 mm (2-inch) minimum overlap under each side of the seam. Alternative means of chemically sealing seams must be pre-approved by the Naval Technical Authority.

D. Seal all edges of the tile including penetrations for pipes, foundations, vents, and other structures with a waterproof sealant conforming to SAE-AMS-S-8802, Class B, MIL-S-24340, 3M 5200 Fastcure Marine Sealant, or NAVSEA-approved equivalent.

2. Electrical grade matting shall conform to MIL-DTL-15562, Type II or III, and meet the fire resistance requirements of MIL-STD-1623. Exposed corners shall be rounded off.

A. Cementing of the mat is optional, but if the mat is not cemented, an outline of the area covered by the mat shall be stenciled on the deck. Inside the outlined area the following shall be stenciled in 20 mm (0.8 inch) or larger letters: "ELECTRICAL GRADE MAT REQUIRED WITHIN MARKED LINES".

B. Over removable deck plates, the mats shall be installed without cement and marked as detailed above.

ATTACHMENT E  
CARPETING

1. Carpeting shall be installed in locations listed in 4.1.

A. Carpets shall be wool, velvet weave, woven through the back, conforming to the fire requirements of MIL-STD-1623. With the exception of Submarine Installations, carpets shall be treated with a soil retardant treatment such as 3M Brand Carpet Protector or equal prior to use.

B. The carpet shall be either single cut pile ( $17 \text{ N/m}^2$  (52 oz./yd<sup>2</sup>) pile), single level loop pile - woven through back ( $13.9 \text{ N/m}^2$  (42 oz./yd<sup>2</sup>) pile), or multilevel loop pile - woven through back ( $14.6 \text{ N/m}^2$  (44 oz./yd<sup>2</sup>) pile), or be specifically approved by the SUPERVISOR.

C. Carpets shall cover the deck completely, but shall be fitted around all permanently installed furniture.

D. Carpets shall be installed without pad over a primed steel or aluminum deck by a tackless procedure, or with an adhesive as recommended by the carpet manufacturer. ***For DDG 51-Class ships, acoustic insulation is authorized for use under carpeting in CO and XO cabins.***

E. A clean, bright CRES or aluminum metal strip shall be installed to tie down edges of the carpet in foot traffic areas where the carpet abuts other deck covering.



ATTACHMENT F  
VINYL TILE

1. Vinyl tile shall be installed in locations listed in 4.1.

A. Vinyl deck tiles shall conform to ASTM F 1066, Class 2, and shall be 1/8-inch thick for maximum durability. Tiles must also conform to MIL-STD-1623 (Fire Test Requirements).

B. Vinyl tile epoxy cement shall be a qualified proprietary part of the new deck covering system applied in accordance with NAVSEA-approved manufacturer's instructions and procedures submitted in 3.1.

C. Installations shall be bulkhead to bulkhead and squared off on adjacent stiffeners and stanchions. Where the exposed edge fails to butt up against a fitting or bulkhead, a vinyl beveled edge strip, or a stainless/brass strip (one inch by 0.08 inch) shall be cemented (with epoxy adhesive) to the deck to protect the edge.

D. Seal all edges of the tile including penetrations for pipes, foundations, vents, and other structures with a waterproof sealant conforming to SAE-AMS-8802, Class B, MIL-S-24340, 3M 5200 Fastcure Marine Sealant, or NAVSEA-approved equivalent.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-27  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Material Identification and Control (MIC) for Level I Systems;  
accomplish

2. REFERENCES:

2.1 0948-LP-045-7010, Material Control Standard

2.2 0948-LP-045-7020, Material Control Standard (Material Designators)

2.3 S9086-GY-STM-010/CH-221, Boilers

3. REQUIREMENTS:

3.1 Provide and maintain a Material Identification and Control (MIC) System in accordance with 2.1 and 2.2 for both Government furnished and contractor furnished materials utilized in the installation, alteration, and repair of systems or portions of systems designated as MIC LEVEL I by Work Items in the Job Order. The system shall be described in a written procedure and shall be available for review and acceptance by the SUPERVISOR prior to the initiation of productive work. It shall specifically address, as a minimum, the following:

3.1.1 Assignments of responsibility for identification and control of LEVEL I material including working level instructions for:

3.1.1.1 Procurement of LEVEL I material.

3.1.1.2 Receipt inspection and verification of LEVEL I material including marking requirements.

3.1.1.3 Storage of LEVEL I material including segregation from non-LEVEL I materials.

3.1.1.4 Handling and issue of LEVEL I material.

3.1.1.5 Control of LEVEL I material during installation.

3.1.1.6 Maintaining the integrity and continuity of marking LEVEL I material from receipt inspection through installation.

3.2 Submit one legible copy, in electronic media, of the LEVEL I certification, inspection, and installation records to the SUPERVISOR at the completion of work and/or a minimum of 24 hours prior to system testing/operation.

4. NOTES:

4.1 LEVEL I designation applies only to materials specified in 2.1 and Figure 221-2-12 of 2.3.

4.2 Certification records in 3.2 are those records which provide Objective Quality Evidence (OQE) as defined in 2.1.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-28  
DATE: 14 JUL 2005  
CATEGORY: II

1. SCOPE:

1.1 Title: Metal-Sprayed Coating System for Corrosion Protection;  
accomplish

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-2138, Metal-Sprayed Coatings for Corrosion Protection Aboard  
Naval Ships (Metric)

2.3 0948-LP-045-7010, Material Control Standard

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.2 for metal-sprayed aluminum coating  
applications.

3.2 Apply manufacturer's proprietary coating system to the flame-sprayed  
components in accordance with manufacturer's instructions, in lieu of the  
epoxy system MIL-DTL-24441.

3.3 Maintain segregation and record identification markings of Material  
Identification and Control (MIC) LEVEL I material. Restore LEVEL I markings  
after coating process in accordance with 2.3.

3.3.1 Accomplish the requirements of 009-27 of 2.1.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-29  
DATE: 29 JUL 2004  
CATEGORY: I

1. SCOPE:

1.1 Title: Asbestos-Free Pipe Hanger Liner Material; install

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Install new fibrous glass pipe hanger liners in lieu of liners containing asbestos material. This requirement applies only where hangers and pipes are removed or new hangers are being installed.

3.2 New liner material shall be in accordance with MIL-C-20079, Type II, Class 4, for temperatures over 180 degrees Fahrenheit up to 650 degrees Fahrenheit.

3.3 For services above 650 degrees Fahrenheit where minimum contact area type hanger designs (similar to that shown in MSS SP-58) are required, no liner material is used.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-30  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Boiler Sample Tubes; inspect

2. REFERENCES:

2.1 S9221-C1-GTP-010, Repair and Overhaul Main Propulsion Boilers

3. REQUIREMENTS:

3.1 Remove tubes using tube-sampling methods in accordance with Paragraph 3.4 of 2.1.

3.1.1 Cut generating tubes removed as samples 8 to 10 inches above the water drum.

3.2 Identify and metal-tag tubes, tube stubs, and tube sections removed, with ship's name and hull number, Work Item number, boiler number, tube designation, bottom and top of sections, segment sequence, upstream side (furnace face), and downstream side of gas flow.

3.2.1 Cut tube removed into 3-foot minimum segments and split longitudinally by mechanical method with tube dry (no oil) so that upstream side (furnace face) half is split from side downstream of gas flow half.

3.2.1.1 There shall be 2 distinct, individual halves to each segment, tube stub, and bend.

3.2.1.2 Each half (waterside/steamside and fireside) shall remain intact.

3.2.2 Identify and metal-tag each segment and half in accordance with 3.2 so that full length of tube may be reconstructed and placement oriented.

3.3 Inspect tube segments for the following:

3.3.1 Steamsides/watersides:

3.3.1.1 Oil deposits

- 3.3.1.2 Loose sludge
- 3.3.1.3 Hard baked-on sludge
- 3.3.1.4 Scale
- 3.3.1.5 Scabs/tubercles
- 3.3.1.6 Pitting
- 3.3.1.7 High temperature oxides
- 3.3.1.8 Waterside grooves
- 3.3.1.9 Corrosion fatigue fissures
- 3.3.1.10 General waterside thinning
- 3.3.1.11 Waterside burning
- 3.3.1.12 Waterside abrasion
- 3.3.1.13 Die marks
- 3.3.1.14 Steam tracking
- 3.3.1.15 Stress corrosion cracking (caustic embrittlement)
- 3.3.2 Firesides:
  - 3.3.2.1 General fireside thinning
  - 3.3.2.2 Fireside burning
  - 3.3.2.3 Tube enlargement
  - 3.3.2.4 Swaging
  - 3.3.2.5 Sagging
  - 3.3.2.6 Warping
  - 3.3.2.7 Heat blisters
  - 3.3.2.8 Thermal cracks
  - 3.3.2.9 Mechanical fatigue cracks
  - 3.3.2.10 Steam gouging

3.3.3 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.3 to the SUPERVISOR.

3.4 Collect samples (equal to a heaping tablespoon each) of waterside soft and hard deposits for each boiler.

3.4.1 Soft deposits - Place the tube segments in a vise with the waterside up and wirebrush watersides. Collect loose residue in a bottle. Label bottle with the title Soft Deposits, ship, boiler number, and tube number.

3.4.2 Hard deposits - Place the tube segment in a vise with the waterside up and power wirebrush watersides to remove loose residue. Crimp the tube segment slowly allowing flakes of hard sludge to fall back into the tube. Collect the loose flakes in a bottle. Label bottle with title Hard Deposits, ship, boiler number, and tube number.

3.5 Package tubes, deposit samples, and a copy of report (3.3.3) and send to a laboratory qualified to accomplish chemical analysis.

3.5.1 Analyze the tube samples for the following:

3.5.1.1 Tube wall thickness at zero, 90, 180, and 270-degree positions

3.5.1.2 Extent of pitting (major pit depths and average overall pitting)

3.5.1.3 Thickness of hard scale mineral deposits

3.5.2 Analyze deposit samples for specific mineral composition in percentages of calcium, magnesium, and silicon oxide.

3.5.3 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.5.1 and 3.5.2 to the SUPERVISOR.

#### 4. NOTES:

4.1 Sample tube(s) replacement will be included in the invoking Work Item.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-31  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Boiler Waterjet Cleaning; accomplish

2. REFERENCES:

2.1 S6300-AE-MMA-010, Waterjet, Model WBD-150N, Operation, Maintenance, Repair and Overhaul Procedures

3. REQUIREMENTS:

3.1 Accomplish the requirements of this item for waterjet cleaning of boiler watersides, using manufacturer's equipment manual and 2.1 for guidance.

3.1.1 Portable extension lights shall conform to MIL-F-16377/49, Symbol 306.2 or MIL-F-16377/52, Symbol 286.

3.1.1.1 Ground each light fixture at the voltage source.

3.1.2 The high-pressure waterjet cleaning unit shall be operated at no more than 10,000 pounds per square inch (PSI).

3.1.3 Rope off and post warning signs in the areas where the unit is operating, where the high-pressure hose is run, and where the waterjet cleaning is to be accomplished.

3.1.4 Unit shall be stopped immediately if high-pressure leaks occur in pump, piping, high-pressure hose, or hose couplings.

3.1.5 While personnel are waterjetting, lance operator shall be in direct visual contact with control gun operator stationed outside of boiler. Control gun operator shall also maintain direct person-to-person voice communication with pump operator, using telephone, radio, or other positive direct means. Communication relay through intermediaries is not acceptable.

3.1.6 The control gun operator shall be able to regulate the flow of water to permit the system to be pressurized during the actual tube cleaning and have the nozzle pressure reduced to zero while the operator removes the lance from one tube and inserts it into the next tube to be cleaned.

3.2 Cleaning equipment shall meet minimum requirements listed herein:

3.2.1 Supply hose from the pump to the control gun shall be 1/2-inch inside diameter (I.D.) with 30,000 PSI minimum burst pressure and shall not exceed 400 feet in length. A 15-foot length of supply hose shall be attached between the control gun and the flexible lance.

3.2.2 Provide a high pressure return line from the control gun dump connection to the waterjet supply tank, on units that discharge pressure to the bilges between cycles.

3.2.3 Tube cleaning nozzle shall be non-rotating. Orifices in the nozzles shall be angled back 30 degrees. Nozzles shall have a minimum of 18 orifices evenly spaced around the circumference. Each orifice shall be 0.024 inch in diameter, plus or minus 0.001 inch.

3.2.4 Fan pattern nozzle attached to a rigid lance for cleaning drum and header surfaces.

3.2.5 Lance and nozzle burst pressure ratings shall be 25,500 PSI minimum. Lance shall be 0.229 inch or larger I.D. and shall have a smooth Teflon core, and shall not exceed 25 feet in length.

3.2.6 Waterjet cleaning solution shall consist of one pound of sodium nitrite to 100 gallons of clean, fresh water.

3.3 Maintain operating pressures and flow rates for boiler cleaning as follows:

3.3.1 Boiler tube cleaning - 10,000 PSI maximum, 9,000 PSI minimum pump discharge pressure at 20 gallons per minute.

3.3.2 Drum and header surface cleaning - 7,500 PSI maximum, 6,500 PSI minimum pump discharge pressure, at 12 to 14 gallons per minute.

3.4 Verify waterjet cleaning equipment capability prior to commencement of work.

3.4.1 Place the lance and nozzle that will be utilized in waterjet cleaning securely into a container. Ensure lance cannot break loose and that unit output is 20 gallons per minute.

3.5 Accomplish cleaning operations as follows:

3.5.1 Lance and nozzle shall traverse the entire length of every tube cleaned.

3.5.1.1 Downcomer, riser, and support tubes shall be traversed twice.

3.5.2 The lance and nozzle shall traverse the tubes at a maximum rate of one foot per second.

3.5.3 A fan nozzle shall be used to clean entire interior drum surfaces.

3.6 Pump waterjet wastewater effluent from boiler to a holding container or a waterjet wastewater recycling unit. Do not drain wastewater to bilges.

3.6.1 Waterjet wastewater recycling filter process shall be capable of filtering the wastewater effluent to meet the following criteria:

Suspended Solids	< 10 mg/L
Sodium Nitrite	1100 - 1300 mg/L
Ph	6.5 - 8.5
Nitrate	< 10 mg/L
Oil and Grease	< 5 mg/L

3.6.1.1 Recycled wastewater discharge samples shall be taken every 3,000 gallons to ensure levels do not exceed the above criteria.

3.6.2 Remove and dispose of spent chemicals and solutions in accordance with federal, state, and local regulations.

3.7 Dry tubes, headers, drums, and downcomers using clean, dry air immediately upon completion of waterjet cleaning. Remove pockets of water and dry surfaces using clean rags.

(V)(G) "CLEANLINESS"

3.8 Inspect surfaces to ensure the following requirements are met:

3.8.1 Surfaces shall be dry.

3.8.2 There shall be no evidence of flash rusting.

3.8.3 There shall be a streaking effect seen when looking into the tubes. The streaking effect shall begin within one to 2 inches from the tube end and continue through the visible length of the tube.

3.8.4 Soft deposits and obstructions shall be removed.

3.8.5 Residual sodium nitrite deposits remaining after the surfaces are dried is acceptable.

#### 4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-32  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Cleaning and Painting Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S9086-VD-STM-010/020/030/CH-631, Preservation of Ships in Service

2.3 29 CFR 1915, Occupational Safety and Health Standards for Shipyard Employment, Subparts C and Z

2.4 Systems and Specifications, SSPC Painting Manual, Volume 2

2.5 NACE Book of Standards

2.6 S6360-AG-MAN-010, Camouflage Manual, Surface Ship Concealment

2.7 ASTM D 4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

2.8 ISO 8502-3, Assessment of Dust on Steel Surfaces Prepared for Painting (Pressure Sensitive Tape Method)

2.9 S9086-CN-STM-020/CH-079, Damage Control - Practical Damage Control

2.10 S9086-VG-STM-010/CH-634, Deck Coverings

2.11 S9086-RK-STM-010/CH-505, Piping Systems

2.12 MS6310-081-015, Submarine Preservation

3. REQUIREMENTS:

3.1 General Preservation Requirements:

3.1.1 Consider marine coatings to contain heavy metals (e.g., lead, cadmium, or chromium), hexavalent chromium, crystalline silica and/or other toxic or hazardous substances.

3.1.2 Accomplish safety precautions as specified in 2.2, 2.3, and the Work Item/task order during surface preparation and the application or removal of marine coatings.

3.1.3 Blast Media:

3.1.3.1 **Maintain a current copy of** material certification of abrasive blast media conforming to MIL-A-22262 or A-A-1722 **for reference by the SUPERVISOR. Copy shall be available starting** 7 working days prior to blasting. MIL-A-22262 abrasives must be listed on the Qualified Products List (QPL), or the **repair activity** shall have written notification from NAVSEA indicating pending listing on the QPL. **Submit one legible copy, in hard copy or electronic media, to the SUPERVISOR upon request.** For A-A-1722 abrasives, a complete data package demonstrating compliance with the requirements must be provided by the supplier to the procuring activity. Exceptions are listed in 3.1.3.2 and 3.1.3.3.

3.1.3.2 Spongejet may be used as an alternative to obtain SSPC-SP 10 or SSPC-SP 11 cleanliness.

3.1.3.3 Recyclable ferrous metallic abrasive materials conforming to AB-3 of 2.4 may be used as an abrasive blast media for steel substrates. Cleanliness of recyclable ferrous metallic abrasive materials shall be measured and maintained in accordance with the requirements of AB-2 of 2.4.

3.1.3.4 For requirements specified in 3.1.3.3, **maintain a current copy of** the results of the quality control requirements of Paragraph 6 of AB-2 and quality assurance test required by Paragraph 5 of AB-3 of 2.4 **for reference by the SUPERVISOR. Submit one legible copy, in hard copy or electronic media, to the SUPERVISOR upon request.**

3.1.4 Abrasive blast steel and aluminum plates, shapes, and ferrous piping, equal to NACE 2/SSPC-SP 10 of 2.4 and 2.5, establishing a surface profile that meets the requirements of 3.10.6, and **coat**, prior to shipboard installations except in the areas where weld joints remain to be accomplished, or unless specified otherwise in the invoking Work Item or task order. **Except for potable water tanks, feedwater tanks, and freshwater drain collecting tanks, the requirements of Notes (26) and (29A) do not apply to these materials.**

3.1.4.1 Non-ferrous piping, which is to be preserved shipboard, shall be hand tool (non-impact tools only) cleaned in accordance with SSPC-SP 2 of 2.4. Preservation of non-ferrous piping one inch in diameter or less does not require surface preparation.

3.1.5 For touch-up, disturbed, and/or inaccessible areas (terms are clarified in 3.6), the minimum surface preparation shall be that shown in Tables One through 9, except that an SSPC-SP 11 is acceptable for areas originally requiring a NACE 2/SSPC-SP 10 or NACE 5/SSPC-SP 12. For submarines this shall be determined by inspection and agreed to by the SUPERVISOR.

3.1.6 Feather edges of well-adhered paint remaining after cleaning for all surface preparation methods. Feathering is explained in more detail in 3.6.5.

3.1.7 Clean insulation and lagging prior to painting; ensure such areas are free of foreign matter and contaminants that would prevent adherence of paint.

3.1.8 Clean and dry all prepared and previously painted surfaces; ensure such surfaces are free of foreign matter that will affect adherence of paint coatings. Inclusions such as dust and debris in the paint film shall be removed prior to the application of the next coat.

3.1.9 Record and restore existing painted labels, compartment designations, hull markings, and other painted information which will be removed or covered during cleaning and painting operations.

3.1.10 Install masking material for protection of equipment and items not to be painted during preservation. Shipboard items not to be painted are listed in 2.2 and 2.12. Remove masking material upon completion of final coating.

3.1.11 Unless otherwise specified, all paints and coatings that are qualified to performance specifications (MIL-PRF) are to be applied in accordance with the manufacturer's NAVSEA-approved ASTM F718 product data sheet. The dry film thickness (DFT) requirements stated herein take precedence over the NAVSEA-approved ASTM F718 data sheets if there is a conflict. The NAVSEA-approved ASTM F718 data sheets shall supersede any other manufacturer's ASTM F718 data sheets for that product, even if it is newer (more recent) than the NAVSEA-approved ASTM F718 data sheets. Copies of the NAVSEA-approved ASTM F718 data sheets are available from the National Surface Treatment Center (NST Center) website: <http://www.nstcenter.com>.

3.1.12 Intentionally left blank.

3.1.13 *Store paint and nonskid system components in a cool, dry place. Do not expose to freezing temperatures or direct sunlight. For both paint and nonskid, storage ambient temperature shall be maintained between 65 and 85 degrees Fahrenheit. Low temperature nonskid systems (non-skid and primer) shall be stored between 65 and 85 degrees Fahrenheit with the optimal storage temperature being 70 and 80 degrees Fahrenheit.*

3.1.13.1 *Monitor the storage temperature over the 24-hour period prior to initiation of the application process and document the minimum and maximum temperatures. If recorded manually, temperature shall be recorded once per shift during the 24-hour period. Manual readings are not necessary if monitoring equipment is used that tracks minimum and maximum temperature for the 24-hour period.*

3.1.13.2 *As an alternative to the storage monitoring requirement for paint and nonskid in 3.1.13.1, a maximum of 1 hour before application of products, measure individual components (after each is mixed, but before components are combined together) with a paint thermometer to confirm that each component of the system is within the required range.*

3.1.14 When applying paint, multiple coats shall be of contrasting colors, unless specifically stated otherwise in Tables One through 9.

3.1.15 When using multiple component (such as 2-part) coating systems (e.g. epoxies and polyurethanes), use of "partial kits" is prohibited unless using verified proportioning equipment or other verified measuring equipment (gravimetric).

3.1.16 For surface ships, for commercial underwater hull coating systems including anti-corrosive paints and anti-fouling paints, the manufacturer's primer must be used with its anti-fouling coating. No substitution is allowed. Successive coats of anti-corrosive paints shall be of a contrasting color. Coats of anti-fouling paints shall be of the colors stated in Tables One through 5.

3.1.16.1 For all ships, anti-fouling coatings may be repaired, touched-up, and/or overcoated as defined in 4.3 with any other approved ablative anti-fouling system, and approved anti-fouling paints may be applied over any approved exterior anti-corrosive system. Anti-fouling coatings must be of the same "Type".

3.1.17 Apply the first coat of MIL-PRF-24647 anti-fouling paint when the last coat of epoxy paint is still slightly tacky (as defined in 3.6.4) (approximately 4 to 6 hours after paint application) and in accordance with applicable NAVSEA-approved ASTM F718. If the maximum recoat time for the epoxy is exceeded, **accomplish the overcoat window requirements of 3.5, then** apply a tack coat (explained in 3.6.1) of epoxy paint one to 2 mils wet film thickness (WFT) over previously painted surfaces. The tack coat shall be allowed to cure until tacky, **and then** the next full coat of the system shall be applied.

3.1.18 Mix and apply all coatings in accordance with the product's NAVSEA-approved ASTM F718, except for invoked requirements for surface preparation and Dry Film Thickness (DFT) as specified in Tables One through 9.

3.1.19 Boats and small craft that are embarked on surface ships or otherwise deployed should meet the camouflage requirements of 2.6.

3.1.20 Utilize water-based latex fire retardant paints in preference to chlorinated alkyd-based fire retardant paints in areas where condensation, high humidity, and temperatures below 50 degrees Fahrenheit are not expected during application and cure. Such paints are available under MIL-PRF-24596.

3.1.21 Mix and apply the Navy Polyamide Epoxy MIL-DTL-24441 coatings in accordance with the following, except the DFT shall be as specified in Tables One through 9. The MIL-DTL-24441 coatings' mixing ratio is one-to-one by volume. The components of the various formulas are not interchangeable. Blend each component thoroughly prior to mixing the components. After mixing equal volumes of the 2 components, the mixture must be thoroughly stirred. For Type III only, the stand-in times listed below must be observed. There is no induction time for Type IV.

3.1.21.1 Stand-in time (induction time) for MIL-DTL-24441, Type III, is considered to be the time immediately following the mixing of the components A and B during which the critical reaction period of these components is initiated and is essential to the complete curing of the coating. During stand-in time, the mixture must be thoroughly stirred at least once every 20 minutes to avoid hot spots caused by localized overheating from the chemical reaction.

<u>Surface Temperature at Job Site</u> <u>(Degrees Fahrenheit)</u>	<u>Stand-In Time in Hours</u>
35 to 50	2 hours at 70 degrees Fahrenheit (paint temperature)
50 to 60	2 hours at job site temperature
60 to 70	One hour to 1-1/2 hours at job site temperature
70 to 90	1/2 to one hour at job site temperature

3.1.22 For proper curing, the maximum application and cure temperature for MIL-DTL-24441 products shall be 90 degrees Fahrenheit (ambient and surface temperature).

3.1.23 Powder coating application may be used if approved by the TYCOM; otherwise use applicable Lines in Tables One through 9. TYCOM approval shall denote specific items or classes of items and applications. Powder coatings may match the color of the surrounding area or, if needed, may be overcoated with liquid paints. Powder coated items require near white metal blast, NACE 2/SSPC-SP 10, as minimum surface preparation. Any use of a chemical pretreatment (e.g., phosphate conversion coatings) requires approval by NAVSEA. QA checkpoints are still required for items that are powder coated.

3.1.23.1 For exterior applications and interior dry applications of removable parts, powder coating shall conform to MIL-PRF-24712.

3.1.23.2 For interior wet or immersion areas, powder coating shall conform to MIL-PRF-23236, Type VIII.



3.1.23.3 Powder coatings are not practical for use on large components or ship structure. Any large-scale applications to ship structure require approval by NAVSEA.

3.1.23.4 Powder coating is not authorized for use on components, covers, or any parts to be installed in potable or reserve feed water tanks aboard nuclear powered ships.

3.1.24 Peel and stick nonskid has been approved for use in limited areas on surface ships.

3.1.25 Coatings used on interior spaces of submarines are approved under the Submarine Atmosphere Control Program and listed on the Submarine Material Control List (SMCL). For interior use on submarines, only those MIL-PRF-23236, Type VII, coatings listed in Note (8A) may be used. For use in tanks, voids and freefloods on submarines, only those MIL-PRF-23236, Type VII, coatings listed in Note (26A) may be used.

3.1.26 For submarines, ensure that identified structural repair sites are not contaminated with paint overspray until repairs have been completed. Upon completion of structural repairs, the affected areas will be abrasive blasted to SSPC-SP 10 prior to paint application unless otherwise specified.

3.1.27 Restrictions on **repair activity** personnel (**which includes Contractors**) working in propulsion plant spaces aboard nuclear powered ships shall be in accordance with NAVSEAINST 4350.2 (**Series**) (Contract Work Onboard **Nuclear**-Powered Ships).

### 3.2 Stripe Coat Requirements:

3.2.1 For all areas where stripe coating is required, as denoted in Tables One through 9, apply stripe coat in accordance with applicable NAVSEA-approved ASTM F718 data sheet to edges, weld seams, welds of attachments and appendages, cutouts, corners, butts, foot/handholds (including inaccessible areas such as back side of piping, underside of I-beams), and other mounting hardware (non-flat surface). Stripe coat these areas after the previous full coat has dried. The stripe coat shall encompass all edges as well as at least a one-inch border outside each edge and weld. For submarines, solvent-based coatings shall have the stripe coat applied by brush; ultra high solids coatings (e.g. MIL-PRF-23236, Type VII) may have the stripe coat applied by brush or spray.

3.2.1.1 Each stripe coat shall be of the specified paint system and shall be a different color from both the paint over which it is being applied and the next coat in the system (if a product only comes in 2 colors, the stripe coat shall contrast with the color of the previous coat). Full coat inspection shall be conducted prior to stripe coat application.

**3.2.1.2 MIL-PRF-23236, Type VII coatings may have the stripe coat waived; however, in lieu of a stripe coat, additional DFT readings are required in accordance with Attachment A.**

3.3 Cure time is dependent on temperature; products applied at lower temperature will need more time to cure. This includes low temperature coatings. Cure time of each coat shall be IAW NAVSEA-approved ASTM F718 unless otherwise specified in the following requirements:

3.3.1 Drying time between coats of a specified coating for potable and feedwater tanks shall be a minimum of 48 hours at a minimum temperature of 70 degrees Fahrenheit (substrate and ambient), using heated air if necessary to maintain temperature. Ventilation shall be sufficient to ensure continuous flow of air through the tanks with at least one complete air change every 4 hours.

3.3.2 Following coating applications, potable and feedwater tanks shall be continuously ventilated with a minimum of one complete air change every 4 hours for at least 7 consecutive days prior to filling with water. During the ventilation period, maintain a minimum tank temperature of 70 degrees Fahrenheit (substrate and ambient). Verify and document daily that ventilation is properly installed and running.

3.3.2.1 Freshly painted potable water tanks shall be filled with potable water and emptied at least twice to ensure tank cleanliness.

3.3.3 Prior to application of any solvent-based alkyd coating, such as MIL-PRF-24635, over an epoxy coating, allow the epoxy to dry until it is no longer tacky (as defined in 3.6.4). It shall be dry to the touch but not fully cured before overcoating with any solvent-based alkyd coating.

3.3.4 Prior to application of any water-based coating, such as MIL-PRF-24596, over an epoxy coating, allow the epoxy to dry for at least 16 hours.

#### 3.4 Overcoating of MIL-DTL-24441 with MIL-DTL-24441:

3.4.1 If less than 7 days has elapsed since the application of the prior coat, the next coat may be applied after visual inspection to confirm the absence of grease, dirt, salts, or other surface contaminants. If surface contamination is suspected as a result of visual inspection or for other reasons, the entire surface shall be cleaned in accordance with SSPC-SP 1 of 2.4. The next coat of MIL-DTL-24441 shall be applied after surfaces are completely dried.

3.4.2 If more than 7 days but less than 30 days has elapsed since the application of the prior coat, the entire surface shall be cleaned in accordance with SSPC-SP 1 of 2.4. Ensure the surface has fully dried, **and then** apply a tack coat (one to 2 mils WFT) of the last coat applied or Formula 150. The tack coat (as defined in 3.6.1) shall be allowed to cure (dry) until tacky (as defined in 3.6.4); then apply the next full coat of the

system. This condition can only be met one time during the painting system application.

3.4.3 If more than 30 days has elapsed since the application of the prior coat, the entire surface shall be cleaned in accordance with SSPC-SP 1 of 2.4. After allowing the surface to dry, the surface shall be lightly abraded to degloss the epoxy, using a brush-off abrasive blast (preferred), power sanding, or hand sanding using 80-120 grit, then apply the next full coat of the system.

### 3.5 Overcoating of Non-MIL-DTL-24441 Epoxy Coatings:

3.5.1 Follow the manufacturer's instructions for the allowable overcoat window, not to exceed 30 days. The 30-day maximum may be extended beyond 30 days if specifically approved in writing by NAVSEA. Where the base coat and topcoat are provided from different manufacturers, the term "manufacturer" refers to the manufacturer of the base coat. Application of a tack coat shall not restart the 30-day window.

3.5.1.1 If either the manufacturer's instructions or the 30-day window (or a specific extension approved by NAVSEA) has been exceeded, the coating shall be reactivated by following the manufacturer's instructions for reactivating the surface.

### 3.6 Clarification of Terms:

3.6.1 A tack coat is defined as a layer of paint with a reduced film thickness (e.g., 1-2 mils vice 5 mils); this does not imply that adding thinner is acceptable.

3.6.2 Touch-up is defined differently within this Standard Item between surface ships and submarines.

3.6.2.1 Touch-up is defined within this Standard Item for surface ships as preservation operations on cumulative surface areas less than one percent of the total area (e.g., bilge, tank, space, etc.) being preserved, with no individual area greater than 10 square feet. Included under touch-up operations are new and disturbed surfaces of less than 10 square feet. The documentation requirements of 3.7 and 3.8 are waived for these touch-up areas. The requirements of 3.10.1, 3.10.2, 3.10.6, 3.10.7, 3.10.8, and 3.10.10 shall be verified by the accomplishing activity as (I) inspections for critical coated areas and (V) inspections for non-critical coated areas prior to coating applications. This waiver does not apply to potable or feedwater tanks.

3.6.2.2 Touch-up is defined within this Standard Item for submarines as preservation operations on cumulative surface areas less than one percent of the total area (e.g., bilge, tank, space, etc.) being preserved, with no individual area greater than 4 square feet. Included under touch-up operations are new and disturbed surfaces of less than 4 square feet. The documentation requirements of 3.7 and 3.8.1 are replaced with Appendix 9

for these touch-up areas (3.8.2 is still required). The requirements of 3.10.1, 3.10.2, 3.10.6, 3.10.7, 3.10.8, and 3.10.10 shall be verified by the accomplishing activity as (I) inspections for critical coated areas and (V) inspections for non-critical coated areas prior to coating applications. This waiver does not apply to potable or feedwater tanks.

3.6.2.3 For submarines, touch-up of MIL-PRF-23236, Type VII, coating systems with solvent-based coating systems qualified to MIL-DTL-24441, Type IV, or MIL-PRF-23236 is acceptable, or touch-up of existing MIL-DTL-24441 or MIL-PRF-23236 coatings with coatings approved to either specification is acceptable.

**3.6.2.4 On surface ships and submarines, for new and disturbed areas of individual areas 2 sq ft or less totaling less than 0.03 percent of the total surface area, the requirements to perform and document the following paragraphs are waived: 3.10.1, 3.10.2, 3.10.6, 3.10.7, 3.10.8, and 3.10.10. The documentation requirements of 3.7 and 3.8 are also waived. The requirement of 3.10.1.1 shall be accomplished, but not documented. For coating application, apply coatings in accordance with Tables One through 9 with the following exception: apply only one coat of primer on prepared substrate, followed by topcoat product applied to overlap intact coating by a minimum of 1 inch around primer. This waiver does not apply to potable or feedwater tanks.**

3.6.3 Disturbed surfaces are defined as any surface that requires cleaning and/or painting due to existing paint finish being damaged in the accomplishment of work specified by the Work Item or task order.

3.6.3.1 Exterior surfaces of underwater hull closure plates/hull accesses and their associated welds will not be considered disturbed surfaces and shall be cleaned, prepared, painted, and documented in accordance with the applicable area. Deviations from the requirements may be authorized by the SUPERVISOR based on size, location, application, or severity of condition of the coating system being applied. For submarines, this shall be determined by inspection and agreed to by the SUPERVISOR.

3.6.3.2 Interior surfaces of underwater hull closure plates/hull access-associated welds shall **have surface preparation** in accordance with 3.1.5.

3.6.3.3 The word "new" in "new and disturbed surfaces" refers to all material installed on the ship by the **repair activity** regardless of source.

3.6.4 Tacky is defined as that curing (drying) stage when a fingertip pressed lightly against the film leaves only a slight impression and none of the film sticks to the finger.

3.6.5 Feathering is used for transition of applying a fresh coating system to an area with an intact coating system that is not removed. To do this, visible areas of defective old paint shall be removed until an area of

completely intact and adhering paint is attained around the defective area by feathering (tapering) the edges of tightly adhering old paint at an approximate 30 degree slope into the newly prepared bare metal surface thus preventing application of new paint over loose or cracked paint.

**3.6.6 Solvent wipe is defined as cleaning a surface by pouring solvent on a clean rag and subsequently wiping the surface.**

**3.6.7 Initiation of the application process is defined as that time when coating is removed from storage for staging at the work site.**

3.7 The following ship structural surfaces are defined as critical coated areas:

<u>SURFACES</u>	<u>TYPE OF SUBSTRATE</u>
MK41 VLS launcher top and base	All
Underwater hull, <b>including appendages and</b> surfaces <b>below the waterline up to and including the boottopping</b>	All
Cofferdams	Steel and aluminum
Hangar, flight, catapult, and vertical replenishment decks	Steel and aluminum
CV and CVN flight deck landing areas	Steel and aluminum
RAST track trough	Steel and aluminum
Well deck overheads	Steel and aluminum
Surface ship bilges	Steel and aluminum
Interior surfaces of intake vent plenums, defined as combustion air intakes (gas turbine, diesel, and steam) and other vent system intake plenums with openings greater than 7 square feet	Steel and aluminum
Uptake spaces	Steel and aluminum
Tanks <b>and floodable voids</b> (including sumps and covers)	Steel and aluminum
<b>Non-floodable voids (at waterline or below)</b>	Steel and aluminum
All recesses on submarines	Steel
Interior surfaces of submarine sail and superstructure (fairwater) when SSPC-SP 10 accomplished	Steel
Aircraft Launch and Recovery Equipment (ALRE) system areas addressed in Table Notes (8) and (35)	Steel
<b>Arresting gear sheave foundations</b>	<b>Steel</b>

3.7.1 Record and maintain in-process records in QA Tools Paperless QA program **or on QA Checklist Form Appendices** as blasting, painting, nonskid, inspections, and tests are being accomplished. QA Tools Paperless QA program and installation setup are available upon request from U.S. Fleet Forces Command N434, Attn. [Dale.Hirschman@navy.mil](mailto:Dale.Hirschman@navy.mil), (757) 836-3455.

3.7.1.1 QA Checklist Form Appendices are available at <http://www.nstcenter.com/NavyResources.aspx>. QA documentation shall include 3.7.1.3 through 3.7.1.12.

**3.7.1.2 If using QA Appendices, submit one legible copy, in hard copy or electronic media, of the applicable appendices with required documented information of evolutions accomplished from the acceptance of the (G)-point to the SUPERVISOR. Submit the documentation within 24 hours or prior to the next (G)-point, whichever is sooner. All records shall include 3.7.1.3 through 3.7.1.12.**

3.7.1.3 Ambient and substrate surface temperatures, relative humidity, and dew point during preservation process (QA Checklist Form Appendix 1);

3.7.1.4 Cleaning/degreasing prior to surface preparation inspection results (QA Checklist Form Appendix 2);

3.7.1.5 Surface profile readings and surface preparation method, including name of abrasive and QPL 22262 revision number from which the product was purchased, or copy of NAVSEA product approval letter. (QA Checklist Form Appendix 3);

3.7.1.6 Surface conductivity or chloride test results (QA Checklist Form Appendix 4);

3.7.1.7 Surface cleanliness test results for dust (QA Checklist Form Appendix 5);

3.7.1.8 Name of paint/nonskid, manufacturer, batch number, and date of manufacture and expiration (QA Checklist Form Appendix 6);

3.7.1.9 Name and type of spray equipment utilized (QA Checklist Form Appendix 6);

3.7.1.10 Elapsed time between coats (QA Checklist Form Appendix 6);

3.7.1.11 Dry film thickness (DFT) measurements (QA Checklist Form Appendix 7) and/or wet film thickness (WFT) measurements (QA Checklist Form Appendix 7A);

3.7.1.12 Minimum and maximum storage temperatures of paint and nonskid over the 24-hour period prior to use (QA Checklist Form Appendix 1).

**3.7.2 If using QA Appendices, submit one legible copy, in hard copy or electronic media, of recorded in-process information on QA Checklist Forms to the SUPERVISOR within 72 hours of completion of preservation of each separate location listed in the invoking work item or task order.**

3.8 Determine the type of surface preparation required and coating system options that are available for use in accomplishing the work.

3.8.1 For areas listed in 3.7, submit one legible copy, in hard copy or electronic media of Coatings Application Product Summary (CAPS) SHEET (QA Checklist Form Appendix 8), to the SUPERVISOR 7 working days prior to starting the preservation process. The submittal shall include all the information identified in QA Checklist Form Appendix 8. The CAPSHEET shall be at the worksite throughout the preservation process.

3.8.2 For areas listed in 3.7, maintain on file the original manufacturer's certificate of compliance and material conformance test data in accordance with Section 11 of 2.2. Documents shall be readily available to the SUPERVISOR upon request.

3.9 Maintain the following certifications for accomplishing preservation operations to areas as listed in 3.7. Information for these certifications can be found at [www.sspc.org](http://www.sspc.org).

3.9.1 Coating inspectors shall be certified in accordance with the NAVSEA Basic Paint Inspector (NBPI) course or NACE Coating Inspector Program (CIP) Level 1, or higher.

3.9.2 Organizations performing blasting operations (abrasive and waterjetting) or coating application shall be certified in accordance with QP 1 of 2.4 **or NAVSEA-approved equivalent**.

3.9.3 Spray painters shall be certified in accordance with SSPC C-12 or SSPC C-14 or NAVSEA-approved equivalent. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the **repair activity**.

3.9.4 Plural Component Pump Tenders and Applicators shall be certified in accordance with SSPC C-14 or NAVSEA-approved equivalent certifications. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the **repair activity**.

3.9.5 Blasters shall be certified in accordance with SSPC C-7 or NAVSEA-approved equivalent. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the **repair activity**.

3.9.6 Blasters performing Ultra-High Pressure waterjetting shall be certified in accordance with SSPC C-13 or NAVSEA-approved equivalent. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the **repair activity**.

3.10 For all coating systems except surface ship nonskid, accomplish preservation operations in accordance with the following. For surface ship nonskid system application, refer to 3.11.

(V) "ENVIRONMENTAL READINGS"

3.10.1 For coatings, record ambient and substrate surface temperatures, relative humidity, and dew point from conditions on-site, in

close proximity to the structure being coated, for all areas listed in Tables One through 9.

**3.10.1.1 Unless otherwise stated within the Notes of Tables One through 9, and as noted in 3.10.1.2 and 3.10.1.3, coatings shall be applied only when the temperature of the prepared substrate is 50 degrees Fahrenheit or greater and a minimum of 5 degrees Fahrenheit above the dew point. The maximum relative humidity shall be 85 percent. For areas listed in 3.7, readings shall be documented on QA checklist Form Appendix 1.**

**3.10.1.2 MIL-PRF-23236, Type VII, Class 17 products are exempt from dew point and relative humidity requirements. For these products, dew point and relative humidity do not need to be recorded on QA Checklist Forms.**

**3.10.1.3 The only products that may be applied below 50 degrees Fahrenheit are those specified in the Tables and Notes for use below 50 degrees Fahrenheit.**

**3.10.1.4** These environmental readings shall be taken from 4 hours prior to, to 48 hours after, the application of a coat of paint. If a product fully cures in less than 48 hours, as defined on its NAVSEA-approved ASTM F718, environmental readings for that coat shall be taken until the product's final cure time is reached. For potable and feedwater tanks, environmental readings shall be taken from the start of surface preparation to 7 days after application of the final coat. For areas preserved under 3.6.2.1, environmental readings shall be taken from immediately prior to start of application to 24 hours after application of a coat of paint.

**3.10.1.5** The preferred method of measurement is using a data logger (Veriteq Instruments, Inc., Model No. KT-2000-NEI or equivalent). If a data logger is used, it shall collect data at a minimum of every 5 minutes. Manual readings shall be taken once every 12 hours and at every evolution involving (G)-points. For areas listed in 3.7, manual readings shall be documented on QA Checklist Form Appendix 1.

**3.10.1.6** If a data logger is not used, environmental readings shall be manually taken every 4 hours and at every evolution involving (G)-points. For areas listed in 3.7, readings shall be documented on QA Checklist Form Appendix 1.

(I) or (I)(G) "CLEANLINESS" (See 4.4)

**3.10.2** Accomplish degreasing/cleaning prior to surface preparation to ensure that the surface is free of contaminants, such as sea salts, mud, marine growth, grease, oil, and other petroleum products, in accordance with SSPC-SP 1 of 2.4. **For areas prepared to SSPC-SP 12 of 2.4 with vacuum self-contained UHP waterjetting equipment, the checkpoint of initial degreasing is waived.** For areas listed in 3.7, document on QA Checklist Form Appendix 2.



3.10.2.1 Inspect the surface a maximum of 4 hours prior to start of coating removal to ensure accomplishment of SSPC-SP 1. For areas listed in 3.7, document on QA Checklist Form Appendix 2.

3.10.3 Except for tanks, surface preparation by abrasive blasting is prohibited on submarine interior surfaces, with the exception that self-contained sponge jet surface preparation is permissible in submarine machinery spaces.

3.10.4 Intentionally left blank.

3.10.5 Limit the square footage of surfaces being prepared for preservation to an area that can be coated prior to the occurrence of flash rusting and/or oxidation. Remove any flash rust prior to painting, except as follows:

3.10.5.1 Surfaces cleaned by waterjetting shall meet the applicable NACE/SSPC Standard for flash rust. For submarines, the first coat of epoxy primer shall be applied within 24 hours of paint removal by waterjetting.

3.10.5.2 The water used in waterjetting shall not include detergents or inhibitors without written approval from the coating manufacturer and the SUPERVISOR.

(I) or (I)(G) "SURFACE PROFILE" (See 4.4)

3.10.6 One profile reading shall be taken for every 200 square feet for the first 1,000 square feet; for each additional 1,000 square feet, 2 profile readings shall be taken. Profile readings shall be taken in accordance with Method B or Method C of 2.7. For profile readings taken in accordance with Method C of 2.7, use profile tape suitable to read subject profile (i.e., coarse to extra-coarse plus). **One profile reading shall be the average (mean) of 3 individual tapes.** If areas are found to be greater than 5 mils, use Method B of 2.7 in those areas to determine existing profile. The retention of Testex tape is not required. For areas listed in 3.7, document surface profile on QA Checklist Form Appendix 3.

3.10.6.1 Following blasting or waterjetting operations, surface peak-to-valley profile must be checked. For Method B of 2.7, each profile reading shall be between 2 and 4 mils. For Method C of 2.7, each profile reading shall be between 2 and 4 mils, with no individual tape reading less than one mil or **greater** than 5 mils. If such profile is not present, **repair activity** shall establish the proper profile.

3.10.6.2 Following power tool cleaning to SSPC-SP 11 of 2.4, surface profile shall be checked. For submarines, one mil minimum profile is acceptable for all areas. For surface ships, profile readings shall be 2 mils minimum for areas listed in 3.7 and one mil minimum for all other areas where accessible (inaccessible areas must be determined by inspection and agreed to by the SUPERVISOR).

3.10.6.3 When surface profile requirements of the NAVSEA-approved ASTM F718s are greater (higher in value) than that specified in this item, the NAVSEA-approved ASTM F718 surface profile requirements shall supersede this item. For products without a NAVSEA-approved F718, manufacturer's instructions may be substituted.

3.10.6.4 Avoid excessive power wire brushing or excessive grinding/sanding which results in a polished surface.

3.10.6.5 Conversely, excessive use of mechanical tools (grinders, sanders, chippers, etc.) must be minimized to avoid metal loss. Overly aggressive blasting which causes metal thickness loss over the amount required for surface profile shall also be avoided. Excessive depth of profile can cause problems with poor coating performance. A greater than recommended surface profile requires a paint film be applied to totally cover the profile to prevent pinpoint or flash rust. The increase in paint film thickness also increases the susceptibility of solvent entrapment, causing blistering and premature failure of the coating.

3.10.6.6 Due to the potential for excessive metal loss, for SSN-21 and SSN-774 Class submarines, only the following power tools may be used to obtain an SSPC-SP 11 surface: needle guns and rotopeens. On submarines, any areas of potential metal loss by corrosion or mechanical means shall be documented and reported to the SUPERVISOR.

3.10.6.7 Spongejet may not establish a sufficient surface profile. If this method is employed and the profile is insufficient to meet the requirements, the **repair activity** shall establish a sufficient surface profile.

3.10.6.8 Waterjetting will not establish a surface profile. If this method is selected by the **repair activity** and a surface profile does not exist or is insufficient to meet the requirements, the **repair activity** shall establish a sufficient surface profile.

(I)(G) "CONDUCTIVITY OR CHLORIDE MEASUREMENT"

3.10.7 For surfaces listed in 3.7, accomplish the requirements for conductivity or chloride measurements as follows:

3.10.7.1 Following coating removal, accomplish conductivity or chloride measurements in accordance with the requirements of 3.10.7.3.

3.10.7.2 Additionally, accomplish a visual inspection within 4 hours prior to application of each coat of paint. If evidence of contamination of the surface exists, accomplish the requirements of 3.10.7.3.

3.10.7.3 Accomplish surface conductivity or chloride checks using available field or laboratory test equipment on the freshly prepared surface. One reading shall be taken for every 200 square feet for the first

1,000 square feet. **Two** determinations shall be conducted for every additional 1,000 square feet. For immersed applications, such as tanks and bilges, chloride measurements shall not exceed 3 ug/cm<sup>2</sup> (30 mg/m<sup>2</sup>); conductivity measurements shall not exceed 30 micro siemens/cm. For non-immersed applications, chloride measurements shall not exceed 5 ug/cm<sup>2</sup> (50 mg/m<sup>2</sup>); conductivity measurements shall not exceed 70 micro siemens/cm. Conductivity samples shall be collected using the Soluble Salt Conductivity Measurement according to Bresle Method, **ARP Soluble Salt Meter model RPCT-07-001**, or approved equivalent. Document on QA Checklist Form Appendix 4.

3.10.7.4 Because conductivity testing measures more than just chlorides, for any conductivity check that fails, a confirmatory chloride check may be conducted to confirm chloride levels. If the chloride levels do not exceed the requirements in 3.10.7.3, the measurement passes the conductivity/chloride check.

3.10.7.5 If a conductivity check fails and the confirmatory chloride check is not conducted, or if chloride measurements exceed the respective values, water wash (3000-5000 PSI) the affected areas with **potable** water. Dry the affected areas and remove all standing water. Accomplish surface conductivity or chloride checks on affected areas in accordance with 3.10.7.3. Repeat step until satisfactory levels are obtained.

(I) or (I)(G) "SURFACE PREPARATION" (See 4.4)

3.10.8 Verify surface preparation for the coating systems specified in the Work Item/task order and Tables One through 9 are in accordance with 2.4 and 2.5. For areas listed in 3.7, document on QA Checklist Form Appendix 3.

3.10.8.1 For surface ships, surface cleanliness for dust shall be accomplished for the underwater hull and documented on QA Checklist Form Appendix 5. Surface cleanliness for dust shall meet Rating 2, Class 2, of 2.8. One dust tape reading shall be taken for every 200 square feet for the first 1,000 square feet; for each additional 1,000 square feet, 2 tape readings shall be taken. The tape reading requirement is waived if the surface was prepared using UHP (ultra high pressure) waterjetting only and the primer is applied within 6 hours of completion of surface preparation.

3.10.8.2 The checkpoints of 3.10.6, 3.10.7, and 3.10.8 can be accomplished concurrently.

3.10.9 Coating systems shall be applied **and cured** in accordance with this NAVSEA Standard Item and applicable NAVSEA-approved ASTM F718s as defined in 3.1.11.

3.10.9.1 For surface ship preservation of areas not listed in Tables One through 5, see the Tables in **Section** 1 of 2.2. For submarine preservation of areas not listed in Tables 6 through 9, see the Tables in 2.12.

3.10.9.2 Paints shall not be thinned.

(I) or (I)(G) "COATING INSPECTION FOR EACH PAINT COAT" (Consists of Dry Film Thickness, Holidays, and Cleanliness) (See 4.4)

3.10.10 Inspect each Prime, Intermediate, Stripe, Tack, and Top Coat as follows: |

3.10.10.1 Accomplish DFT measurements of each coat applied for the coating systems listed in Tables One through 9. This excludes any stripe coats. For areas listed in 3.7, document on QA Checklist Form Appendix 7.

3.10.10.2 Accomplish a visual holiday check on each coat of the system for areas listed in 3.7 and document on QA Checklist Form Appendix 7. Any holiday found shall be identified and touched up. ***These touched-up holidays do not constitute a new coat of paint.***

3.10.10.3 Accomplish a visual inspection for surface cleanliness. If evidence of contamination exists, accomplish degreasing/cleaning a maximum of 4 hours prior to application of next coat of paint to ensure removal of surface contaminants. For areas listed in 3.7, document on QA Checklist Form Appendix 7 or 7A. If condition is UNSAT, then also use Appendix 2.

3.10.10.4 Accomplish a visual inspection for chloride contamination for areas listed in 3.7. If evidence of chloride contamination exists, accomplish requirement of 3.10.7.2 a maximum of 4 hours prior to application of next coat of paint to ensure removal of surface contaminants. Document on QA Checklist Form Appendix 7 or 7A. If condition is UNSAT, then also use Appendix 4 as required in 3.10.7.3.

3.10.11 For Dry Film Thickness (DFT) readings required in 3.10.10.1, DFT readings for each coat shall be taken in accordance with Method PA 2 of 2.4. When measuring full coats to determine total system thicknesses denoted in Tables One through 9, DFT readings shall not be taken in areas where stripe coatings have been applied.

3.10.11.1 WFT readings are required in lieu of DFT readings for any coat that must be in a tacky state (as defined in 3.6.4) when the next coat is applied and for non-metallic surfaces. For metallic surfaces, the number of WFT spot readings shall be 2 readings per 1,000 sq ft. For non-metallic surfaces, the number of WFT spot readings shall equal the number of DFT readings that would have been taken. WFT equals DFT divided by percent solids by volume (when percent solids by volume is expressed as a decimal, i.e., 60 percent equals 0.60). For areas listed in 3.7, document on QA Checklist Form Appendix 7A.

3.10.11.2 Apply an additional coat of any single coat of a multiple coat system when that coat measures less than its specified DFT. DFT of each coat, including an additional coat if applied, shall not exceed

the specified maximum thickness for each coat as specified in Tables One through 9. If an additional coat is required, **accomplish a cleanliness checkpoint in accordance with 3.10.10.3 prior to application of** the additional coat.

3.10.11.3 During paint application, a WFT gage shall be used to verify the application of proper paint thickness for the primer coat of all coating systems listed in Tables One through 9. WFT readings shall be taken to confirm this, but need not be recorded.

3.11 Accomplish preservation operations for surface ship nonskid systems in accordance with the following:

(V) "ENVIRONMENTAL READINGS"

3.11.1 Accomplish the requirements of 3.10.1 (environmental) with the following additions:

3.11.1.1 Record ambient and substrate surface temperatures, relative humidity, and dew point readings at one-hour intervals during actual surface preparation and nonskid system application.

3.11.1.2 Do not apply sprayed components of nonskid systems when sustained winds exceed 15 MPH.

3.11.1.3 Unless the applicable NAVSEA-approved ASTM F718 is more stringent, ambient air temperature shall be 55-100 degrees Fahrenheit, deck temperature for primer application shall be 40-120 degrees Fahrenheit, and deck temperature for nonskid application shall be 40-110 degrees Fahrenheit. Deck temperature shall be a minimum of 5 degrees Fahrenheit above the dew point for nonskid system application.

3.11.2 Accomplish the requirements of 3.10.2 through 3.10.4 with the following additions:

3.11.2.1 If cleaning is performed via solvent wiping, after solvent wiping, the deck shall be allowed to dry before application of any **coating**. No **visible** solvent shall be present on deck surfaces prior to proceeding with the next process step. **Solvent wiping is defined in 3.6.6.**

3.11.2.2 When a solvent wipe is performed, annotate Appendix 2 with type of solvent and time allowed to dry.

(I) or (I)(G) "SURFACE PROFILE" (See 4.4)

3.11.3 Following blasting or waterjetting operations, surface peak-to-valley profile shall be checked. For each area of preparation, one profile reading shall be taken every 100 sq ft for the first 500 sq ft. If the profile readings are consistent, only one profile reading shall be taken for every 1,000 sq ft remaining. Profile readings shall be taken in accordance with Method B or Method C of 2.7. For profile readings taken in

accordance with Method C of 2.7, use profile tape suitable to read subject profile (i.e., coarse to extra-coarse plus). **One profile reading shall be the average (mean) of three (3) individual tapes. Each profile reading shall be 3 to 4.5 mils, with no individual tape reading less than 2.5 mils or greater than 5 mils. If such profile is not present, repair activity shall establish proper profile.** The retention of Testex tape is not required. For areas listed in 3.7, document on QA Checklist Form Appendix 3.

3.11.3.1 For nonskid areas that abrasive blast equipment or waterjet equipment cannot access, substrate shall be prepared to SSPC-SP 11, except that minimum profile shall be 2 mils where accessible. **Inaccessible areas of tiedowns shall be prepared to SSPC-SP 3 of 2.4.**

3.11.4 Accomplish the requirements of 3.10.7 for conductivity/chloride measurements.

3.11.5 Accomplish the requirements of 3.10.8 for surface preparation.

3.11.5.1 Surface cleanliness for dust shall be accomplished for nonskid flight decks and documented on QA Checklist Form Appendix 5. Surface cleanliness for dust shall meet Rating 2, Class 2, of 2.8. Three individual readings shall be taken every 100 sq ft for the first 500 sq ft. If the tape readings are consistent, only one tape reading shall be taken for every 1,000 sq ft remaining. The tape reading requirement is waived if the surface was prepared using UHP (ultra high pressure) waterjetting only and the primer is applied within 6 hours of completion of surface preparation.

3.11.6 Nonskid systems shall be applied in accordance with the applicable Tables.

3.11.7 Accomplish the requirements of 3.2 for stripe coat with the exception that stripe coat may precede prime coat.

3.11.7.1 For overcoating of stripe coat or stripe coating of the primer coat, refer to the applicable NAVSEA-approved ASTM F718.

3.11.8 Nonskid application shall occur within 36 hours of primer application.

3.11.8.1 If nonskid application occurs within 36 to 72 hours after primer application, the primer coat shall be solvent wiped with a manufacturer's approved solvent.

3.11.8.2 If nonskid application occurs within 3 to 7 days after primer application, the primer coat shall be solvent wiped with a manufacturer's approved solvent, then lightly abraded, solvent wiped again, and a tack coat (one to 2 mils) of primer shall be applied.

3.11.8.3 If the primer coat is not overcoated with nonskid within 7 days of primer application, the primer shall be removed and the

surface preparation repeated. ***For zone tie-in areas where the primer is to be overcoated with itself (up to 12 inches of overlap), the recoat window shall be in accordance with the NAVSEA-approved ASTM F718; the primer shall be solvent wiped with a manufacturer's approved solvent, then lightly abraded, then solvent wiped again.***

3.11.8.4 Aircraft carrier landing areas not overcoated with nonskid within 72 hours of primer application shall have surface preparation repeated.

3.11.9 Accomplish the requirements of 3.10.10 and 3.10.11 for coating inspection of nonskid primer (full and stripe coats).

(I) or (I) (G) "NONSKID SPREAD RATE AND HOLIDAY INSPECTION" (See 4.4)

3.11.10 Accomplish the requirements of 634-3.35.6 Paragraph 5 of 2.10 for spread rate and visual holiday inspection of nonskid and document on QA Checklist Form Appendix 7.

3.11.11 Inspect the location and color of required visual landing aid (VLA) markings in accordance with Naval Air Warfare Center Aircraft Division (NAWCAD) Class Guidance Drawings, Air Capable Ship Aviation Facilities Bulletin, Amphibious Assault Ship Aviation Facilities Bulletin, Shipboard Aviation Resume (NAEC-ENG-7576), VLA General Service Bulletin No. 8 (latest revision) or by contacting the local NAWC (CAFSU/ASIR) Field Office.

#### 4. NOTES:

4.1 Wet space decks include sanitary spaces (washrooms, water closets, and showers), food service spaces (galley, scullery, butcher shop, bakery, meat prep rooms, and food service line), and trash compactor rooms.

4.2 Total DFT encountered during removal may exceed specified Table thicknesses.

4.3 Total removal of ablative coating is not required. An ablative copper AF coating system shall not be removed by blasting prior to its specified service life unless it is blistered, peeling, or otherwise damaged beyond repair. Stable and intact ablative AF coatings shall be retained and over-coated. The total film thickness of the combined retained and freshly applied paint shall comply with Table 1/Table 6. When the work specification calls for over-coating of retained intact ablative copper AF coating, AF surfaces shall be washed down with fresh water at 2000 psi as the vessel comes out of the water, in order to prevent slime and oxidized paint from drying on the hull and inhibiting leaching of the paint when the ship is returned to the water. The surface shall be cleaned and dried before new paint is applied. Apply any AC paint to areas in need of repairs and then overcoat with the identical AF system. The Work Item or task order will specify the degree of removal.

4.4 The paragraphs referencing this note are considered an (I)(G) if the inspection/test is on a critical surface as listed in 3.7. If the inspection/test is not on a surface listed in 3.7, then the paragraph is considered an (I). These inspection point requirements also apply to build-up coats to obtain proper millage.

4.5 Refer to 009-03 of 2.1 as appropriate for requirements concerning potential exposure to toxic or hazardous substances and hazardous operations.

4.6 The **repair activity** may use environmental enclosures to control environmental conditions.

4.7 Preservation Process Instructions (PPIs) provide detailed instructions and procedures for specific ship preservation evolutions to include safety precautions, surface preparation, selection of appropriate coating systems, and third-party quality assurance check points. See new Section 12 of 2.2 for details.

4.8 Preservation system repairs are an Unrestricted Operations (URO) Maintenance Requirement Cards (MRC) program attribute.

4.8.1 The Unrestricted Operations (URO) Maintenance Requirement Cards (MRC) program was developed by NAVSEA to monitor specific areas of interest to determine if the conditions of these areas are suitable for continued unrestricted operations. Maintaining the protective capability of the coating system is critical to maintaining structural integrity during the periods between inspections. For this reason, complying with requirements for coating system application for all aspects of the preservation process is essential. Other systems that impact the URO MRC program are Special Hull Treatment (SHT) application process, including Mold-In-Place (MIP), maintenance of cathodic protection systems (Impressed Current Cathodic Protection (ICCP) and anodes) and installation of various types of tiles (acoustic, damping, etc).

4.8.1.1 Substrate preparation is not authorized/covered in this Standard Item for damping tile, acoustic tile, vertical launch system (VLS) bathtub area, thin line towed array (TLTA), interior, and retractable bow plane recesses on submarines.

4.8.2 Preservation work in submarine tanks and enclosed spaces is usually scheduled to occur when the tanks and spaces are opened and entered to perform URO MRC structural inspections. Any time a tank or other enclosed space is entered, if a URO MRC 003 structural inspection is not authorized, the government will be performing a structural visual examination.

4.8.3 Any URO MRC item being blasted and painted will have a URO MRC hull survey inspection performed by the government prior to blasting and again prior to repainting.

4.9 Painting of rubber piece parts of pipe hangers is permitted in the following areas: Main Ballast Tanks (MBTs), freeflood areas, and internal



tanks which are normally painted. The rubber piece parts include the liners, grommets, and inserts found in steel strap and steel block type pipe hangers; also included is the block rubber type pipe hangers. This allowance does not include internal tanks under nuclear cognizance, nuclear piping which traverses other non-Nuclear tanks, or potable water tanks.

4.10 Table One is for surface ship underwater hull areas. Table 2 is for surface ship exterior areas. Table 3 is for surface ship interior spaces. Table 4 is for surface ship tanks and voids. Table 5 is for surface ship miscellaneous areas. Table 6 is for submarine exterior hull areas. Table 7 is for submarine interior areas. Table 8 is for submarine tanks and voids. Table 9 is for submarine miscellaneous areas.

## Attachment A

### Edge DFT Measurement

In addition to the required DFTs per SSPC PA-2, a separate set of "edge" DFT readings shall be taken in close proximity to corners and edges of area structural elements including, but not limited to stiffeners, "rat holes," cut-outs, and frames. This data shall be taken in accordance with SSPC PA-2, with the following modifications:

1) The "edge" gage readings shall be taken approximately  $\frac{1}{4}$  inch (i.e., 0.5 cm) from edges using micro-probe gages with a probe less than or equal to  $\frac{1}{2}$ -inch in diameter (such as Elcometer 456 with T456FM3R90A probe or DeFelsko Positector 6000 series gauge with mini probe F90S or F0S). For "edge" readings taken on substrates less than  $\frac{1}{2}$ -inch thick, readings shall be taken from the "middle" of the substrate. Microprobe gages shall be calibrated, in accordance with manufacturer's direction, to measure coating thicknesses expected during application.

2) Welds, not associated with corners or edges (i.e., a butt weld joining two flat plates), shall be inspected using standard visual techniques. The inherent roughness of the weld precludes the collection of reproducible data from these areas. Inspectors may, if they choose, take a spot reading within  $\frac{1}{4}$  inch (i.e., 0.5 cm) from a butt weld. Such a reading would be included in the normal, flat surface data set, not the edge or corner data set.

3) In accordance with the SSPC terminology for a spot measurement, an "edge" spot measurement shall consist of 3 gage readings taken within a 1.5 inch (i.e., 4 cm) length as shown in Figure (1). Type "A" spot measurements will be taken around the thin section of the structure; Type "B" spot measurements will be taken on the front side of the structure; Type "C" spot measurements will be taken on the back side of the structure.

4) Within each 100 ft<sup>2</sup> area, as defined by PA-2, the inspector shall randomly select a combination of five of the edge spot measurement types shown in Figure (1). The selection of "edge" spot measurement types shall be at the inspector's discretion provided a minimum of one Type "A," one Type "B," and one Type "C" measurement shall be taken within a 100 square foot (10 square meter) area. If the structure within the 100 square foot area does not contain Type "A," Type "B," and Type "C" configurations, the inspector shall take five spot measurements of the type(s) available.

Paint thickness in close proximity to "edges" will be documented, evaluated, and corrective action taken to satisfy coating application thickness requirements. Coatings thicknesses measured on the flat portions of the area in accordance with PA-2 and coating thicknesses measured on "edges" shall be used to accept the area. The "flat portion" DFTs and "edge" DFTs shall be documented separately to ensure corrective actions (if necessary) target the appropriate area. Stripe coat area DFTs up to 50 mils are acceptable. Stripe coat area DFTs in excess of 50 mils will be assessed by the local engineering code to ensure higher millage is not apt to result in edge coating failure due to chipping.



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- (1) Use Sherwin-Williams P23RQ62/P23VQ80 in lieu of P23RQ82/P23VQ80 and use P23AQ61/P23VQ80 in lieu of P23AQ81/P23VQ80 for cold weather applications below 50 degrees Fahrenheit. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (2) Boottop - The boottopping is defined as the black area from minimum load waterline at which the ship is expected to operate to 12 inches above the maximum load waterline. The black paint is an anti-fouling paint conforming to MIL-PRF-24647. Haze gray shall be carried to the black anti-fouling paint that marks the upper boottop paint. Do not apply the black anti-fouling paint over haze gray MIL-PRF-24635.
- (3) Ameron Amercoat 235 can be used for cold weather application below 40 degrees Fahrenheit. Apply at 5 mils DFT (minimum) per coat. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (4) Use International FCA 321 in lieu of FPA 327, or KHA414 in lieu of KHA062, for cold weather application below 50 degrees Fahrenheit. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (5) Use Hempel Hempadur 4514U in lieu of 45150 for cold weather applications below 50 degrees Fahrenheit. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (6) A minimum of 24 hours drying time shall be allowed after last coat prior to undocking.
- (7) To ensure a continuous primer base, areas adjacent to those being coated with proprietary primer and nonskid listed on QPLs for MIL-PRF-24667 shall be coated with the same primer and compatible topcoat.
- (8) These systems shall also be invoked for catapult wing voids and catapult exhaust blowdown trunks.
- (9) DOD-E-24607, chlorinated alkyd, may also be used. MIL-PRF-24596, Type I, Grade C, Classes 1 and 2, or DOD-E-24607 must be used if surface and ambient temperature are less than 50 degrees Fahrenheit.
- (10) The "inner shield" is defined as the portion of the dielectric shield that extends 3 ft. from the anode in all directions. The "outer shield" is defined as the portion of the dielectric shield from the inner shield to a distance of 6 ft. from the anode. Repair of the inner shield area is required when total deteriorated inner shield surface area is from 0 to 2 percent, and no single spot is greater than one square foot. Repair of the outer shield area is required when total deteriorated outer shield surface area is from 0 to 10 percent, and

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no single spot is greater than one square foot. Replacement (new installation) of the entire dielectric shield is required when either of the above criteria is exceeded (damage to the inner shield is greater than 2 percent, OR damage to the outer shield is greater than 10 percent, OR any single spot damage is greater than one square foot).

- (11) The following steps shall be used for repair/replacement of dielectric shields. Ensure QA checkpoints are conducted in accordance with 3.7.
- a. Protect surrounding area from damage. Mask anode surfaces with heavy cardboard or plywood.
  - b. Abrasive blast.
  - c. For repair, areas of undamaged dielectric shield shall be roughened and feathered into the bare metal areas to provide a profile for adhesion of the new dielectric shield. Feather edges at least one inch using power tools or hand sanding. To prevent fracturing of shield, do not feather using abrasive blasting.
  - d. The dielectric shield material shall be mixed, applied, and cured in accordance with manufacturer's instructions.
  - e. The dielectric shield material should be faired in and made smooth from the anode for a distance of at least 10 inches to minimize hull turbulence.
  - f. The anti-corrosive shall be applied when the dielectric shield material is in a tack-free state. If the dielectric shield material has cured, sanding shall be accomplished to smooth any rough areas and to degloss the surface for the anti-corrosive to be applied over it.
  - g. During visual inspection, ensure anode surfaces are undamaged and free of paint and dielectric shield material.
  - h. The anode should remain covered with heavy cardboard or plywood to prevent damage or contamination by the ship's underwater hull coating system until just before undocking.
- (12) These systems may also be invoked for preservation of decks in spaces that are prone to wear and do not receive deck covering.
- (13) Anchors below lower boottopping limit shall be painted in accordance with normal underwater hull anti-corrosion/anti-fouling system.

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- (14) For MCM and MHC ships, use black walnut shells for abrasive blast media.
- (15) Anchor chain and detachable links shall be marked and color-coded in accordance with NSTM Chapter 581 unless otherwise directed by the Work Item or task order.
- (16) Apply one mist coat (1-2 mils) after blast and prior to remaining coats where invoking Work Item or task order requires anchor chain inspections prior to preservation.
- (17) Colors shown in Tables 631-8-**10** and 631-8-**11** of 2.2 shall be specified by TYCOM or ship's Commanding Officer in accordance with Paragraph 631-8.**18.3.2** of 2.2.
- (18) Restore each compartment marking in accordance with 2.9 and 2.11.
- (19) MIL-PRF-24667 nonskid systems shall be applied as complete systems (primer, intermediate coat when MIL-PRF-24667, Type III, coatings are invoked, nonskid, and color topping) from the same manufacturer except for the color topping. When a manufacturer does not have approved color topping, use another compatible manufacturer's color topping. MIL-PRF-24667, Type I, when required, shall be specified in the invoking Work Item or task order. Boundaries of areas receiving nonskid not specified by specific ship's drawings shall be in accordance with 2.10.
- (20) Prior to accomplishing painting of wooden underwater hulls, allow the hull to dry to a moisture content of 15 percent. Readings shall be taken with an electronic moisture meter, Sovereign Moisture Master or equal. Cover grounding plates and zincs prior to painting.
- (21) Blasted surface metal must be degreased following walnut shell blasting. Even traces of residual oil will degrade coating adhesion. Appropriate safety precautions for working with flammable solvents must be enforced. Alternate procedure is a vigorous soap and water wash followed by pressurized fresh water rinse. Do not use a detergent and fresh water washdown when using aluminum oxide as an abrasive blast medium.
- (22) Peripheral deck edging and areas not receiving nonskid may substitute the manufacturer's color topping for MIL-PRF-24635.
- (23) ***For MIL-PRF-23236, Type VII coatings, the stripe coat may be waived if additional DFT readings are taken in accordance with Attachment A and recorded on Appendix 7.***

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- (24) *This product shall be spray applied where possible. Two coats applied by brush/roller at 10-15 mils per coat shall be substituted for one coat of the spray-applied product at 20-30 mils per coat in areas where plural-component spray application is not feasible or for coating touch-up. For brush applied areas the stripe coat shall be after the 2 full coats. The brush coat version of Sherwin-Williams Fast Clad ER is Fast Clad Brush Grade. The brush coat version of Interline 783 is Interline 624. The spray version of each product may be brush-applied.*

*For application of the spray-applied "single coat" products, the product shall be applied all at one time, meaning during a continuous spray operation. Specifically, a "single-coat" system involves one color of paint, applied during one work evolution (i.e., no time is required to wait for the paint to dry), with a single pass or double pass, then a stripe coat is applied over the edges and welds to build adequate coating thickness in these failure-prone areas. Because the spray application is one work evolution, coating inspection QA checkpoint 3.10.10 need only be conducted after completion of application of the full coat with the stripe coat. If application is accomplished during numerous work evolutions (non-continuous application), each work evolution shall constitute a separate coat of paint for QA purposes.*

*Where application is performed using 2 full coats by brush/roller at 10-15 mils/coat, QA requirements will occur after each brush/roller coat is applied.*

- (25) Power impact tool cleaning using power-driven needle guns, chipping or scaling hammers, rotary scalers, single or multiple-piston scalers, or other similar impact cleaning tools shall not be utilized in the cleaning methods.
- (26) Maintain the relative humidity in the tank or void space at a maximum of 50 percent from the start of surface preparation to cure of the topcoat.
- (27) Finish coats for boats and craft shall be as specified in Paragraph 631-9.3.2 through 631-9.3.3 of 2.2 unless otherwise specified in the invoking Work Item or task order.
- (28) Thermal insulation shall be soap and water cleaned and hand sanded.
- (29) Three coats of MIL-DTL-24441, Type III, at 3-4 mils per coat can be substituted for 2 coats of MIL-DTL-24441, Type IV, at 4-6 mils per coat, for total system DFT of 8-12 mils. Three full coats and 2 stripe coats of MIL-DTL-24441, Type III, at 3-4 mils per coat can be substituted for 2 full coats and one stripe coat of MIL-DTL-24441, Type IV, at 4-6 mils per coat, for total system DFT of 8-12 mils.

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- (30) Grit blasting to near white metal is the preferred method of surface preparation. Only where grit blasting is not possible should power tool cleaning be used with prior authorization by the SUPERVISOR. Power tool cleaning should not be used for well deck areas frequently exposed to LCAC exhaust.
- (31) A low-pressure (3,000 to 5,000 psi) fresh water washdown of the well deck area shall be performed before either grit blasting or power tool cleaning to remove dirt, oil, grease, salts, and loosely adherent coatings.
- (32) Upon completion of surface preparation, pH measurements must be taken. The pH must be in the range of 6.5 to 7.5. If the pH is not within this range, the surface must be washed with fresh water until the required pH is obtained.
- (33) Runs, sags, and drips may appear in the coating due to its solvent-free nature and application properties. In the normal application of this product, the appearance of runs, sags, and drips is only superficial and is not detrimental to the coating system. In these cases, no action shall be taken. In cases where the conditions are determined to be detrimental (coating in excess of 50 mils DFT) to the effectiveness of the coating system, immediate action shall be taken to correct the coating system. If the wet run, sag, or drip occurs on a dry surface, brush out the run, sag, or drip and reapply the prime coat directly over the brushed out area. If the run, sag, or drip has dried, then the affected area shall be scraped or mechanically removed and the prime coat shall be reapplied.
- (34) These systems may also be invoked for preservation of well deck bulkheads and decks.
- (35) These systems shall also be invoked for barricade stanchions and wells, catapult jet blast deflector pits, and associated void spaces.
- (36) SSPC-SP 11 shall be the surface preparation standard used, even if the applicable NAVSEA-approved ASTM F718 has a more stringent requirement.
- (37) Total DFT specified for potable water tanks shall not be exceeded except in isolated areas adjacent to shapes and stiffeners. In no case shall the maximum DFT be exceeded by 2 mils. The isolated areas shall be less than 2 percent of the total area.
- (38) Maintain the relative humidity in the tank at a maximum of 85 percent from the start of abrasive blasting to cure of the topcoat. By allowing 85 percent vice 50 percent relative humidity, this will reduce the service life of the tank from 15-20 years to 10-12 years.



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- (39) Ameron Amercoat 892HS shall not be used for surfaces that exceed 700 degrees Fahrenheit.
- (40) Do not stripe coat inside surfaces of the Sonar Trunk Guide Rail angles.
- (41) Apply 3 coats of a vapor barrier-coating compound, MIL-PRF-19565, in contrasting colors (white-orange-white), to insulation within laundries, sculleries, galleys, drying rooms, and to insulation on the warm side of refrigerated stores spaces.
- (42) High temperature areas of exhaust pipe exteriors include BLISS caps, air eductors, and exhaust stacks.
- (43) In lieu of white, use Light Gray, Color No. 26373 (Low Solar Absorption only). In lieu of black, use Ocean Gray, Color No. 26173 (Low Solar Absorption only).
- (44) These systems shall also be invoked for Aircraft Electrical Servicing Stations (AESS) trunks.
- (45) PCMS tile on the bow flares shall be painted with the same topcoat as the freeboard.
- (46) For struts, rudders, and other erosion-prone areas, add one coat 3M Co. No. EC-2216, 4-5 mils, and 3 coats, 5-6 mils/coat over the AC system prior to AF application if authorized by the TYCOM.
- (47) The topcoats for ordnance/non-ordnance pyrotechnic locker sun shields shall be painted white (FED STD 595, Color No. 17875) or as directed by NAVSEA.
- (48) All of the AC and AF coats in the product system must be from the same manufacturer.
- (49) For touch-up of Sherwin-Williams Duraplate or Novaplate, Brushplate may be used. For touch-up of Sherwin-Williams Fast Clad ER, Fast Clad Brush Grade may be used. Brushplate and Fast Clad Brush Grade are applied at 8-10 mils/coat.
- (50) "Cosmetic" color topping is not to be applied on top of nonskid on vertical replenishment or aviation decks.
- (51) A second full coat of proprietary nonskid primer listed on the QPL for MIL-PRF-24667 may be applied if requested by the TYCOM.

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- (52) Do not blast fin stabilizers to near white metal. As-received fin stabilizers shall be brush-off blasted to NACE 4/SSPC-SP 7 (Brush-Off Blast Cleaning) in lieu of near white metal blast to ensure polymer fairing compound is not removed prior to application of coatings. Blank, wrap, cover, or mask equipment, shafts and openings to preclude damage and prevent entry of contaminants prior to cleaning operation. Remove protective covering upon completion of preservation operations.
- (53) "Total System" value is only listed when it is more stringent than the sum of the individual coats of the system.
- (54) This does not apply to propulsion plant water tanks aboard nuclear-powered ships.
- (55) For MIL-PRF-23236, Type VII, Class 9, coatings, follow the NAVSEA-approved ASTM F718 for cure and recoat times. This supersedes the 48-hour/7 day requirement.
- (56) Do not nonskid a 7-inch wide strip of deck surface in way of the helo hangar door seal interface on DDG-51 Class Flight II-A ships.
- (57) *If using Fast Clad ER system, the primer shall be applied at 8-10 mils instead of 4-8 mils.*

NOTES OF TABLES 6 THROUGH 9 FOR SUBMARINES

- (1A) Hull inserts shall be coated with the preservation system applied to adjacent surfaces. Extend coating system a minimum 1/2-inch on to non-ferrous liner or cladding.
- (2A) Alternating AF colors may be used. Final coat can be red or black.
- (3A) For all surfaces above max beam that are to receive AF, all coats shall be black. The final coat of all exterior coating systems above the waterline shall also be black.
- (4A) When applying a MIL-PRF-24647 system, the cure to immersion time for the anti-corrosive system may be different than the cure to immersion time for the anti-fouling paint. The longer cure to immersion time shall be used. Tack coats are not included when determining cure to immersion times.
- (5A) Draft marks are applied directly to the AC coat; do not apply AF beneath draft marks.
- (6A) Blasting is not allowed in machinery spaces.
- (7A) Topcoat color shall match surrounding paint on visible surfaces.
- (8A) MIL-PRF-23236, Type VII, **NAVSEA approved** coatings for **interior** submarine use under the Submarine Atmosphere Control Manual are listed in Table 10 of 2.12 as **"Internal Atmospheric"**.
- (9A) To minimize premature yellowing, chlorinated alkyd-based paints (DOD-E-24607) shall not be applied within 4 weeks before and after the application of amine-cured epoxy paints formulated to MIL-PRF-23236.
- (10A) When using paints qualified to DOD-E-24607, use Table 631-8-**10** of 2.2 to select approved colors.
- (11A) MIL-PRF-24596 Type I, Class 2, Grade A, and Formula 25A may be substituted for DOD-E-24607 chlorinated alkyd enamels. Color shall match the existing surroundings.
- (12A) The SSBN-726 Class logistics escape trunk (LET) bubble skirt knife edge in way of gaskets and fasteners for LET upper hatch fairings are to be left painted.
- (13A) The Environmental Protection Agency (EPA) has found that samples of vermiculite ore contain asbestos fibers. Vermiculite **was** used as an anti-sweat treatment **on the upper hatch covers on** submarines. All facilities and workers shall assume vermiculite contains asbestos fibers until it has been tested. All facilities are to test new vermiculite or vermiculite in use prior

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to working with the material. Workers who are doing work with or near vermiculite should be aware that it may contain asbestos and proper precautions shall be used.

- (14A) For Ensolite hull insulation (MIL-P-15280), DOD-E-24607 shall be used. For polyimide hull insulation either DOD-E-24607 or MIL-PRF-24596 may be used.
- (15A) Motor generators require protection from paints conforming to MIL-DTL-24441 or MIL-PRF-23236 during application and curing of the paint. When these paints are being applied or cured while venting in a space containing motor generators, the motor generators shall be protected using a NAVSEA-approved procedure. For 300 kW and 500 kW motor generators, a positive pressure unit according to Appendix A of the motor generator technical manual shall be used. Maintenance on motor generators shall not be performed for a minimum of 5 days after painting with MIL-DTL-24441 and MIL-PRF-23236 paints or any application of silicones (e.g., TT-P-28, MIL-PRF-24635 silicone enamels) in the engine room.
- (16A) When lead is removed from lead bins, the structure shall be blasted to SSPC-SP 10 and preserved with an ultra high solids coating, (even if the surrounding structure is being touch-up painted) prior to installing lead. Lead pockets, lead bins, and adjacent bulkhead and hull plating which will be in contact with lead ballast shall be covered with either one layer of 1/8-inch thick rubber conforming to MIL-PRF-1149, or with 2 layers of 1/16-inch thick rubber conforming to MIL-PRF-2912, Type II. The rubber linings shall be installed using adhesive conforming to MIL-A-24456. Before installing the rubber sheeting, all repairs and painting work in the tank shall be completed.
- (17A) Immersed non-ferrous and corrosion-resistant steel piping shall be completely coated with the specified tank or bilge coating system with the following exceptions: piping in reactor and propulsion plants in nuclear powered ships shall not be painted; non-ferrous and corrosion-resistant steel piping and CRES torpedo system components in torpedo impulse tanks shall not be painted; non-ferrous and CRES piping above residual waterline in MBTs is not required to be painted; in all tanks, closed system piping one-inch diameter and less is to be protected from blast and is not required to be painted.
- (18A) Final coat shall be light colored.
- (19A) CRES fasteners (studs, nuts, washers) used to secure Type II vibration damping and acoustic tiles may be left unpainted.

NOTES OF TABLES 6 THROUGH 9 FOR SUBMARINES  
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- (20A) Unpainted NFO, hydraulic oil, hydrophone, and CFO tanks shall remain unpainted. Lube oil sludge tanks on SSBN/SSGN-726 Class submarines are not painted.
- (21A) Reduced touch-up paint curing procedures of Section 7 of 2.2 do not apply to these surfaces. Also, note accelerated touch-up times authorized by Section 631-8.5.5.1 of 2.2 are for non-reactor potable water tanks only, and therefore are not to be used for potable water and reserve feedwater tanks unless specifically approved by NAVSEA.
- (22A) Total DFT specified in Table 8 for potable water tanks shall not be exceeded except in isolated areas adjacent to shapes and stiffeners. In no case shall the maximum DFT be exceeded by more than 2 mils. The isolated areas shall be less than 2 percent of the total area. For touch-up or overcoating intact aged paint in good condition, the same requirements for each coat apply, and the total film thickness maximum requirement may be corrected to allow for thickness of underlying aged paint.
- (23A) Prior to surface preparation, flasks must be depressurized. Barrier protection shall be in accordance with NAVSEA SO400-AD-URM-010, Tag Out Users Manual (TUM), Appendix G.
- (24A) Tek-Haz coating system will extend to a line even with the underside of the ventilation plenum welds, but not including the welds. Welds and area above welds will be coated with MIL-DTL-24441 primer (at 4-6 mils/coat) and 2 coats MIL-PRF-24635 (at 4-6 mils/coat).
- (25A) Bilge and Drain Collection Tanks includes the following: Bilge Collecting Tanks, Bilge Collecting Sump Tanks, Non-Oily Drain Collecting Tanks (other than Fresh Water), Oily Drain Collecting Tanks, Bilge Water Processing Tank, Drain Water Collecting Tanks, VLS Drain Collecting Tank, Oil Collection Tanks.
- (26A) MIL-PRF-23236, Type VII, coatings approved for submarines are listed in Table 10 of 2.12 as approved by NAVSEA.
- (27A) Conduct low voltage holiday detection on 100 percent of potable water tanks. Holiday detection shall also be performed on any repaired (touchup) areas of an existing coating system. The holiday checks are to be performed after application of the topcoat using a low voltage wet sponge holiday detector. Any holidays (defects to bare metal) found shall be marked by the inspector and the area touched up. Holiday checks shall be performed again on these areas after repair.

- (28A) All painting with organic solvent-based paints (alkyd, epoxy, oil based) that exceeds 1 quart per day for the entire ship shall be completed 5 days prior to the date of departure as determined by the

NOTES OF TABLES 6 THROUGH 9 FOR SUBMARINES

(Con't)

Commanding Officer. Date of departure, as it relates to painting, is the date of first dive after departure for a period of operation.

- (29A) Maintain the relative humidity in the tank or void space at a maximum of 50 percent from the start of surface preparation to cure of the topcoat.
- (30A) Steam clean to remove excess oil.
- (31A) Tank manhole covers are critical coated areas. Solvent-based coating systems may be used to paint manhole covers of tanks painted with high solids coating systems due to fit-up issues associated with high solids coating systems. ***Powder coatings shall not be applied to reserve feedwater, potable water, and steam surge tank manhole covers.***
- (32A) Areas visible from above shall be topcoated either gray or black.
- (33A) Total number of coats and total DFT specified in Table 7 for all interior spaces shall not be exceeded. Maximum system total DFT shall not exceed 17 mils for surfaces topcoated with DOD-E-24607, 21 mils for surfaces topcoated with MIL-PRF-24596, or 24 mils for surfaces topcoated with Formula 25A.
- (34A) ***Naval Shipyards and NAVSEA Note 5000 activities only are allowed to perform work in this area in accordance with guidance provided in reference 2.12.***
- (35A) ***The David Taylor Research Center coating system (DTRC 2844-1110 and 2844-1109) may be used on other exterior hull areas. This is to allow areas adjacent to areas covered by MIP or SHT to be re-preserved the same as MIP or SHT areas and improve the painting process.***
- (36A) ***If using Fast Clad ER system, the primer shall be applied at 8-10 mils instead of 4-8 mils.***
- (37A) ***For MIL-PRF-23236, Type VII coatings, the stripe coat may be waived if additional DFT readings are taken in accordance with Attachment A and recorded on Appendix 7.***
- (38A) ***Final grooming of bow domes must be performed by qualified shipyard personnel. Final surface finish of bow domes must be 180 microinches Ra or smoother. Measure and record surface roughness in accordance with ANSI B46.1 "Surface Roughness, Waviness, and Lay". If necessary, groom the surface of the dome to attain a maximum surface roughness of 180 microinches Ra. This additional grooming can be accomplished by***

wet sanding the surface by hand using 120 grit paper and fresh water. Refer to the appropriate bow dome manual for the class for more specific guidance on surface roughness, grooming and paint application.

- (39A) For MIL-PRF-23236, Type VII, Class 9 coatings, follow the NAVSEA-approved ASTM F718 for cure and recoat times. This supersedes the 48-hour/7-day requirement.
- (40A) This product shall be spray applied where possible. Two brush coats at 10-15 mils per coat shall be substituted for one coat of the spray-applied product at 20-30 mils per coat in areas where plural-component spray application is not feasible or for coating touch-up. For brush applied areas the stripe coat shall be after the 2 full coats. The brush coat version of Sherwin-Williams Fast Clad ER is Fast Clad Brush Grade. The brush coat version of Interline 783 is Interline 624. The spray version of each product may be brush-applied.

For application of the spray-applied "single coat" products, the product shall be applied all at one time, meaning during a continuous spray operation. Specifically, a "single-coat" system involves one color of paint, applied during one work evolution (i.e., no time is required to wait for the paint to dry), with a single pass or double pass, then a stripe coat is applied over the edges and welds to build adequate coating thickness in these failure-prone areas. Because the spray application is one work evolution, coating inspection QA checkpoint 3.10.10 need only be conducted after completion of application of the full coat with the stripe coat. If application is accomplished during numerous work evolutions (non-continuous application), each work evolution shall constitute a separate coat of paint for QA purposes.

For application of brush coat products, QA requirements are not waived after the first coat; QA requirements will occur after each brush coat is applied.

- (41A) Work shall be in accordance with the requirements of the following:

688 Class - Technical Handbook for Special Hull Treatment Maintenance and Repair for Submarines: NAVSEA S6360-AD-HBK-010. For Fairing Compound use NAVSEA Drawing 605-6160358.

21 Class - Submarine Mold-in Place Special Hull Treatment Maintenance and Repair Manual: NAVSEA S6360-AN-MMA-010/SHT

774 Class - Maintenance and Repair Manual for Virginia Class Submarine Mold-in-Place Special Hull Treatment: NAVSEA S6360-AV-MMA-010

- (42A) Low Pressure Water Clean (LP WC) with a fan spray starting at a pressure of 1,000 psi. Keep the cleaning lance nozzle tip perpendicular to and at least 4" from the surface. Increase pressure, if needed, in increments of 500 psi up to a maximum of 5,000 psi. Remove all paints down to sound grey or green anti-corrosive paint (F-151 or F-150) or

bare GRP. Remove any remaining barnacle particles or other foreign objects with wood or plastic scrapers, or by sanding. Do not use wire brushes or other abrasive instruments.

- (43A) Remove all marine growth and existing paint from the boot surface by Low Pressure Water Cleaning (LP WC) or sanding with soft back dual action or soft back random orbital sanders and 60 grit paper. Observe extreme caution when water jetting (LP WC). Measure stand-off distance and control nozzle pressure to assure that the boot is not damaged during the cleaning process. Low Pressure Water Cleaning must be performed using fresh water with a starting pressure of 1000 psi. Pressure must be increased in 500 psi increments until the desired results are obtained. Scuff the entire boot surface using 60 grit paper or equivalent coarseness Scotchbrite pad to remove any remaining paint and provide an adequately prepared surface for paint application. Clean the bare boot surface with PF-145HP degreaser (NSN 6850-01-378-0044) or mineral spirits per Commercial Item Description A-A-2904 Grade 1.
- (44A) Do not apply nonskid to Fairwater Planes or Retractable Bow Planes.
- (45A) Navy Formula 187 is not required to be applied to SHT tiles under towed array fairing covers. These tiles are to be left unpainted above the waterline or be painted with anti-fouling paint below the waterline.
- (46A) Navy Formula F-187 cannot be applied over F-184.
- (47A) If performing touchup of coating in Steam Plant Surge Tanks, 1 coat Dampney Company ENDCOR 450 (no DFT required) shall be applied prior to application of the coats of Apexior No. 1.
- (48A) Powder coatings approved for use on submarines are listed in 2.12 Table 19.



TABLE ONE STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (KEEL TO BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 3 YEARS SERVICE LIFE  FOR SMALL BOATS AND SERVICE CRAFT ONLY	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L	ONE AC COAT MIL-PRF-24647, TYPE I OR II, RED -- & -- ONE AC COAT MIL-PRF-24647, TYPE I OR II, GRAY, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE COAT MIL-PRF-24635 LT GRAY, COLOR NO. 26373 (LOW SOLAR ABSORPTION ONLY) TO BOOTTOPPING & BELOW, 2 - 3 MILS <b>--OR--</b> <b>COMMERCIAL GRADE WHITE</b> <b>AF</b>  ONE COAT COLOR NO. 26173 (FED STD 595) MIL-PRF-24635 OCEAN GRAY (LOW SOLAR ABSORPTION ONLY) ABOVE BOOTTOPPING, 2 - 3 MILS
	2	SAME AS LINE ONE	<b>ONE AC COAT MIL-PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, RED, 4 - 6 MILS</b> <b>-- &amp; --</b> <b>ONE AC COAT MIL-PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, GRAY, 4 - 6 MILS, 10 MILS MINIMUM</b>  SEE NOTE (4)			<b>ONE AF TIE COAT 3-5 MILS</b> <b>-- &amp; --</b> <b>ONE AF FULL COAT 5-7 MILS</b> <b>MIL-PRF-24647, TYPE III,</b> <b>CLASSES 1, 2, AND 3, GRADE A</b>  SEE NOTES (2) & (6)	<b>ONE AF TIE COAT 3-5 MILS</b> <b>-- &amp; --</b> <b>ONE AF FULL COAT 5-7 MILS</b> <b>MIL-PRF-24647, TYPE III,</b> <b>CLASSES 1, 2, AND 3, GRADE</b> <b>A</b>  SEE NOTES (2) & (6)	SAME AS LINE ONE
UNDERWATER HULL (KEEL TO BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 7 YEARS SERVICE LIFE  SEE NOTE (46)	3	SAME AS LINE ONE	SAME AS LINE ONE			ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	2 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	SAME AS LINE ONE
	4	<b>SAME AS LINE ONE</b>	<b>SAME AS LINE ONE</b>			<b>ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK</b> <b>-- &amp; --</b> <b>ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6</b> <b>MILS/COAT, 10 MILS MIN</b>  <b>SEE NOTES (2), (6) &amp; (48)</b>	<b>2 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6</b> <b>MILS/COAT, 10 MILS MIN</b>  <b>SEE NOTES (2), (6) &amp; (48)</b>	<b>SAME AS LINE ONE</b>
UNDERWATER HULL (KEEL TO BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 12 YEARS SERVICE LIFE  SEE NOTE (46)	5	SAME AS LINE ONE	SAME AS LINE ONE			ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	3 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	SAME AS LINE ONE
EXISTING FIN STABILIZERS  SEE NOTES (48) & (52)	6	BRUSH-OFF BLAST TO NACE 4/SSPC-SP 7	SAME AS LINE ONE			SAME AS LINE 5		
REFURBISHED FIN STABILIZERS  SEE NOTE (48)	7	HAND TOOL CLEAN SSPC- SP 2	SAME AS LINE ONE			SAME AS LINE 5		

TABLE ONE STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (DIELECTRIC SHIELDS)  SEE NOTES (10) & (11)	8	WHITE METAL BLAST, NACE 1/SSPC-SP 5	INNER SHIELD: ONE COAT US FILTER, ELECTROCATALYTIC, CAPASTIC™, PART NO. 35524, 100 MILS MIN  OUTER SHIELD: ONE COAT US FILTER, ELECTROCATALYTIC, CAPASTIC™, PART NO. 35524, 22 MILS MIN	ANTICORROSIVE PAINT SAME AS SURROUNDING HULL EXCEPT ONE COAT		ANTIFOULING PAINT SAME AS SURROUNDING HULL  SEE NOTES (2) & (6)		
EXPOSED AREAS OF OUTBOARD SHAFTING COVERED BY GRP	9	SAME AS LINE 7	ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ANTIFOULING PAINT SAME AS SURROUNDING HULL  SEE NOTES (2) & (6)		

TABLE ONE ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (KEEL TO BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS) SEE NOTE (46)	10	NEAR WHITE METAL BLAST USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS - OR - WATERJETTING TO NACE 5/ SSPC-SP12 CONDITION WJ-2	<b>ONE AC COAT MIL-PRF- 24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, RED, 4 - 6 MILS, WITHIN 4 HOURS AFTER SURFACE PREPARATION</b>  <b>SEE NOTE (4)</b>	<b>ONE AC COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, GRAY, 4 - 6 MILS, 10 MILS MIN</b>  <b>SEE NOTE (4)</b>	<b>ONE AF TIE COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 3-5 MILS</b>	<b>ONE AF FULL COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 5-7 MILS, HAZE GRAY</b>  <b>SEE NOTES (2) &amp; (6)</b>	<b>ONE AF FULL COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 5-7 MILS, HAZE GRAY</b>  <b>SEE NOTES (2) &amp; (6)</b>	<b>ONE AF FULL COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 5-7 MILS, BLACK</b>
UNDERWATER HULL  APPLIES TO EMBARKED BOATS AND CRAFT ONLY	11	SAME AS LINE 10	ONE COAT E-PAINT EP PRIMER 1000, 4 - 6 MILS	ONE COAT E-PAINT EP PRIMER 1000, 4 - 6 MILS	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) GRAY -- & -- ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) BLACK	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) GRAY  SEE NOTES (2) & (6)	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) GRAY  SEE NOTES (2) & (6)	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) BLACK

TABLE ONE GRP FIBERGLASS SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (KEEL TO TOP OF BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 7 YEARS SERVICE LIFE  SEE NOTE (46)	12	HIGH PRESSURE WASH TO REMOVE MARINE GROWTH & LOOSE PAINT - OR - TOUCH-UP OR REMOVAL OF PAINT SYSTEM TO SOUND PRIMER BY LIGHT ABRASIVE BLASTING WITH BLACK WALNUT SHELLS -- & -- SPOT CLEAN, CHAP 631, PARA 631-5.2.6  SEE NOTE (21)	ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	2 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	ONE COAT MIL-PRF-24635 LT GRAY, COLOR NO. 26373 (LOW SOLAR ABSORPTION ONLY) TO BOOTTOPPING & BELOW, 2 - 3 MILS  ONE COAT COLOR NO. 26173 (FED STD 595) MIL-PRF-24635 OCEAN GRAY (LOW SOLAR ABSORPTION ONLY) ABOVE BOOTTOPPING, 2 - 3 MILS
UNDERWATER HULL (KEEL TO TOP OF BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 12 YEARS SERVICE LIFE  SEE NOTE (46)	13	SAME AS LINE 12	ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	3 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	SAME AS LINE 11
UNDERWATER HULL APPENDAGES ON MINESWEEPERS ONLY	14	NEAR WHITE METAL BLAST USING GARNET OR ALUMINUM OXIDE - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2	ONE FULL COAT AMERON 3258 GREEN, 3 - 5 MILS --- & --- ONE STRIPE COAT AMERON 3258 BLACK, 3 - 5 MILS --- & --- ONE FULL COAT AMERON 3258 HAZE GRAY, 3 - 5 MILS --- & --- ONE STRIPE COAT AMERON 3258 GREEN, 3 - 5 MILS --- & --- ONE FULL COAT AMERON 3258 BLACK, 3 - 5 MILS  SEE NOTE (40)	ANTI-FOULING PAINT SAME AS SURROUNDING HULL				
SONAR TRANSDUCER TR-192B/UQN-1 ON MINESWEEPERS ONLY	15	POWER TOOL CLEANING TO BARE METAL PER SSPC-SP 11	SAME AS LINE 14	SAME AS LINE 14				

TABLE ONE WOOD SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL	16	BRUSH-OFF BLAST TO REMOVE LOOSE & DETERIORATED COATINGS - OR - HIGH-PRESSURE WASH TO REMOVE MARINE GROWTH & LOOSE PAINT  SEE NOTE (20)	KEEL TO 6 INCHES ABOVE UPPER BOOTTOP LIMIT  ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE COAT NO. 26373 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY) LT GRAY, TO BOOTTOPPING & BELOW, 2 - 3 MILS  ONE COAT NO. 26173 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY) OCEAN GRAY, ABOVE BOOTTOPPING, 2 - 3 MILS  SEE NOTE (6)



TABLE 2 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
HANGAR DECKS, FLIGHT DECKS, VERTICAL REPLENISHMENT DECK AREAS, CV AND CVN FLIGHT DECK LANDING AREAS, WALK AREAS AND ALL OTHER DECK AREAS	8	POWER TOOL CLEANING TO BARE METAL SSPC-SP-11	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		
UP TO 30 DAYS SERVICE LIFE	9	SAME AS LINE 8				ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		
CV AND CVN FLIGHT DECK LANDING AREAS  SERVICE LIFE UP TO 15,000 LANDINGS	10	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE V, COMP L  SEE NOTES (19), (22) & (50)		
CV AND CVN FLIGHT DECK LANDING AREAS  SERVICE LIFE UP TO 12,000 LANDINGS	11	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE I, VI, OR VIII COMP L  SEE NOTES (19), (22) & (50)		
WALK AREAS (ALL DECK AREAS OTHER THAN HANGAR DECK, FLIGHT DECK, & VERTICAL REPLENISHMENT DECK AREAS)	12	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT MIL-PRF-24667, TYPE I, V, VI, OR VIII, COMP G OR L -OR- ONE COAT DARK GRAY, MIL-PRF-24667, TYPE II, III, IV, COMP G  SEE NOTES (19) & (22)		
	13	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE		ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS -- & -- APPLICATION OF MIL-PRF-24667, TYPE XI, COMP PS		
	14	SAME AS LINE ONE	ONE COAT MIL-PRF-32171, TYPE III			ONE COAT MIL-PRF-32171, TYPE III		

TABLE 2 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
RAST TRACK TROUGHS WHERE PAINTED (WHERE NONSKID NOT APPLIED)	15	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  <b>SEE NOTE (23)</b>	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS			
WELL DECK OVERHEADS, BOTH EXPOSED & NON- EXPOSED TO LCAC EXHAUST  SEE NOTE (34)	16	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTES (30) & (31)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 19, 4 - 8 MILS  SEE NOTES (33) & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 19, 6 - 10 MILS  SEE NOTES (23), (33) & (49)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 19, 10 - 12 MILS  SEE NOTES (33) & (49)			
EXTERIOR PORTABLE/BOLTED LOUVERS FOR INTAKES AND UPTAKES	17	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS  SEE NOTES (33), (49) & (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS  SEE NOTES (23), (33) & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS  SEE NOTES (33) & (49)		SAME AS LINE ONE	SAME AS LINE ONE
	18	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7/18, 20-30 MILS</b>  <b>SEE NOTES (24) &amp; (33)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL- PRF-23236, TYPE VII, CLASS 7/18, 10-15 MILS</b>  <b>SEE NOTES (23) &amp; (33)</b>			<b>SAME AS LINE ONE</b>	<b>SAME AS LINE ONE</b>



TABLE 2 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR SURFACES ABOVE BOOTTOP, WITH EXCEPTION OF AREAS RECEIVING NONSKID  SEE NOTE (2)	19	NEAR WHITE METAL BLAST, USING GARNET, ALUMINUM OXIDE, BLACK WALNUT SHELLS, OR STAINLESS STEEL SHOT -- & -- SPOT CLEANING, CHAP 631, PARA 631-5.2.4.3 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2  SEE NOTE (21)	ONE COAT MIL-PRF- 23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE COAT MIL-PRF-23236, TYPE VII, 4 - 8 MILS  SEE NOTE (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE STRIPE COAT MIL- PRF-23236, TYPE VII, 6 - 10 MILS  SEE NOTE (23)	ONE FULL COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE FULL COAT MIL-PRF-23236, TYPE VII, 10 - 12 MILS	ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTE (47)	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL-E-24763 TYPE II, CLASS 2, 2 - 4 MILS  SEE NOTE (42)	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL-E-24763 TYPE II, CLASS 2, 2 - 4 MILS  PAINT DESIGNATIONS & MARKINGS MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTES (43) & (47)
	20	SAME AS LINE 19		2 COATS F-84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT		SAME AS LINE 19	SAME AS LINE 19	SAME AS LINE 19
	21	SAME AS LINE 19				ONE COAT MIL-PRF-24635, TYPE V OR VI, CLASS 2, 5- 6 MILS DECK GRAY	ONE COAT MIL-PRF- 24635, TYPE V OR VI, CLASS 2, 5-6 MILS, HAZE GRAY	ONE COAT MIL-PRF-24635, TYPE V OR VI, CLASS 2, 5-6 MILS, HAZE GRAY
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 3 YEARS SERVICE LIFE	22	SAME AS LINE 19	PROPRIETARY NONSKID LISTED ON THE QPL FOR MIL-PRF-24667  SEE NOTE (7)	STRIPE COAT OF PROPRIETARY NONSKID PRIMER LISTED ON THE QPL FOR MIL-PRF-24667  SEE NOTES (7) & (51)		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE V, COMP G OR L  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 12 MONTHS SERVICE LIFE	23	SAME AS LINE 19	SAME AS LINE 22	SAME AS LINE 22		ONE COAT DARK GRAY MIL-PRF-24667, TYPE I, VI, OR VIII, COMP G OR L  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 6 MONTHS SERVICE LIFE	24	SAME AS LINE 19	SAME AS LINE 22	SAME AS LINE 22		ONE COAT DARK GRAY MIL-PRF-24667 TYPE II, COMP G  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS, VERTICAL REPLENISHMENT DECK AREAS, CV AND CVN FLIGHT DECK LANDING AREAS, WALK AREAS AND ALL OTHER DECK AREAS  UP TO 30 DAYS SERVICE LIFE	25	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	SAME AS LINE 22	SAME AS LINE 22		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		
	26	SAME AS LINE 25				ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		

TABLE 2 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
WALK AREAS (ALL DECK AREAS OTHER THAN HANGAR DECK, FLIGHT DECK, & VERTICAL REPLENISHMENT DECK AREAS)	27	SAME AS LINE 19	SAME AS LINE 22	SAME AS LINE 22		ONE COAT MIL-PRF-24667, TYPE I, V, VI, OR VIII, COMP G OR L -OR- ONE COAT DARK GRAY, MIL-PRF-24667, TYPE II, III, IV, COMP G  SEE NOTES (19) & (22)		
	28	SAME AS LINE 19	SAME AS LINE 19	SAME AS LINE 19		ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS -- & -- APPLICATION OF MIL-PRF- 24667, TYPE XI, COMP PS		
	29	SAME AS LINE ONE	ONE COAT MIL-PRF- 32171 TYPE III			ONE COAT MIL-PRF-32171, TYPE III		
RAST TRACK TROUGHS WHERE PAINTED (WHERE NONSKID NOT APPLIED)	30	SAME AS LINE 19	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (23)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS			
EXTERIOR PORTABLE/BOLTED LOUVERS FOR INTAKES AND UPTAKES	31	SAME AS LINE 19	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS  SEE NOTES (33), (49) & (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS  SEE NOTES (23), (33) & (49)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS  SEE NOTES (33) & (49)		SAME AS LINE 19	SAME AS LINE 19
	32	SAME AS LINE 19	"SINGLE COAT"  ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7/18, 20-30 MILS  SEE NOTES (24) & (33)	"SINGLE COAT"  ONE STRIPE COAT MIL- PRF-23236, TYPE VII, CLASS 7/18, 10-15 MILS  SEE NOTES (23) & (33)			SAME AS LINE 19	SAME AS LINE 19

TABLE 2 GRP FIBERGLASS SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR SURFACES ABOVE BOOTTOP	33	HIGH PRESSURE WASH TO REMOVE MARINE GROWTH & LOOSE PAINT - OR - TOUCH-UP OR REMOVAL OF PAINT SYSTEM TO SOUND PRIMER BY LIGHT ABRASIVE BLASTING WITH BLACK WALNUT SHELLS -- & -- SPOT CLEAN, CHAP 631, PARA 631-5.2.6	ONE COAT F-150, MIL-DTL-24441, TYPE IV, 4 - 6 MILS		ONE STRIPE COAT F-152, MIL-DTL-24441, TYPE IV, 4 - 6 MILS -- & -- ONE COAT F-151, MIL-DTL-24441, TYPE IV, 4 - 6 MILS	ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <del>E</del> -24763, TYPE II, CLASS 2, 2 - 4 MILS	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <del>E</del> -24763, TYPE II, CLASS 2, 2 - 4 MILS
SEE NOTE (2)		SEE NOTE (21)	SEE NOTE (29)		SEE NOTE (29)		SEE NOTE (42)	SEE NOTE (43)
EXTERIOR WALK AREAS ALL EXTERIOR DECK AREAS	34	POWER TOOL CLEAN TO CLEAN FIBERGLASS (DISC SANDER, ETC.) - OR - POWER TOOL CLEAN TO POLYURETHANE OVERLAY SUBSTRATE (DISC SANDER, ETC.) - OR - HYDROBLAST TO CLEAN FIBERGLASS	PROPRIETARY NONSKID PRIMER LISTED ON THE QPL FOR MIL-PRF-24667			ONE COAT MIL-PRF-24667, TYPE I, II, OR III, COMP G - OR - MIL-PRF-24667 TYPE IV		
		SEE NOTE (25)	SEE NOTE (7)			SEE NOTES (19) & (22)		

TABLE 2 WOOD SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR ABOVE BOOTTOPPING	35	HAND TOOL CLEAN - OR - POWER TOOL CLEAN TO REMOVE DETERIORATED COATINGS	ONE COAT F-150, MIL-DTL-24441, TYPE IV, 4 - 6 MILS	DECKS, MASTS & SPARS:  ONE COAT NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - ONE COAT NO. 37038 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS	ALL OTHER SURFACES:  ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS			IDENTIFICATION MARKINGS:  PAINT DESIGNATIONS & MARKINGS MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTE (43)



TABLE 3 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
WELDING BAYS AND LIGHT TRAPS	9	SAME AS LINE 7	SAME AS LINE 7		SAME AS LINE 3	SAME AS LINE 3		
MACHINERY SPACES & BILGES	10	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11 - OR - WATERJETTING TO NACE 5/SSPC- SP 12 CONDITION WJ-2/L - OR - NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS		ABOVE BILGE AREA:  2 COATS F-124, DOD-E-24607, 1.5 - 3 MILS/COAT	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS	SAME AS LINE ONE	
SEE NOTE (44)		SEE NOTE (28)				<b>SEE NOTE (23)</b>		
	11	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS		SAME AS LINE 10	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS	SAME AS LINE ONE	
		SEE NOTE (28)	SEE NOTE (49)			SEE NOTES (23) & (49)		
INTAKE VENT PLENUMS BETWEEN SKIN OF SHIP & MOISTURE SEPARATORS (CONT)	12	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)	ONE STRIPE COAT MI-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)		
	13	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L -OR- NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		
CLEAN AND DIRTY SIDE OF COMBUSTION AIR INTAKES/UP TAKES/ EXHAUST TRUNKS	14	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (33) & (57)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS -- & -- ONE FULL COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7,6 - 10 MILS -- & -- ONE FULL COAT MIL-PRF- 23236, TYPE VII, CLASS 7,10 - 12 MILS  SEE NOTES (23) & (33)		
	15	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L - OR - NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - <b>OR -</b> <b>POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11</b>	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		

TABLE 3 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
FAN ROOMS	16	SAME AS LINE 10	SAME AS LINE 15		SAME AS LINE 15	SAME AS LINE 15		
MIXING ROOM/UPTAKE SPACES WITH VENTS OR LOUVERS TO THE OUTSIDE ATMOSPHERE (BULKHEADS & DECKS)	17	NEAR WHITE METAL BLAST NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)		
UNDER AFFF PROPORTIONING UNITS (INSIDE THE COAMING), OR BILGE DRAIN WELLS	18	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11  SEE NOTES (32) & (36)	ONE COAT MIL-PRF-32171, TYPE IV, CLASS 1 OR 2, 12 - 18 MILS			ONE COAT MIL-PRF-32171, TYPE IV, CLASS 1 OR 2, 12 - 18 MILS		
INTERIOR DECK PASSAGEWAYS NOT RECEIVING DECK COVERINGS (HIGH DURABILITY DECK PAINT)  SEE NOTE (12)	19	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS			ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS		
	20	SAME AS LINE 19	SAME AS LINE 18			SAME AS LINE 18		
INTERIOR STEEL SURFACES	21	SAME AS LINE 12	SAME AS LINE ONE		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE
	22	SAME AS LINE 13	SAME AS LINE ONE		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE
	23	<b>SAME AS LINE 19</b>	<b>SAME AS LINE ONE</b>		<b>SAME AS LINE ONE</b>	<b>SAME AS LINE ONE</b>	<b>SAME AS LINE ONE</b>	<b>SAME AS LINE ONE</b>

TABLE 3 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR COMPARTMENTS	<b>24</b>	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11, USING STAINLESS STEEL WIRE BRUSHES, STAINLESS STEEL PADS, OR ABRASIVE SANDING DISCS (ANSI/BHMA B74.18)  SEE NOTES (17) & (28)	2 COATS FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT - OR - ONE COAT MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS --OR-- <b>ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2</b>		2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT - OR - 2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTE (9)	TO DECKS NOT RECEIVING COVERING:  ONE COAT DECK GRAY (OR TERRACOTTA RED) (FED STD 595).: MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS	HULL, VENTILATION & PIPING INSULATION  2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT - OR - 2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTES (9), (28) & (41)	FOR COMPARTMENT PIPING & VENTILATION  SEE NOTE (18)
	<b>25</b>	HAND TOOL CLEANING, SSPC-SP 2  SEE NOTES (17) & (28)	SAME AS LINE <b>24</b>		SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>
INTERIOR COMPARTMENTS (OVERCOAT)	<b>26</b>	HAND TOOL CLEANING, SSPC-SP 2  SEE NOTE (28)	SAME AS LINE <b>24</b> FOR BARE METAL AREAS		SAME AS LINE <b>24</b> EXCEPT ONE COAT	SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b> EXCEPT ONE COAT	SAME AS LINE <b>24</b>
	<b>27</b>	POWER TOOL CLEANING, SSPC-SP 3  SEE NOTE (28)	SAME AS LINE <b>24</b> FOR BARE METAL AREAS		SAME AS LINE <b>24</b> EXCEPT ONE COAT	SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b> EXCEPT ONE COAT	SAME AS LINE <b>24</b>
WELDING BAYS AND LIGHT TRAPS	<b>28</b>	SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>		ONE COAT BLACK, LOW GLOSS (FED STD 595), MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS	ONE COAT BLACK, SEMI-GLOSS (FED STD 595): MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS		
	<b>29</b>	SAME AS LINE <b>25</b>	SAME AS LINE <b>24</b>		SAME AS LINE <b>28</b>	SAME AS LINE <b>28</b>		
WET SPACES (WASH ROOMS, WATER CLOSETS, SHOWER STALLS, GALLEYS, SCULLERIES & STOREROOMS WHERE HEAVY CONDENSATION IS COMMON)	<b>30</b>	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11  SEE NOTE (28)	ONE COAT SIGMA GLAZE 5492, 8-10 MILS, WHITE ONLY		ONE STRIPE COAT SIGMA 5492, 8-10 MILS -- & -- ONE FULL COAT, 8-10 MILS, WHITE ONLY  <b>SEE NOTE (23)</b>		SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>
	<b>31</b>	SAME AS LINE <b>30</b>	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS		ONE STRIPE COAT SHERWIN WILLIAMS DURA-PLATE UHS, 6 - 10 MILS -- & -- ONE FINAL COAT, 10 - 12 MILS  <b>SEE NOTE (23)</b>		SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>
	<b>32</b>	SAME AS LINE <b>30</b>	<b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS</b> --OR-- <b>ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2</b>		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE FULL COAT 6 - 8 MILS  <b>SEE NOTE (23)</b>		SAME AS LINE <b>24</b>	SAME AS LINE <b>24</b>



TABLE 3 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
MACHINERY SPACES & BILGES	33	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2 - OR - NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTE (28)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS		ABOVE BILGE AREA:  2 COATS F-124, DOD-E-24607, 1.5 - 3MILS/COAT	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (23)	SAME AS LINE 24	
	34	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTE (28)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTE (49)		SAME AS LINE 33	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23) & (49)	SAME AS LINE 24	
INTAKE VENT PLENUMS, BETWEEN SKIN OF SHIP & MOISTURE SEPARATORS	35	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTES (33) & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)		
	36	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2 - OR - NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTE (33)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		

TABLE 3 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
CLEAN AND DIRTY SIDE OF COMBUSTION AIR INTAKES/UPTAKES/ EXHAUST TRUNKS	37	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES <b>S (33) &amp; (57)</b>		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES <b>S (23) &amp; (33)</b>	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES <b>S (23) &amp; (33)</b>		
	38	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2 - OR - NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES <b>S (23) &amp; (33)</b>	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES <b>S (23) &amp; (33)</b>		
	39	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES <b>S (23) &amp; (33)</b>	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES <b>S (23) &amp; (33)</b>		
MIXING ROOM/UPTAKE SPACES WITH VENTS OR LOUVERS TO THE OUTSIDE ATMOSPHERE (BULKHEADS & DECKS)	40	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES <b>(23), (33), &amp; (49)</b>	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES <b>(23), (33), &amp; (49)</b>		
INTERIOR ALUMINUM SURFACES	41	SAME AS LINE 24	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24
	42	SAME AS LINE 35	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24
	43	SAME AS LINE 36	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24

TABLE 3 GRP FIBERGLASS SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C WELDING BAYS & LIGHT TRAPS	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR FIBROUS GLASS BOARDS	<b>44</b>	SOAP & WATER CLEAN & HAND SAND AS NECESSARY	ONE COAT FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS		2 COATS WATER-BASED INTERIOR LATEX, MIL-PRF-24596, 2 - 4 MILS/COAT			
	<b>45</b>	SAME AS LINE <b>44</b>	ONE COAT FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS		2 COATS OF FINISH COAT DOD-E-24607, 1.5 - 3 MILS/COAT, F-124, 125, OR 126 (COLOR TO BE DESIGNATED)			

TABLE 3 WOOD SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C WELDING BAYS & LIGHT TRAPS	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR COMPARTMENTS	<b>46</b>	HAND TOOL CLEAN -- & -- POWER TOOL CLEAN TO BARE WOOD OR TIGHTLY ADHERING INTACT PAINT	2 COATS FORMULA 84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS/COAT		2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTES (9) & (17)			FOR COMPARTMENT PIPING & VENTILATION  SEE NOTE (18)
	<b>47</b>	SAME AS LINE <b>46</b>	2 COATS FORMULA 84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS/COAT		2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT  SEE NOTE (17)			SAME AS LINE <b>46</b>



TABLE 4 STEEL SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
CHT/MSD TANKS	8	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 4 - 8 MILS  SEE NOTE (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 6 - 10 MILS  SEE NOTES <b>(23)</b> & (33)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 10 - 12 MILS  SEE NOTE (33)			
BALLAST TANKS, FLOODABLE VOIDS (SUBSTRATE TEMPERATURE 50 DEGREES FAHRENHEIT & ABOVE)  EDGE RETENTIVE-EXTENDED SERVICE LIFE 15-20 YEARS  SEE NOTE (8)	9	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS  SEE NOTES (33), (49) & <b>(57)</b>	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS  SEE NOTES <b>(23)</b> , (33) & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS  SEE NOTES (33) & (49)			
BALLAST TANKS, FLOODABLE VOIDS (SUBSTRATE TEMPERATURE 50 DEGREES FAHRENHEIT & ABOVE)  EDGE RETENTIVE SERVICE LIFE 10 - 12 YEARS (LESS STRINGENT HUMIDITY REQUIREMENTS)  SEE NOTE (8)	10	SAME AS LINE 7	SAME AS LINE 9	SAME AS LINE 9	SAME AS LINE 9			
<b>BALLAST TANKS, FLOODABLE VOIDS (SUBSTRATE TEMPERATURE 50 DEGREES FAHRENHEIT &amp; ABOVE)  EDGE RETENTIVE SERVICE LIFE 10 - 12 YEARS (MORE STRINGENT HUMIDITY REQUIREMENTS)  SEE NOTE (8)</b>	11	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236 TYPE VII CLASS 7/18, 20-30 MILS</b>  <b>SEE NOTES (24) &amp; (33)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-23236 TYPE VII CLASS 7/18, 10-15 MILS</b>  <b>SEE NOTES (23) &amp; (33)</b>				
BALLAST TANKS, FLOODABLE VOIDS (USE ONLY WHEN SUBSTRATE TEMPERATURE CANNOT BE MAINTAINED ABOVE 50 DEGREES FAHRENHEIT)  NORMAL 5 - 7 YEARS SERVICE LIFE	12	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, GRADE A OR B, 4 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, GRADE A OR B, 4 - 8 MILS	ONE COAT MIL-PRF-23236, GRADE A OR B, 4 - 8 MILS			
CHAIN LOCKERS	13	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE COAT MIL-PRF-23236, TYPE VII, 4 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE STRIPE COAT MIL-PRF-23236, TYPE VII, 6 - 10 MILS  <b>SEE NOTE (23)</b>	ONE FULL COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE FULL COAT MIL-PRF-23236, TYPE VII, 10 - 12 MILS			
	14	<b>SAME AS LINE 13</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 20-30 MILS</b>  <b>SEE NOTES (24) &amp; (33)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 10-15 MILS</b>  <b>SEE NOTES (23) &amp; (33)</b>				

TABLE 4 STEEL SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
NON-FLOODABLE VOIDS	15	SAME AS LINE 13	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS  SEE NOTES (33), (49), & (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS  SEE NOTES (23), (33), & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS  SEE NOTES (33) & (49)			
	16	SAME AS LINE 13	<b>"SINGLE COAT"</b>  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 20-30 MILS  SEE NOTES (24) & (33)	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 10-15 MILS  SEE NOTES (23) & (33)				

TABLE 4 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
TANKS AND VOIDS	17	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL



TABLE 5 VARIOUS LOCATIONS	LINE	A SURFACE PREPARATION	B	C	D	E	F TOTAL SYSTEM SEE NOTE (53)	G DESIGNATIONS & MARKINGS
UNHEATED PIPING, FITTINGS, VALVES	1	HAND TOOL CLEAN, SSPC-SP 2	ONE COAT F-84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS	ONE COAT F-84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS	2 COATS OF BILGE FINISH COAT TO MATCH SURROUNDING SURFACES, INCLUDING LAGGED SURFACES			ONE COAT MIL-PRF-24635, 2 - 3 MILS, FOR COLOR CODED SYSTEMS
UNHEATED FERROUS MACHINERY EXTERNAL SURFACES	2	POWER TOOL CLEAN, SSPC-SP 3	SAME AS LINE ONE	ONE COAT F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - ONE COAT NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS	IF REQUIRED FOR HIDING, ONE ADDITIONAL COAT: F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS			
MACHINERY, GAGEBOARDS	3	SAME AS LINE 2	SAME AS LINE ONE	ONE COAT F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - ONE COAT NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS	IF REQUIRED FOR HIDING, ONE ADDITIONAL COAT: F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS			
UNINSULATED SIDE OF BULKHEAD OR SHELL ADJACENT TO SEA OR AC BOUNDARY (FOR INTERIOR COMPARTMENTS ONLY)	4	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT HEMPEL HEMPADUR 45150-50630, 4 - 6 MILS	ONE COAT HEMPEL ANTI-CONDENS 617US-10000, 50 - 60 MILS				
	5	SAME AS LINE 4	ONE COAT F-84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS - OR - ONE COAT MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS	ONE COAT TEMP-COAT 101, 20 - 22 MILS	ONE COAT TEMP-COAT 101, 20 - 22 MILS	ONE COAT TEMP- COAT 101, 20 - 22 MILS		
	6	SAME AS LINE 4	SAME AS LINE 5	ONE COAT MASCOAT DELTA-T MARINE, 20-22 MILS	ONE COAT MASCOAT DELTA-T MARINE, 20-22 MILS	ONE COAT MASCOAT DELTA-T MARINE, 20-22 MILS		
	7	SAME AS LINE 4	SAME AS LINE 5	ONE COAT KEFA AIRLESS 8125, 50 - 60 MILS				
BOILERS & ECONOMIZERS (EXCEPT PARTS USED FOR HEAT TRANSFER), MACHINERY CASINGS, FERROUS SHEET METAL	8	SAME AS LINE 4	ONE COAT AMERON AMERCOAT 892HS, 2 - 3 MILS  SEE NOTE (39)					
	9	SAME AS LINE 4	2 COATS OF TT-P-28 SUFFICIENT TO COVER THE PROFILE					
<b>STEAM, FEEDWATER, BOTTOM/ SURFACE BLOW &amp; BOILER PRESSURE VESSEL PIPING IN PREPARATION FOR ULTRASONIC MEASUREMENTS</b>	10	<b>POWER TOOL CLEAN TO BARE METAL, SSPC-SP- 11, USING STAINLESS STEEL WIRE BRUSHES, STAINLESS STEEL PADS, OR ABRASIVE SANDING DISCS (ANSI/BHMA B74.18)</b>						
ELECTRICAL EQUIPMENT, ELECTRONIC EQUIPMENT & CABLES	11	SAME AS LINE ONE	ONE COAT F-84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS	2 COATS F-111, MIL-DTL- 15090, 1.5 - 3 MILS/COAT - OR - ONE COAT NO. 26307 FED STD 595), MIL-PRF-24635, 2 - 3 MILS				

TABLE 5 VARIOUS LOCATIONS	LINE	A SURFACE PREPARATION	B	C	D	E	F TOTAL SYSTEM SEE NOTE (53)	G DESIGNATIONS & MARKINGS
CABLE, INTERIOR (OTHER THAN PVC, LOW SMOKE)	12	SAME AS LINE ONE	2 COATS FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT	2 COATS WATER-BASED LATEX PER MIL-PRF-24596, 2 - 4 MILS/COAT	2 COATS DOD-E-24607 CHLORINATED ALKYD 1.5 - 3 MILS/COAT (FOR COLOR MATCH IF REQUIRED)			
<b>CABLE, EXTERIOR (OTHER THAN PVC, LOW SMOKE)</b>	13	SAME AS LINE ONE	SAME AS LINE 11	ONE COAT MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY) TO MATCH SURROUNDING AREA, 2 - 3 MILS				
ANCHOR (SURFACE SHIP BOW ANCHORS)  FOR ANCHORS BELOW LOWER BOOTTOPPING LIMIT, SEE NOTE (13)	14	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (14)	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS - OR - ONE COAT MIL-PRF-23236, TYPE VII, 4 - 8 MILS	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS - OR - ONE COAT MIL-PRF-23236, TYPE VII, 10 - 12 MILS	ONE COAT HAZE GRAY, NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS			
ANCHOR CHAIN	15	COMMERCIAL BLAST CLEAN, SSPC-SP 6  SEE NOTE (14)	ONE COAT AMERON PSX 700 TO HOLD BLAST, 1 - 2 MILS  SEE NOTE (16)	ONE COAT AMERON PSX 700, 4 - 5 MILS	ONE COAT AMERON PSX 700, 4 - 5 MILS		10 MILS MIN, 12 MILS MAX	AMERON PSX 700  SEE NOTE (15)
	16	SAME AS LINE 15	ONE COAT INTERNATIONAL INTERGARD 264 TO HOLD BLAST, 1-2 MILS  SEE NOTE (16)	ONE COAT INTERNATIONAL INTERGARD 264, 4-6 MILS	ONE COAT INTERNATIONAL INTERFINE 979, 4-6 MILS		SAME AS LINE 15	INTERNATIONAL INTERFINE 979  SEE NOTE (15)
	17	SAME AS LINE 15	ONE COAT SHERWIN WILLIAMS SEAGUARD 5000 HS TO HOLD BLAST, 1-2 MILS  SEE NOTE (16)	ONE COAT SHERWIN WILLIAMS SEAGUARD 5000 HS, 4-6 MILS	ONE COAT SHERWIN WILLIAMS PXLE-80, 4-6 MILS		SAME AS LINE 15	SHERWIN WILLIAMS PXLE-80  SEE NOTE (15)
	18	SAME AS LINE 15	ONE COAT MIL-PRF-24635, CLASS 5 OR 6, TO HOLD BLAST, 1-2 MILS  SEE NOTE (16)	ONE COAT MIL-PRF-24635 CLASS 5 OR 6, 4-6 MILS	ONE COAT MIL-PRF-24635, CLASS 5 OR 6, 4-6 MILS		SAME AS LINE 15	MIL-PRF-24635, CLASS 5 OR 6  SEE NOTE (15)
INTERIOR GALVANIZED SURFACES	19	BRUSH-OFF BLAST, SSPC-SP 7 - OR - POWER TOOL CLEAN, SSPC-SP 3		ONE COAT WATER-BASED INTERIOR LATEX, MIL-PRF-24596, 2 - 4 MILS	TOPCOAT TO MATCH SURROUNDING AREA			
EXTERIOR GALVANIZED SURFACES	20	SAME AS LINE 19		ONE COAT MIL-E-24763, 2 - 4 MILS	TOPCOAT TO MATCH SURROUNDING AREA			

TABLE 5 VARIOUS LOCATIONS	LINE	A SURFACE PREPARATION	B	C	D	E	F TOTAL SYSTEM SEE NOTE (53)	G DESIGNATIONS & MARKINGS
EXHAUST PIPE EXTERIOR	21	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT AMERCOAT 892HS, HAZE GRAY #26270, 2 - 3 MILS - OR - 2 COATS OF TT-P-28 SUFFICIENT TO COVER THE PROFILE  SEE NOTES (39) & (42)					
PCMS (REPAIRS)	22	STRIP PAINT, USING "PEEL-AWAY-7" - OR - PLASTIC MEDIA BLASTER - OR - SODIUM BICARBONATE MEDIA BLASTER  SEE REPAIR & INSTALLATION METHODS, RIM 05T1-99			ONE COAT HAZE GRAY, MIL- <b>E-24763</b> (LOW SOLAR ABSORPTION ONLY), 2 - 4 MILS (TOP COAT OF PCMS)  SEE NOTE (45)			
PCMS (NEW INSTALLATION)	23	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT MIL-PRF-23236 TYPE IV, V, or VI 4 - 8 MILS  SEE NOTE (29)	ONE COAT MIL-PRF-23236, TYPE IV, V, or VI 4 - 8 MILS  SEE NOTES (29)	SAME AS LINE 22			
<b>ARRESTING GEAR SHEAVE FOUNDATIONS</b>	24	<b>SSPC-SP 1</b> <b>-- &amp; --</b> <b>SPONGEJET TO NEAR WHITE</b> <b>METAL BLAST, NACE 2/SSPC-SP 10</b> <b>-- &amp; --</b> <b>SSPC-SP 1 (STEAM CLEAN)</b> <b>-- &amp; --</b> <b>SPONGEJET TO NEAR WHITE</b> <b>METAL BLAST, NACE 2/SSPC-SP 10</b>	<b>ONE COAT MIL-PRF-23236, TYPE</b> <b>VII, CLASS 5, 4 - 8 MILS</b> <b>(BRUSH APPLY ONLY)</b>  <b>SEE NOTES (33) &amp; (49)</b>	<b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS 5,</b> <b>6 - 10 MILS</b>  <b>SEE NOTES (33) &amp; (49)</b>	<b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 5,</b> <b>10 - 12 MILS</b>  <b>SEE NOTES (33) &amp; (49)</b>			

TABLE 6 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO MAX BEAM	F MAX BEAM TO UPPER BOOTTOP	G DRAFT MARKS
UNDERWATER HULL  (KEEL TO UPPER BOOTTOP; RUDDERS; STRUTS; DIVING PLANES)  (NON-SHT SURFACES BELOW WATERLINE)	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L	<b>2 COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT</b> --OR-- 2 AC COATS MIL-PRF-24647 TYPE I OR II, 4 – 6 MILS/COAT --OR-- <b>2 COATS MIL-DTL-24441 TYPE IV, F- 150, 4-6 MILS/COAT</b>  SEE NOTES (1A), (4A), & (35A)			2 AF COATS MIL-PRF- 24647, TYPE I OR II, 4 – 6 MILS/COAT  SEE NOTES (2A) & (4A)	2 AF COATS MIL-PRF- 24647, TYPE I OR II BLACK, 4 – 6 MILS/COAT  SEE NOTES (3A) & (4A)	ONE COAT MIL-DTL-24631 F- 186 --OR-- ONE COAT MIL-DTL-24441 TYPE IV, F-152 --OR-- ONE AC COAT MIL-PRF- <b>23236</b> , WHITE, 3-4 MILS  SEE NOTE (5A)
NON-SHT, EXTERIOR SURFACES ABOVE THE WATERLINE (INCLUDES DSRV/SRC SEATING SURFACES)	2	SAME AS LINE ONE	TWO COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 COATS AC MIL-PRF-24647, TYPE I OR II, 4-6 MILS/COAT  FINAL COAT TO BE BLACK  SEE NOTES (1A), (32A), & (35A)					
	3	SAME AS LINE ONE	ONE COAT MIL-DTL-24441 TYPE IV, F- 150, 4-6 MILS -- & -- ONE COAT MIL-DTL-24441 TYPE IV, F- 153, 4-6 MILS  SEE NOTES (1A), (32A), & (35A)					
FOR MOORED TRAINING SHIPS ONLY; EXTERIOR SURFACES ABOVE THE WATERLINE (NON- IMMERSION SURFACES ONLY)	4	SAME AS LINE ONE	2 COATS MIL-PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 COATS MIL-DTL-24441, TYPE IV 4-6 MILS/COAT  SEE NOTES (1A) & (32A)		ONE COAT, MIL- PRF-24635 NO. 27038, 2-4 MILS			
UNTILED (NON-SHT COVERED) FOOT TRAFFIC AREAS TO BE COVERED WITH NONSKID PAINT (ALL CLASSES OF SUBMARINES)	5	SAME AS LINE ONE	ONE COAT MIL-DTL-24441 TYPE IV F- 150, 4-6 MILS --- & --- ONE COAT MIL-DTL-24441 TYPE IV F- 153, 4-6 MILS  SEE NOTE (32A)		NONSKID: MIL- PRF-24667, TYPE I OR X, COMP G  <b>SEE NOTE (44A)</b>			
	6	SAME AS LINE ONE	TWO COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 COATS AC MIL-PRF-24647, TYPE I OR II, 4-6 MILS / COAT  FINAL COAT TO BE BLACK  SEE NOTES (3A) & (32A)		SAME AS LINE 5			
<b>SURFACES TO BE COVERED BY MIP OR MIP- SHT</b>  <b>SEE NOTE (34A)</b>	7	<b>SEE NOTE (41A) FOR DETAILS ON SURFACE PREPARATION</b>	<b>ONE COAT DTRC 2844-1110 (YELLOW PRIMER), 4-5 MILS</b>  <b>SEE NOTES (1A) &amp; (35A)</b>	<b>ONE COAT DTRC 2844- 1109 (BLACK TOPCOAT), 4-5 MILS</b>  <b>SEE NOTES (1A) &amp; (35A)</b>				

TABLE 6 STEEL SURFACES  SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO MAX BEAM	F MAX BEAM TO UPPER BOOTTOP	G DRAFT MARKS
SHT TILES (688 CLASS ONLY) (KEEL TO UPPER BOOTTOP)  SEE NOTE (34A)	8	SEE NOTE (41A) FOR DETAILS ON SURFACE PREPARATION				TWO COATS AF MIL-PRF-24647, TYPE I, CLASS 3, 4-6 MILS/COAT  SEE NOTE (2A)	TWO COATS AF MIL-PRF-24647, TYPE I, CLASS 3, 4-6 MILS/COAT  SEE NOTES (3A) & (45A)	SAME AS LINE ONE
SHT/MIP-SHT (SSN 21 AND 774CLASS) (KEEL TO UPPER BOOTTOP)  SEE NOTE (34A)	9	SAME AS LINE 8	ONE COAT MIL-DTL-24631A, 3-4 MILS --OR-- ONE COAT AMERCOAT 3273, 2-3 MILS			SAME AS LINE 8	SAME AS LINE 8	SAME AS LINE ONE
SHT/MIP-SHT AREAS ABOVE UPPER BOOTTOP LIMIT (EXCEPT TRAFFIC AREAS)  SEE NOTE (34A)	10	SAME AS LINE 8	ONE COAT MIL-DTL-24631A (F-187 POLYURETHANE), 3-4 MILS  SEE NOTES (45A) & (46A)					SAME AS LINE ONE
SURFACES TO BE COVERED BY A FAIRING COMPOUND  SEE NOTE (34A)	11	SEE NOTE (41A) FOR DETAILS ON SURFACE PREPARATION	ONE COAT DTRC 2844-1110 (YELLOW PRIMER), 4-5 MILS  SEE NOTES (1A) & (35A)	ONE COAT DTRC 2844-1109, 4-5 MILS --OR-- ONE COAT MIL-DTL-24441 TYPE IV, 4-6 MILS  SEE NOTES (1A), (32A) & (35A)				
SHT OR MIP-SHT AREAS TO BE COVERED WITH NONSKID (688 CLASS ONLY)  SEE NOTE (34A)	12	SAME AS LINE 8	ONE COAT MIL-DTL-24631A F-184 OR AMERCOAT 3273, 3-4 MILS -- & -- 18LBS/250 SQ FT GRIT PER MIL-A-22262 CAST UNIFORMLY ON FRESHLY APPLIED PAINT	ONE COAT MIL-DTL-24631A, F-184 --OR-- AMERCOAT 3273, 3-4 MILS	ONE COAT MIL-DTL-24631A, F-187, 3-4 MILS  SEE NOTE (32A)			
SHT OR MIP-SHT AREAS TO BE COVERED WITH NONSKID (21 AND 774 CLASS ONLY)  SEE NOTE (34A)	13	SAME AS LINE 8	SAME AS LINE 12		SAME AS LINE 12			

TABLE 6 GRP FIBERGLASS SURFACES  SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO MAX BEAM	F MAX BEAM TO UPPER BOOTTOP	G DRAFT MARKS
UNBOOTED GRP BOW DOMES ABOVE UPPER BOOTTOP  SEE NOTE (34A)	14	LOW PRESSURE WATER CLEAN (LP WC)  SEE NOTE (42A)	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS -- & -- ONE COAT MIL-DTL-24441 TYPE IV, F- 153 OR F-154, 4-6 MILS --OR-- TWO COATS MIL-PRF-24647 4-6 MIL/COAT --OR-- OR, 2 COATS MIL-PRF-23236 TYPE IV, V, OR VI, CLASS 5 OR 7, 4-6 MILS/COAT  SEE NOTES (32A) & (38A)					
UNBOOTED GRP BOW DOMES BELOW UPPER BOOTTOP  SEE NOTE (34A)	15	SAME AS LINE 14	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS --OR-- TWO COATS MIL-PRF-24647 4-6 MIL/COAT  SEE NOTE (4A)			TWO COATS AF MIL- PRF-24647, TYPE I, CLASS 3, 4-6 MIL/COAT  SEE NOTES (2A), (4A), & (38A)	TWO COATS AF MIL-PRF- 24647, TYPE I, CLASS 3, 4- 6 MIL/COAT  SEE NOTES (3A), (4A), & (38A)	
BOOTED GRP BOW DOMES ABOVE UPPER BOOTTOP  SEE NOTE (34A)	16	LOW PRESSURE WATER CLEAN (LP WC)  SEE NOTE (43A)	PRIOR TO INSTALLING THE BOOT - ONE COAT MIL-DTL-24441, TYPE IV, F-150, 2-4 MILS AFTER BOOT INSTALLATION ONE COAT NAVY FORMULA 187, 2-3 MILS  SEE NOTES (38A) & (46A)					
BOOTED GRP BOW DOMES BELOW UPPER BOOTTOP  SEE NOTE (34A)	17	SAME AS LINE 16	PRIOR TO INSTALLING THE BOOT - ONE COAT MIL-DTL-24441, TYPE IV, F-150, 2-4 MILS AFTER BOOT INSTALLATION ONE COAT NAVY FORMULA 184, 2-3 MIL/COAT			SAME AS LINE 15	SAME AS LINE 15	

TABLE 7 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
BILGE AND TRUNK INTERIOR AREAS BELOW THE LOWER WALKING FLAT	1	POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTE (6A)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 5-7 MILS  SEE NOTES (8A), (15A), & (28A)	ONE STRIPE COAT AND ONE FULL COAT MIL-PRF-23236, TYPE VII, CLASS 17, 5-7 MILS/COAT  SEE NOTE (7A), (8A), (9A), (15A), (28A), (33A) & (37A)				
	2	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (15A) & (28A)	ONE STRIPE COAT AND ONE FULL COAT MIL-DTL-24441, TYPE IV, F-151 OR F-157, 4-6 MILS/COAT  SEE NOTES (7A), (15A), (28A), & (33A)				
	3	SAME AS LINE ONE	ONE COAT MIL- PRF-23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4-8 MILS  SEE NOTES (15A) & (28A)	ONE STRIPE COAT AND ONE FULL COAT MIL-PRF-23236, TYPE V, CLASS 5 OR 7, 4-8 MILS/COAT  SEE NOTES (7A), (9A), (15A), (28A), & (33A)				
	4	<b>INTENTIONALLY LEFT BLANK</b>						
WET SPACES (EXCEPT BILGES AND TRUNKS)	5	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 2				
	6	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 3				
VRLA BATTERY COMPARTMENT	7	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 2				
VA CLASS BATTERY COMPARTMENT (DECK AND BHDS UP TO 62" ABOVE TOP STEP OF DECK)	8	SAME AS LINE ONE	TEK-HAZ RED PRIME COAT, 16-20 MILS  SEE NOTES (24A) & (28A)	TEK-HAZ GRAY TOPCOAT, 16- 20 MILS  SEE NOTES (24A), (28A), & (33A)				
VA CLASS BATTERY COMPARTMENT (OVHD AND BHDS ABOVE 62" ABOVE TOP STEP OF DECK)	9	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTE S(24A) & (28A)			2 COATS MIL-PRF- 24635, TYPE II, CLASS 1, 4-6 MILS/ COAT  SEE NOTES (24A), (28A), & (33A)		

TABLE 7 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
TRUNK INTERIORS, UNINSULATED AREA ABOVE THE LOWER FLAT <i>(INCLUDING UPPER HATCH COVER)</i>	10	<b>POWER TOOL CLEAN TO BARE METAL SSPC-SP 11</b>  <b>SEE NOTES (6A) &amp; (13A)</b>	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 5-7 MILS/COAT  SEE NOTE (7A), <b>(8A)</b> , (9A), (15A), (28A), (33A), & <b>(37A)</b>				
	11	SAME AS LINE 10	SAME AS LINE 2	ONE COAT MIL-DTL-24441, TYPE IV, F-151 OR F-157, 4-6 MILS/COAT  SEE NOTES (7A), (15A), & (28A)		ONE COAT DOD-E-24607, 1-2 MILS  SEE NOTES (7A), (9A), (10A), (11A), (12A), (28A) & (33A)		
	12	SAME AS LINE 10	SAME AS LINE 3	ONE COAT MIL-PRF-23236, TYPE V, CLASS 5 OR 7, 4-8 MILS/COAT  SEE NOTES (7A), (9A), (15A), & (28A)		SAME AS LINE 11		
TRUNK INTERIORS UNDER INSULATION ABOVE THE LOWER FLAT	13	SAME AS LINE ONE	SAME AS LINE 2	ONE COAT MIL-DTL-24441, TYPE IV, CONTRASTING COLOR, 4-6 MILS  SEE NOTES (7A), (15A), (28A), & (33A)				
	14	SAME AS LINE ONE	SAME AS LINE 3	ONE FULL COAT MIL-PRF- 23236, TYPE V, CLASS 5 OR 7, 4-8 MILS/COAT  SEE NOTES (7A), (15A), (28A), & (33A)				
MACHINERY SPACES (ENGINE ROOMS AND AUXILIARY MACHINERY ROOMS) UNINSULATED PRESSURE HULL	15	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 11	2 COATS DOD-E- 24607, 1-2 MILS/COAT  SEE NOTES (7A), (9A), (10A), (11A), (28A) & (33A)			
	16	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 12	SAME AS LINE 15			
MACHINERY SPACES (ENGINE ROOMS AND AUXILIARY MACHINERY ROOMS) PRESSURE HULL TO BE COVERED BY INSULATION	17	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 2				
	18	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 3				
DECKS WITHOUT COVERINGS	19	SAME AS LINE ONE	<b>ONE COAT MIL-DTL-24441, TYPE IV, 2-4 MILS</b>	<b>ONE COAT MIL-DTL- 24441, TYPE IV, 2-4 MILS</b>				
	20	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 14				
	21	SAME AS LINE ONE	ONE COAT TT-P-645, F-84, 1-2 MILS  SEE NOTES (28A) & (33A)	2 COATS MIL-PRF-24635, 1-2 MILS/COAT  SEE NOTES (7A), (28A), & (33A)				



TABLE 7 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
DECKS WITH COVERINGS	22	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 2-4 MILS					
	23	SAME AS LINE ONE	SAME AS LINE 21					
ENSOLITE INSULATION (OVERCOAT)	24	DETERGENT WASH AND RINSE				2 COATS DOD-E-24607, 1-2 MILS/COAT  SEE NOTES (9A), (10A), (11A), (14A), (28A) & (33A)		
POLYIMIDE INSULATION (OVERCOAT)	25	SAME AS LINE 24				SAME AS LINE 24		
	26	SAME AS LINE 24				2 COATS MIL-PRF-24596, 1-2 MILS/COAT -OR- 2 COATS F-25A, 1-2 MILS/COAT  SEE NOTES (28A) & (33A)		
DRY VOIDS	27	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 14				
	28	<b><i>SAME AS LINE ONE</i></b>	<b><i>SAME AS LINE 19</i></b>	<b><i>SAME AS LINE 19</i></b>				

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
POTABLE WATER TANKS  <b>SEE NOTES (31A) &amp; (34A)</b>	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (29A)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 4-8 MILS  SEE NOTES (15A), (17A), (26A), (29A), & (39A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 9, 6- 10 MILS  SEE NOTES (15A), (26A), (29A), (37A), & (39A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 9, 10-12 MILS  SEE NOTES (15A), (26A), (27A), (29A), & (39A)			
	2	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE III, F-150, 2-4 MILS  SEE NOTES (15A), (17A), (21A) & (29A)	ONE STRIPE COAT MIL-DTL- 24441, TYPE III, 2-4 MILS  SEE NOTES (15A), (21A) & (29A)	ONE COAT MIL-DTL- 24441, TYPE III, 2-4 MILS  SEE NOTES (15A), (21A) & (29A)	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2-4 MILS  SEE NOTES (15A), (21A) & (29A)	ONE COAT MIL-DTL- 24441, TYPE III, <b>F-152</b> , 2-4 MILS DFT AT ADEQUATE THICKNESS TO MEET COATING RANGE  SEE NOTES (15A), (21A), (27A) & (29A)	TOTAL SYSTEM 8-12 MILS (ON AREAS WITHOUT STRIPE COAT)  SEE NOTE (22A)
RESERVE FEEDWATER TANKS  <b>SEE NOTES (31A) &amp; (34A)</b>	3	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE III, F-150, 2 - 4 MILS  SEE NOTES (15A), (17A), (21A) & (29A)	ONE STRIPE COAT MIL-DTL- 24441 TYPE III F-152, 2 - 4 MILS  SEE NOTES (15A), (21A), & (29A)	ONE COAT MIL-DTL- 24441, TYPE III F-151, 2 - 4 MILS  SEE NOTES (15A), (21A), & (29A)	ONE STRIPE COAT MIL-DTL-24441, TYPE III, F-150, 2 - 4 MILS  SEE NOTES (15A), (21A), & (29A)	ONE COAT MIL-DTL- 24441 TYPE III F-152, 2 - 4 MILS  SEE NOTES (15A), (21A), & (29A)	TOTAL SYSTEM 8 MILS MIN
AUXILIARY TANKS, ACR HOLDING TANKS (MTS), DEPTH CONTROL TANKS, FORWARD TRIM/WRT TANKS, NFO EXPANSION TANK, SEAWATER EXPANSION TANK, SECONDARY SHIELD WATER OVERFLOW TANK (MTS), TRIM TANKS, UNHEATED WATER STORAGE TANK (MTS), WRT TANKS	4	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (15A), (16A), (17A), (26A), (29A) & (36A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (15A), (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (15A), (26A), & (29A)			
	5	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 7/18, 20-30</b> <b>MILS</b>  <b>SEE NOTES (15A), (16A), (17A),</b> <b>(26A), (29A), &amp; (40A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS</b> <b>7/18, 10-15 MILS</b>  <b>SEE NOTES (15A), (26A),</b> <b>(29A), &amp; (37A)</b>				
BILGE AND DRAIN COLLECTION TANKS  SEE NOTE (25A)	6	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (15A), (17A), (26A), & (29A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS  SEE NOTES (15A), (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (15A), (26A), & (29A)			
BOW TANK, BOW SONAR TANK, SONAR DOME AREA STEEL STRUCTURE (INCLUDES SONAR SPHERE, ITS SUPPORT STRUCTURE, AND FORWARD SIDE OF MBT BULKHEAD)	7	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7 4 - 8 MILS  SEE NOTES (17A), (19A), (26A), (29A), & (36A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (18A), (26A), & (29A)			
	8	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 7/18, 20-30</b> <b>MILS</b>  <b>SEE NOTES (17A), (18A), (19A),</b> <b>(26A), (29A), &amp; (40A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS</b> <b>7/18, 10-15 MILS</b>  <b>SEE NOTES (18A), (26A),</b> <b>(29A), &amp; (37A)</b>				

TABLE 8 STEEL SURFACES  SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
FUEL OIL OVERFLOW/COLLECTING   TANK, FUEL OIL FILTER SUMP DRAIN TANK, ES DIESEL FUEL OIL TANK (MTS)	9	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4 - 6 MILS  SEE NOTES (17A), (19A), & (29A)	ONE STRIPE COAT MIL-DTL- 24441, TYPE IV, 4 - 6 MILS  SEE NOTE (29A)	ONE COAT MIL-DTL- 24441, TYPE IV, F-152 OR F-151, 4 - 6 MILS  SEE NOTE (29A)			
	10	SAME AS LINE ONE	ONE COAT MIL-PRF-23236 TYPE VI, CLASS 5, 4-8 MILS  SEE NOTES (17A), (19A) & (29A)	ONE STRIPE COAT MIL-PRF- 23236 TYPE VI, CLASS 5, 4-8 MILS  SEE NOTE (29A)	ONE COAT MIL-PRF- 23236 TYPE VI, CLASS 5, 4-8 MILS  SEE NOTE (29A)			
MAIN BALLAST TANKS ABOVE RESIDUAL WATER LINE; HIGH PRESSURE AIR FLASKS IN MBT'S, EMBT AIR FLASKS IN MBT'S	11	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (23A) & (29A)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (16A), (17A), (19A), (23A), (26A), (29A), & (36A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (18A), (26A), & (29A)			
	12	<b>SAME AS LINE 11</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 7/18, 20-30</b> <b>MILS</b>  <b>SEE NOTES (16A), (17A), (18A),</b> <b>(19A), (26A), (29A), &amp; (40A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS</b> <b>7/18, 10-15 MILS</b>  <b>SEE NOTES (18A), (26A),</b> <b>(29A), &amp; (37A)</b>				
MAIN BALLAST TANKS BELOW RESIDUAL WATER LINE	13	SAME AS LINE 11	SAME AS LINE 11	SAME AS LINE 11	SAME AS LINE 11	2 COATS AF MIL-PRF- 24647, 4-6 MILS/COAT, FROM BOTTOM CENTERLINE TO APPROXIMATELY 2' VERTICALLY ABOVE HEIGHT OF HIGHEST FLOOD LOUVER OVER A TACK COAT (1-2 MILS) MIL-DTL- 24441 TYPE IV  SEE NOTES (4A) & (29A)		
	14	<b>SAME AS LINE 11</b>	<b>SAME AS LINE 12</b>	<b>SAME AS LINE 12</b>		<b>SAME AS LINE 13</b>		
MAIN INDUCTION SUMP TANK, MISSILE COMPENSATING TANKS,   AUXILIARY VARIABLE BALLAST TANKS, <b>AND</b> VARIABLE BALLAST TANKS	15	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (15A), (17A), (26A), (29A), & (36A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (15A), (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (15A), (26A), & (29A)			
	16	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 7/18, 20-30</b> <b>MILS</b>  <b>SEE NOTES (15A), (17A), (26A),</b> <b>(29A), &amp; (40A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS</b> <b>7/18, 10-15 MILS</b>  <b>SEE NOTES (15A), (26A),</b> <b>(29A), &amp; (37A)</b>				

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
TORPEDO IMPULSE TANKS	17	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (15A), (17A), & (29A)	ONE STRIPE COAT MIL-DTL- 24441, TYPE IV, 4-6 MILS  SEE NOTES (15A), (17A), & (29A)	ONE COAT MIL-DTL- 24441, TYPE IV, F-152 OR F-151, 4-6 MILS  SEE NOTES (15A), (17A), & (29A)			
	18	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VI, CLASS 7, GRADE B OR C, 4-8 MILS  SEE NOTES (15A), (17A), & (29A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VI, CLASS 7, GRADE B OR C, 4-8 MILS  SEE NOTES (15A), (17A), & (29A)	ONE COAT MIL-PRF- 23236, TYPE VI, CLASS 7, GRADE B OR C, 4-8 MILS  SEE NOTES (15A), (17A), & (29A)			
TORPEDO IMPULSE TANKS (SSBN & SSGN ONLY)	19	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (15A), (17A), (26A), (29A), & (36A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (15A), (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (15A), (26A), & (29A)			
	20	SAME AS LINE ONE	"SINGLE COAT"  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 20-30 MILS  SEE NOTES (15A), (17A), (19A), (26A), (29A), & (40A)	"SINGLE COAT"  ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7/18, 10-15 MILS  SEE NOTES (15A), (26A), (29A), & (37A)				
SANITARY TANKS SANITARY FLUSHING TANKS	21	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 4-8 MILS  SEE NOTES (15A), (17A), (26A), & (29A)	STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 13 6-10 MILS  SEE NOTES (15A), (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 13, 10-12 MILS  SEE NOTES (15A), (26A), & (29A)			
STEAM PLANT SURGE TANKS (MTS)	22	SAME AS LINE ONE	ONE COAT OF APEXIOR NO. 1 (DAMPNEY CO.), 2 - 4 MILS  SEE NOTES (29A) & (47A)	ONE COAT OF APEXIOR NO. 1 (DAMPNEY CO.), 2 - 4 MILS  SEE NOTES (29A) & (47A)				
WASTE OIL COLLECTING TANKS, WASTE OIL OVERFLOW TANKS, ENGINE ROOM OIL COLLECTION TANKS	23	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (15A), (17A), (26A), & (29A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS  SEE NOTES (15A), (26A), (29A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (15A), (26A), & (29A)			

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
FREE FLOOD AREAS AND RECESSES: INSIDE SURFACES OF FAIRWATER, UNDERSIDE OF SUPERSTRUCTURE, CHAIN LOCKERS (EXCEPT 726 CLASS), INTERIOR SURFACES OF STEEL DOMES, SHAFT TUBE INTERIOR SURFACES (WHEN SHAFT IS REMOVED), BOW DOME ACCESS FREE FLOOD AREA, BSY-1 RECESS (FR 29-30 STBD), 726 CLASS ACCESS SONAR DOME RECESS (FR 6-7 PORT), 726 CLASS SONAR SPHERE EXTERNAL SURFACES, 726 CLASS SONAR TRUNK EXTERNAL SURFACES, 726 CLASS SONAR DOME BHD (FR 4), 726 CLASS SONAR CAVITY (FR 6-8), 726 CLASS SONAR DOME ACCESS TRUNK (FR 6-7), CAPSTAN RECESS, SONAR PENETRATION SPLICE TRUNK RECESSES (PORT AND STBD), SONAR CABLE TRUNK, EMERGENCY TOWING PENDANT, BETWEEN BLADES COVER PLATES (BBCP) RECESS, <b>726 CLASS MSS RECESS AT BHD 4</b>	24	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4-8 MILS  SEE NOTES (1A), (26A) & (36A)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6-10 MILS  SEE NOTES (26A) & (37A)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10-12 MILS  SEE NOTES (26A) & (32A)			
	25	SAME AS LINE ONE	<b>"SINGLE COAT"</b>  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 20-30 MILS  SEE NOTES (1A), (26A), (32A), & (40A)	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 10-15 MILS  SEE NOTES (26A), (32A), & (37A)				
FREE FLOOD AREAS AND RECESSES: TORPEDO TUBE RECESS, AFT FREE FLOOD AREA (MUD TANK), EJECTION PUMP RECESS, SECONDARY PROPULSION MOTOR (SPM) RECESS, 726 CLASS CHAIN LOCKER, SSN688 CLASS BQN-17, BSY-1 OR AN/BBQ-10/V(1) RECESS (FR 14-15 PORT BOTTOM), 726 CLASS ANCHOR RECESS	26	SAME AS LINE ONE	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	2 AF COATS MIL-PRF-24647 TYPE I OR II 4 – 6 MILS PER COAT  SEE NOTE (4A)		
	27	SAME AS LINE ONE	SAME AS LINE 25	SAME AS LINE 25		SAME AS LINE 26		

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
ALL OTHER FREE FLOOD AREAS, RECESSES ABOVE WATERLINE (APPLIES TO FREE FLOOD AREAS, RECESSES, AND VOIDS NOT LISTED ELSEWHERE IN THIS TABLE)	28	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (16A), (17A), (26A), & (36A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (26A) & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (26A) & (32A)			
	29	SAME AS LINE ONE	"SINGLE COAT"  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7/18, 20-30 MILS  SEE NOTES (16A), (17A), (26A), (32A), & (40A)	"SINGLE COAT"  ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7/18, 10-15 MILS  SEE NOTES (26A), (32A), & (37A)				
	30	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4 - 8 MILS -OR- ONE COAT MIL-DTL-24441 TYPE IV, F-150, 4-6 MILS -OR- ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTES (16A) & (17A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4 - 8 MILS -OR- ONE STRIPE COAT MIL-DTL- 24441 TYPE IV, F-153, 4-6 MILS -OR- ONE AC STRIPE COAT MIL- PRF-24647, TYPE I OR II, 4-6 MILS	ONE COAT MIL-PRF- 23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4 - 8 MILS -OR- ONE COAT MIL-DTL- 24441 TYPE IV, 4-6 MILS -OR- ONE AC COAT MIL-PRF- 24647, TYPE I OR II, 4-6 MILS  SEE NOTE (32A)			
ALL OTHER FREE FLOOD AREAS, RECESSES BELOW WATERLINE (APPLIES TO FREE FLOOD AREAS, RECESSES, AND VOIDS NOT LISTED ELSEWHERE IN THIS TABLE)	31	SAME AS LINE ONE	SAME AS LINE 28	SAME AS LINE 28	SAME AS LINE 28	SAME AS LINE 26		
CLEAN FUEL OIL, HYDRAULIC OIL, LUBE OIL SLUDGE AND HYDROPHONE TANKS	32	POWER TOOL CLEAN, SSPC-SP 3  SEE NOTE (29A)	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (15A), (17A), (20A), & (29A)	MIL-DTL-24441, TYPE IV, F- 152 OR F-151, 4-6 MILS  SEE NOTES (15A) & (29A)				
	33	COMMERCIAL BLAST, SSPC-SP 6 OR POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTES (20A) & (29A)						
NORMAL FUEL OIL (688 CLASS ONLY; FROM BASELINE TO 4 FEET ABOVE BASELINE)	34	COMMERCIAL BLAST, SSPC-SP 6 OR POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTES (20A), (29A) & (30A)						
TANK MANHOLE COVERS	35	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VIII --OR-- USE APPROVED COATING SYSTEM SPECIFIED FOR TANK OR FREEFLOOD  SEE NOTES (15A), (21A), (26A), (29A), (31A), & (48A)					

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
FREEFLOOD ACCESS COVERS	36	SAME AS LINE ONE	2 COATS AC MIL-PRF-24647, TYPE I OR II, 4-6 MILS/COAT  <b>SEE NOTE (32A)</b>			2 AF COATS MIL-PRF- 24647, TYPE I OR II, 4-6 MILS PER COAT  SEE NOTES (2A), (3A), (4A), (7A), & (32A)		
	37	SAME AS LINE ONE	TWO COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT  <b>SEE NOTE (32A)</b>			SAME AS LINE 36		
	38	<b>SAME AS LINE ONE</b>	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS --- & --- ONE COAT MIL-DTL-24441, TYPE IV, F-151 OR F-152, 4-6 MILS  <b>SEE NOTE (32A)</b>			SAME AS LINE 36		

TABLE 9 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
INTERIOR SURFACES OF RUDDERS, PLANES, STABILIZERS (SYNTACTIC FILLED VOIDS)	1	HAND TOOL CLEAN, SSPC-SP 2	2 COATS TT-P-645 F-84 (PRIMER), 1-2 MILS / COAT	ONE COAT MIL-DTL- 24441, TYPE IV, 4-6 MILS				
	2	SAME AS LINE ONE	SAME AS LINE ONE	ONE COAT PRIMER MIL- PRF-23236, TYPE <i>IV</i> , <i>V</i> , <b>OR VI</b> , 4-6 MILS				



NAVSEA  
STANDARD ITEM

FY-10 (CH-1)

ITEM NO: 009-32  
DATE: 09 MAR 2009  
CATEGORY: II

1. SCOPE:

1.1 Title: Cleaning and Painting Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S9086-VD-STM-010/020/030/CH-631, Preservation of Ships in Service

2.3 29 CFR 1915, Occupational Safety and Health Standards for Shipyard Employment, Subparts C and Z

2.4 Systems and Specifications, SSPC Painting Manual, Volume 2

2.5 NACE Book of Standards

2.6 S6360-AG-MAN-010, Camouflage Manual, Surface Ship Concealment

2.7 ASTM D 4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

2.8 ISO 8502-3, Assessment of Dust on Steel Surfaces Prepared for Painting (Pressure Sensitive Tape Method)

2.9 S9086-CN-STM-020/CH-079, Damage Control - Practical Damage Control

2.10 S9086-VG-STM-010/CH-634, Deck Coverings

2.11 S9086-RK-STM-010/CH-505, Piping Systems

2.12 MS6310-081-015, Submarine Preservation

3. REQUIREMENTS:

3.1 General Preservation Requirements:

3.1.1 Consider marine coatings to contain heavy metals (e.g., lead, cadmium, or chromium), hexavalent chromium, crystalline silica and/or other toxic or hazardous substances.

3.1.2 Accomplish safety precautions as specified in 2.2, 2.3, and the Work Item/task order during surface preparation and the application or removal of marine coatings.

3.1.3 Blast Media:

3.1.3.1 Maintain a current copy of material certification of abrasive blast media conforming to MIL-A-22262 or A-A-1722 for reference by the SUPERVISOR. Copy shall be available starting 7 working days prior to blasting. MIL-A-22262 abrasives must be listed on the Qualified Products List (QPL), or the repair activity shall have written notification from NAVSEA indicating pending listing on the QPL. Submit one legible copy, in hard copy or electronic media, to the SUPERVISOR upon request. For A-A-1722 abrasives, a complete data package demonstrating compliance with the requirements must be provided by the supplier to the procuring activity. Exceptions are listed in 3.1.3.2 and 3.1.3.3.

3.1.3.2 Spongejet may be used as an alternative to obtain SSPC-SP 10 or SSPC-SP 11 cleanliness. ***Abrasive sponge media shall be procured from the sponge-media blasting equipment manufacturer or their authorized licensee.***

3.1.3.3 Recyclable ferrous metallic abrasive materials conforming to AB-3 of 2.4 may be used as an abrasive blast media for steel substrates. Cleanliness of recyclable ferrous metallic abrasive materials shall be measured and maintained in accordance with the requirements of AB-2 of 2.4.

3.1.3.4 For requirements specified in 3.1.3.3, maintain a current copy of the results of the quality control requirements of Paragraph 6 of AB-2 and quality assurance test required by Paragraph 5 of AB-3 of 2.4 for reference by the SUPERVISOR. Submit one legible copy, in hard copy or electronic media, to the SUPERVISOR upon request.

3.1.4 Abrasive blast steel and aluminum plates, shapes, and ferrous piping, equal to NACE 2/SSPC-SP 10 of 2.4 and 2.5, establishing a surface profile that meets the requirements of 3.10.6, and coat, prior to shipboard installations except in the areas where weld joints remain to be accomplished, or unless specified otherwise in the invoking Work Item or task order. Except for potable water tanks, feedwater tanks, and freshwater drain collecting tanks, the requirements of Notes (26) and (29A) do not apply to these materials.

3.1.4.1 Non-ferrous piping, which is to be preserved shipboard, shall be hand tool (non-impact tools only) cleaned in accordance with SSPC-SP 2 of 2.4. Preservation of non-ferrous piping one inch in diameter or less does not require surface preparation.

3.1.5 For touch-up, disturbed, and/or inaccessible areas (terms are clarified in 3.6), the minimum surface preparation shall be that shown in Tables One through 9, except that an SSPC-SP 11 is acceptable for areas

originally requiring a NACE 2/SSPC-SP 10 or NACE 5/SSPC-SP 12. For submarines this shall be determined by inspection and agreed to by the SUPERVISOR.

3.1.6 Feather edges of well-adhered paint remaining after cleaning for all surface preparation methods. Feathering is explained in more detail in 3.6.5.

3.1.7 Clean insulation and lagging prior to painting; ensure such areas are free of foreign matter and contaminants that would prevent adherence of paint.

3.1.8 Clean and dry all prepared and previously painted surfaces; ensure such surfaces are free of foreign matter that will affect adherence of paint coatings. Inclusions such as dust and debris in the paint film shall be removed prior to the application of the next coat.

3.1.9 Record and restore existing painted labels, compartment designations, hull markings, and other painted information which will be removed or covered during cleaning and painting operations.

3.1.10 Install masking material for protection of equipment and items not to be painted during preservation. Shipboard items not to be painted are listed in 2.2 and 2.12. Remove masking material upon completion of final coating.

3.1.11 Unless otherwise specified, all paints and coatings that are qualified to performance specifications (MIL-PRF) are to be applied in accordance with the manufacturer's NAVSEA-approved ASTM F718 product data sheet. The dry film thickness (DFT), **temperature, relative humidity, and surface preparation** requirements stated herein take precedence over the NAVSEA-approved ASTM F718 data sheets if there is a conflict. The NAVSEA-approved ASTM F718 data sheets shall supersede any other manufacturer's ASTM F718 data sheets for that product, even if it is newer (more recent) than the NAVSEA-approved ASTM F718 data sheets. Copies of the NAVSEA-approved ASTM F718 data sheets are available from the National Surface Treatment Center (NST Center) website: <http://www.nstcenter.com>.

3.1.12 Intentionally left blank.

3.1.13 Store paint and nonskid system components in a cool, dry place. Do not expose to freezing temperatures or direct sunlight. For both paint and nonskid, storage ambient temperature shall be maintained between 65 and 85 degrees Fahrenheit. Low temperature nonskid systems (non-skid and primer) shall be stored between 65 and 85 degrees Fahrenheit with the optimal storage temperature being 70 and 80 degrees Fahrenheit.

3.1.13.1 Monitor the storage temperature over the 24-hour period prior to initiation of the application process and document the minimum and maximum temperatures. If recorded manually, temperature shall be recorded once per shift during the 24-hour period. Manual readings are not

necessary if monitoring equipment is used that tracks minimum and maximum temperature for the 24-hour period.

3.1.13.2 As an alternative to the storage monitoring requirement for paint and nonskid in 3.1.13.1, a maximum of 1 hour before application of products, measure individual components (after each is mixed, but before components are combined together) with a paint thermometer to confirm that each component of the system is within the required range.

3.1.14 When applying paint, multiple coats shall be of contrasting colors, unless specifically stated otherwise in Tables One through 9.

3.1.15 When using multiple component (such as 2-part) coating systems (e.g. epoxies and polyurethanes), use of "partial kits" is prohibited unless using verified proportioning equipment or other verified measuring equipment (gravimetric).

3.1.16 For surface ships, for commercial underwater hull coating systems including anti-corrosive paints and anti-fouling paints, the manufacturer's primer must be used with its anti-fouling coating. No substitution is allowed. Successive coats of anti-corrosive paints shall be of a contrasting color. Coats of anti-fouling paints shall be of the colors stated in Tables One through 5.

3.1.16.1 For all ships, anti-fouling coatings may be repaired, touched-up, and/or overcoated as defined in 4.3 with any other approved ablative anti-fouling system, and approved anti-fouling paints may be applied over any approved exterior anti-corrosive system. Anti-fouling coatings must be of the same "Type".

3.1.17 Apply the first coat of MIL-PRF-24647 anti-fouling paint when the last coat of epoxy paint is still slightly tacky (as defined in 3.6.4) (approximately 4 to 6 hours after paint application) and in accordance with applicable NAVSEA-approved ASTM F718. If the maximum recoat time for the epoxy is exceeded, accomplish the overcoat window requirements of 3.5, then apply a tack coat (explained in 3.6.1) of epoxy paint one to 2 mils wet film thickness (WFT) over previously painted surfaces. The tack coat shall be allowed to cure until tacky, and then the next full coat of the system shall be applied.

3.1.18 Mix and apply all coatings in accordance with the product's NAVSEA-approved ASTM F718, except for invoked requirements for surface preparation and Dry Film Thickness (DFT) as specified in Tables One through 9.

3.1.19 Boats and small craft that are embarked on surface ships or otherwise deployed should meet the camouflage requirements of 2.6.

3.1.20 Utilize water-based latex fire retardant paints in preference to chlorinated alkyd-based fire retardant paints in areas where condensation,

high humidity, and temperatures below 50 degrees Fahrenheit are not expected during application and cure. Such paints are available under MIL-PRF-24596.

3.1.21 Mix and apply the Navy Polyamide Epoxy MIL-DTL-24441 coatings in accordance with the following, except the DFT shall be as specified in Tables One through 9. The MIL-DTL-24441 coatings' mixing ratio is one-to-one by volume. The components of the various formulas are not interchangeable. Blend each component thoroughly prior to mixing the components. After mixing equal volumes of the 2 components, the mixture must be thoroughly stirred. For Type III only, the stand-in times listed below must be observed. There is no induction time for Type IV.

3.1.21.1 Stand-in time (induction time) for MIL-DTL-24441, Type III, is considered to be the time immediately following the mixing of the components A and B during which the critical reaction period of these components is initiated and is essential to the complete curing of the coating. During stand-in time, the mixture must be thoroughly stirred at least once every 20 minutes to avoid hot spots caused by localized overheating from the chemical reaction.

<u>Surface Temperature at Job Site</u> <u>(Degrees Fahrenheit)</u>	<u>Stand-In Time in Hours</u>
35 to 50	2 hours at 70 degrees Fahrenheit (paint temperature)
50 to 60	2 hours at job site temperature
60 to 70	One hour to 1-1/2 hours at job site temperature
70 to 90	1/2 to one hour at job site temperature

3.1.22 For proper curing, the maximum application and cure temperature for MIL-DTL-24441 products shall be 90 degrees Fahrenheit (ambient and surface temperature).

3.1.23 Powder coating application may be used if approved by the TYCOM; otherwise use applicable Lines in Tables One through 9. TYCOM approval shall denote specific items or classes of items and applications. Powder coatings may match the color of the surrounding area or, if needed, may be overcoated with liquid paints. Powder coated items require near white metal blast, NACE 2/SSPC-SP 10, as minimum surface preparation. Any use of a chemical pretreatment (e.g., phosphate conversion coatings) requires approval by NAVSEA. QA checkpoints are still required for items that are powder coated.

3.1.23.1 For exterior applications and interior dry applications of removable parts, powder coating shall conform to MIL-PRF-24712.

3.1.23.2 For interior wet or immersion areas, powder coating shall conform to MIL-PRF-23236, Type VIII.

3.1.23.3 Powder coatings are not practical for use on large components or ship structure. Any large-scale applications to ship structure require approval by NAVSEA.

3.1.23.4 Powder coating is not authorized for use on components, covers, or any parts to be installed in potable or reserve feed water tanks aboard nuclear powered ships.

3.1.24 Peel and stick nonskid has been approved for use in limited areas on surface ships.

3.1.25 Coatings used on interior spaces of submarines are approved under the Submarine Atmosphere Control Program and listed on the Submarine Material Control List (SMCL). For interior use on submarines, only those MIL-PRF-23236, Type VII, coatings listed in Note (8A) may be used. For use in tanks, voids and freefloods on submarines, only those MIL-PRF-23236, Type VII, coatings listed in Note (26A) may be used.

3.1.26 For submarines, ensure that identified structural repair sites are not contaminated with paint overspray until repairs have been completed. Upon completion of structural repairs, the affected areas will be abrasive blasted to SSPC-SP 10 prior to paint application unless otherwise specified.

3.1.27 Restrictions on repair activity personnel (which includes Contractors) working in propulsion plant spaces aboard nuclear powered ships shall be in accordance with NAVSEAINST 4350.2 (Series) (Contract Work Onboard Nuclear-Powered Ships).

### 3.2 Stripe Coat Requirements:

3.2.1 For all areas where stripe coating is required, as denoted in Tables One through 9, apply stripe coat in accordance with applicable NAVSEA-approved ASTM F718 data sheet to edges, weld seams, welds of attachments and appendages, cutouts, corners, butts, foot/handholds (including inaccessible areas such as back side of piping, underside of I-beams), and other mounting hardware (non-flat surface). Stripe coat these areas after the previous full coat has dried. The stripe coat shall encompass all edges as well as at least a one-inch border outside each edge and weld. For submarines, solvent-based coatings shall have the stripe coat applied by brush; ultra high solids coatings (e.g. MIL-PRF-23236, Type VII) may have the stripe coat applied by brush or spray.

3.2.1.1 Each stripe coat shall be of the specified paint system and shall be a different color from both the paint over which it is being applied and the next coat in the system (if a product only comes in 2 colors, the stripe coat shall contrast with the color of the previous coat). Full coat inspection shall be conducted prior to stripe coat application.

3.2.1.2 MIL-PRF-23236, Type VII coatings may have the stripe coat waived; however, in lieu of a stripe coat, additional DFT readings are required in accordance with Attachment A.

3.3 Cure time is dependent on temperature; products applied at lower temperature will need more time to cure. This includes low temperature coatings. Cure time of each coat shall be IAW NAVSEA-approved ASTM F718 unless otherwise specified in the following requirements:

3.3.1 Drying time between coats of a specified coating for potable and feedwater tanks shall be a minimum of 48 hours at a minimum temperature of 70 degrees Fahrenheit (substrate and ambient), using heated air if necessary to maintain temperature. Ventilation shall be sufficient to ensure continuous flow of air through the tanks with at least one complete air change every 4 hours.

3.3.2 Following coating applications, potable and feedwater tanks shall be continuously ventilated with a minimum of one complete air change every 4 hours for at least 7 consecutive days prior to filling with water. During the ventilation period, maintain a minimum tank temperature of 70 degrees Fahrenheit (substrate and ambient). Verify and document daily that ventilation is properly installed and running. ***For potable water tanks coated with MIL-PRF-23236 Type VII, Class 9 paints, see Note (55) for surface ships and Note (39A) for submarines.***

3.3.2.1 Freshly painted potable water tanks shall be filled with potable water and emptied at least twice to ensure tank cleanliness.

3.3.3 Prior to application of any solvent-based alkyd coating, such as MIL-PRF-24635, over an epoxy coating, allow the epoxy to dry until it is no longer tacky (as defined in 3.6.4). It shall be dry to the touch but not fully cured before overcoating with any solvent-based alkyd coating.

3.3.4 Prior to application of any water-based coating, such as MIL-PRF-24596, over an epoxy coating, allow the epoxy to dry for at least 16 hours.

3.4 Overcoating of MIL-DTL-24441 with MIL-DTL-24441:

3.4.1 If less than 7 days has elapsed since the application of the prior coat, the next coat may be applied after visual inspection to confirm the absence of grease, dirt, salts, or other surface contaminants. If surface contamination is suspected as a result of visual inspection or for other reasons, the entire surface shall be cleaned in accordance with SSPC-SP 1 of 2.4. The next coat of MIL-DTL-24441 shall be applied after surfaces are completely dried.

3.4.2 If more than 7 days but less than 30 days has elapsed since the application of the prior coat, the entire surface shall be cleaned in accordance with SSPC-SP 1 of 2.4. Ensure the surface has fully dried, and

then apply a tack coat (one to 2 mils WFT) of the last coat applied or Formula 150. The tack coat (as defined in 3.6.1) shall be allowed to cure (dry) until tacky (as defined in 3.6.4); then apply the next full coat of the system. This condition can only be met one time during the painting system application.

3.4.3 If more than 30 days has elapsed since the application of the prior coat, the entire surface shall be cleaned in accordance with SSPC-SP 1 of 2.4. After allowing the surface to dry, the surface shall be lightly abraded to degloss the epoxy, using a brush-off abrasive blast (preferred), power sanding, or hand sanding using 80-120 grit, then apply the next full coat of the system.

### 3.5 Overcoating of Non-MIL-DTL-24441 Epoxy Coatings:

3.5.1 Follow the manufacturer's instructions for the allowable overcoat window, not to exceed 30 days. The 30-day maximum may be extended beyond 30 days if specifically approved in writing by NAVSEA. Where the base coat and topcoat are provided from different manufacturers, the term "manufacturer" refers to the manufacturer of the base coat. Application of a tack coat shall not restart the 30-day window.

3.5.1.1 If either the manufacturer's instructions or the 30-day window (or a specific extension approved by NAVSEA) has been exceeded, the coating shall be reactivated by following the manufacturer's instructions for reactivating the surface.

### 3.6 Clarification of Terms:

3.6.1 A tack coat is defined as a layer of paint with a reduced film thickness (e.g., 1-2 mils vice 5 mils); this does not imply that adding thinner is acceptable.

3.6.2 Touch-up is defined differently within this Standard Item between surface ships and submarines.

3.6.2.1 Touch-up is defined within this Standard Item for surface ships as preservation operations on cumulative surface areas less than one percent of the total area (e.g., bilge, tank, space, etc.) being preserved, with no individual area greater than 10 square feet. Included under touch-up operations are new and disturbed surfaces of less than 10 square feet. The documentation requirements of 3.7 and 3.8 are waived for these touch-up areas. The requirements of 3.10.2, 3.10.6, 3.10.7, 3.10.8, and 3.10.10 shall be verified by the accomplishing activity as (I) inspections prior to coating applications. This waiver does not apply to potable or feedwater tanks.

3.6.2.2 Touch-up is defined within this Standard Item for submarines as preservation operations on cumulative surface areas less than one percent of the total area (e.g., bilge, tank, space, etc.) being preserved, with no individual area greater than 4 square feet. Included under



touch-up operations are new and disturbed surfaces of less than 4 square feet. The documentation requirements of 3.7 and 3.8.1 are replaced with Appendix 9 for these touch-up areas (3.8.2 is still required). The requirements of 3.10.2, 3.10.6, 3.10.7, 3.10.8, and 3.10.10 shall be verified by the accomplishing activity as (I) inspections prior to coating applications. This waiver does not apply to potable or feedwater tanks.

3.6.2.3 For submarines, touch-up of MIL-PRF-23236, Type VII, coating systems **and existing MIL-DTL-24441 and MIL-PRF-23236 coating systems** with solvent-based coating systems qualified to MIL-DTL-24441, Type IV or MIL-PRF-23236, **Type V or VI** is acceptable.

3.6.2.4 On surface ships and submarines, for new and disturbed areas of individual areas 2 sq ft or less totaling less than 0.03 percent of the total surface area, the requirements to perform and document the following paragraphs are waived: 3.10.1, 3.10.2, 3.10.6, 3.10.7, 3.10.8, and 3.10.10. The documentation requirements of 3.7 and 3.8 are also waived. The requirement of 3.10.1.1 shall be accomplished, but not documented. For coating application, apply coatings in accordance with Tables One through 9 with the following exception: apply only one coat of primer on prepared substrate, followed by topcoat product applied to overlap intact coating by a minimum of 1 inch around primer. This waiver does not apply to potable or feedwater tanks.

3.6.3 Disturbed surfaces are defined as any surface that requires cleaning and/or painting due to existing paint finish being damaged in the accomplishment of work specified by the Work Item or task order.

3.6.3.1 Exterior surfaces of underwater hull closure plates/hull accesses and their associated welds will not be considered disturbed surfaces and shall be cleaned, prepared, painted, and documented in accordance with the applicable area. Deviations from the requirements may be authorized by the SUPERVISOR based on size, location, application, or severity of condition of the coating system being applied. For submarines, this shall be determined by inspection and agreed to by the SUPERVISOR.

3.6.3.2 Interior surfaces of underwater hull closure plates/hull access-associated welds shall have surface preparation in accordance with 3.1.5.

3.6.3.3 The word "new" in "new and disturbed surfaces" refers to all material installed on the ship by the repair activity regardless of source.

3.6.4 Tacky is defined as that curing (drying) stage when a fingertip pressed lightly against the film leaves only a slight impression and none of the film sticks to the finger.

3.6.5 Feathering is used for transition of applying a fresh coating system to an area with an intact coating system that is not removed. To do this, visible areas of defective old paint shall be removed until an area of

completely intact and adhering paint is attained around the defective area by feathering (tapering) the edges of tightly adhering old paint at an approximate 30 degree slope into the newly prepared bare metal surface thus preventing application of new paint over loose or cracked paint.

3.6.6 Solvent wipe is defined as cleaning a surface by pouring solvent on a clean rag and subsequently wiping the surface.

3.6.7 Initiation of the application process is defined as that time when coating is removed from storage for staging at the work site.

3.7 The following ship structural surfaces are defined as critical coated areas:

<u>SURFACES</u>	<u>TYPE OF SUBSTRATE</u>
MK41 VLS launcher top and base	All
Underwater hull, including appendages and surfaces below the waterline up to and including the boottopping	All
Cofferdams	Steel and aluminum
Hangar, flight, catapult, and vertical replenishment decks	Steel and aluminum
CV and CVN flight deck landing areas	Steel and aluminum
RAST track trough	Steel and aluminum
Well deck overheads	Steel and aluminum
Surface ship bilges	Steel and aluminum
Interior surfaces of intake vent plenums, defined as combustion air intakes (gas turbine, diesel, and steam) and other vent system intake plenums with openings greater than 7 square feet	Steel and aluminum
Uptake spaces	Steel and aluminum
Tanks and floodable voids (including sumps and covers)	Steel and aluminum
Non-floodable voids (at waterline or below)	Steel and aluminum
All recesses on submarines	Steel
Interior surfaces of submarine sail and superstructure (fairwater) when SSPC-SP 10 accomplished	Steel
Aircraft Launch and Recovery Equipment (ALRE) system areas addressed in Table Notes (8) and (35)	Steel
Arresting gear sheave foundations	Steel

3.7.1 Record and maintain in-process records in QA Tools Paperless QA program or on QA Checklist Form Appendices as blasting, painting, nonskid, inspections, and tests are being accomplished. QA Tools Paperless QA program and installation setup are available upon request from U.S. Fleet Forces Command N434, Attn. [Dale.Hirschman@navy.mil](mailto:Dale.Hirschman@navy.mil), (757) 836-3455.

3.7.1.1 QA Checklist Form Appendices are available at <http://www.nstcenter.com/NavyResources.aspx>. QA documentation shall include 3.7.1.3 through 3.7.1.12.

**3.7.1.2 Intentionally left blank.**

3.7.1.3 Ambient and substrate surface temperatures, relative humidity, and dew point during preservation process (QA Checklist Form Appendix 1);

3.7.1.4 Cleaning/degreasing prior to surface preparation inspection results (QA Checklist Form Appendix 2);

3.7.1.5 Surface profile readings and surface preparation method, including name of abrasive and QPL 22262 revision number from which the product was purchased, or copy of NAVSEA product approval letter. (QA Checklist Form Appendix 3);

3.7.1.6 Surface conductivity or chloride test results (QA Checklist Form Appendix 4);

3.7.1.7 Surface cleanliness test results for dust (QA Checklist Form Appendix 5);

3.7.1.8 Name of paint/nonskid, manufacturer, batch number, and date of manufacture and expiration (QA Checklist Form Appendix 6);

3.7.1.9 Name and type of spray equipment utilized (QA Checklist Form Appendix 6);

3.7.1.10 Elapsed time between coats (QA Checklist Form Appendix 6);

3.7.1.11 Dry film thickness (DFT) measurements (QA Checklist Form Appendix 7) and/or wet film thickness (WFT) measurements (QA Checklist Form Appendix 7A);

3.7.1.12 Minimum and maximum storage temperatures of paint and nonskid over the 24-hour period prior to use (QA Checklist Form Appendix 1).

3.7.2 If using QA Appendices, submit one legible copy, in hard copy or electronic media, of recorded in-process information on QA Checklist Forms to the SUPERVISOR within 72 hours of completion of preservation of each separate location listed in the invoking work item or task order.

3.8 Determine the type of surface preparation required and coating system options that are available for use in accomplishing the work.

3.8.1 For areas listed in 3.7, submit one legible copy, in hard copy or electronic media of Coatings Application Product Summary (CAPS) SHEET (QA Checklist Form Appendix 8), to the SUPERVISOR 7 working days prior to starting the preservation process. The submittal shall include all the information identified in QA Checklist Form Appendix 8. The CAPSHEET shall be at the worksite throughout the preservation process.

3.8.2 For areas listed in 3.7, maintain on file the original manufacturer's certificate of compliance and material conformance test data in accordance with Section 11 of 2.2. Documents shall be readily available to the SUPERVISOR upon request.

3.9 Maintain the following certifications for accomplishing preservation operations to areas as listed in 3.7. Information for these certifications can be found at [www.sspc.org](http://www.sspc.org).

3.9.1 Coating inspectors shall be certified in accordance with the NAVSEA Basic Paint Inspector (NBPI) course or NACE Coating Inspector Program (CIP) Level 1, or higher.

3.9.2 Organizations performing blasting operations (abrasive and waterjetting) or coating application shall be certified in accordance with QP 1 of 2.4 or NAVSEA-approved equivalent.

3.9.3 Spray painters shall be certified in accordance with SSPC C-12 or SSPC C-14 or NAVSEA-approved equivalent. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the repair activity.

3.9.4 Plural Component Pump Tenders and Applicators shall be certified in accordance with SSPC C-14 or NAVSEA-approved equivalent certifications. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the repair activity.

3.9.5 Blasters shall be certified in accordance with SSPC C-7 or NAVSEA-approved equivalent. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the repair activity.

3.9.6 Blasters performing Ultra-High Pressure waterjetting shall be certified in accordance with SSPC C-13 or NAVSEA-approved equivalent. For equivalent certifications, a copy of the NAVSEA approval letter shall be maintained by the repair activity.

3.10 For all coating systems except surface ship nonskid, accomplish preservation operations in accordance with the following. For surface ship nonskid system application, refer to 3.11.

(V) "ENVIRONMENTAL READINGS"

3.10.1 For coatings, record ambient and substrate surface temperatures, relative humidity, and dew point from conditions on-site, in close proximity to the structure being coated, for all areas listed in Tables One through 9.

3.10.1.1 Unless otherwise stated within the Notes of Tables One through 9, and as noted in 3.10.1.2 and 3.10.1.3, coatings shall be applied only when the temperature of the prepared substrate is 50 degrees

Fahrenheit or greater and a minimum of 5 degrees Fahrenheit above the dew point. The maximum relative humidity shall be 85 percent. For areas listed in 3.7, readings shall be documented on QA checklist Form Appendix 1.

3.10.1.2 MIL-PRF-23236, Type VII, Class 17 products are exempt from dew point and relative humidity requirements. For these products, dew point and relative humidity do not need to be recorded on QA Checklist Forms.

3.10.1.3 The only products that may be applied below 50 degrees Fahrenheit are those specified in the Tables and Notes for use below 50 degrees Fahrenheit.

3.10.1.4 These environmental readings shall be taken from 4 hours prior to, to 48 hours after, the application of a coat of paint. If a product fully cures in less than 48 hours, as defined on its NAVSEA-approved ASTM F718, environmental readings for that coat shall be taken until the product's final cure time is reached. For potable and feedwater tanks, environmental readings shall be taken from the start of surface preparation to 7 days after application of the final coat. For areas preserved under 3.6.2.1, environmental readings shall be taken from immediately prior to start of application to 24 hours after application of a coat of paint.

3.10.1.5 The preferred method of measurement is using a data logger (Veriteq Instruments, Inc., Model No. KT-2000-NEI or equivalent). If a data logger is used, it shall collect data at a minimum of every 5 minutes. Manual readings shall be taken once every 12 hours and at every evolution involving (G)-points. For areas listed in 3.7, manual readings shall be documented on QA Checklist Form Appendix 1.

3.10.1.6 If a data logger is not used, environmental readings shall be manually taken every 4 hours and at every evolution involving (G)-points. For areas listed in 3.7, readings shall be documented on QA Checklist Form Appendix 1.

(I) or (I)(G) "CLEANLINESS" (See 4.4)

3.10.2 Accomplish degreasing/cleaning prior to surface preparation to ensure that the surface is free of contaminants, such as sea salts, mud, marine growth, grease, oil, and other petroleum products, in accordance with SSPC-SP 1 of 2.4. For areas prepared to SSPC-SP 12 of 2.4 with vacuum self-contained UHP waterjetting equipment, the checkpoint of initial degreasing is waived. For areas listed in 3.7, document on QA Checklist Form Appendix 2.

3.10.2.1 Inspect the surface a maximum of 4 hours prior to start of coating removal to ensure accomplishment of SSPC-SP 1. For areas listed in 3.7, document on QA Checklist Form Appendix 2.

3.10.3 Except for tanks, surface preparation by abrasive blasting is prohibited on submarine interior surfaces, with the exception that self-

contained sponge jet surface preparation is permissible in submarine machinery spaces.

3.10.4 Intentionally left blank.

3.10.5 Limit the square footage of surfaces being prepared for preservation to an area that can be coated prior to the occurrence of flash rusting and/or oxidation. Remove any flash rust prior to painting, except as follows:

3.10.5.1 Surfaces cleaned by waterjetting shall meet the applicable NACE/SSPC Standard for flash rust. For submarines, the first coat of epoxy primer shall be applied within 24 hours of paint removal by waterjetting.

3.10.5.2 The water used in waterjetting shall not include detergents or inhibitors without written approval from the coating manufacturer and the SUPERVISOR.

(I) or (I)(G) "SURFACE PROFILE" (See 4.4)

3.10.6 One profile reading shall be taken for every 200 square feet for the first 1,000 square feet; for each additional 1,000 square feet, 2 profile readings shall be taken. Profile readings shall be taken in accordance with Method B or Method C of 2.7. For profile readings taken in accordance with Method C of 2.7, use profile tape suitable to read subject profile (i.e., coarse to extra-coarse plus). One profile reading shall be the average (mean) of 3 individual tapes. If areas are found to be greater than 5 mils, use Method B of 2.7 in those areas to determine existing profile. The retention of Testex tape is not required. For areas listed in 3.7, document surface profile on QA Checklist Form Appendix 3.

3.10.6.1 Following blasting or waterjetting operations, surface peak-to-valley profile must be checked. For Method B of 2.7, each profile reading shall be between 2 and 4 mils. For Method C of 2.7, each profile reading shall be between 2 and 4 mils, with no individual tape reading less than one mil or greater than 5 mils. If such profile is not present, repair activity shall establish the proper profile.

3.10.6.2 Following power tool cleaning to SSPC-SP 11 of 2.4, surface profile shall be checked. For submarines, one mil minimum profile is acceptable for all areas. For surface ships, profile readings shall be 2 mils minimum for areas listed in 3.7 and one mil minimum for all other areas where accessible (inaccessible areas must be determined by inspection and agreed to by the SUPERVISOR).

3.10.6.3 When surface profile requirements of the NAVSEA-approved ASTM F718s are greater (higher in value) than that specified in this item, the NAVSEA-approved ASTM F718 surface profile requirements shall supersede this item. For products without a NAVSEA-approved F718, manufacturer's instructions may be substituted.

3.10.6.4 Avoid excessive power wire brushing or excessive grinding/sanding which results in a polished surface.

3.10.6.5 Conversely, excessive use of mechanical tools (grinders, sanders, chippers, etc.) must be minimized to avoid metal loss. Overly aggressive blasting which causes metal thickness loss over the amount required for surface profile shall also be avoided. Excessive depth of profile can cause problems with poor coating performance. A greater than recommended surface profile requires a paint film be applied to totally cover the profile to prevent pinpoint or flash rust. The increase in paint film thickness also increases the susceptibility of solvent entrapment, causing blistering and premature failure of the coating.

3.10.6.6 Due to the potential for excessive metal loss, for SSN-21 and SSN-774 Class submarines, only the following power tools may be used to obtain an SSPC-SP 11 surface: needle guns and rotopeens. On submarines, any areas of potential metal loss by corrosion or mechanical means shall be documented and reported to the SUPERVISOR.

3.10.6.7 Spongejet may not establish a sufficient surface profile. If this method is employed and the profile is insufficient to meet the requirements, the repair activity shall establish a sufficient surface profile.

3.10.6.8 Waterjetting will not establish a surface profile. If this method is selected by the repair activity and a surface profile does not exist or is insufficient to meet the requirements, the repair activity shall establish a sufficient surface profile.

(I)(G) "CONDUCTIVITY OR CHLORIDE MEASUREMENT"

3.10.7 For surfaces listed in 3.7, accomplish the requirements for conductivity or chloride measurements as follows:

3.10.7.1 Following coating removal, accomplish conductivity or chloride measurements in accordance with the requirements of 3.10.7.3.

3.10.7.2 Additionally, accomplish a visual inspection within 4 hours prior to application of each coat of paint. If evidence of contamination of the surface exists, accomplish the requirements of 3.10.7.3.

3.10.7.3 Accomplish surface conductivity or chloride checks using available field or laboratory test equipment on the freshly prepared surface. One reading shall be taken for every 200 square feet for the first 1,000 square feet. Two determinations shall be conducted for every additional 1,000 square feet. For immersed applications, such as tanks and bilges, chloride measurements shall not exceed 3 ug/cm<sup>2</sup> (30 mg/m<sup>2</sup>); conductivity measurements shall not exceed 30 micro siemens/cm. For non-immersed applications, chloride measurements shall not exceed 5 ug/cm<sup>2</sup> (50 mg/m<sup>2</sup>); conductivity measurements shall not exceed 70 micro siemens/cm.

Conductivity samples shall be collected using the Soluble Salt Conductivity Measurement according to Bresle Method, ARP Soluble Salt Meter model RPCT-07-001, or approved equivalent. Document on QA Checklist Form Appendix 4.

3.10.7.4 Because conductivity testing measures more than just chlorides, for any conductivity check that fails, a confirmatory chloride check may be conducted to confirm chloride levels. If the chloride levels do not exceed the requirements in 3.10.7.3, the measurement passes the conductivity/chloride check.

3.10.7.5 If a conductivity check fails and the confirmatory chloride check is not conducted, or if chloride measurements exceed the respective values, water wash (3000-5000 PSI) the affected areas with potable water. Dry the affected areas and remove all standing water. Accomplish surface conductivity or chloride checks on affected areas in accordance with 3.10.7.3. Repeat step until satisfactory levels are obtained.

(I) or (I)(G) "SURFACE PREPARATION" (See 4.4)

3.10.8 Verify surface preparation for the coating systems specified in the Work Item/task order and Tables One through 9 are in accordance with 2.4 and 2.5. For areas listed in 3.7, document on QA Checklist Form Appendix 3.

3.10.8.1 For surface ships, surface cleanliness for dust shall be accomplished for the underwater hull and documented on QA Checklist Form Appendix 5. Surface cleanliness for dust shall meet Rating 2, Class 2, of 2.8. One dust tape reading shall be taken for every 200 square feet for the first 1,000 square feet; for each additional 1,000 square feet, 2 tape readings shall be taken. The tape reading requirement is waived if the **final stage of surface preparation for the entire surface is** ultra high pressure (UHP) waterjetting and the primer is applied within 6 hours of completion of surface preparation. |

3.10.8.2 The checkpoints of 3.10.6, 3.10.7, and 3.10.8 can be accomplished concurrently.

3.10.9 Coating systems shall be applied and cured in accordance with this NAVSEA Standard Item and applicable NAVSEA-approved ASTM F718s as defined in 3.1.11.

3.10.9.1 For surface ship preservation of areas not listed in Tables One through 5, see the Tables in Section 1 of 2.2. For submarine preservation of areas not listed in Tables 6 through 9, see the Tables in 2.12.

3.10.9.2 Paints shall not be thinned.



(I) or (I)(G) "COATING INSPECTION FOR EACH PAINT COAT" (Consists of Dry Film Thickness, Holidays, and Cleanliness) (See 4.4)

3.10.10 Inspect each Prime, Intermediate, Stripe, Tack, and Top Coat as follows:

3.10.10.1 Accomplish DFT measurements of each coat applied for the coating systems listed in Tables One through 9. This excludes any stripe coats. For areas listed in 3.7, document on QA Checklist Form Appendix 7.

3.10.10.2 Accomplish a visual holiday check on each coat of the system for areas listed in 3.7 and document on QA Checklist Form Appendix 7. Any holiday found shall be identified and touched up. These touched-up holidays do not constitute a new coat of paint. ***Paint containing Optically Active Pigment (OAP) shall be visually inspected using violet light; when this occurs the inspector shall use a violet-light flashlight conforming to ASTM E2501 to enhance the normal visual inspection process. An ASTM E2501 flashlight produces violet light that activates the fluorescent OAP. The inspector shall wear yellow-tinted glasses that block ultraviolet and violet light to accomplish the inspection. Guidance regarding OAP inspection practices is available in SSPC TU-11.***

3.10.10.3 Accomplish a visual inspection for surface cleanliness. If evidence of contamination exists, accomplish degreasing/cleaning a maximum of 4 hours prior to application of next coat of paint to ensure removal of surface contaminants. For areas listed in 3.7, document on QA Checklist Form Appendix 7 or 7A. If condition is UNSAT, then also use Appendix 2.

3.10.10.4 Accomplish a visual inspection for chloride contamination for areas listed in 3.7. If evidence of chloride contamination exists, accomplish requirement of 3.10.7.2 a maximum of 4 hours prior to application of next coat of paint to ensure removal of surface contaminants. Document on QA Checklist Form Appendix 7 or 7A. If condition is UNSAT, then also use Appendix 4 as required in 3.10.7.3.

3.10.11 For Dry Film Thickness (DFT) readings required in 3.10.10.1, DFT readings for each coat shall be taken in accordance with Method PA 2 of 2.4. When measuring full coats to determine total system thicknesses denoted in Tables One through 9, DFT readings shall not be taken in areas where stripe coatings have been applied.

3.10.11.1 WFT readings are required in lieu of DFT readings for any coat that must be in a tacky state (as defined in 3.6.4) when the next coat is applied and for non-metallic surfaces. For metallic surfaces, the number of WFT spot readings shall be 2 readings per 1,000 sq ft. For non-metallic surfaces, the number of WFT spot readings shall equal the number of DFT readings that would have been taken. WFT equals DFT divided by percent solids by volume (when percent solids by volume is expressed as a

decimal, i.e., 60 percent equals 0.60). For areas listed in 3.7, document on QA Checklist Form Appendix 7A.

3.10.11.2 Apply an additional coat of any single coat of a multiple coat system when that coat measures less than its specified DFT. DFT of each coat, including an additional coat if applied, shall not exceed the specified maximum thickness for each coat as specified in Tables One through 9. If an additional coat is required, accomplish a cleanliness checkpoint in accordance with 3.10.10.3 prior to application of the additional coat.

3.10.11.3 During paint application, a WFT gage shall be used to verify the application of proper paint thickness for the primer coat of all coating systems listed in Tables One through 9. WFT readings shall be taken to confirm this, but need not be recorded.

3.11 Accomplish preservation operations for surface ship nonskid systems in accordance with the following:

(V) "ENVIRONMENTAL READINGS"

3.11.1 Accomplish the requirements of 3.10.1 (environmental) with the following additions:

3.11.1.1 Record ambient and substrate surface temperatures, relative humidity, and dew point readings at one-hour intervals during actual surface preparation and nonskid system application.

3.11.1.2 Do not apply sprayed components of nonskid systems when sustained winds exceed 15 MPH.

3.11.1.3 Unless the applicable NAVSEA-approved ASTM F718 is more stringent, ambient air temperature shall be 55-100 degrees Fahrenheit, deck temperature for primer application shall be 40-120 degrees Fahrenheit, and deck temperature for nonskid application shall be 40-110 degrees Fahrenheit. Deck temperature shall be a minimum of 5 degrees Fahrenheit above the dew point for nonskid system application.

3.11.2 Accomplish the requirements of 3.10.2 through 3.10.4 with the following additions:

3.11.2.1 If cleaning is performed via solvent wiping, after solvent wiping, the deck shall be allowed to dry before application of any coating. No visible solvent shall be present on deck surfaces prior to proceeding with the next process step. Solvent wiping is defined in 3.6.6.

3.11.2.2 When a solvent wipe is performed, annotate Appendix 2 with type of solvent and time allowed to dry.

(I) or (I)(G) "SURFACE PROFILE" (See 4.4)

3.11.3 Following blasting or waterjetting operations, surface peak-to-valley profile shall be checked. For each area of preparation, one profile reading shall be taken every 100 sq ft for the first 500 sq ft. If the profile readings are consistent, only one profile reading shall be taken for every 1,000 sq ft remaining. Profile readings shall be taken in accordance with Method B or Method C of 2.7. For profile readings taken in accordance with Method C of 2.7, use profile tape suitable to read subject profile (i.e., coarse to extra-coarse plus). One profile reading shall be the average (mean) of three (3) individual tapes. Each profile reading shall be 3 to 4.5 mils, with no individual tape reading less than 2.5 mils or greater than 5 mils. If such profile is not present, repair activity shall establish proper profile. The retention of Testex tape is not required. For areas listed in 3.7, document on QA Checklist Form Appendix 3.

3.11.3.1 For nonskid areas that abrasive blast equipment or waterjet equipment cannot access, substrate shall be prepared to SSPC-SP 11, except that minimum profile shall be 2 mils where accessible. Inaccessible areas of tiedowns shall be prepared to SSPC-SP 3 of 2.4.

3.11.4 Accomplish the requirements of 3.10.7 for conductivity/chloride measurements.

3.11.5 Accomplish the requirements of 3.10.8 for surface preparation.

3.11.5.1 Surface cleanliness for dust shall be accomplished for nonskid flight decks and documented on QA Checklist Form Appendix 5. Surface cleanliness for dust shall meet Rating 2, Class 2, of 2.8. Three individual readings shall be taken every 100 sq ft for the first 500 sq ft. If the tape readings are consistent, only one tape reading shall be taken for every 1,000 sq ft remaining. The tape reading requirement is waived if the **final stage of surface preparation for the entire surface is** ultra high pressure (**UHP**) waterjetting and the primer is applied within 6 hours of completion of surface preparation.

3.11.6 Nonskid systems shall be applied in accordance with the applicable Tables.

3.11.7 Accomplish the requirements of 3.2 for stripe coat with the exception that stripe coat may precede prime coat.

3.11.7.1 For overcoating of stripe coat or stripe coating of the primer coat, refer to the applicable NAVSEA-approved ASTM F718.

3.11.8 Nonskid application shall occur within 36 hours of primer application.

3.11.8.1 If nonskid application occurs within 36 to 72 hours after primer application, the primer coat shall be solvent wiped with a manufacturer's approved solvent.

3.11.8.2 If nonskid application occurs within 3 to 7 days after primer application, the primer coat shall be solvent wiped with a manufacturer's approved solvent, then lightly abraded, solvent wiped again, and a tack coat (one to 2 mils) of primer shall be applied.

3.11.8.3 If the primer coat is not overcoated with nonskid within 7 days of primer application, the primer shall be removed and the surface preparation repeated. For zone tie-in areas where the primer is to be overcoated with itself (up to 12 inches of overlap), the recoat window shall be in accordance with the NAVSEA-approved ASTM F718; the primer shall be solvent wiped with a manufacturer's approved solvent, then lightly abraded, then solvent wiped again.

3.11.8.4 Aircraft carrier landing areas not overcoated with nonskid within 72 hours of primer application shall have surface preparation repeated.

3.11.9 Accomplish the requirements of 3.10.10 and 3.10.11 for coating inspection of nonskid primer (full and stripe coats).

(I) or (I) (G) "NONSKID SPREAD RATE AND HOLIDAY INSPECTION" (See 4.4)

3.11.10 Accomplish the requirements of 634-3.35.6 Paragraph 5 of 2.10 for spread rate and visual holiday inspection of nonskid and document on QA Checklist Form Appendix 7.

3.11.11 Inspect the location and color of required visual landing aid (VLA) markings in accordance with Naval Air Warfare Center Aircraft Division (NAWCAD) Class Guidance Drawings, Air Capable Ship Aviation Facilities Bulletin, Amphibious Assault Ship Aviation Facilities Bulletin, Shipboard Aviation Resume (NAEC-ENG-7576), VLA General Service Bulletin No. 8 (latest revision) or by contacting the local NAWC (CAFSU/ASIR) Field Office.

#### 4. NOTES:

4.1 Wet space decks include sanitary spaces (washrooms, water closets, and showers), food service spaces (galley, scullery, butcher shop, bakery, meat prep rooms, and food service line), and trash compactor rooms.

4.2 Total DFT encountered during removal may exceed specified Table thicknesses.

4.3 Total removal of ablative coating is not required. An ablative copper AF coating system shall not be removed by blasting prior to its specified service life unless it is blistered, peeling, or otherwise damaged beyond repair. Stable and intact ablative AF coatings shall be retained and over-coated. The total film thickness of the combined retained and freshly

applied paint shall comply with Table 1/Table 6. When the work specification calls for over-coating of retained intact ablative copper AF coating, AF surfaces shall be washed down with fresh water at 2000 psi as the vessel comes out of the water, in order to prevent slime and oxidized paint from drying on the hull and inhibiting leaching of the paint when the ship is returned to the water. The surface shall be cleaned and dried before new paint is applied. Apply any AC paint to areas in need of repairs and then overcoat with the identical AF system. The Work Item or task order will specify the degree of removal.

4.4 The paragraphs referencing this note are considered an (I)(G) if the inspection/test is on a critical surface as listed in 3.7. If the inspection/test is not on a surface listed in 3.7, then the paragraph is considered an (I). These inspection point requirements also apply to build-up coats to obtain proper **coating thickness**.

4.5 Refer to 009-03 of 2.1 as appropriate for requirements concerning potential exposure to toxic or hazardous substances and hazardous operations.

4.6 The repair activity may use environmental enclosures to control environmental conditions.

4.7 Preservation Process Instructions (PPIs) provide detailed instructions and procedures for specific ship preservation evolutions to include safety precautions, surface preparation, selection of appropriate coating systems, and third-party quality assurance check points. See new Section 12 of 2.2 for details.

4.8 Preservation system repairs are an Unrestricted Operations (URO) Maintenance Requirement Cards (MRC) program attribute.

4.8.1 The Unrestricted Operations (URO) Maintenance Requirement Cards (MRC) program was developed by NAVSEA to monitor specific areas of interest to determine if the conditions of these areas are suitable for continued unrestricted operations. Maintaining the protective capability of the coating system is critical to maintaining structural integrity during the periods between inspections. For this reason, complying with requirements for coating system application for all aspects of the preservation process is essential. Other systems that impact the URO MRC program are Special Hull Treatment (SHT) application process, including Mold-In-Place (MIP), maintenance of cathodic protection systems (Impressed Current Cathodic Protection (ICCP) and anodes) and installation of various types of tiles (acoustic, damping, etc).

4.8.1.1 Substrate preparation is not authorized/covered in this Standard Item for damping tile, acoustic tile, vertical launch system (VLS) bathtub area, thin line towed array (TLTA), interior, and retractable bow plane recesses on submarines.

4.8.2 Preservation work in submarine tanks and enclosed spaces is usually scheduled to occur when the tanks and spaces are opened and entered

to perform URO MRC structural inspections. Any time a tank or other enclosed space is entered, if a URO MRC 003 structural inspection is not authorized, the government will be performing a structural visual examination.

4.8.3 Any URO MRC item being blasted and painted will have a URO MRC hull survey inspection performed by the government prior to blasting and again prior to repainting.

4.9 Painting of rubber piece parts of pipe hangers is permitted in the following areas: Main Ballast Tanks (MBTs), freeflood areas, and internal tanks which are normally painted. The rubber piece parts include the liners, grommets, and inserts found in steel strap and steel block type pipe hangers; also included is the block rubber type pipe hangers. This allowance does not include internal tanks under nuclear cognizance, nuclear piping which traverses other non-Nuclear tanks, or potable water tanks.

4.10 Table One is for surface ship underwater hull areas. Table 2 is for surface ship exterior areas. Table 3 is for surface ship interior spaces. Table 4 is for surface ship tanks and voids. Table 5 is for surface ship miscellaneous areas. Table 6 is for submarine exterior hull areas. Table 7 is for submarine interior areas. Table 8 is for submarine tanks and voids. Table 9 is for submarine miscellaneous areas.

## Attachment A

### Edge DFT Measurement

In addition to the required DFTs per SSPC PA-2, a separate set of "edge" DFT readings shall be taken in close proximity to corners and edges of area structural elements including, but not limited to stiffeners, "rat holes," cut-outs, and frames. This data shall be taken in accordance with SSPC PA-2, with the following modifications:

1) The "edge" gage readings shall be taken approximately  $\frac{1}{4}$  inch (i.e., 0.5 cm) from edges using micro-probe gages with a probe less than or equal to  $\frac{1}{2}$ -inch in diameter (such as Elcometer 456 with T456FM3R90A probe or DeFelsko Positector 6000 series gauge with mini probe F90S or F0S). For "edge" readings taken on substrates less than  $\frac{1}{2}$ -inch thick, readings shall be taken from the "middle" of the substrate. Microprobe gages shall be calibrated, in accordance with manufacturer's direction, to measure coating thicknesses expected during application.

2) Welds, not associated with corners or edges (i.e., a butt weld joining two flat plates), shall be inspected using standard visual techniques. The inherent roughness of the weld precludes the collection of reproducible data from these areas. Inspectors may, if they choose, take a spot reading within  $\frac{1}{4}$  inch (i.e., 0.5 cm) from a butt weld. Such a reading would be included in the normal, flat surface data set, not the edge or corner data set.

3) In accordance with the SSPC terminology for a spot measurement, an "edge" spot measurement shall consist of 3 gage readings taken within a 1.5 inch (i.e., 4 cm) length as shown in Figure (1). Type "A" spot measurements will be taken around the thin section of the structure; Type "B" spot measurements will be taken on the front side of the structure; Type "C" spot measurements will be taken on the back side of the structure.

4) Within each 100 ft<sup>2</sup> area, as defined by PA-2, the inspector shall randomly select a combination of five of the edge spot measurement types shown in Figure (1). The selection of "edge" spot measurement types shall be at the inspector's discretion provided a minimum of one Type "A," one Type "B," and one Type "C" measurement shall be taken within a 100 square foot (10 square meter) area. If the structure within the 100 square foot area does not contain Type "A," Type "B," and Type "C" configurations, the inspector shall take five spot measurements of the type(s) available.

Paint thickness in close proximity to "edges" will be documented, evaluated, and corrective action taken to satisfy coating application thickness requirements. Coatings thicknesses measured on the flat portions of the area in accordance with PA-2 and coating thicknesses measured on "edges" shall be used to accept the area. The "flat portion" DFTs and "edge" DFTs shall be documented separately to ensure corrective actions (if necessary) target the appropriate area. Stripe coat area DFTs up to 50 mils are acceptable. Stripe coat area DFTs in excess of 50 mils will be assessed by the local engineering code to ensure higher **coating thickness** is not apt to result in edge coating failure due to chipping.





NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS

- (1) Use Sherwin-Williams P23RQ62/P23VQ80 in lieu of P23RQ82/P23VQ80 and use P23AQ61/P23VQ80 in lieu of P23AQ81/P23VQ80 for cold weather applications below 50 degrees Fahrenheit. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (2) Boottop - The boottopping is defined as the black area from minimum load waterline at which the ship is expected to operate to 12 inches above the maximum load waterline. The black paint is an anti-fouling paint conforming to MIL-PRF-24647. Haze gray shall be carried to the black anti-fouling paint that marks the upper boottop paint. Do not apply the black anti-fouling paint over haze gray MIL-PRF-24635.
- (3) Ameron Amercoat 235 can be used for cold weather application below 40 degrees Fahrenheit. Apply at 5 mils DFT (minimum) per coat. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (4) Use International FCA 321 in lieu of FPA 327, or KHA414 in lieu of KHA062, for cold weather application below 50 degrees Fahrenheit. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (5) Use Hempel Hempadur 4514U in lieu of 45150 for cold weather applications below 50 degrees Fahrenheit. Do not apply coating below 35 degrees Fahrenheit without approval of the SUPERVISOR.
- (6) A minimum of 24 hours drying time shall be allowed after last coat prior to undocking.
- (7) To ensure a continuous primer base, areas adjacent to those being coated with proprietary primer and nonskid listed on QPLs for MIL-PRF-24667 shall be coated with the same primer and compatible topcoat.
- (8) These systems shall also be invoked for catapult wing voids and catapult exhaust blowdown trunks.
- (9) DOD-E-24607, chlorinated alkyd, may also be used. MIL-PRF-24596, Type I, Grade C, Classes 1 and 2, or DOD-E-24607 must be used if surface and ambient temperature are less than 50 degrees Fahrenheit.
- (10) The "inner shield" is defined as the portion of the dielectric shield that extends 3 ft. from the anode in all directions. The "outer shield" is defined as the portion of the dielectric shield from the inner shield to a distance of 6 ft. from the anode. Repair of the inner shield area is required when total deteriorated inner shield surface area is from 0 to 2 percent, and no single spot is greater than one square foot. Repair of the outer shield area is required when total deteriorated outer shield surface area is from 0 to 10 percent, and

NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS  
(Con't)

no single spot is greater than one square foot. Replacement (new installation) of the entire dielectric shield is required when either of the above criteria is exceeded (damage to the inner shield is greater than 2 percent, OR damage to the outer shield is greater than 10 percent, OR any single spot damage is greater than one square foot).

- (11) The following steps shall be used for repair/replacement of dielectric shields. Ensure QA checkpoints are conducted in accordance with 3.7.
- a. Protect surrounding area from damage. Mask anode surfaces with heavy cardboard or plywood.
  - b. Abrasive blast.
  - c. For repair, areas of undamaged dielectric shield shall be roughened and feathered into the bare metal areas to provide a profile for adhesion of the new dielectric shield. Feather edges at least one inch using power tools or hand sanding. To prevent fracturing of shield, do not feather using abrasive blasting.
  - d. The dielectric shield material shall be mixed, applied, and cured in accordance with manufacturer's instructions.
  - e. The dielectric shield material should be faired in and made smooth from the anode for a distance of at least 10 inches to minimize hull turbulence.
  - f. The anti-corrosive shall be applied when the dielectric shield material is in a tack-free state. If the dielectric shield material has cured, sanding shall be accomplished to smooth any rough areas and to degloss the surface for the anti-corrosive to be applied over it.
  - g. During visual inspection, ensure anode surfaces are undamaged and free of paint and dielectric shield material.
  - h. The anode should remain covered with heavy cardboard or plywood to prevent damage or contamination by the ship's underwater hull coating system until just before undocking.
- (12) These systems may also be invoked for preservation of decks in spaces that are prone to wear and do not receive deck covering.
- (13) Anchors below lower boottopping limit shall be painted in accordance with normal underwater hull anti-corrosion/anti-fouling system.

NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS  
(Con't)

- (14) For MCM and MHC ships, use black walnut shells for abrasive blast media.
- (15) Anchor chain and detachable links shall be marked and color-coded in accordance with NSTM Chapter 581 unless otherwise directed by the Work Item or task order.
- (16) Apply one mist coat (1-2 mils) after blast and prior to remaining coats where invoking Work Item or task order requires anchor chain inspections prior to preservation.
- (17) Colors shown in Tables 631-8-10 and 631-8-11 of 2.2 shall be specified by TYCOM or ship's Commanding Officer in accordance with Paragraph 631-8.18.3.2 of 2.2.
- (18) Restore each compartment marking in accordance with 2.9 and 2.11.
- (19) MIL-PRF-24667 nonskid systems shall be applied as complete systems (primer, intermediate coat when MIL-PRF-24667, Type III, coatings are invoked, nonskid, and color topping) from the same manufacturer except for the color topping. When a manufacturer does not have approved color topping, use another compatible manufacturer's color topping. MIL-PRF-24667, Type I, when required, shall be specified in the invoking Work Item or task order. Boundaries of areas receiving nonskid not specified by specific ship's drawings shall be in accordance with 2.10.
- (20) Prior to accomplishing painting of wooden underwater hulls, allow the hull to dry to a moisture content of 15 percent. Readings shall be taken with an electronic moisture meter, Sovereign Moisture Master or equal. Cover grounding plates and zincs prior to painting.
- (21) Blasted surface metal must be degreased following walnut shell blasting. Even traces of residual oil will degrade coating adhesion. Appropriate safety precautions for working with flammable solvents must be enforced. Alternate procedure is a vigorous soap and water wash followed by pressurized fresh water rinse. Do not use a detergent and fresh water washdown when using aluminum oxide as an abrasive blast medium.
- (22) Peripheral deck edging and areas not receiving nonskid may substitute the manufacturer's color topping for MIL-PRF-24635.
- (23) For MIL-PRF-23236, Type VII coatings, the stripe coat may be waived if additional DFT readings are taken in accordance with Attachment A and recorded on Appendix 7.

NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS  
(Con't)

- (24) This product shall be spray applied where possible. **All references to "brush coat" or "brush application" may be accomplished using a paint brush or a paint roller or cartridge unit.** Two coats applied by brush/roller/**cartridge unit** at 10-15 mils per coat shall be substituted for one coat of the spray-applied product at 20-30 mils per coat in areas where plural-component spray application is not feasible or for coating touch-up. **Where 2 full coats are applied by brush application, the stripe coat shall be applied over the 2 full coats rather than between them. For brush application the spray version of each product may be brush-applied or the brush coat version of the product may be used.** The brush coat version of Sherwin-Williams Fast Clad ER is Fast Clad Brush Grade. The brush coat version of Interline 783 is Interline 624.

For application of the spray-applied "single coat" products, the product shall be applied all at one time, meaning during a continuous spray operation. Specifically, a "single-coat" system involves one color of paint, applied during one work evolution (i.e., no time is required to wait for the paint to dry), with a single pass or double pass, then a stripe coat is applied over the edges and welds to build adequate coating thickness in these failure-prone areas. Because the spray application is one work evolution, coating inspection QA checkpoint 3.10.10 need only be conducted after completion of application of the full coat with the stripe coat. If application is accomplished during numerous work evolutions (non-continuous application), each work evolution shall constitute a separate coat of paint for QA purposes.

Where application is performed using 2 full coats by brush **application** at 10-15 mils/coat, QA requirements will occur after each brush coat is applied **if using the brush coat version of the product. If the brush application is performed using the spray version of the product, and it is performed in one work evolution, then coating inspection QA checkpoint 3.10.10 need only be conducted after completion of application of the full coat with the stripe coat.**

- (25) Power impact tool cleaning using power-driven needle guns, chipping or scaling hammers, rotary scalers, single or multiple-piston scalers, or other similar impact cleaning tools shall not be utilized in the cleaning methods.
- (26) Maintain the relative humidity in the tank or void space at a maximum of 50 percent from the start of surface preparation to cure of the topcoat.
- (27) Finish coats for boats and craft shall be as specified in Paragraph 631-9.3.2 through 631-9.3.3 of 2.2 unless otherwise specified in the invoking Work Item or task order.
- (28) Thermal insulation shall be soap and water cleaned and hand sanded.

NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS  
(Con't)

- (29) Three coats of MIL-DTL-24441, Type III, at 3-4 mils per coat can be substituted for 2 coats of MIL-DTL-24441, Type IV, at 4-6 mils per coat, for total system DFT of 8-12 mils. Three full coats and 2 stripe coats of MIL-DTL-24441, Type III, at 3-4 mils per coat can be substituted for 2 full coats and one stripe coat of MIL-DTL-24441, Type IV, at 4-6 mils per coat, for total system DFT of 8-12 mils.
- (30) Grit blasting to near white metal is the preferred method of surface preparation. Only where grit blasting is not possible should power tool cleaning be used with prior authorization by the SUPERVISOR. Power tool cleaning should not be used for well deck areas frequently exposed to LCAC exhaust.
- (31) A low-pressure (3,000 to 5,000 psi) fresh water washdown of the well deck area shall be performed before either grit blasting or power tool cleaning to remove dirt, oil, grease, salts, and loosely adherent coatings.
- (32) Upon completion of surface preparation, pH measurements must be taken. The pH must be in the range of 6.5 to 7.5. If the pH is not within this range, the surface must be washed with fresh water until the required pH is obtained.
- (33) Runs, sags, and drips may appear in the coating due to its solvent-free nature and application properties. In the normal application of this product, the appearance of runs, sags, and drips is only superficial and is not detrimental to the coating system. In these cases, no action shall be taken. In cases where the conditions are determined to be detrimental (coating in excess of 50 mils DFT) to the effectiveness of the coating system, immediate action shall be taken to correct the coating system. If the wet run, sag, or drip occurs on a dry surface, brush out the run, sag, or drip and reapply the prime coat directly over the brushed out area. If the run, sag, or drip has dried, then the affected area shall be scraped or mechanically removed and the prime coat shall be reapplied.
- (34) These systems may also be invoked for preservation of well deck bulkheads and decks.
- (35) These systems shall also be invoked for barricade stanchions and wells, catapult jet blast deflector pits, and associated void spaces.
- (36) SSPC-SP 11 shall be the surface preparation standard used, even if the applicable NAVSEA-approved ASTM F718 has a more stringent requirement.

NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS  
(Con't)

- (37) Total DFT specified for potable water tanks shall not be exceeded except in isolated areas adjacent to shapes and stiffeners. In no case shall the maximum DFT be exceeded by 2 mils. The isolated areas shall be less than 2 percent of the total area.
- (38) Maintain the relative humidity in the tank at a maximum of 85 percent from the start of abrasive blasting to cure of the topcoat. By allowing 85 percent vice 50 percent relative humidity, this will reduce the service life of the tank from 15-20 years to 10-12 years.
- (39) Ameron Amercoat 892HS shall not be used for surfaces that exceed 700 degrees Fahrenheit.
- (40) Do not stripe coat inside surfaces of the Sonar Trunk Guide Rail angles.
- (41) Apply 3 coats of a vapor barrier-coating compound, MIL-PRF-19565, in contrasting colors (white-orange-white), to insulation within laundries, sculleries, galleys, drying rooms, and to insulation on the warm side of refrigerated stores spaces.
- (42) High temperature areas of exhaust pipe exteriors include BLISS caps, air eductors, and exhaust stacks.
- (43) In lieu of white, use Light Gray, Color No. 26373 (Low Solar Absorption only). In lieu of black, use Ocean Gray, Color No. 26173 (Low Solar Absorption only).
- (44) These systems shall also be invoked for Aircraft Electrical Servicing Stations (AESS) trunks.
- (45) PCMS tile on the bow flares shall be painted with the same topcoat as the freeboard.
- (46) For struts, rudders, and other erosion-prone areas, add one coat 3M Co. No. EC-2216, 4-5 mils, and 3 coats, 5-6 mils/coat over the **first coat of AC** prior to application **of the second coat of AC**, if authorized by the TYCOM.
- (47) The topcoats for ordnance/non-ordnance pyrotechnic locker sun shields shall be painted white (FED STD 595, Color No. 17875) or as directed by NAVSEA.
- (48) All of the AC and AF coats in the product system must be from the same manufacturer.

NOTES OF TABLES ONE THROUGH 5 FOR SURFACE SHIPS  
(Con't)

- (49) For touch-up of Sherwin-Williams Duraplate or Novaplate, Brushplate may be used. For touch-up of Sherwin-Williams Fast Clad ER, Fast Clad Brush Grade may be used. Brushplate and Fast Clad Brush Grade are applied at 8-10 mils/coat.
- (50) "Cosmetic" color topping is not to be applied on top of nonskid on vertical replenishment or aviation decks.
- (51) A second full coat of proprietary nonskid primer listed on the QPL for MIL-PRF-24667 may be applied if requested by the TYCOM.
- (52) Do not blast fin stabilizers to near white metal. As-received fin stabilizers shall be brush-off blasted to NACE 4/SSPC-SP 7 (Brush-Off Blast Cleaning) in lieu of near white metal blast to ensure polymer fairing compound is not removed prior to application of coatings. Blank, wrap, cover, or mask equipment, shafts and openings to preclude damage and prevent entry of contaminants prior to cleaning operation. Remove protective covering upon completion of preservation operations.
- (53) "Total System" value is only listed when it is more stringent than the sum of the individual coats of the system.
- (54) This does not apply to propulsion plant water tanks aboard nuclear-powered ships.
- (55) For MIL-PRF-23236, Type VII, Class 9, coatings, follow the NAVSEA-approved ASTM F718 for cure and recoat times. This supersedes the 48-hour/7 day requirement.
- (56) Do not nonskid a 7-inch wide strip of deck surface in way of the helo hangar door seal interface on DDG-51 Class Flight II-A ships.
- (57) If using Fast Clad ER system, the primer shall be applied at 8-10 mils instead of 4-8 mils.
- (58) ***Products used for the full coat shall contain Optically Active Pigment (OAP).***

NOTES OF TABLES 6 THROUGH 9 FOR SUBMARINES

- (1A) Hull inserts shall be coated with the preservation system applied to adjacent surfaces. Extend coating system a minimum 1/2-inch on to non-ferrous liner or cladding.
- (2A) Alternating AF colors may be used. Final coat can be red or black.
- (3A) For all surfaces above max beam that are to receive AF, all coats shall be black. The final coat of all exterior coating systems above the waterline shall also be black.
- (4A) When applying a MIL-PRF-24647 system, the cure to immersion time for the anti-corrosive system may be different than the cure to immersion time for the anti-fouling paint. The longer cure to immersion time shall be used. Tack coats are not included when determining cure to immersion times.
- (5A) Draft marks are applied directly to the AC coat; do not apply AF beneath draft marks.
- (6A) Blasting is not allowed in machinery spaces.
- (7A) Topcoat color shall match surrounding paint on visible surfaces.
- (8A) MIL-PRF-23236, Type VII, NAVSEA approved coatings for interior submarine use under the Submarine Atmosphere Control Manual are listed in Table 10 of 2.12 as "Internal Atmospheric".
- (9A) To minimize premature yellowing, chlorinated alkyd-based paints (DOD-E-24607) shall not be applied within 4 weeks before and after the application of amine-cured epoxy paints formulated to MIL-PRF-23236.
- (10A) When using paints qualified to DOD-E-24607, use Table 631-8-10 of 2.2 to select approved colors.
- (11A) MIL-PRF-24596 Type I, Class 2, Grade A, and Formula 25A may be substituted for DOD-E-24607 chlorinated alkyd enamels. Color shall match the existing surroundings.
- (12A) The SSBN-726 Class logistics escape trunk (LET) bubble skirt knife edge in way of gaskets and fasteners for LET upper hatch fairings are to be left painted.
- (13A) The Environmental Protection Agency (EPA) has found that samples of vermiculite ore contain asbestos fibers. Vermiculite was used as an anti-sweat treatment on the upper hatch covers on submarines. All facilities and workers shall assume vermiculite contains asbestos fibers until it has been tested. All facilities are to test new vermiculite or vermiculite in use prior to working with the material.



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(Con't)

Workers who are doing work with or near vermiculite should be aware that it may contain asbestos and proper precautions shall be used.

- (14A) For Ensolite hull insulation (MIL-P-15280), DOD-E-24607 shall be used. For polyimide hull insulation either DOD-E-24607 or MIL-PRF-24596 may be used.
- (15A) Motor generators require protection from paints conforming to MIL-DTL-24441 or MIL-PRF-23236 during application and curing of the paint. When these paints are being applied or cured while venting in a space containing motor generators, the motor generators shall be protected using a NAVSEA-approved procedure. For 300 kW and 500 kW motor generators, a positive pressure unit according to Appendix A of the motor generator technical manual shall be used. Maintenance on motor generators shall not be performed for a minimum of 5 days after painting with MIL-DTL-24441 and MIL-PRF-23236 paints or any application of silicones (e.g., TT-P-28, MIL-PRF-24635 silicone enamels) in the engine room.
- (16A) When lead is removed from lead bins, the structure shall be blasted to SSPC-SP 10 and preserved with an ultra high solids coating, (even if the surrounding structure is being touch-up painted) prior to installing lead. Lead pockets, lead bins, and adjacent bulkhead and hull plating which will be in contact with lead ballast shall be covered with either one layer of 1/8-inch thick rubber conforming to MIL-PRF-1149, or with 2 layers of 1/16-inch thick rubber conforming to MIL-PRF-2912, Type II. The rubber linings shall be installed using adhesive conforming to MIL-A-24456. Before installing the rubber sheeting, all repairs and painting work in the tank shall be completed.
- (17A) Immersed non-ferrous and corrosion-resistant steel piping shall be completely coated with the specified tank or bilge coating system with the following exceptions: piping in reactor and propulsion plants in nuclear powered ships shall not be painted; non-ferrous and corrosion-resistant steel piping and CRES torpedo system components in torpedo impulse tanks shall not be painted; non-ferrous and CRES piping above residual waterline in MBTs is not required to be painted; in all tanks, closed system piping one-inch diameter and less is to be protected from blast and is not required to be painted.
- (18A) Final coat shall be light colored.
- (19A) CRES fasteners (studs, nuts, washers) used to secure Type II vibration damping and acoustic tiles may be left unpainted.
- (20A) Unpainted NFO, hydraulic oil, hydrophone, and CFO tanks shall remain unpainted. Lube oil sludge tanks on SSBN/SSGN-726 Class submarines are not painted.

NOTES OF TABLES 6 THROUGH 9 FOR SUBMARINES  
(Con't)

- (21A) Reduced touch-up paint curing procedures of Section 7 of 2.2 do not apply to these surfaces. Also, note accelerated touch-up times authorized by Section 631-8.5.5.1 of 2.2 are for non-reactor potable water tanks only, and therefore are not to be used for potable water and reserve feedwater tanks unless specifically approved by NAVSEA.
- (22A) Total DFT specified in Table 8 for potable water tanks shall not be exceeded except in isolated areas adjacent to shapes and stiffeners. In no case shall the maximum DFT be exceeded by more than 2 mils. The isolated areas shall be less than 2 percent of the total area. For touch-up or overcoating intact aged paint in good condition, the same requirements for each coat apply, and the total film thickness maximum requirement may be corrected to allow for thickness of underlying aged paint.
- (23A) Prior to surface preparation, flasks must be depressurized. Barrier protection shall be in accordance with NAVSEA SO400-AD-URM-010, Tag Out Users Manual (TUM), Appendix G.
- (24A) Tek-Haz coating system will extend to a line even with the underside of the ventilation plenum welds, but not including the welds. Welds and area above welds will be coated with MIL-DTL-24441 primer (at 4-6 mils/coat) and 2 coats MIL-PRF-24635 (at 4-6 mils/coat).
- (25A) Bilge and Drain Collection Tanks includes the following: Bilge Collecting Tanks, Bilge Collecting Sump Tanks, Non-Oily Drain Collecting Tanks (other than Fresh Water), Oily Drain Collecting Tanks, Bilge Water Processing Tank, Drain Water Collecting Tanks, VLS Drain Collecting Tank, Oil Collection Tanks.
- (26A) MIL-PRF-23236, Type VII, coatings approved for submarines are listed in Table 10 of 2.12 as approved by NAVSEA.
- (27A) Conduct low voltage holiday detection on 100 percent of potable water tanks. Holiday detection shall also be performed on any repaired (touchup) areas of an existing coating system. The holiday checks are to be performed after application of the topcoat using a low voltage wet sponge holiday detector. Any holidays (defects to bare metal) found shall be marked by the inspector and the area touched up. Holiday checks shall be performed again on these areas after repair.
- (28A) All painting with organic solvent-based paints (alkyd, epoxy, oil based) that exceeds 1 quart per day for the entire ship shall be completed 5 days prior to the date of departure as determined by the Commanding Officer. Date of departure, as it relates to painting, is the date of first dive after departure for a period of operation.

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(Con't)

- (29A) Maintain the relative humidity in the tank or void space at a maximum of 50 percent from the start of surface preparation to cure of the topcoat.
- (30A) Steam clean to remove excess oil.
- (31A) Tank manhole covers are critical coated areas. Solvent-based coating systems may be used to paint manhole covers of tanks painted with high solids coating systems due to fit-up issues associated with high solids coating systems. Powder coatings shall not be applied to reserve feedwater, potable water, **freshwater drain collecting**, and steam surge tank manhole covers.
- (32A) Areas visible from above shall be topcoated either gray or black.
- (33A) Total number of coats and total DFT specified in Table 7 for all interior spaces shall not be exceeded. Maximum system total DFT shall not exceed 17 mils for surfaces topcoated with DOD-E-24607, 21 mils for surfaces topcoated with MIL-PRF-24596, or 24 mils for surfaces topcoated with Formula 25A.
- (34A) Naval Shipyards and NAVSEA Note 5000 activities only are allowed to perform work in this area in accordance with guidance provided in reference 2.12.
- (35A) The David Taylor Research Center coating system (DTRC 2844-1110 and 2844-1109) may be used on other exterior hull areas. This is to allow areas adjacent to areas covered by MIP or SHT to be re-preserved the same as MIP or SHT areas and improve the painting process.
- (36A) If using Fast Clad ER system, the primer shall be applied at 8-10 mils instead of 4-8 mils.
- (37A) For MIL-PRF-23236, Type VII coatings, the stripe coat may be waived if additional DFT readings are taken in accordance with Attachment A and recorded on Appendix 7.
- (38A) Final grooming of bow domes must be performed by qualified shipyard personnel. Final surface finish of bow domes must be 180 microinches Ra or smoother. Measure and record surface roughness in accordance with ANSI B46.1 "Surface Roughness, Waviness, and Lay". If necessary, groom the surface of the dome to attain a maximum surface roughness of 180 microinches Ra. This additional grooming can be accomplished by wet sanding the surface by hand using 120 grit paper and fresh water. Refer to the appropriate bow dome manual for the class for more specific guidance on surface roughness, grooming and paint application.

NOTES OF TABLES 6 THROUGH 9 FOR SUBMARINES  
(Con't)

- (39A) For MIL-PRF-23236, Type VII, Class 9 coatings, follow the NAVSEA-approved ASTM F718 for cure and recoat times. This supersedes the 48-hour/7-day requirement.
- (40A) This product shall be spray applied where possible. **All references to "brush coat" or "brush application" may be accomplished using a paint brush or a paint roller or cartridge unit.** Two coats **applied by brush/roller/cartridge unit** at 10-15 mils per coat shall be substituted for one coat of the spray-applied product at 20-30 mils per coat in areas where plural-component spray application is not feasible or for coating touch-up. **Where 2 full coats are applied by brush application, the stripe coat shall be applied over the 2 full coats rather than between them. For brush application the spray version of each product may be brush-applied or the brush coat version of the product may be used.** The brush coat version of Sherwin-Williams Fast Clad ER is Fast Clad Brush Grade. The brush coat version of Interline 783 is Interline 624.

For application of the spray-applied "single coat" products, the product shall be applied all at one time, meaning during a continuous spray operation. Specifically, a "single-coat" system involves one color of paint, applied during one work evolution (i.e., no time is required to wait for the paint to dry), with a single pass or double pass, then a stripe coat is applied over the edges and welds to build adequate coating thickness in these failure-prone areas. Because the spray application is one work evolution, coating inspection QA checkpoint 3.10.10 need only be conducted after completion of application of the full coat with the stripe coat. If application is accomplished during numerous work evolutions (non-continuous application), each work evolution shall constitute a separate coat of paint for QA purposes.

**Where application is performed using 2 full coats by brush application at 10-15 mils/coat, QA requirements will occur after each brush coat is applied if using the brush coat version of the product. If the brush application is performed using the spray version of the product, and it is performed in one work evolution, then coating inspection QA checkpoint 3.10.10 need only be conducted after completion of application of the full coat with the stripe coat.**

- (41A) Work shall be in accordance with the requirements of the following:

688 Class - Technical Handbook for Special Hull Treatment Maintenance and Repair for Submarines: NAVSEA S6360-AD-HBK-010. For Fairing Compound use NAVSEA Drawing 605-6160358.

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21 Class - Submarine Mold-in Place Special Hull Treatment Maintenance and Repair Manual: NAVSEA S6360-AN-MMA-010/SHT

774 Class - Maintenance and Repair Manual for Virginia Class Submarine Mild-in-Place Special Hull Treatment: NAVSEA S6360-AV-MMA-010

- (42A) Low Pressure Water Clean (LP WC) with a fan spray starting at a pressure of 1,000 psi. Keep the cleaning lance nozzle tip perpendicular to and at least 4" from the surface. Increase pressure, if needed, in increments of 500 psi up to a maximum of 5,000 psi. Remove all paints down to sound grey or green anti-corrosive paint (F-151 or F-150) or bare GRP. Remove any remaining barnacle particles or other foreign objects with wood or plastic scrapers, or by sanding. Do not use wire brushes or other abrasive instruments.
- (43A) Remove all marine growth and existing paint from the boot surface by Low Pressure Water Cleaning (LP WC) or sanding with soft back dual action or soft back random orbital sanders and 60 grit paper. Observe extreme caution when water jetting (LP WC). Measure stand-off distance and control nozzle pressure to assure that the boot is not damaged during the cleaning process. Low Pressure Water Cleaning must be performed using fresh water with a starting pressure of 1000 psi. Pressure must be increased in 500 psi increments until the desired results are obtained. Scuff the entire boot surface using 60 grit paper or equivalent coarseness Scotchbrite pad to remove any remaining paint and provide an adequately prepared surface for paint application. Clean the bare boot surface with PF-145HP degreaser (NSN 6850-01-378-0044) or mineral spirits per Commercial Item Description A-A-2904 Grade 1.
- (44A) Do not apply nonskid to Fairwater Planes or Retractable Bow Planes.
- (45A) Navy Formula 187 is not required to be applied to SHT tiles under towed array fairing covers. These tiles are to be left unpainted above the waterline or be painted with anti-fouling paint below the waterline.
- (46A) Navy Formula F-187 cannot be applied over F-184.
- (47A) If performing touchup of coating in Steam Plant Surge Tanks, 1 coat Dampney Company ENDCOR 450 (no DFT required) shall be applied prior to application of the coats of Apexior No. 1.
- (48A) Powder coatings approved for use on submarines are listed in 2.12 Table 19.
- (49A) ***For touch-up of MIL-PRF-23236, Type VII coating systems, MIL-DTL-24441, Type IV, or MIL-PRF-23236 coating systems are acceptable.***

TABLE ONE STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (KEEL TO <b>TOP OF</b> BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 3 YEARS SERVICE LIFE  FOR SMALL BOATS AND SERVICE CRAFT ONLY	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L	ONE AC COAT MIL-PRF-24647, TYPE I OR II, RED -- & -- ONE AC COAT MIL-PRF-24647, TYPE I OR II, GRAY, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE COAT MIL-PRF-24635 LT GRAY, COLOR NO. 26373 (LOW SOLAR ABSORPTION ONLY) TO BOOTTOPPING & BELOW, 2 - 3 MILS <b>--OR--</b> <b>COMMERCIAL GRADE WHITE</b> <b>AF</b>  ONE COAT COLOR NO. 26173 (FED STD 595) MIL-PRF-24635 OCEAN GRAY (LOW SOLAR ABSORPTION ONLY) ABOVE BOOTTOPPING, 2 - 3 MILS
	2	SAME AS LINE ONE	<b>ONE AC COAT MIL-PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, RED, 4 - 6 MILS</b> <b>-- &amp; --</b> <b>ONE AC COAT MIL-PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, GRAY, 4 - 6 MILS, 10 MILS MINIMUM</b>  SEE NOTE (4)			<b>ONE AF TIE COAT 3-5 MILS</b> <b>-- &amp; --</b> <b>ONE AF FULL COAT 5-7 MILS</b> <b>MIL-PRF-24647, TYPE III,</b> <b>CLASSES 1, 2, AND 3, GRADE A</b>  SEE NOTES (2) & (6)	<b>ONE AF TIE COAT 3-5 MILS</b> <b>-- &amp; --</b> <b>ONE AF FULL COAT 5-7 MILS</b> <b>MIL-PRF-24647, TYPE III,</b> <b>CLASSES 1, 2, AND 3, GRADE</b> <b>A</b>  SEE NOTES (2) & (6)	SAME AS LINE ONE
UNDERWATER HULL (KEEL TO <b>TOP OF</b> BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 7 YEARS SERVICE LIFE  SEE NOTE (46)	3	SAME AS LINE ONE	SAME AS LINE ONE			ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	2 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	SAME AS LINE ONE
	4	<b>INTENTIONALLY LEFT BLANK</b>						
UNDERWATER HULL (KEEL TO <b>TOP OF</b> BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 12 YEARS SERVICE LIFE  SEE NOTE (46)	5	SAME AS LINE ONE	SAME AS LINE ONE			ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	3 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	SAME AS LINE ONE
EXISTING FIN STABILIZERS  SEE NOTES (48) & (52)	6	BRUSH-OFF BLAST TO NACE 4/SSPC-SP 7	SAME AS LINE ONE			SAME AS LINE 5		
REFURBISHED FIN STABILIZERS  SEE NOTE (48)	7	HAND TOOL CLEAN SSPC- SP 2	SAME AS LINE ONE			SAME AS LINE 5		

TABLE ONE STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (DIELECTRIC SHIELDS)  SEE NOTES (10) & (11)	8	WHITE METAL BLAST, NACE 1/SSPC-SP 5	INNER SHIELD: ONE COAT US FILTER, ELECTROCATALYTIC, CAPASTIC™, PART NO. 35524, 100 MILS MIN  OUTER SHIELD: ONE COAT US FILTER, ELECTROCATALYTIC, CAPASTIC™, PART NO. 35524, 22 MILS MIN	ANTICORROSIVE PAINT SAME AS SURROUNDING HULL EXCEPT ONE COAT		ANTIFOULING PAINT SAME AS SURROUNDING HULL  SEE NOTES (2) & (6)		
EXPOSED AREAS OF OUTBOARD SHAFTING COVERED BY GRP	9	SAME AS LINE 7	ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ANTIFOULING PAINT SAME AS SURROUNDING HULL  SEE NOTES (2) & (6)		

TABLE ONE ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (KEEL TO <b>TOP OF</b> BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS) SEE NOTE (46)	10	NEAR WHITE METAL BLAST USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS - OR - WATERJETTING TO NACE 5/ SSPC-SP12 CONDITION WJ-2	ONE AC COAT MIL-PRF- 24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, RED, 4 - 6 MILS, WITHIN 4 HOURS AFTER SURFACE PREPARATION SEE NOTE (4)	ONE AC COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, GRAY, 4 - 6 MILS, 10 MILS MIN SEE NOTE (4)	ONE AF TIE COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 3-5 MILS	ONE AF FULL COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 5-7 MILS, HAZE GRAY SEE NOTES (2) & (6)	ONE AF FULL COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 5-7 MILS, HAZE GRAY SEE NOTES (2) & (6)	ONE AF FULL COAT MIL- PRF-24647, TYPE III, CLASSES 1, 2, AND 3, GRADE A, 5-7 MILS, BLACK
UNDERWATER HULL APPLIES TO EMBARKED BOATS AND CRAFT ONLY	11	SAME AS LINE <b>10</b>	ONE COAT E-PAINT EP PRIMER 1000, 4 - 6 MILS	ONE COAT E-PAINT EP PRIMER 1000, 4 - 6 MILS	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) GRAY -- & -- ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) BLACK SEE NOTES (2) & (6)	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) GRAY SEE NOTES (2) & (6)	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) GRAY SEE NOTES (2) & (6)	ONE COAT E-PAINT SN-1, 5 - 7 MILS WFT/COAT (3 - 4 MILS DFT/COAT) BLACK



TABLE ONE GRP FIBERGLASS SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL (KEEL TO TOP OF BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 7 YEARS SERVICE LIFE  SEE NOTE (46)	12	HIGH PRESSURE WASH TO REMOVE MARINE GROWTH & LOOSE PAINT - OR - TOUCH-UP OR REMOVAL OF PAINT SYSTEM TO SOUND PRIMER BY LIGHT ABRASIVE BLASTING WITH BLACK WALNUT SHELLS -- & -- SPOT CLEAN, CHAP 631, PARA 631-5.2.6  SEE NOTE (21)	ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	2 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 10 MILS MIN  SEE NOTES (2), (6) & (48)	ONE COAT MIL-PRF-24635 LT GRAY, COLOR NO. 26373 (LOW SOLAR ABSORPTION ONLY) TO BOOTTOPPING & BELOW, 2 - 3 MILS  ONE COAT COLOR NO. 26173 (FED STD 595) MIL-PRF-24635 OCEAN GRAY (LOW SOLAR ABSORPTION ONLY) ABOVE BOOTTOPPING, 2 - 3 MILS
UNDERWATER HULL (KEEL TO TOP OF BOOTTOP, INCLUDING PROPULSION SHAFT OUTBOARD BEARING VOIDS)  UP TO 12 YEARS SERVICE LIFE  SEE NOTE (46)	13	SAME AS LINE 12	ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, RED -- & -- ONE AF COAT MIL-PRF-24647, TYPE I OR II, BLACK -- & -- ONE COAT MIL-PRF-24647, TYPE I OR II, RED, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	3 AF COATS MIL-PRF-24647, TYPE I OR II, BLACK, 4 - 6 MILS/COAT, 15 MILS MIN  SEE NOTES (2), (6) & (48)	SAME AS LINE 11
UNDERWATER HULL APPENDAGES ON MINESWEEPERS ONLY	14	NEAR WHITE METAL BLAST USING GARNET OR ALUMINUM OXIDE - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2	ONE FULL COAT AMERON 3258 GREEN, 3 - 5 MILS --- & --- ONE STRIPE COAT AMERON 3258 BLACK, 3 - 5 MILS --- & --- ONE FULL COAT AMERON 3258 HAZE GRAY, 3 - 5 MILS --- & --- ONE STRIPE COAT AMERON 3258 GREEN, 3 - 5 MILS --- & --- ONE FULL COAT AMERON 3258 BLACK, 3 - 5 MILS  SEE NOTE (40)	ANTI-FOULING PAINT SAME AS SURROUNDING HULL				
SONAR TRANSDUCER TR-192B/UQN-1 ON MINESWEEPERS ONLY	15	POWER TOOL CLEANING TO BARE METAL PER SSPC-SP 11	SAME AS LINE 14	SAME AS LINE 14				

TABLE ONE WOOD SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO BOTTOM OF BOOTTOP	F BOOTTOP	G DRAFT MARKS
UNDERWATER HULL	16	BRUSH-OFF BLAST TO REMOVE LOOSE & DETERIORATED COATINGS - OR - HIGH-PRESSURE WASH TO REMOVE MARINE GROWTH & LOOSE PAINT  SEE NOTE (20)	KEEL TO 6 INCHES ABOVE UPPER BOOTTOP LIMIT  ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (1), (3), (4), (5) & (48)			ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE AF COAT MIL-PRF-24647, TYPE I OR II, 4 - 6 MILS  SEE NOTES (2), (6), (27) & (48)	ONE COAT NO. 26373 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY) LT GRAY, TO BOOTTOPPING & BELOW, 2 - 3 MILS  ONE COAT NO. 26173 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY) OCEAN GRAY, ABOVE BOOTTOPPING, 2 - 3 MILS  SEE NOTE (6)

TABLE 2 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR SURFACES ABOVE BOOTTOP WITH EXCEPTION OF AREAS RECEIVING NONSKID & WELL DECK OVERHEAD AREAS  SEE NOTE (2)	1	NEAR WHITE METAL BLAST NACE 2/SSPC-SP-10 - OR - WATERJETTING TO NACE 5/SSPC-SP-12 CONDITION WJ-2/L	ONE COAT MIL-PRF- 23236, TYPE IV, V, OR VI, 4 - 8 MILS	ONE STRIPE COAT -- & -- ONE FULL COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS/COAT		ONE COAT DECK GRAY NO.26008 (FED STD 595), MIL-PRF-24635 <b>TYPE II OR III</b> (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF- 24635 <b>TYPE II OR III</b> (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <b>E</b> -24763, TYPE II, CLASS 2, 2 - 4 MILS  SEE NOTE (42)	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL- PRF-24635 <b>TYPE II OR III</b> (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <b>E</b> -24763, TYPE II, CLASS 2, 2 - 4 MILS PAINT DESIGNATIONS & MARKINGS MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTES (43) & (47)
	2	SAME AS LINE ONE	ONE COAT MIL-PRF- 23236, TYPE VII, 4 - 8 MILS  SEE NOTE (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, 6 - 10 MILS -- & -- ONE FULL COAT MIL-PRF-23236, TYPE VII, 10 - 12 MILS  SEE NOTE (23)		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE
	3	SAME AS LINE ONE	ONE COAT MIL-PRF- 24647 APPROVED PRODUCT FROM TABLE ONE, LINE 4	ONE STRIPE COAT -- & -- ONE FULL COAT MIL-PRF-24647 APPROVED PRODUCT FROM TABLE ONE, LINE 4		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE
	4	SAME AS LINE ONE	ONE COAT MIL-PRF- 23236, 4 - 8 MILS --OR-- ONE COAT MIL-PRF- 24647, APPROVED PRODUCT FROM TABLE ONE, LINE 4			ONE COAT MIL-PRF-24635, TYPE V OR VI, CLASS 2, 5-6 MILS, DECK GRAY	ONE COAT MIL-PRF- 24635, TYPE V OR VI, CLASS 2, 5-6 MILS, HAZE GRAY	ONE COAT MIL-PRF-24635, TYPE V OR VI, CLASS 2, 5-6 MILS HAZE GRAY
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 3 YEARS SERVICE LIFE	5	SAME AS LINE ONE	PROPRIETARY NONSKID LISTED ON THE QPL FOR MIL-PRF-24667  SEE NOTE (7)	STRIPE COAT OF PROPRIETARY NONSKID PRIMER LISTED ON THE QPL FOR MIL-PRF-24667  SEE NOTES (7) & (51)		ONE COAT DARK GRAY, MIL-PRF- 24667, TYPE V, COMP G OR L  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 12 MONTHS SERVICE LIFE	6	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF- 24667, TYPE I, VI, OR VIII, COMP G OR L  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 6 MONTHS SERVICE LIFE	7	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARKGRAY, MIL-PRF-24667, TYPE II, COMP G  SEE NOTES (19), (22), (50), & (56)		

TABLE 2 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
HANGAR DECKS, FLIGHT DECKS, VERTICAL REPLENISHMENT DECK AREAS, CV AND CVN FLIGHT DECK LANDING AREAS, WALK AREAS AND ALL OTHER DECK AREAS	8	POWER TOOL CLEANING TO BARE METAL SSPC-SP-11	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		
UP TO 30 DAYS SERVICE LIFE	9	SAME AS LINE 8				ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		
CV AND CVN FLIGHT DECK LANDING AREAS  SERVICE LIFE UP TO 15,000 LANDINGS	10	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE V, COMP L  SEE NOTES (19), (22) & (50)		
CV AND CVN FLIGHT DECK LANDING AREAS  SERVICE LIFE UP TO 12,000 LANDINGS	11	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE I, VI, OR VIII COMP L  SEE NOTES (19), (22) & (50)		
WALK AREAS (ALL DECK AREAS OTHER THAN HANGAR DECK, FLIGHT DECK, & VERTICAL REPLENISHMENT DECK AREAS)	12	SAME AS LINE ONE	SAME AS LINE 5	SAME AS LINE 5		ONE COAT MIL-PRF-24667, TYPE I, V, VI, OR VIII, COMP G OR L -OR- ONE COAT DARK GRAY, MIL-PRF-24667, TYPE II, III, IV, COMP G  SEE NOTES (19) & (22)		
	13	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE		ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS -- & -- APPLICATION OF MIL-PRF-24667, TYPE XI, COMP PS		
	14	SAME AS LINE ONE	ONE COAT MIL-PRF- 32171, TYPE III			ONE COAT MIL-PRF-32171, TYPE III		

TABLE 2 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
RAST TRACK TROUGHS WHERE PAINTED (WHERE NONSKID NOT APPLIED)	15	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  <b>SEE NOTE (23)</b>	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS			
WELL DECK OVERHEADS, BOTH EXPOSED & NON- EXPOSED TO LCAC EXHAUST  SEE NOTE (34)	16	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTES (30) & (31)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 19, 4 - 8 MILS  SEE NOTES (33) & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 19, 6 - 10 MILS  SEE NOTES (23), (33) & (49)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 19, 10 - 12 MILS  SEE NOTES (33) & (49)			
EXTERIOR PORTABLE/BOLTED LOUVERS FOR INTAKES AND UPTAKES	17	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS  SEE NOTES (33), (49) & (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS  SEE NOTES (23), (33) & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS  SEE NOTES (33) & (49)		SAME AS LINE ONE	SAME AS LINE ONE
	18	SAME AS LINE ONE	<b>"SINGLE COAT"</b>  ONE COAT MIL-PRF-23236, TYPE VII, CLASS <b>18/7</b> , 20- 30 MILS  SEE NOTES (24) & (33)	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS <b>18/7</b> , 10-15 MILS  SEE NOTES (23) & (33)			SAME AS LINE ONE	SAME AS LINE ONE

TABLE 2 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR SURFACES ABOVE BOOTTOP, WITH EXCEPTION OF AREAS RECEIVING NONSKID  SEE NOTE (2)	19	NEAR WHITE METAL BLAST, USING GARNET, ALUMINUM OXIDE, BLACK WALNUT SHELLS, OR STAINLESS STEEL SHOT -- & -- SPOT CLEANING, CHAP 631, PARA 631-5.2.4.3 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2  SEE NOTE (21)	ONE COAT MIL-PRF- 23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE COAT MIL-PRF-23236, TYPE VII, 4 - 8 MILS  <b>SEE NOTE (57)</b>	ONE STRIPE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE STRIPE COAT MIL- PRF-23236, TYPE VII, 6 - 10 MILS  <b>SEE NOTE (23)</b>	ONE FULL COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS -- OR -- ONE FULL COAT MIL-PRF-23236, TYPE VII, 10 - 12 MILS	ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 <b>TYPE II OR III</b> (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTE (47)	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 <b>TYPE II OR III</b> (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <b>E</b> -24763 TYPE II, CLASS 2, 2 - 4 MILS  SEE NOTE (42)	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 <b>TYPE II OR III</b> (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <b>E</b> -24763 TYPE II, CLASS 2, 2 - 4 MILS  PAINT DESIGNATIONS & MARKINGS MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTES (43) & (47)
	20	SAME AS LINE 19		2 COATS F-84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT		SAME AS LINE 19	SAME AS LINE 19	SAME AS LINE 19
	21	SAME AS LINE 19				ONE COAT MIL-PRF-24635, TYPE V OR VI, CLASS 2, 5- 6 MILS DECK GRAY	ONE COAT MIL-PRF- 24635, TYPE V OR VI, CLASS 2, 5-6 MILS, HAZE GRAY	ONE COAT MIL-PRF-24635, TYPE V OR VI, CLASS 2, 5-6 MILS, HAZE GRAY
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 3 YEARS SERVICE LIFE	22	SAME AS LINE 19	PROPRIETARY NONSKID LISTED ON THE QPL FOR MIL-PRF-24667  SEE NOTE (7)	STRIPE COAT OF PROPRIETARY NONSKID PRIMER LISTED ON THE QPL FOR MIL-PRF-24667  SEE NOTES (7) & (51)		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE V, COMP G OR L  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 12 MONTHS SERVICE LIFE	23	SAME AS LINE 19	SAME AS LINE 22	SAME AS LINE 22		ONE COAT DARK GRAY MIL-PRF-24667, TYPE I, VI, OR VIII, COMP G OR L  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS & VERTICAL REPLENISHMENT DECK AREAS  UP TO 6 MONTHS SERVICE LIFE	24	SAME AS LINE 19	SAME AS LINE 22	SAME AS LINE 22		ONE COAT DARK GRAY MIL-PRF-24667 TYPE II, COMP G  SEE NOTES (19), (22), (50), & (56)		
HANGAR DECKS, FLIGHT DECKS, VERTICAL REPLENISHMENT DECK AREAS, CV AND CVN FLIGHT DECK LANDING AREAS, WALK AREAS AND ALL OTHER DECK AREAS  UP TO 30 DAYS SERVICE LIFE	25	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	SAME AS LINE 22	SAME AS LINE 22		ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		
	26	SAME AS LINE 25				ONE COAT DARK GRAY, MIL-PRF-24667, TYPE VII, COMP G OR L  SEE NOTES (19), (22), (50) & (56)		

TABLE 2 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
WALK AREAS (ALL DECK AREAS OTHER THAN HANGAR DECK, FLIGHT DECK, & VERTICAL REPLENISHMENT DECK AREAS)	27	SAME AS LINE 19	SAME AS LINE 22	SAME AS LINE 22		ONE COAT MIL-PRF-24667, TYPE I, V, VI, OR VIII, COMP G OR L -OR- ONE COAT DARK GRAY, MIL-PRF-24667, TYPE II, III, IV, COMP G  SEE NOTES (19) & (22)		
	28	SAME AS LINE 19	SAME AS LINE 19	SAME AS LINE 19		ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS -- & -- APPLICATION OF MIL-PRF- 24667, TYPE XI, COMP PS		
	29	SAME AS LINE ONE	ONE COAT MIL-PRF- 32171 TYPE III			ONE COAT MIL-PRF-32171, TYPE III		
RAST TRACK TROUGHS WHERE PAINTED (WHERE NONSKID NOT APPLIED	30	SAME AS LINE 19	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  <b>SEE NOTE (23)</b>	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS			
EXTERIOR PORTABLE/BOLTED LOUVERS FOR INTAKES AND UPTAKES	31	SAME AS LINE 19	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS  SEE NOTES (33), (49) & (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS  SEE NOTES (23), (33) & (49)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS  SEE NOTES (33) & (49)		SAME AS LINE 19	SAME AS LINE 19
	32	SAME AS LINE 19	<b>"SINGLE COAT"</b>  ONE COAT MIL-PRF- 23236, TYPE VII, CLASS <b>18/7</b> , 20-30 MILS  SEE NOTES (24) & (33)	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL- PRF-23236, TYPE VII, CLASS <b>18/7</b> , 10-15 MILS  SEE NOTES (23) & (33)			SAME AS LINE 19	SAME AS LINE 19

TABLE 2 GRP FIBERGLASS SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR SURFACES ABOVE BOOTTOP	33	HIGH PRESSURE WASH TO REMOVE MARINE GROWTH & LOOSE PAINT - OR - TOUCH-UP OR REMOVAL OF PAINT SYSTEM TO SOUND PRIMER BY LIGHT ABRASIVE BLASTING WITH BLACK WALNUT SHELLS -- & -- SPOT CLEAN, CHAP 631, PARA 631-5.2.6	ONE COAT F-150, MIL-DTL-24441, TYPE IV, 4 - 6 MILS		ONE STRIPE COAT F-152, MIL-DTL-24441, TYPE IV, 4 - 6 MILS -- & -- ONE COAT F-151, MIL-DTL-24441, TYPE IV, 4 - 6 MILS	ONE COAT DECK GRAY NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <del>E</del> -24763, TYPE II, CLASS 2, 2 - 4 MILS	ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - MIL- <del>E</del> -24763, TYPE II, CLASS 2, 2 - 4 MILS
SEE NOTE (2)		SEE NOTE (21)	SEE NOTE (29)		SEE NOTE (29)		SEE NOTE (42)	SEE NOTE (43)
EXTERIOR WALK AREAS ALL EXTERIOR DECK AREAS	34	POWER TOOL CLEAN TO CLEAN FIBERGLASS (DISC SANDER, ETC.) - OR - POWER TOOL CLEAN TO POLYURETHANE OVERLAY SUBSTRATE (DISC SANDER, ETC.) - OR - HYDROBLAST TO CLEAN FIBERGLASS	PROPRIETARY NONSKID PRIMER LISTED ON THE QPL FOR MIL-PRF-24667			ONE COAT MIL-PRF-24667, TYPE I, II, OR III, COMP G - OR - MIL-PRF-24667 TYPE IV		
		SEE NOTE (25)	SEE NOTE (7)			SEE NOTES (19) & (22)		



TABLE 2 WOOD SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E HORIZONTAL SURFACES DECKS & FITTINGS	F MASTS & STACKS EXPOSED TO GASES	G VERTICAL SURFACES
EXTERIOR ABOVE BOOTTOPPING	35	HAND TOOL CLEAN - OR - POWER TOOL CLEAN TO REMOVE DETERIORATED COATINGS	ONE COAT F-150, MIL-DTL-24441, TYPE IV, 4 - 6 MILS	DECKS, MASTS & SPARS:  ONE COAT NO. 26008 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS - OR - ONE COAT NO. 37038 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS	ALL OTHER SURFACES:  ONE COAT HAZE GRAY NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS			IDENTIFICATION MARKINGS:  PAINT DESIGNATIONS & MARKINGS MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS  SEE NOTE (43)

TABLE 3 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR COMPARTMENTS  COLORS TO BE SPECIFIED BY TYCOM OR SHIP'S COMMANDING OFFICER PER CHAP 631, PARA 631-8.18.3.2	1	HAND TOOL CLEANING, SSPC-SP 2  SEE NOTES (17) & (28)	2 COATS FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT - OR - ONE COAT MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS --OR-- ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2		2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT - OR - 2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT  SEE NOTE (9)	TO DECKS NOT RECEIVING COVERING:  ONE COAT DECK GRAY (OR TERRACOTTA RED) (FED STD 595) MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS	HULL, VENTILATION & PIPING INSULATION  2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTES (9), (28) & (41)	FOR COMPARTMENT PIPING & VENTILATION  SEE NOTE (18)
INTERIOR COMPARTMENTS (OVERCOAT)	2	HAND TOOL CLEANING, SSPC-SP 2  SEE NOTE (28)	SAME AS LINE ONE FOR BARE METAL AREAS		SAME AS LINE ONE EXCEPT ONE COAT	SAME AS LINE ONE	SAME AS LINE ONE EXCEPT ONE COAT	SAME AS LINE ONE EXCEPT ONE COAT
WELDING BAYS AND LIGHT TRAPS	3	SAME AS LINE ONE	SAME AS LINE ONE		ONE COAT BLACK, LOW GLOSS (FED STD 595), MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS	ONE COAT BLACK, SEMI-GLOSS (FED STD 595): MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS		
WET SPACES (WASH ROOMS, WATER CLOSETS, SHOWER STALLS, GALLEYS, SCULLERIES & STOREROOMS WHERE HEAVY CONDENSATION IS COMMON)	4	POWER TOOL CLEANING TO BARE METAL, SSPC-SP 11  SEE NOTE (28)	ONE COAT SIGMAGLAZE 5492, WHITE ONLY, 8-10 MILS		ONE STRIPE COAT SIGMAGLAZE 5492, 8-10 MILS, -- & -- ONE FULL COAT, 8-10 MILS, WHITE ONLY  SEE NOTE (23)		SAME AS LINE ONE	SAME AS LINE ONE
	5	SAME AS LINE 4	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS		ONE STRIPE COAT SHERWIN WILLIAMS DURA-PLATE UHS, 6 - 10 MILS -- & -- ONE FULL COAT, 10 - 12 MILS  SEE NOTE (23)		SAME AS LINE ONE	SAME AS LINE ONE
	6	SAME AS LINE 4	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS --OR-- ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE FULL COAT 6 - 8 MILS  SEE NOTE (23)		SAME AS LINE ONE	SAME AS LINE ONE
INTERIOR COMPARTMENTS  COLORS TO BE SPECIFIED BY TYCOM OR SHIP'S COMMANDING OFFICER PER CHAP 631, PARA 631-8.18.3.2	7	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11  SEE NOTES (17) & (28)	2 COATS FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT - OR - ONE COAT MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS --OR-- ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2		2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT - OR - 2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT  SEE NOTE (9)	TO DECKS NOT RECEIVING COVERING:  ONE COAT DECK GRAY (OR TERRACOTTA RED) (FED STD 595) MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS	SAME AS LINE ONE	SAME AS LINE ONE
INTERIOR COMPARTMENTS (OVERCOAT)	8	POWER TOOL CLEANING, SSPC-SP 3  SEE NOTE (28)	SAME AS LINE ONE FOR BARE METAL AREAS		SAME AS LINE ONE EXCEPT ONE COAT	SAME AS LINE ONE	SAME AS LINE ONE EXCEPT ONE COAT	SAME AS LINE ONE EXCEPT ONE COAT

TABLE 3 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
WELDING BAYS AND LIGHT TRAPS	9	SAME AS LINE 7	SAME AS LINE 7		SAME AS LINE 3	SAME AS LINE 3		
MACHINERY SPACES & BILGES  SEE NOTE (44)	10	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11 - OR - WATERJETTING TO NACE 5/SSPC- SP 12 CONDITION WJ-2/L - OR - NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (28)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS		ABOVE BILGE AREA:  2 COATS F-124, DOD-E-24607, 1.5 - 3 MILS/COAT	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (23)	SAME AS LINE ONE	
	11	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (28)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTE (49)		SAME AS LINE 10	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23) & (49)	SAME AS LINE ONE	
INTAKE VENT PLENUMS BETWEEN SKIN OF SHIP & MOISTURE SEPARATORS (CONT)	12	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTES (33) & (49)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)	ONE STRIPE COAT MI-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)		
	13	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L -OR- NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (33)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		
CLEAN AND DIRTY SIDE OF COMBUSTION AIR INTAKES/UP TAKES/ EXHAUST TRUNKS	14	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTES (33) & (57)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (33) & (57)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 6 - 10 MILS -- & -- ONE FULL COAT MIL-PRF- 23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 7,6 - 10 MILS -- & -- ONE FULL COAT MIL-PRF- 23236, TYPE VII, CLASS 7,10 - 12 MILS  SEE NOTES (23) & (33)		
	15	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L - OR - NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11  SEE NOTE (33)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		

TABLE 3 STEEL SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
FAN ROOMS	16	SAME AS LINE 10	SAME AS LINE 15		SAME AS LINE 15	SAME AS LINE 15		
MIXING ROOM/UPTAKE SPACES WITH VENTS OR LOUVERS TO THE OUTSIDE ATMOSPHERE (BULKHEADS & DECKS)	17	NEAR WHITE METAL BLAST NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)		
UNDER AFFF PROPORTIONING UNITS (INSIDE THE COAMING), OR BILGE DRAIN WELLS	18	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11  SEE NOTES (32) & (36)	ONE COAT MIL-PRF-32171, TYPE IV, CLASS 1 OR 2, 12 - 18 MILS			ONE COAT MIL-PRF-32171, TYPE IV, CLASS 1 OR 2, 12 - 18 MILS		
INTERIOR DECK PASSAGEWAYS NOT RECEIVING DECK COVERINGS (HIGH DURABILITY DECK PAINT)	19	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS			ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS		
SEE NOTE (12)	20	SAME AS LINE 19	SAME AS LINE 18			SAME AS LINE 18		
INTERIOR STEEL SURFACES	21	SAME AS LINE 12	SAME AS LINE ONE		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE
	22	SAME AS LINE 13	SAME AS LINE ONE		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE
	23	SAME AS LINE 19	SAME AS LINE ONE		SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE	SAME AS LINE ONE

TABLE 3 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR COMPARTMENTS	24	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11, USING STAINLESS STEEL WIRE BRUSHES, STAINLESS STEEL PADS, OR ABRASIVE SANDING DISCS (ANSI/BHMA B74.18)  SEE NOTES (17) & (28)	2 COATS FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT - OR - ONE COAT MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS --OR-- ONE COAT MIL-PRF-32171, TYPE I, CLASS 1 OR 2		2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT - OR - 2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTE (9)	TO DECKS NOT RECEIVING COVERING:  ONE COAT DECK GRAY (OR TERRACOTTA RED) (FED STD 595), MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS	HULL, VENTILATION & PIPING INSULATION  2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT - OR - 2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTES (9), (28) & (41)	FOR COMPARTMENT PIPING & VENTILATION  SEE NOTE (18)
	25	HAND TOOL CLEANING, SSPC-SP 2  SEE NOTES (17) & (28)	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24
INTERIOR COMPARTMENTS (OVERCOAT)	26	HAND TOOL CLEANING, SSPC-SP 2  SEE NOTE (28)	SAME AS LINE 24 FOR BARE METAL AREAS		SAME AS LINE 24 EXCEPT ONE COAT	SAME AS LINE 24	SAME AS LINE 24 EXCEPT ONE COAT	SAME AS LINE 24
	27	POWER TOOL CLEANING, SSPC-SP 3  SEE NOTE (28)	SAME AS LINE 24 FOR BARE METAL AREAS		SAME AS LINE 24 EXCEPT ONE COAT	SAME AS LINE 24	SAME AS LINE 24 EXCEPT ONE COAT	SAME AS LINE 24
WELDING BAYS AND LIGHT TRAPS	28	SAME AS LINE 24	SAME AS LINE 24		ONE COAT BLACK, LOW GLOSS (FED STD 595), MIL- PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS	ONE COAT BLACK, SEMI- GLOSS (FED STD 595): MIL- PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS - OR - MIL-PRF-32171, TYPE I, CLASS 1 OR 2, 10 - 12 MILS		
	29	SAME AS LINE 25	SAME AS LINE 24		SAME AS LINE 28	SAME AS LINE 28		
WET SPACES (WASH ROOMS, WATER CLOSETS, SHOWER STALLS, GALLEYS, SCULLERIES & STOREROOMS WHERE HEAVY CONDENSATION IS COMMON)	30	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11  SEE NOTE (28)	ONE COAT SIGMA GLAZE 5492, 8-10 MILS, WHITE ONLY		ONE STRIPE COAT SIGMA 5492, 8-10 MILS -- & -- ONE FULL COAT, 8-10 MILS, WHITE ONLY  SEE NOTE (23)		SAME AS LINE 24	SAME AS LINE 24
	31	SAME AS LINE 30	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS		ONE STRIPE COAT SHERWIN WILLIAMS DURA-PLATE UHS, 6 - 10 MILS -- & -- ONE FINAL COAT, 10 - 12 MILS  SEE NOTE (23)		SAME AS LINE 24	SAME AS LINE 24
	32	SAME AS LINE 30	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 17, 6 - 8 MILS --OR-- ONE COAT MIL-PRF- 32171, TYPE I, CLASS 1 OR 2		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE FULL COAT 6 - 8 MILS  SEE NOTE (23)		SAME AS LINE 24	SAME AS LINE 24

TABLE 3 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
MACHINERY SPACES & BILGES	33	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2 - OR - NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTE (28)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS		ABOVE BILGE AREA:  2 COATS F-124, DOD-E-24607, 1.5 - 3MILS/COAT	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (23)	SAME AS LINE 24	
	34	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTE (28)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTE (49)		SAME AS LINE 33	BILGE AREA:  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23) & (49)	SAME AS LINE 24	
INTAKE VENT PLENUMS, BETWEEN SKIN OF SHIP & MOISTURE SEPARATORS	35	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTES (33) & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33) & (49)		
	36	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2 - OR - NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS  SEE NOTE (33)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		

TABLE 3 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
CLEAN AND DIRTY SIDE OF COMBUSTION AIR INTAKES/UP-TAKES/ EXHAUST TRUNKS	37	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (33) & (57)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (23) & (33)		
	38	WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2 - OR - NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		
	39	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTE (33)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 6 - 8 MILS  SEE NOTES (23) & (33)		
MIXING ROOM/UP-TAKE SPACES WITH VENTS OR LOUVERS TO THE OUTSIDE ATMOSPHERE (BULKHEADS & DECKS)	40	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)		ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33), & (49)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 6 - 10 MILS -- & -- ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (23), (33), & (49)		
INTERIOR ALUMINUM SURFACES	41	SAME AS LINE 24	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24
	42	SAME AS LINE 35	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24
	43	SAME AS LINE 36	SAME AS LINE 24		SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24	SAME AS LINE 24

TABLE 3 GRP FIBERGLASS SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C WELDING BAYS & LIGHT TRAPS	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR FIBROUS GLASS BOARDS	44	SOAP & WATER CLEAN & HAND SAND AS NECESSARY	ONE COAT FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS		2 COATS WATER-BASED INTERIOR LATEX, MIL-PRF-24596, 2 - 4 MILS/COAT			
	45	SAME AS LINE <b>44</b>	ONE COAT FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS		2 COATS OF FINISH COAT DOD-E-24607, 1.5 - 3 MILS/COAT, F-124, 125, OR 126 (COLOR TO BE DESIGNATED)			



TABLE 3 WOOD SURFACES	LINE	A SURFACE PREPARATION	B PRIMER	C WELDING BAYS & LIGHT TRAPS	D BULKHEADS & OVERHEADS	E DECKS	F THERMAL INSULATION	G MARKINGS
INTERIOR COMPARTMENTS	46	HAND TOOL CLEAN -- & -- POWER TOOL CLEAN TO BARE WOOD OR TIGHTLY ADHERING INTACT PAINT	2 COATS FORMULA 84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS/COAT		2 COATS MIL-PRF-24596, WATER-BASED INTERIOR LATEX, 2 - 4 MILS/COAT  SEE NOTES (9) & (17)			FOR COMPARTMENT PIPING & VENTILATION  SEE NOTE (18)
	47	SAME AS LINE 46	2 COATS FORMULA 84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS/COAT		2 COATS DOD-E-24607, 1.5 - 3 MILS/COAT  SEE NOTE (17)			SAME AS LINE 46

TABLE 4 STEEL SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
AIRCRAFT CARRIER POTABLE WATER TANKS	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (26)	ONE COAT F-150, MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS AT ADEQUATE THICKNESS TO MEET COATING RANGE	TOTAL SYSTEM 8 MILS MIN, 12 MILS MAX (AREAS WITHOUT STRIPE COAT) SEE NOTE (37)
	1A	<b>SAME AS LINE ONE</b>	<b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 4 - 8 MILS  SEE NOTES (33) &amp; (55)</b>	<b>ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 6 - 10 MILS  SEE NOTES (23), (33) &amp; (55)</b>	<b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 10 - 12 MILS  SEE NOTES (33) &amp; (55)</b>			
POTABLE WATER TANKS  SEE NOTE (54)	2	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 4 - 8 MILS  SEE NOTES (33) & (55)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 6 - 10 MILS  SEE NOTES (23), (33) & (55)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 10 - 12 MILS  SEE NOTES (33) & (55)			
AIRCRAFT CARRIER RESERVE FEEDWATER TANKS AND FRESH WATER DRAIN COLLECTING TANKS	3	SAME AS LINE ONE	ONE COAT F-150, MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS  SEE NOTE (23)	ONE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS AT ADEQUATE THICKNESS TO MEET COATING RANGE	TOTAL SYSTEM 8 MILS MIN, 12 MILS MAX (AREAS WITHOUT STRIPE COAT)
FEEDWATER TANKS  SEE NOTE (54)	4	SAME AS LINE ONE	ONE COAT F-150, MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS	ONE COAT MIL-DTL-24441, TYPE III, 2 - 4 MILS AT ADEQUATE THICKNESS TO MEET COATING RANGE	TOTAL SYSTEM 8 MILS MIN, 12 MILS MAX (AREAS WITHOUT STRIPE COAT)
	5	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VI OR VII, CLASS 11, 4 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, TYPE VI OR VII, CLASS 11, 4 - 8 MILS  SEE NOTE (23)	ONE COAT MIL-PRF-23236, TYPE VI OR VII, CLASS 11, 4 - 8 MILS			
JP-5 TANKS, MOGAS TANKS, FUEL OIL SERVICE TANKS, DIESEL SERVICE TANKS, CONTAMINATED FUEL TANKS, FUEL COMP TANKS, FUEL STORAGE TANKS, SUMPS  15-20 YEARS SERVICE LIFE  SEE NOTE (35)	6	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (33) & (49)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS  SEE NOTES (23), (33), & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (33) & (49)			

TABLE 4 STEEL SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
JP-5 TANKS, MOGAS TANKS, FUEL OIL SERVICE TANKS, DIESEL SERVICE TANKS, CONTAMINATED FUEL TANKS, FUEL COMP TANKS, FUEL STORAGE TANKS, SUMPS  10-12 YEARS SERVICE LIFE  SEE NOTE (35)	7	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (38)	SAME AS LINE 6	SAME AS LINE 6	SAME AS LINE 6			
	7A	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236 TYPE VII CLASS 18/5, 20-30 MILS</b>  <b>SEE NOTES (24) &amp; (33)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-23236 TYPE VII CLASS 18/5, 10-15 MILS</b>  <b>SEE NOTES (23) &amp; (33)</b>				
CHT/MSD TANKS	8	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 4 - 8 MILS  SEE NOTE (33)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 6 - 10 MILS  SEE NOTES (23) & (33)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 10 - 12 MILS  SEE NOTE (33)			
BALLAST TANKS, FLOODABLE VOIDS (SUBSTRATE TEMPERATURE 50 DEGREES FAHRENHEIT & ABOVE)  EDGE RETENTIVE-EXTENDED SERVICE LIFE 15-20 YEARS <b>(MORE STRINGENT HUMIDITY REQUIREMENTS)</b>  SEE NOTE (8)	9	SAME AS LINE ONE	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236 TYPE VII CLASS 18/7, 20-30 MILS</b>  <b>SEE NOTES (24), (33), &amp; (58)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-23236 TYPE VII CLASS 18/7, 10-15 MILS</b>  <b>SEE NOTES (23) &amp; (33)</b>				
BALLAST TANKS, FLOODABLE VOIDS (SUBSTRATE TEMPERATURE 50 DEGREES FAHRENHEIT & ABOVE)  EDGE RETENTIVE SERVICE LIFE 10 - 12 YEARS (LESS STRINGENT HUMIDITY REQUIREMENTS)  SEE NOTE (8)	10	SAME AS LINE 7	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236 TYPE VII CLASS 18/7, 20-30 MILS</b>  <b>SEE NOTES (24) &amp; (33)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-23236 TYPE VII CLASS 18/7, 10-15 MILS</b>  <b>SEE NOTES (23) &amp; (33)</b>				
<b>TOUCH-UP ONLY:</b> <b>BALLAST TANKS, FLOODABLE VOIDS (SUBSTRATE TEMPERATURE 50 DEGREES FAHRENHEIT &amp; ABOVE)</b>  <b>SEE NOTE (8)</b>	11	<b>SAME AS LINE 7</b>	<b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS</b>  <b>SEE NOTES (33), (49), &amp; (57)</b>	<b>ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS</b>  <b>SEE NOTES (23), (33), &amp; (49)</b>	<b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS</b>  <b>SEE NOTES (33) &amp; (49)</b>			
BALLAST TANKS, FLOODABLE VOIDS (USE ONLY WHEN SUBSTRATE TEMPERATURE CANNOT BE MAINTAINED ABOVE 50 DEGREES FAHRENHEIT)  NORMAL 5 - 7 YEARS SERVICE LIFE	12	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, GRADE A OR B, 4 - 8 MILS	ONE STRIPE COAT MIL-PRF-23236, GRADE A OR B, 4 - 8 MILS	ONE COAT MIL-PRF-23236, GRADE A OR B, 4 - 8 MILS			

TABLE 4 STEEL SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
CHAIN LOCKERS	13	<b>INTENTIONALLY LEFT BLANK</b>						
	14	<b>NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10</b>	<b>"SINGLE COAT"</b> ONE COAT MIL-PRF-23236, TYPE VII, CLASS <b>187</b> , 20-30 MILS SEE NOTES (24) & (33)	<b>"SINGLE COAT"</b> ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS <b>187</b> , 10-15 MILS SEE NOTES (23) & (33)				
<b>NON-FLOODABLE VOIDS</b>	15	<b>SAME AS LINE 14</b>	<b>"SINGLE COAT"</b> ONE COAT MIL-PRF-23236, TYPE VII, CLASS <b>187</b> , 20-30 MILS SEE NOTES (24) & (33)	<b>"SINGLE COAT"</b> ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS <b>187</b> , 10-15 MILS SEE NOTES (23) & (33)				
<b>TOUCH-UP ONLY: NON-FLOODABLE VOIDS</b>	16	<b>SAME AS LINE 14</b>	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 4 - 8 MILS SEE NOTES (33), (49), & (57)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 6 - 10 MILS SEE NOTES (23), (33), & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5 OR 7, 10 - 12 MILS SEE NOTES (33) & (49)			

TABLE 4 ALUMINUM SURFACES	LINE	A SURFACE PREPARATION	B	C	D	E	F	G TOTAL SYSTEM SEE NOTE (53)
TANKS AND VOIDS	17	NEAR WHITE METAL BLAST, USING GARNET OR ALUMINUM OXIDE OR BLACK WALNUT SHELLS	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL	SAME AS FOR STEEL

TABLE 5 VARIOUS LOCATIONS	LINE	A SURFACE PREPARATION	B	C	D	E	F TOTAL SYSTEM SEE NOTE (53)	G DESIGNATIONS & MARKINGS
UNHEATED PIPING, FITTINGS, VALVES	1	HAND TOOL CLEAN, SSPC-SP 2	ONE COAT F-84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS	ONE COAT F-84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS	2 COATS OF BILGE FINISH COAT TO MATCH SURROUNDING SURFACES, INCLUDING LAGGED SURFACES			ONE COAT MIL-PRF-24635, 2 - 3 MILS, FOR COLOR CODED SYSTEMS
UNHEATED FERROUS MACHINERY EXTERNAL SURFACES	2	POWER TOOL CLEAN, SSPC-SP 3	SAME AS LINE ONE	ONE COAT F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - ONE COAT NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS	IF REQUIRED FOR HIDING, ONE ADDITIONAL COAT: F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS			
MACHINERY, GAGEBOARDS	3	SAME AS LINE 2	SAME AS LINE ONE	ONE COAT F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - ONE COAT NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS	IF REQUIRED FOR HIDING, ONE ADDITIONAL COAT: F-111, MIL-DTL-15090, 1.5 - 3 MILS - OR - NO. 26307 (FED STD 595), MIL-PRF-24635, 2 - 3 MILS			
UNINSULATED SIDE OF BULKHEAD OR SHELL ADJACENT TO SEA OR AC BOUNDARY (FOR INTERIOR COMPARTMENTS ONLY)	4	POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT HEMPEL HEMPADUR 45150-50630, 4 - 6 MILS	ONE COAT HEMPEL ANTI-CONDENS 617US-10000, 50 - 60 MILS				
	5	SAME AS LINE 4	ONE COAT F-84, ALKYD ZINC MOLYBDATE, TT-P-645, 1.5 - 3 MILS - OR - ONE COAT MIL-PRF-23236, TYPE IV, V, VI, OR VII, 4 - 8 MILS	ONE COAT TEMP-COAT 101, 20 - 22 MILS	ONE COAT TEMP-COAT 101, 20 - 22 MILS	ONE COAT TEMP- COAT 101, 20 - 22 MILS		
	6	SAME AS LINE 4	SAME AS LINE 5	ONE COAT MASCOAT DELTA-T MARINE, 20-22 MILS	ONE COAT MASCOAT DELTA-T MARINE, 20-22 MILS	ONE COAT MASCOAT DELTA-T MARINE, 20-22 MILS		
	7	SAME AS LINE 4	SAME AS LINE 5	ONE COAT KEFA AIRLESS 8125, 50 - 60 MILS				
BOILERS & ECONOMIZERS (EXCEPT PARTS USED FOR HEAT TRANSFER), MACHINERY CASINGS, FERROUS SHEET METAL	8	SAME AS LINE 4	ONE COAT AMERON AMERCOAT 892HS, 2 - 3 MILS  SEE NOTE (39)					
	9	SAME AS LINE 4	2 COATS OF TT-P-28 SUFFICIENT TO COVER THE PROFILE					
STEAM, FEEDWATER, BOTTOM/ SURFACE BLOW & BOILER PRESSURE VESSEL PIPING IN PREPARATION FOR ULTRASONIC MEASUREMENTS	10	POWER TOOL CLEAN TO BARE METAL, SSPC-SP- 11, USING STAINLESS STEEL WIRE BRUSHES, STAINLESS STEEL PADS, OR ABRASIVE SANDING DISCS (ANSI/BHMA B74.18)						
ELECTRICAL EQUIPMENT, ELECTRONIC EQUIPMENT & CABLES	11	SAME AS LINE ONE	ONE COAT F-84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS	2 COATS F-111, MIL-DTL- 15090, 1.5 - 3 MILS/COAT - OR - ONE COAT NO. 26307 FED STD 595), MIL-PRF-24635, 2 - 3 MILS				
CABLE, INTERIOR (OTHER THAN PVC, LOW SMOKE)	12	SAME AS LINE ONE	2 COATS FORMULA 84, TT-P-645, ALKYD ZINC MOLYBDATE, 1.5 - 3 MILS/COAT	2 COATS WATER-BASED LATEX PER MIL-PRF-24596, 2 - 4 MILS/COAT	2 COATS DOD-E-24607 CHLORINATED ALKYD 1.5 - 3 MILS/COAT (FOR COLOR MATCH IF REQUIRED)			

TABLE 5 VARIOUS LOCATIONS	LINE	A SURFACE PREPARATION	B	C	D	E	F TOTAL SYSTEM SEE NOTE (53)	G DESIGNATIONS & MARKINGS
CABLE, EXTERIOR (OTHER THAN PVC, LOW SMOKE)	13	SAME AS LINE ONE	SAME AS LINE 11	ONE COAT MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY) TO MATCH SURROUNDING AREA, 2 - 3 MILS				
ANCHOR (SURFACE SHIP BOW ANCHORS)  FOR ANCHORS BELOW LOWER BOOTTOPPING LIMIT, SEE NOTE (13)	14	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10  SEE NOTE (14)	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS - OR - ONE COAT MIL-PRF-23236, TYPE VII, 4 - 8 MILS	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, 4 - 8 MILS - OR - ONE COAT MIL-PRF-23236, TYPE VII, 10 - 12 MILS	ONE COAT HAZE GRAY, NO. 26270 (FED STD 595), MIL-PRF-24635 (LOW SOLAR ABSORPTION ONLY), 2 - 3 MILS			
ANCHOR CHAIN	15	COMMERCIAL BLAST CLEAN, SSPC-SP 6  SEE NOTE (14)	ONE COAT AMERON PSX 700 TO HOLD BLAST, 1 - 2 MILS  SEE NOTE (16)	ONE COAT AMERON PSX 700, 4 - 5 MILS	ONE COAT AMERON PSX 700, 4 - 5 MILS		10 MILS MIN, 12 MILS MAX	AMERON PSX 700  SEE NOTE (15)
	16	SAME AS LINE 15	ONE COAT INTERNATIONAL INTERGARD 264 TO HOLD BLAST, 1-2 MILS  SEE NOTE (16)	ONE COAT INTERNATIONAL INTERGARD 264, 4-6 MILS	ONE COAT INTERNATIONAL INTERFINE 979, 4-6 MILS		SAME AS LINE 15	INTERNATIONAL INTERFINE 979  SEE NOTE (15)
	17	SAME AS LINE 15	ONE COAT SHERWIN WILLIAMS SEAGUARD 5000 HS TO HOLD BLAST, 1-2 MILS  SEE NOTE (16)	ONE COAT SHERWIN WILLIAMS SEAGUARD 5000 HS, 4-6 MILS	ONE COAT SHERWIN WILLIAMS PXLE-80 <b>HAPS FREE</b> , 4-6 MILS		SAME AS LINE 15	SHERWIN WILLIAMS PXLE-80 <b>HAPS FREE</b>  SEE NOTE (15)
	18	SAME AS LINE 15	ONE COAT MIL-PRF-24635, <b>TYPE</b> 5 OR 6, TO HOLD BLAST, 1-2 MILS  SEE NOTE (16)	ONE COAT MIL-PRF-24635 <b>TYPE</b> 5 OR 6, 4-6 MILS	ONE COAT MIL-PRF-24635, <b>TYPE</b> 5 OR 6, 4-6 MILS		SAME AS LINE 15	MIL-PRF-24635, <b>TYPE</b> 5 OR 6  SEE NOTE (15)
INTERIOR GALVANIZED SURFACES	19	BRUSH-OFF BLAST, SSPC-SP 7 - OR - POWER TOOL CLEAN, SSPC-SP 3		ONE COAT WATER-BASED INTERIOR LATEX, MIL-PRF-24596, 2 - 4 MILS	TOPCOAT TO MATCH SURROUNDING AREA			
EXTERIOR GALVANIZED SURFACES	20	SAME AS LINE 19		ONE COAT MIL- <del>E</del> -24763, 2 - 4 MILS	TOPCOAT TO MATCH SURROUNDING AREA			
EXHAUST PIPE EXTERIOR	21	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT AMERCOAT 892HS, HAZE GRAY #26270, 2 - 3 MILS - OR - 2 COATS OF TT-P-28 SUFFICIENT TO COVER THE PROFILE  SEE NOTES (39) & (42)					

TABLE 5 VARIOUS LOCATIONS	LINE	A SURFACE PREPARATION	B	C	D	E	F TOTAL SYSTEM SEE NOTE (53)	G DESIGNATIONS & MARKINGS
PCMS (REPAIRS)	22	STRIP PAINT, USING "PEEL-AWAY-7" - OR - PLASTIC MEDIA BLASTER - OR - SODIUM BICARBONATE MEDIA BLASTER  SEE REPAIR & INSTALLATION METHODS, RIM 05T1-99			ONE COAT HAZE GRAY, MIL- E-24763 (LOW SOLAR ABSORPTION ONLY), 2 - 4 MILS (TOP COAT OF PCMS)  SEE NOTE (45)			
PCMS (NEW INSTALLATION)	23	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - POWER TOOL CLEAN TO BARE METAL, SSPC-SP 11	ONE COAT MIL-PRF-23236 TYPE IV, V, or VI 4 - 8 MILS  SEE NOTE (29)	ONE COAT MIL-PRF-23236, TYPE IV, V, or VI 4 - 8 MILS  SEE NOTES (29)	SAME AS LINE 22			
ARRESTING GEAR SHEAVE FOUNDATIONS	24	SSPC-SP 1 -- & -- SPONGEJET TO NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 -- & -- SSPC-SP 1 (STEAM CLEAN) -- & -- SPONGEJET TO NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS (BRUSH APPLY ONLY)  SEE NOTES (33) & (49)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS  SEE NOTES (33) & (49)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (33) & (49)			



TABLE 6 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO MAX BEAM	F MAX BEAM TO UPPER BOOTTOP	G DRAFT MARKS
UNDERWATER HULL  (KEEL TO UPPER BOOTTOP; RUDDERS; STRUTS; DIVING PLANES)  (NON-SHT SURFACES BELOW WATERLINE)	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10 - OR - WATERJETTING TO NACE 5/SSPC-SP 12 CONDITION WJ-2/L	2 COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 AC COATS MIL-PRF-24647 TYPE I OR II, 4 - 6 MILS/COAT --OR-- 2 COATS MIL-DTL-24441 TYPE IV, F- 150, 4-6 MILS/COAT  SEE NOTES (1A), (4A), & (35A)			2 AF COATS MIL-PRF- 24647, TYPE I OR II, 4 - 6 MILS/COAT  SEE NOTES (2A) & (4A)	2 AF COATS MIL-PRF- 24647, TYPE I OR II BLACK, 4 - 6 MILS/COAT  SEE NOTES (3A) & (4A)	ONE COAT MIL-DTL-24631 F- 186 --OR-- ONE COAT MIL-DTL-24441 TYPE IV, F-152 --OR-- ONE AC COAT MIL-PRF- <b>23236</b> , WHITE, 3-4 MILS  SEE NOTE (5A)
NON-SHT, EXTERIOR SURFACES ABOVE THE WATERLINE (INCLUDES DSRV/SRC SEATING SURFACES)	2	SAME AS LINE ONE	TWO COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 COATS AC MIL-PRF-24647, TYPE I OR II, 4-6 MILS/COAT  FINAL COAT TO BE BLACK  SEE NOTES (1A), (32A), & (35A)					
	3	SAME AS LINE ONE	ONE COAT MIL-DTL-24441 TYPE IV, F- 150, 4-6 MILS -- & -- ONE COAT MIL-DTL-24441 TYPE IV, F- 153, 4-6 MILS  SEE NOTES (1A), (32A), & (35A)					
FOR MOORED TRAINING SHIPS ONLY; EXTERIOR SURFACES ABOVE THE WATERLINE (NON- IMMERSION SURFACES ONLY)	4	SAME AS LINE ONE	2 COATS MIL-PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 COATS MIL-DTL-24441, TYPE IV 4-6 MILS/COAT  SEE NOTES (1A) & (32A)		ONE COAT, MIL- PRF-24635 NO. 27038, 2-4 MILS			
UNTILED (NON-SHT COVERED) FOOT TRAFFIC AREAS TO BE COVERED WITH NONSKID PAINT (ALL CLASSES OF SUBMARINES)	5	SAME AS LINE ONE	ONE COAT MIL-DTL-24441 TYPE IV F- 150, 4-6 MILS --- & --- ONE COAT MIL-DTL-24441 TYPE IV F- 153, 4-6 MILS  SEE NOTE (32A)		NONSKID: MIL- PRF-24667, TYPE I OR X, COMP G  SEE NOTE (44A)			
	6	SAME AS LINE ONE	TWO COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT --OR-- 2 COATS AC MIL-PRF-24647, TYPE I OR II, 4-6 MILS / COAT  FINAL COAT TO BE BLACK  SEE NOTES (3A) & (32A)		SAME AS LINE 5			
SURFACES TO BE COVERED BY MIP OR MIP- SHT  SEE NOTE (34A)	7	SEE NOTE (41A) FOR DETAILS ON SURFACE PREPARATION	ONE COAT DTRC 2844-1110 (YELLOW PRIMER), 4-5 MILS  SEE NOTES (1A) & (35A)	ONE COAT DTRC 2844- 1109 (BLACK TOPCOAT), 4-5 MILS  SEE NOTES (1A) & (35A)				

TABLE 6 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO MAX BEAM	F MAX BEAM TO UPPER BOOTTOP	G DRAFT MARKS
SHT TILES (688 CLASS ONLY) (KEEL TO UPPER BOOTTOP)  SEE NOTE (34A)	8	SEE NOTE (41A) FOR DETAILS ON SURFACE PREPARATION				TWO COATS AF MIL-PRF-24647, TYPE I, CLASS 3, 4-6 MILS/COAT  SEE NOTE (2A)	TWO COATS AF MIL-PRF-24647, TYPE I, CLASS 3, 4-6 MILS/COAT  SEE NOTES (3A) & (45A)	SAME AS LINE ONE
SHT/MIP-SHT (SSN 21 AND 774CLASS) (KEEL TO UPPER BOOTTOP)  SEE NOTE (34A)	9	SAME AS LINE 8	ONE COAT MIL-DTL-24631A, 3-4 MILS --OR-- ONE COAT AMERCOAT 3273, 2-3 MILS			SAME AS LINE 8	SAME AS LINE 8	SAME AS LINE ONE
SHT/MIP-SHT AREAS ABOVE UPPER BOOTTOP LIMIT (EXCEPT TRAFFIC AREAS)  SEE NOTE (34A)	10	SAME AS LINE 8	ONE COAT MIL-DTL-24631A (F-187 POLYURETHANE), 3-4 MILS  SEE NOTES (45A) & (46A)					SAME AS LINE ONE
SURFACES TO BE COVERED BY A FAIRING COMPOUND  SEE NOTE (34A)	11	SEE NOTE (41A) FOR DETAILS ON SURFACE PREPARATION	ONE COAT DTRC 2844-1110 (YELLOW PRIMER), 4-5 MILS  SEE NOTES (1A) & (35A)	ONE COAT DTRC 2844-1109, 4-5 MILS --OR-- ONE COAT MIL-DTL-24441 TYPE IV, 4-6 MILS  SEE NOTES (1A), (32A) & (35A)				
SHT OR MIP-SHT AREAS TO BE COVERED WITH NONSKID (688 CLASS ONLY)  SEE NOTE (34A)	12	SAME AS LINE 8	ONE COAT MIL-DTL-24631A F-184 OR AMERCOAT 3273, 3-4 MILS -- & -- 18LBS/250 SQ FT GRIT PER MIL-A-22262 CAST UNIFORMLY ON FRESHLY APPLIED PAINT	ONE COAT MIL-DTL-24631A, F-184 --OR-- AMERCOAT 3273, 3-4 MILS	ONE COAT MIL-DTL-24631A, F-187, 3-4 MILS  SEE NOTE (32A)			
SHT OR MIP-SHT AREAS TO BE COVERED WITH NONSKID (21 AND 774 CLASS ONLY)  SEE NOTE (34A)	13	SAME AS LINE 8	SAME AS LINE 12		SAME AS LINE 12			

TABLE 6 GRP FIBERGLASS SURFACES  SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E KEEL TO MAX BEAM	F MAX BEAM TO UPPER BOOTTOP	G DRAFT MARKS
UNBOOTED GRP BOW DOMES ABOVE UPPER BOOTTOP  SEE NOTE (34A)	14	LOW PRESSURE WATER CLEAN (LP WC)  SEE NOTE (42A)	ONE COAT MIL-DTL-24441, TYPE IV, F- 150, 4-6 MILS -- & -- ONE COAT MIL-DTL-24441 TYPE IV, F- 153 OR F-154, 4-6 MILS --OR-- TWO COATS MIL-PRF-24647 4-6 MIL/COAT --OR-- OR, 2 COATS MIL-PRF-23236 TYPE IV, V, OR VI, CLASS 5 OR 7, 4-6 MILS/COAT  SEE NOTES (32A) & (38A)					
UNBOOTED GRP BOW DOMES BELOW UPPER BOOTTOP  SEE NOTE (34A)	15	SAME AS LINE 14	ONE COAT MIL-DTL-24441, TYPE IV, F- 150, 4-6 MILS --OR-- TWO COATS MIL-PRF-24647 4-6 MIL/COAT  SEE NOTE (4A)			TWO COATS AF MIL- PRF-24647, TYPE I, CLASS 3, 4-6 MIL/COAT  SEE NOTES (2A), (4A), & (38A)	TWO COATS AF MIL-PRF- 24647, TYPE I, CLASS 3, 4-6 MIL/COAT  SEE NOTES (3A), (4A), & (38A)	
BOOTED GRP BOW DOMES ABOVE UPPER BOOTTOP  SEE NOTE (34A)	16	LOW PRESSURE WATER CLEAN (LP WC)  SEE NOTE (43A)	PRIOR TO INSTALLING THE BOOT - ONE COAT MIL-DTL-24441, TYPE IV, F- 150, 2-4 MILS AFTER BOOT INSTALLATION ONE COAT NAVY FORMULA 187, 2-3 MILS  SEE NOTES (38A) & (46A)					
BOOTED GRP BOW DOMES BELOW UPPER BOOTTOP  SEE NOTE (34A)	17	SAME AS LINE 16	PRIOR TO INSTALLING THE BOOT - ONE COAT MIL-DTL-24441, TYPE IV, F- 150, 2-4 MILS AFTER BOOT INSTALLATION ONE COAT NAVY FORMULA 184, 2-3 MIL/COAT			SAME AS LINE 15	SAME AS LINE 15	

TABLE 7 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
BILGE AND TRUNK INTERIOR AREAS BELOW THE LOWER WALKING FLAT	1	POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTE (6A)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 5-7 MILS  SEE NOTES (8A), (15A), & (28A)	ONE STRIPE COAT AND ONE FULL COAT MIL-PRF-23236, TYPE VII, CLASS 17, 5-7 MILS/COAT  SEE NOTE (7A), (8A), (9A), (15A), (28A), (33A) & (37A)				
	2	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (15A) & (28A)	ONE STRIPE COAT AND ONE FULL COAT MIL-DTL-24441, TYPE IV, F-151 OR F-157, 4-6 MILS/COAT  SEE NOTES (7A), (15A), (28A), & (33A)				
	3	SAME AS LINE ONE	ONE COAT MIL- PRF-23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4-8 MILS  SEE NOTES (15A) & (28A)	ONE STRIPE COAT AND ONE FULL COAT MIL-PRF-23236, TYPE V, CLASS 5 OR 7, 4-8 MILS/COAT  SEE NOTES (7A), (9A), (15A), (28A), & (33A)				
	4	INTENTIONALLY LEFT BLANK						
WET SPACES (EXCEPT BILGES AND TRUNKS)	5	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 2				
	6	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 3				
VRLA BATTERY COMPARTMENT	7	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 2				
VA CLASS BATTERY COMPARTMENT (DECK AND BHDS UP TO 62" ABOVE TOP STEP OF DECK)	8	SAME AS LINE ONE	TEK-HAZ RED PRIME COAT, 16-20 MILS  SEE NOTES (24A) & (28A)	TEK-HAZ GRAY TOPCOAT, 16- 20 MILS  SEE NOTES (24A), (28A), & (33A)				
VA CLASS BATTERY COMPARTMENT (OVHD AND BHDS ABOVE 62" ABOVE TOP STEP OF DECK)	9	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (24A) & (28A)			2 COATS MIL-PRF- 24635, TYPE II, CLASS 1, 4-6 MILS/ COAT  SEE NOTES (24A), (28A), & (33A)		

TABLE 7 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
TRUNK INTERIORS, UNINSULATED AREA ABOVE THE LOWER FLAT <i>(INCLUDING UPPER HATCH COVER)</i>	10	POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTES (6A) & (13A)	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 17, 5-7 MILS/COAT  SEE NOTE (7A), (8A), (9A), (15A), (28A), (33A), & (37A)				
	11	SAME AS LINE 10	SAME AS LINE 2	ONE COAT MIL-DTL-24441, TYPE IV, F-151 OR F-157, 4-6 MILS/COAT  SEE NOTES (7A), (15A), & (28A)		ONE COAT DOD-E-24607, 1-2 MILS  SEE NOTES (7A), (9A), (10A), (11A), (12A), (28A) & (33A)		
	12	SAME AS LINE 10	SAME AS LINE 3	ONE COAT MIL-PRF-23236, TYPE V, CLASS 5 OR 7, 4-8 MILS/COAT  SEE NOTES (7A), (9A), (15A), & (28A)		SAME AS LINE 11		
TRUNK INTERIORS UNDER INSULATION ABOVE THE LOWER FLAT	13	SAME AS LINE ONE	SAME AS LINE 2	ONE COAT MIL-DTL-24441, TYPE IV, CONTRASTING COLOR, 4-6 MILS  SEE NOTES (7A), (15A), (28A), & (33A)				
	14	SAME AS LINE ONE	SAME AS LINE 3	ONE FULL COAT MIL-PRF- 23236, TYPE V, CLASS 5 OR 7, 4-8 MILS/COAT  SEE NOTES (7A), (15A), (28A), & (33A)				
MACHINERY SPACES (ENGINE ROOMS AND AUXILIARY MACHINERY ROOMS) UNINSULATED PRESSURE HULL	15	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 11	2 COATS DOD-E- 24607, 1-2 MILS/COAT  SEE NOTES (7A), (9A), (10A), (11A), (28A) & (33A)			
	16	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 12	SAME AS LINE 15			
MACHINERY SPACES (ENGINE ROOMS AND AUXILIARY MACHINERY ROOMS) PRESSURE HULL TO BE COVERED BY INSULATION	17	SAME AS LINE ONE	SAME AS LINE 2	SAME AS LINE 2				
	18	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 3				
DECKS WITHOUT COVERINGS	19	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, 2-4 MILS	ONE COAT MIL-DTL-24441, TYPE IV, 2-4 MILS				
	20	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 14				
	21	SAME AS LINE ONE	ONE COAT TT-P-645, F-84, 1-2 MILS  SEE NOTES (28A) & (33A)	2 COATS MIL-PRF-24635, 1-2 MILS/COAT  SEE NOTES (7A), (28A), & (33A)				

TABLE 7 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
DECKS WITH COVERINGS	22	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 2-4 MILS					
	23	SAME AS LINE ONE	SAME AS LINE 21					
ENSOLITE INSULATION (OVERCOAT)	24	DETERGENT WASH AND RINSE				2 COATS DOD-E-24607, 1-2 MILS/COAT  SEE NOTES (9A), (10A), (11A), (14A), (28A) & (33A)		
POLYIMIDE INSULATION (OVERCOAT)	25	SAME AS LINE 24				SAME AS LINE 24		
	26	SAME AS LINE 24				2 COATS MIL-PRF-24596, 1-2 MILS/COAT -OR- 2 COATS F-25A, 1-2 MILS/COAT  SEE NOTES (28A) & (33A)		
DRY VOIDS	27	SAME AS LINE ONE	SAME AS LINE 3	SAME AS LINE 14				
	28	SAME AS LINE ONE	SAME AS LINE 19	SAME AS LINE 19				

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
POTABLE WATER TANKS	1	NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 9, 4-8 MILS	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 9, 6- 10 MILS	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 9, 10-12 MILS			
SEE NOTES (31A) & (34A)		SEE NOTE (29A)	SEE NOTES (15A), (17A), (26A), & (39A)	SEE NOTES (15A), (26A), (37A), & (39A)	SEE NOTES (15A), (26A), (27A), & (39A)			
	2	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE III, F-150, 2-4 MILS	ONE STRIPE COAT MIL-DTL- 24441, TYPE III, 2-4 MILS	ONE COAT MIL-DTL- 24441, TYPE III, 2-4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, 2-4 MILS	ONE COAT MIL-DTL- 24441, TYPE III, F-152, 2-4 MILS DFT AT ADEQUATE THICKNESS TO MEET COATING RANGE	TOTAL SYSTEM 8 -12 MILS (ON AREAS WITHOUT STRIPE COAT)
			SEE NOTES (15A), (17A), & (21A)	SEE NOTES (15A), & (21A)	SEE NOTES (15A) & (21A)	SEE NOTES (15A) & (21A)	SEE NOTES (15A), (21A), & (27A)	SEE NOTE (22A)
RESERVE FEEDWATER TANKS	3	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE III, F-150, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL- 24441 TYPE III F-152, 2 - 4 MILS	ONE COAT MIL-DTL- 24441, TYPE III F-151, 2 - 4 MILS	ONE STRIPE COAT MIL-DTL-24441, TYPE III, F-150, 2 - 4 MILS	ONE COAT MIL-DTL- 24441 TYPE III F-152, 2 - 4 MILS	TOTAL SYSTEM 8 MILS MIN
SEE NOTES (31A) & (34A)			SEE NOTES (15A), (17A), & (21A)	SEE NOTES (15A) & (21A)	SEE NOTES (15A) & (21A)	SEE NOTES (15A) & (21A)	SEE NOTES (15A) & (21A)	
	4					<b>INTENTIONALLY LEFT BLANK</b>		
AUXILIARY TANKS, ACR HOLDING TANKS (MTS), DEPTH CONTROL TANKS, FORWARD TRIM/WRT TANKS, NFO EXPANSION TANK, SEAWATER EXPANSION TANK, SECONDARY SHIELD WATER OVERFLOW TANK (MTS), TRIM TANKS, UNHEATED WATER STORAGE TANK (MTS), WRT TANKS	5	SAME AS LINE ONE	"SINGLE COAT"  ONE COAT MIL-PRF-23236, TYPE VII, CLASS <b>18/7</b> , 20-30 MILS	"SINGLE COAT"  ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS <b>18/7</b> , 10-15 MILS				
			SEE NOTES (15A), (16A), (17A), (26A), (40A), & <b>(49A)</b>	SEE NOTES (15A), (26A), (37A), & <b>(49A)</b>				
BILGE AND DRAIN COLLECTION TANKS	6	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 10 - 12 MILS			
SEE NOTE (25A)			SEE NOTES (15A), (17A), & (26A)	SEE NOTES (15A), (26A), & (37A)	SEE NOTES (15A) & (26A)			
	7	<b>INTENTIONALLY LEFT BLANK</b>						
BOW TANK, BOW SONAR TANK, SONAR DOME AREA STEEL STRUCTURE (INCLUDES SONAR SPHERE, ITS SUPPORT STRUCTURE, AND FORWARD SIDE OF MBT BULKHEAD)	8	SAME AS LINE ONE	"SINGLE COAT"  ONE COAT MIL-PRF-23236, TYPE VII, CLASS <b>18/7</b> , 20-30 MILS	"SINGLE COAT"  ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS <b>18/7</b> , 10-15 MILS				
			SEE NOTES (17A), (18A), (19A), (26A), (40A), & <b>(49A)</b>	SEE NOTES (18A), (26A), (37A), & <b>(49A)</b>				

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
FUEL OIL OVERFLOW/COLLECTING TANK, FUEL OIL FILTER SUMP DRAIN TANK, ES DIESEL FUEL OIL TANK (MTS)	9	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4 - 6 MILS  SEE NOTES (17A) & (19A)	ONE STRIPE COAT MIL-DTL-24441, TYPE IV, 4 - 6 MILS	ONE COAT MIL-DTL-24441, TYPE IV, F-152 OR F-151, 4 - 6 MILS			
	10	SAME AS LINE ONE	ONE COAT MIL-PRF-23236 TYPE VI, CLASS 5, 4-8 MILS  SEE NOTES (17A) & (19A)	ONE STRIPE COAT MIL-PRF-23236 TYPE VI, CLASS 5, 4-8 MILS	ONE COAT MIL-PRF-23236 TYPE VI, CLASS 5, 4-8 MILS			
	11	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 18/5, 20-30 MILS</b>  <b>SEE NOTES (17A), (19A), (26A), (40A), &amp; (49A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 18/5, 10-15 MILS</b>  <b>SEE NOTES (26A), (37A), &amp; (49A)</b>				
<b>MAIN BALLAST TANKS ABOVE RESIDUAL WATER LINE; HIGH PRESSURE AIR FLASKS IN MBT'S, EMBT AIR FLASKS IN MBT'S</b>	12	<b>NEAR WHITE METAL BLAST, NACE 2/SSPC-SP 10</b>  <b>SEE NOTE (23A) &amp; (29A)</b>	<b>"SINGLE COAT"</b>  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 20-30 MILS  SEE NOTES (16A), (17A), (18A), (19A), (26A), (40A), & (49A)	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 10-15 MILS  SEE NOTES (18A), (26A), (37A), & (49A)				
MAIN BALLAST TANKS BELOW RESIDUAL WATER LINE	13	SAME AS LINE 12	SAME AS LINE 12	SAME AS LINE 12		2 COATS AF MIL-PRF-24647, 4-6 MILS/COAT, FROM BOTTOM CENTERLINE TO APPROXIMATELY 2' VERTICALLY ABOVE HEIGHT OF HIGHEST FLOOD LOUVER OVER A TACK COAT (1-2 MILS) MIL-DTL-24441 TYPE IV <b>OR (4-6 MILS) MIL-PRF-24647 PRIMER</b>  SEE NOTE (4A)		
	14	<b>INTENTIONALLY LEFT BLANK</b>						
	15	<b>INTENTIONALLY LEFT BLANK</b>						
<b>MAIN INDUCTION SUMP TANK, MISSILE COMPENSATING TANKS, AUXILIARY VARIABLE BALLAST TANKS, AND VARIABLE BALLAST TANKS</b>	16	SAME AS LINE ONE	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 20-30 MILS</b>  SEE NOTES (15A), (17A), (26A), (40A), & (49A)	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 10-15 MILS  SEE NOTES (15A), (26A), (37A), & (49A)				
TORPEDO IMPULSE TANKS	17	SAME AS LINE ONE	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (15A) & (17A),	ONE STRIPE COAT MIL-DTL-24441, TYPE IV, 4-6 MILS  SEE NOTES (15A) & (17A),	ONE COAT MIL-DTL-24441, TYPE IV, F-152 OR F-151, 4-6 MILS  SEE NOTES (15A) & (17A)			



TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
	18	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VI, CLASS 7, GRADE B OR C, 4-8 MILS  SEE NOTES (15A) & (17A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VI, CLASS 7, GRADE B OR C, 4-8 MILS  SEE NOTES (15A) & (17A)	ONE COAT MIL-PRF- 23236, TYPE VI, CLASS 7, GRADE B OR C, 4-8 MILS  SEE NOTES (15A) & (17A)			
	19	<b>INTENTIONALLY LEFT BLANK</b>						
<b>TORPEDO IMPULSE TANKS</b>	20	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  ONE COAT MIL-PRF-23236, TYPE VII, CLASS <b>18/7</b> , 20-30 MILS  SEE NOTES (15A), (17A), (19A), (26A), (40A), & <b>(49A)</b>	<b>"SINGLE COAT"</b>  ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS <b>18/7</b> , 10-15 MILS  SEE NOTES (15A), (26A), (37A), & <b>(49A)</b>				
SANITARY TANKS SANITARY FLUSHING TANKS	21	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 13, 4-8 MILS  SEE NOTES (15A), (17A), & (26A)	STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 13 6-10 MILS  SEE NOTES (15A), (26A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 13, 10-12 MILS  SEE NOTES (15A) & (26A)			
STEAM PLANT SURGE TANKS (MTS)	22	SAME AS LINE ONE	ONE COAT OF APEXIOR NO. 1 (DAMPNEY CO.), 2 - 4 MILS  SEE NOTE (47A)	ONE COAT OF APEXIOR NO. 1 (DAMPNEY CO.), 2 - 4 MILS  SEE NOTE (47A)				
WASTE OIL COLLECTING TANKS, WASTE OIL OVERFLOW TANKS, ENGINE ROOM OIL COLLECTION TANKS	23	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 5, 4 - 8 MILS  SEE NOTES (15A), (17A), & (26A)	ONE STRIPE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 6 - 10 MILS  SEE NOTES (15A), (26A), & (37A)	ONE COAT MIL-PRF- 23236, TYPE VII, CLASS 5, 10 - 12 MILS  SEE NOTES (15A) & (26A)			
	24	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 18/5, 20-30</b> <b>MILS</b>  <b>SEE NOTES (15A), (17A), (26A),</b> <b>(40A), &amp; (49A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS</b> <b>18/5, 10-15 MILS</b>  <b>SEE NOTES (15A), (26A),</b> <b>(37A), &amp; (49A)</b>				

TABLE 8 STEEL SURFACES  SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
FREE FLOOD AREAS AND RECESSES: INSIDE SURFACES OF FAIRWATER, UNDERSIDE OF SUPERSTRUCTURE, CHAIN LOCKERS (EXCEPT 726 CLASS), INTERIOR SURFACES OF STEEL DOMES, SHAFT TUBE INTERIOR SURFACES (WHEN SHAFT IS REMOVED), BOW DOME ACCESS FREE FLOOD AREA, BSY-1 RECESS (FR 29-30 STBD), 726 CLASS ACCESS SONAR DOME RECESS (FR 6-7 PORT), 726 CLASS SONAR SPHERE EXTERNAL SURFACES, 726 CLASS SONAR TRUNK EXTERNAL SURFACES, 726 CLASS SONAR DOME BHD (FR 4), 726 CLASS SONAR CAVITY (FR 6-8), 726 CLASS SONAR DOME ACCESS TRUNK (FR 6-7), CAPSTAN RECESS, SONAR PENETRATION SPLICE TRUNK RECESSES (PORT AND STBD), SONAR CABLE TRUNK, EMERGENCY TOWING PENDANT, BETWEEN BLADES COVER PLATES (BBCP) RECESS, 726 CLASS MSS RECESS AT BHD 4	25	SAME AS LINE ONE	"SINGLE COAT"  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 20-30 MILS  SEE NOTES (1A), (26A), (32A), (40A), & (49A)	"SINGLE COAT"  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 10-15 MILS  SEE NOTES (26A), (32A), (37A), & (49A)				
FREE FLOOD AREAS AND RECESSES: TORPEDO TUBE RECESS, AFT FREE FLOOD AREA (MUD TANK), EJECTION PUMP RECESS, SECONDARY PROPULSION MOTOR (SPM) RECESS, 726 CLASS CHAIN LOCKER, SSN688 CLASS BQN-17, BSY-1 OR AN/BBQ-10/V(1) RECESS (FR 14-15 PORT BOTTOM), 726 CLASS ANCHOR RECESS	26	SAME AS LINE ONE	SAME AS LINE 25	SAME AS LINE 25		2 AF COATS MIL-PRF-24647 TYPE I OR II 4 - 6 MILS PER COAT  SEE NOTE (4A)		
	27	INTENTIONALLY LEFT BLANK						
ALL OTHER FREE FLOOD AREAS, RECESSES <b>BELOW</b> WATERLINE (APPLIES TO FREE FLOOD AREAS, RECESSES, AND VOIDS NOT LISTED ELSEWHERE IN THIS TABLE)	28	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 4 - 8 MILS  SEE NOTES (16A), (17A), (26A), & (36A)	ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 6 - 10 MILS  SEE NOTES (26A) & (37A)	ONE COAT MIL-PRF-23236, TYPE VII, CLASS 7, 10 - 12 MILS  SEE NOTES (26A) & (32A)	SAME AS LINE 26		
ALL OTHER FREE FLOOD AREAS, RECESSES ABOVE WATERLINE (APPLIES TO FREE FLOOD AREAS, RECESSES, AND VOIDS NOT LISTED ELSEWHERE IN THIS TABLE)	29	SAME AS LINE ONE	"SINGLE COAT"  ONE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 20-30 MILS  SEE NOTES (16A), (17A), (26A), (32A), (40A), & (49A)	"SINGLE COAT"  ONE STRIPE COAT MIL-PRF-23236, TYPE VII, CLASS 18/7, 10-15 MILS  SEE NOTES (26A), (32A), (37A), & (49A)				
	30	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4 - 8 MILS -OR- ONE COAT MIL-DTL-24441 TYPE IV, F-150, 4-6 MILS -OR- ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTES (16A) & (17A)	ONE STRIPE COAT MIL-PRF-23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4 - 8 MILS -OR- ONE STRIPE COAT MIL-DTL-24441 TYPE IV, F-153, 4-6 MILS -OR- ONE AC STRIPE COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS	ONE COAT MIL-PRF-23236, TYPE IV, V, OR VI, CLASS 5 OR 7, 4 - 8 MILS -OR- ONE COAT MIL-DTL-24441 TYPE IV, 4-6 MILS -OR- ONE AC COAT MIL-PRF-24647, TYPE I OR II, 4-6 MILS  SEE NOTE (32A)			

TABLE 8 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E	F	G TOTAL
	31	<b>INTENTIONALLY LEFT BLANK</b>						
CLEAN FUEL OIL, HYDRAULIC OIL, LUBE OIL SLUDGE AND HYDROPHONE TANKS	32	POWER TOOL CLEAN, SSPC-SP 3  SEE NOTE (29A)	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS  SEE NOTES (15A), (17A), & (20A)	MIL-DTL-24441, TYPE IV, F- 152 OR F-151, 4-6 MILS  SEE NOTE (15A)				
	33	COMMERCIAL BLAST, SSPC-SP 6 OR POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTES (20A) & (29A)						
NORMAL FUEL OIL (688 CLASS ONLY; FROM BASELINE TO 4 FEET ABOVE BASELINE)	34	COMMERCIAL BLAST, SSPC-SP 6 OR POWER TOOL CLEAN TO BARE METAL SSPC-SP 11  SEE NOTES (20A), (29A) & (30A)						
<b>PAINTED NORMAL FUEL OIL</b>	34A	<b>SAME AS LINE ONE</b>	<b>"SINGLE COAT"</b>  <b>ONE COAT MIL-PRF-23236,</b> <b>TYPE VII, CLASS 18/7, 20-30</b> <b>MILS</b>  <b>SEE NOTES (15A), (16A), (17A),</b> <b>(26A), (40A), &amp; (49A)</b>	<b>"SINGLE COAT"</b>  <b>ONE STRIPE COAT MIL-PRF-</b> <b>23236, TYPE VII, CLASS</b> <b>18/7, 10-15 MILS</b>  <b>SEE NOTES (15A), (26A),</b> <b>(37A), &amp; (49A)</b>				
TANK MANHOLE COVERS	35	SAME AS LINE ONE	ONE COAT MIL-PRF-23236, TYPE VIII --OR-- USE APPROVED COATING SYSTEM SPECIFIED FOR TANK OR FREEFLOOD  SEE NOTES (15A), (21A), (26A), (31A), & (48A)					
FREEFLOOD ACCESS COVERS	36	SAME AS LINE ONE	2 COATS AC MIL-PRF-24647, TYPE I OR II, 4-6 MILS/COAT  <b>SEE NOTE (32A)</b>			2 AF COATS MIL-PRF- 24647, TYPE I OR II, 4-6 MILS PER COAT  SEE NOTES (2A), (3A), (4A), (7A), & (32A)		
	37	SAME AS LINE ONE	TWO COATS MIL- PRF-23236, TYPE IV, V, OR VI CLASS 5 OR 7, 4-8 MILS/COAT  <b>SEE NOTE (32A)</b>			SAME AS LINE 36		
	38	<b>SAME AS LINE ONE</b>	ONE COAT MIL-DTL-24441, TYPE IV, F-150, 4-6 MILS --- & --- ONE COAT MIL-DTL-24441, TYPE IV, F-151 OR F-152, 4-6 MILS  <b>SEE NOTE (32A)</b>			SAME AS LINE 36		

TABLE 9 STEEL SURFACES SUBMARINES	LINE	A SURFACE PREPARATION	B PRIMER	C	D	E BULKHEADS AND OVERHEADS	F THERMAL INSULATION	G
INTERIOR SURFACES OF RUDDERS, PLANES, STABILIZERS (SYNTACTIC FILLED VOIDS)	1	HAND TOOL CLEAN, SSPC-SP 2	2 COATS TT-P-645 F-84 (PRIMER), 1-2 MILS / COAT	ONE COAT MIL-DTL-24441, TYPE IV, 4-6 MILS				
	2	SAME AS LINE ONE	SAME AS LINE ONE	ONE COAT PRIMER MIL-PRF-23236, TYPE <i>IV, V, OR VI</i> , 4-6 MILS				

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-33  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Rotating Electrical Equipment; rewind

2. REFERENCES:

2.1 Standard Items

2.2 Equipment Technical Manual

2.3 S9086-KC-STM-010/CH-300, Electric Plant - General

2.4 S9086-KE-STM-000/CH-302, Electrical Motors and Controllers

2.5 S9086-KN-STM-010/CH-310, Electrical Power Generators and Conversion Equipment

2.6 S9086-HN-STM-010/CH-244, Propulsion Bearings and Seals

2.7 S6260-BJ-GTP-010, Electrical Machinery Repair, Electric Motor Repair, Shop Procedures Manual

2.8 S9310-AC-HBK-010, Commutator/Slip Ring Maintenance Handbook

2.9 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety

3. REQUIREMENTS:

3.1 Accomplish preliminary repair preparations as follows:

3.1.1 Prior to disconnecting equipment:

3.1.1.1 Record and retain electrical hook-up data. Record and retain air gap readings. Record and retain bearing clearances for sleeve bearing equipment only.

3.1.1.2 Inspect couplings for cracks, broken segments, wear, and misalignment in excess of tolerances specified in 2.2.

3.1.2 Disconnect the equipment electrically and mechanically, using 2.2 for guidance.

3.1.2.1 Matchmark, identify, and retain chocks, shims, shock mounts, sound damping pads, and other accessories associated with equipment.

3.1.2.2 Record shaft thrust and run out readings.

3.2 Remove equipment including rotating components connected directly to the shaft.

3.3 Inspect foundations for cracks, areas of distortion, and deterioration in excess of 25 percent of the thickness of each member of the structure.

3.4 Submit one legible copy, in electronic media, of a report listing inspection results, missing parts, defective parts, and measurements taken in 3.1 and 3.3 to the SUPERVISOR.

3.5 Matchmark, disassemble and inspect the equipment removed in 3.2, using 2.2 through 2.7 for guidance.

3.5.1 Accomplish a core loss test prior to winding removal in accordance with Paragraphs 300-4.5.6 and 300-4.5.6.1 of 2.3. Record data.

3.5.1.1 Inspect for hot spots in accordance with the Core Loss Tester Instruction Manual.

3.5.1.2 Conduct a loop test in accordance with Paragraph 300-4.5.6.1.2 of 2.3 when core indicates a marginal satisfactory reading or when test equipment does not directly support equipment being subjected to testing.

3.5.2 Remove each winding, using Paragraph 300-4.5.7.2 of 2.3 for guidance for winding removal and 2.7 for core inspection.

3.5.2.1 Verify the temperature limitations of the core material prior to exercising the burnout oven option.

3.5.2.2 Record winding data. Verify conformance of recorded data to the manufacturer's winding data.

3.5.2.3 Accomplish a core loss test after winding removal in accordance with Paragraph 300-4.5.6 and 300-4.5.6.1 of 2.3. Record data.

3.5.2.4 Inspect for hot spots in accordance with the Core Loss Tester Instruction Manual.

3.5.2.5 Conduct a loop test in accordance with Paragraph 300-4.5.6.1.2 of 2.3 when core indicates a marginal satisfactory reading or when test equipment does not directly support equipment being subjected to testing.

3.5.2.6 Dip core iron in a 20 percent solution of varnish MIL-I-24092 and dry. In localities where MIL-I-24092 does not meet state and local Air Pollution Control District (APCD) standards, spray the iron core with a clear air-drying varnish.

3.5.3 Protect machined surfaces and clean the equipment housing exterior, fan(s), core iron, and interior and exterior of end bells to bare metal.

3.5.3.1 Prime equipment housing, fan(s), and end bells with one coat F-84 Alkyd Zinc Molybdate TT-P-645 (1.5 mils dry film thickness).

3.6 Inspect non-wound rotors for loose or cracked bars, localized overheating, and rubbing. Inspect wound rotors, slip ring leads, and armatures for insulation damage and burns/hot spots. Inspect for loose coils and slot wedges. Inspect slip rings and commutators for damage and for wear limits, using 2.2 for criteria. Record data.

3.7 Inspect and dimensionally measure end bells, frame, rabbet fits, shaft, sleeve and pedestal bearings, keyways, fan and running surfaces for wear, eccentricity, and other defects, using 2.2 for accept or reject criteria, and 2.6 for location and type of measurements to be taken. Record data.

3.8 Inspect brush rigging for cracks, chips, worn areas, distortion, spring condition, and insulating material for cracks and arc paths. Record data.

3.9 Accomplish commutator pre-installation and post-installation test, using Table 300-3-9 of 2.3 for guidance. Record data.

3.10 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.5 through 3.9 to the SUPERVISOR.

3.11 Rewind the equipment in accordance with Original Equipment Manufacturer's (OEM) "for Navy use" winding data.

3.11.1 Do not permanently connect winding until after successful completion of testing of 3.11.3 through 3.11.6.

3.11.2 Material shall conform to:

3.11.2.1 Magnet wire, National Electrical Manufacturers Association (NEMA) MW-1000, Table MW 16 (round wire), or NEMA MW-1000, Table MW 20 (rectangular wire), or equivalent to OEM original

3.11.2.2 Slot and phase insulation, **NEMA FI-3-2004**

3.11.2.3 Slot wedge-spacers and fillers, MIL-I-24768/17

3.11.2.4 Lead wire, stranded, MIL-DTL-16878

3.11.2.5 Glass banding, MIL-I-24178

3.11.2.6 New temperature detectors in accordance with 2.2

(V) "INSULATION RESISTANCE TEST"

3.11.3 Accomplish 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.3 for guidance.

(V) "DC RESISTANCE TEST"

3.11.4 Accomplish a DC resistance test of windings, using a Wheatstone or Kelvin bridge, or with an ohmmeter capable of resolving one milliohm (0.001 ohm). Record phase balance for multi-phase equipment, using Paragraph 5.22 of 2.7 for guidance.

(V) "VOLTAGE SURGE TEST"

3.11.5 Accomplish a voltage surge test in accordance with Paragraphs 300-3.5.4 through 300-3.5.5 of 2.3.

(V) "DC HI POT TEST"

3.11.6 Accomplish a DC HI POT test in accordance with Paragraph 300-3.5.2 through 300-3.5.2.3.4 of 2.3.

3.12 Permanently connect the windings.

3.12.1 Repeat tests described in 3.11.3 through 3.11.6.

(V) "BAR-TO-BAR TEST"

3.12.2 Accomplish DC bar-to-bar test on commutators after making coil connections to the risers in accordance with Paragraph 300-4.7.11.2 of 2.3.

(V) "VARNISH TEMPERATURE, VISCOSITY, AND GEL TIME TESTS"

3.13 Select the proper insulation process based on winding insulation classifications and to meet state or local air pollution standards. Application of a sealed insulation system by vacuum pressure impregnation shall be by a NAVSEA-certified repair facility. (See 4.4)

3.13.1 Select varnish methods and material, using Paragraphs 300-4.5.8 through 300-4.5.8.9 of 2.3 for guidance.

3.13.1.1 Maintain the varnish in accordance with Paragraphs 300-4.5.8.3 through 300-4.5.8.3.3 of 2.3 and the varnish manufacturer's instructions.



3.13.1.2 Maintain a current revision of the varnish manufacturer's instructions on storage, maintenance, and use of the type of varnish to be applied.

3.13.1.3 Maintain a record of varnish temperature, viscosity, and, for solventless varnish, gel time tests. Tests must show varnish is within varnish manufacturer's recommendations and have been accomplished in the intervals specified by the varnish manufacturer. The record must also show the varnish is being stored as recommended by the varnish manufacturer.

3.14 Varnish windings in accordance with Paragraphs 300-4.5.8.2 of 2.3 and the varnish manufacturer's instructions.

3.14.1 Do not immerse the leads.

3.14.2 Wipe surfaces that affect assembly such as rabbet fits and mounting flanges with a cloth moistened with a solvent after draining and before baking.

3.15 Remove excess varnish runoff from the component locations described in 3.14.2 after final baking. Apply a thin coat of air-dry varnish to metal surfaces exposed by the removal process in accordance with Paragraphs 300-4.5.8.5 and 300-4.5.8.6 of 2.3.

3.16 Repeat tests described in 3.11.3 through 3.11.6. Record data.

3.17 Accomplish an AC HI POT test in accordance with Paragraphs 300-3.5.3 through 300-3.5.3.2.9 of 2.3. Record data.

3.18 Accomplish a 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.3 for guidance. Record data.

3.19 Measure resistance value of each winding temperature detector, using a low voltage ohmmeter. Record data.

3.20 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.16 through 3.19 to the SUPERVISOR.

3.21 True the commutator or collector rings. Eccentricity shall not exceed the requirements of 2.8. Resurface or machine each individual collector ring to the same exact diameter to allow symmetrical brush holder to ring clearance spacing. Ensure metal shavings are not permitted to contaminate the rotor or stator assembly.

3.21.1 Each cut shall not exceed 0.010 inch. Finish thickness shall not be less than design wear tolerance as shown in 2.2.

3.21.2 Undercut the mica between the commutator bars with the edge of the mica not exceeding a depth of 5/64-inch below the bars.

3.21.3 Chamfer the bar edges and remove rough surfaces in accordance with Paragraph 5-2-4 of 2.8.

3.21.4 Burnish the commutator with a very fine commercial burnishing stone conforming to A-A-58052. Polish collector rings to a mirror finish.

3.22 Accomplish the requirements of 009-15 of 2.1 for each rotating assembly.

3.23 Accomplish the following for the brush rigging:

3.23.1 Disassemble the brush rigging.

3.23.2 Remove foreign matter.

3.23.3 **Replace** existing cadmium-plated parts with zinc in accordance with ASTM A 153.

3.23.4 Recondition threads of plated parts.

3.23.5 Assemble brush rigging.

3.24 Install identification markers on wiring in the external connection box.

3.24.1 Markers shall be aluminum wrap-around type with metal stamped or embossed markings.

3.25 Repair lightly scored areas of frame, end bells, and shaft by manual methods. Recondition threads and fit key to keyway. Step keys shall not be used.

3.25.1 Apply a thin coat of petrolatum to unpainted mating surfaces except for explosion-proof motors that shall have clean, dry mating surfaces.

3.26 Prepare and refinish equipment. Protect machine surfaces, windings, and nameplates from being painted or otherwise damaged.

3.26.1 Accomplish the requirements of 009-32 of 2.1 for each housing, fan, and interior and exterior of each end bell.

3.27 Accomplish the requirements of 009-32 of 2.1 for the foundations of the equipment removed in 3.2.

3.28 Accomplish the following on equipment having other than sleeve-type bearings unless otherwise specified in the invoking Work Item, using 2.7 for guidance.

3.28.1 Except as indicated in 3.28.1.1, install new bearings, seals, fittings, lock washers, and locknuts conforming to 2.2, using 2.6 and Chapter 6 of 2.7 for guidance.

3.28.1.1 Install Type 111, Class 8 (double seal) bearings in motors meeting the criteria identified in Chapter 6 of 2.7. Only double seal bearings identified in Chapter 6 of 2.7 are acceptable for this use.

3.28.1.2 For vaneaxial and tubeaxial fan motors not meeting the criteria of Chapter 6 of 2.7, if not originally furnished or already accomplished during previous repair, install Type 111, Class 8 (double seal) bearings with a C3 (greater than normal) radial internal clearance in place of the Type 111 bearing originally furnished. Install Type 120 bearings in vaneaxial and tubeaxial fan motors originally furnished with Type 120 bearings.

3.28.1.3 Install new label plates with the inscription "DO NOT LUBRICATE" on equipment using double seal bearings (Type 111, Class 8 or Type 120).

3.28.1.4 For equipment converted from re-lubricable bearings to double seal bearings, install pipe plugs on all grease fills and drains.

3.28.2 For equipment not using double seal bearings, lubricate bearings with grease conforming to DOD-G-24508 as required in Paragraphs 244-1.7.7.2 and 244-1.7.7.3 of 2.6.

3.29 Assemble the equipment disassembled in 3.5, using 2.2 through 2.7 for guidance.

3.29.1 Do not use materials containing silicone in the repair and reassembly of equipment with commutator or collector rings.

3.29.2 Install new fasteners conforming to MIL-DTL-1222, Type I or II, Grade 5, zinc coated.

3.29.3 Fasteners requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.29.4 Install new gaskets on covers, inspection plates, and between the external connection box and the frame. Gaskets shall conform to MIL-PRF-1149 unless otherwise specified in 2.2.

3.29.5 Set brush holders not less than 1/16-inch or more than 1/8-inch from commutator or collector rings unless otherwise specified in 2.2.

3.29.6 Set brush holders in electrical neutral plane and stagger brushes for maximum coverage of the commutator, in accordance with Paragraph 300-4.7.7.1.10 of 2.3.

3.29.7 Center the brush holder over the collector rings.

3.29.7.1 Ensure the brushes do not extend beyond the edge of the collector rings.

3.29.8 Install new brushes in accordance with 2.2. Sand new brushes to fit curvature of the commutator or collector rings, using Paragraphs 4-4-4.2 through 4-4-4.4 of 2.8 for guidance.

3.29.8.1 Brushes shall have a surface contact of 100 percent and shall not be chipped, cracked, or broken.

3.29.8.2 Remove sand, carbon, and other foreign matter resulting from fitting new brushes.

3.29.9 Adjust spring tension of brushes in accordance with 2.2.

3.29.10 Adjust air gap as specified in 2.2, plus or minus 10 percent.

3.29.11 Rotate shaft by hand a minimum of 3 revolutions. Rubbing or binding of rotating assembly not allowed.

3.29.12 Install label plates conforming to MIL-DTL-15024 for those found to be missing or damaged.

(V) "NO-LOAD SHOP TEST"

3.30 Accomplish a no-load shop test of the motor for a minimum of one-half hour.

3.30.1 Verify proper direction of rotation.

3.30.2 After one-half hour, record current and voltage in each phase, speed and bearing temperature rise measured on the equipment's exterior near each bearing.

3.30.3 Submit one legible copy, in electronic media, of the recorded data to the SUPERVISOR.

3.31 Install equipment removed in 3.2.

3.31.1 Remove existing and install new foundation fasteners conforming to MIL-DTL-1222, Type I or II, Grade 5, zinc coated, and self-locking hexagon nuts conforming to NASM-25027, excluding body-fitted bolts and studs.

3.31.2 Remove existing galled or distorted body-fitted bolts and studs and install new fitted bolts and studs conforming to MIL-DTL-1222, Type I, Grade 5.

3.31.3 Fasteners, body-fitted bolts, and studs requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.31.4 Align equipment in accordance with 2.2. Measure and record facial and peripheral coupling data.

3.31.4.1 Install chocks, shims, shock mounts, and sound damping pads.

3.31.4.2 Accomplish the requirements of 009-58 of 2.1 for driver and pump shafts.

3.31.5 Connect electrical cables to equipment, using data retained in 3.1.1.1.

3.31.6 Bond and ground equipment in accordance with 2.9, using new ground straps.

3.31.7 Rotate shaft by hand a minimum of 3 revolutions. Rubbing or binding of rotating assembly not allowed.

3.31.8 Measure and record the air gap and bearing clearance (sleeve bearing equipment only), insulation resistance (at 500 volts DC), and thrust.

(V)(G) "OPERATIONAL TEST"

3.32 Accomplish an operational test of the equipment at full nameplate load or maximum system capacity for a minimum of one hour after temperatures stabilize, unless otherwise specified in the invoking Work Item.

3.32.1 Verify proper direction of rotation.

3.32.2 Verify/establish oxide film coating of the commutator/collector rings, using 2.8 for guidance.

3.32.3 Record current, voltage, frame and bearing temperature rise, and speed at 15-minute intervals.

3.32.3.1 Bearing temperatures shall not exceed 180 degrees Fahrenheit unless otherwise specified in the invoking Work Item/equipment technical manual.

3.32.4 Measure and record hot insulation resistances of windings to ground immediately upon completion of test, using a 500-volt megger.

3.33 Submit one legible copy, in hard copy or electronic media, of a report listing data recorded in 3.31.4, 3.31.8, 3.32.3, and 3.32.4 to the SUPERVISOR.

#### 4. NOTES:

4.1 Equipment technical manual and drawings will be listed in the invoking Work Item.

4.2 Shop test of generator will be addressed in the invoking Work Item.

4.3 The use of silicone is not allowed on any rotating electrical machinery containing brushes.

4.4 For the current list of NAVSEA-certified facilities for Vacuum Pressure Insulation (VPI) Sealed Insulation Systems, contact Naval Surface Warfare Center Carderock Division, Department 934, Phone (215) 897-7245.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-34  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Fire Protection of Unmanned **Vessels** at Contractor's Facility;  
provide

2. REFERENCES:

2.1 NFPA Standard 312, Standard for Fire Protection of Vessels During  
Construction, Repair, and Lay-up

2.2 29 CFR Part 1915, Occupational Safety and Health Standards for  
Shipyard Employment

3. REQUIREMENTS:

3.1 Provide fire protection in accordance with the requirements of 2.1 and  
2.2 and this item.

3.2 Maintain available for review, prior to commencement of work, a fire  
safety plan meeting the requirements of 2.2. In addition to the requirements  
of 2.2, the plan shall include and identify the method for reporting fires,  
the shipyard fire fighting facilities, equipment, and organization (paid or  
volunteer), the procedures for maintenance of clear fire lanes in the shipyard  
and on the piers, and the nearest municipal fire fighting organization,  
including the anticipated time of response.

3.3 Provide fire protection equipment consisting of:

3.3.1 Fire-fighting water, utilizing manifolds connected to a source  
capable of providing 150 GPM at 60 PSIG at the manifold shall be in place  
before start of work.

3.3.1.1 The number of manifolds shall be sufficient to permit  
reaching all points on the vessel (including underwater body when the vessel  
is in dry dock or on a marine railway) with 2, 1-1/2 inch hoses of not more  
than 100 feet in length.

3.3.1.2 Hoses shall be attached to the manifolds and fitted  
with an all-purpose combination fog and straight stream nozzle.

3.3.1.3 Verify by the Pitot tube method or an in-line flow meter that the water volume and pressure meets these requirements.

4. NOTES:

4.1 None.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-35  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Confined Space Entry, Certification, Fire Prevention Utilizing Military Fire Watches, and Housekeeping; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

2.3 29 CFR Part 1910.134, Occupational Safety and Health Standards, Respiratory Protection

2.4 NFPA Standard 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

2.5 NFPA Standard 312, Standard for Fire Protection of Vessels During Construction, Repair, and Lay-up

3. REQUIREMENTS:

3.1 Comply with the requirements of 2.2 through 2.5 and this item to determine whether or not an explosive or other dangerous atmosphere exists in tanks, spaces, and associated piping, including adjacent tanks, spaces, and piping aboard the ship and control hot work and entry to those spaces to preclude damage to the ship or injury to personnel during the accomplishment of this Job Order.

3.1.1 Submit one legible copy, in electronic media, of a list of tanks or spaces to be opened or certified to the SUPERVISOR at least 24 hours prior to commencement of work.

3.1.1.1 Comply with additional requirements of 009-88 of 2.1 when accomplishing work in Collection, Holding and Transfer (CHT) and Mogas tanks, spaces, or associated piping.

3.1.2 Provide initial and annual update training for Competent Persons by utilizing a National Fire Protection Association (NFPA) Certified

Marine Chemist or NFPA training program meeting the requirements of Section 1915.7 of 2.2. The length of the initial training class shall be at least 24 hours. Annual update training shall be at least 8 hours.

3.1.3 Post a copy of the Marine Chemist's certificate (MCC), Certified Industrial Hygienist's test/inspection record, or Competent Person's test/inspection record at each access to the affected space while work in the space is in progress. A copy of the MCC or test/inspection record shall also be delivered to a location designated by the SUPERVISOR. In the event that the space is found to be NOT SAFE FOR WORKERS/NOT SAFE FOR HOT WORK, the space shall be posted accordingly and the SUPERVISOR and ship shall be notified immediately. The posted copy shall be clearly visible and legible.

3.1.3.1 Initial certification of spaces that require a Certified MCC or Certified Industrial Hygienist's test/inspection record in support of work operations shall be effective until conditions change which would void the certificate or test/inspection record.

3.1.3.2 For those certified spaces which employees will enter, a Competent Person shall visually inspect and test each space certified as ENTER WITH RESTRICTIONS or SAFE FOR WORKERS as often as necessary, and as a minimum, prior to entry by employees on a daily basis. If a space is not to be entered on any given day, it is not required to be inspected and tested by a Competent Person. The initial MCC remains valid if conditions have not changed, unless noted on the MCC.

3.1.3.3 For those certified spaces affected by hot work, a Competent Person shall visually inspect and test each space certified as SAFE FOR HOT WORK as often as necessary and, as a minimum, daily prior to commencement of hot work to ensure that conditions established by the certificate are maintained. When hot work is continuous, the affected spaces shall be visually inspected, tested, and recorded on a daily basis to maintain the SAFE FOR HOT WORK certification.

3.1.3.4 If a Competent Person finds that the conditions within a certified space fail to meet the applicable requirements for which it was certified, work in the space shall be stopped and may not be resumed until the space has been recertified by a Marine Chemist.

3.1.3.5 For those spaces where only Competent Person tests and inspections are required in accordance with 2.2, a Competent Person shall visually inspect and test each space as often as necessary and, as a minimum, daily prior to entry or commencement of hot work to ensure that conditions are safe.

3.1.3.6 After the Competent Person has determined initially that a space is safe for entry and finds subsequently that the conditions within the tested space fail to meet the requirements of 2.2, work shall be stopped until the conditions in the tested space are corrected, the space is retested, and a new record of tests/inspections is recorded and posted.

3.1.4 Tank cleaning personnel shall be trained annually on safety practices to include a discussion of safety information found in Subparts A, B, and Section 1915.152 of Subpart I of 2.2.

3.1.5 Maintain current copies of the documents listed in 3.1.5.1 through 3.1.5.4 for reference by the SUPERVISOR. Submit one legible copy, in electronic media, of specific documents when requested by the SUPERVISOR.

3.1.5.1 A roster of designated Competent Persons, along with contractor certification that the training in 3.1.2 has been completed within the past year. Updates to the roster each time Competent Persons are added, deleted, or retrained.

3.1.5.2 A list of Competent Person(s) and tank cleaning personnel who will enter or work in confined spaces, including company name, badge number, and date training was provided in accordance with 3.1.2 and 3.1.4.

3.1.5.3 A list of the names of the Shipyard/Plant Rescue Team Members, along with contractor certification that training requirements of Subpart B of 2.2 have been accomplished and are current for each Rescue Team Member, or documentation of arrangements made for an outside rescue team to respond promptly to a request for rescue service in a contractor facility. At a naval facility, the Navy will respond.

3.1.5.4 Describe the manner by which the requirements for fire watches shall be implemented using Ship's Force personnel, including the manner in which the ship's Commanding Officer's designated representative will be notified in case of absence of the assigned fire watch.

3.1.5.5 Train Ship's Force personnel to be utilized as fire watches in accordance with the requirements of 2.2 and 2.4, including steps to be taken by the fire watch and hot work operator prior to accomplishment of hot work, proper selection and use of fire extinguishing equipment and other safety equipment, relationship between the fire watch and hot work operator, proper fire reporting procedures and other sounding of fire alarms, and reporting of fires to the ship's Quarterdeck. This training shall include theory and practical (hands-on) fire suppression techniques. This training shall be provided to all newly assigned fire watches, with annual updates provided to personnel. Ship's Force shall be provided with a visible means of identifying trained fire watches, i.e., badge, sticker, vest, etc.

3.1.6 Spaces that are determined to contain Immediately Dangerous to Life or Health (IDLH) atmospheres shall never be entered except for emergency rescue or for short duration for installation of ventilation equipment in accordance with 2.2 and 2.3. When entering IDLH spaces for the purpose of installing ventilation, notify the SUPERVISOR prior to entry. Notifications of rescue shall be made as soon as possible.

3.1.7 Confirm that all personnel have exited the space prior to closure of tanks, voids, and cofferdams. Designate one person to account for all personnel who may have entered the space.

3.2 Provide a written notice for each job or separate area of hot work aboard ship.

3.2.1 The notice shall state a description of the work to be done, the specific location of the hot work and compartments adjacent to decks, bulkheads, and similar structures upon which hot work is to be accomplished, the time hot work will commence, current gas-free status of the area (if required), the absence or existence of combustible material within 35 feet in any direction of the operation (or further, if affected by the operation), and if combustible material exists, what action shall be taken to protect the material from fire, the provision and assignment of a fire watch, and the affirmation that conditions at the work site (ventilation, temporary lighting, accesses) permit the fire watch(es) to have a clear view of and immediate access to all areas included in the fire watch.

3.2.2 The notice shall affirm that a suitable, fully-charged fire extinguisher shall be available at the job site and provide for an inspection of the area 30 minutes after completion of the hot work or the cessation of hot work at the job site unless the contractor's Hot Work Supervisor surveys the affected work area and determines that there is no further fire hazard as the final action to complete the notice.

3.2.3 The notice shall be signed by a supervisor specifically designated as responsible for coordination of the hot work and the fire watch requirement.

3.2.4 One copy of each notice shall be given to the SUPERVISOR and one copy to the Commanding Officer's designated representative, and at a minimum, one copy of each notice shall also be conspicuously posted at the location where the hot work is being accomplished.

3.2.4.1 The notice to the Commanding Officer's designated representative shall precede the initiation of the actual hot work in order to permit the Commanding Officer to designate a member of the crew to observe the operation, if desired.

3.2.4.2 Deliver written notification of hot work planned Tuesday through Friday to the Commanding Officer's designated representative at least 30 minutes and not more than 24 hours preceding start of work.

3.2.4.3 Deliver written notification of hot work planned over a weekend or Monday following that weekend to the Commanding Officer's designated representative no later than 0900 on the Friday immediately preceding that weekend.

3.2.4.4 Deliver written notification of hot work planned on a federal holiday and on the day following the federal holiday to the Commanding Officer's designated representative no later than 0900 of the last working day preceding the federal holiday.

3.2.4.5 The notice shall be effective for 24 hours unless a shorter period is specified in the contract or the gas-free status of the work area or system requires stopping the work. A new notice is required if work is interrupted due to loss of gas-free status.

3.3 Request sufficient fire watches from Ship's Force to provide fire watches at all affected areas where hot work is being accomplished. Provide each Ship's Force fire watch with fire extinguishing equipment as described in 2.2, 2.4, and 2.5. Fire watches and equipment shall meet the following requirements, as a minimum:

3.3.1 A fire watch must be posted if during hot work any of the following conditions are present:

3.3.1.1 Slag, weld splatter, or sparks might pass through an opening and cause a fire.

3.3.1.2 Fire-resistant guards or curtains are not used to prevent ignition of combustible materials on or near decks, bulkheads, partitions, or overheads.

3.3.1.3 Combustible material closer than 35 feet (10.7 meters) to the hot work in either the horizontal or vertical direction cannot be removed, protected with flame-proof covers, or otherwise shielded with metal or fire-resistant guards or curtains.

3.3.1.4 The hot work is carried out on or near insulation, combustible coatings, or sandwich-type construction that cannot be shielded, cut back, or removed, or in a space within a sandwich-type construction that cannot be inerted.

3.3.1.5 Combustible materials adjacent to the opposite sides of bulkheads, decks, overheads, metal partitions, or sandwich-type construction may be ignited by heat conduction or radiation.

3.3.1.6 The hot work is close enough to cause ignition through heat conduction or radiation on the following: (a) insulated pipes, bulkheads, decks, partitions, or overheads; or (b) combustible materials and/or coatings.

3.3.1.7 The hot work is close enough to unprotected combustible pipe or cable runs to cause ignition.

3.3.1.8 A Marine Chemist or a Competent Person, as defined in 2.2, requires that a fire watch be posted.

3.3.1.9 Equipment cannot be protected from falling sparks.

3.3.1.10 Ducts and conveyor systems cannot be blanked off, protected, or shut down.

3.3.2 Each fire watch attending worker(s) accomplishing hot work shall be equipped with a fully-charged and operable fire extinguisher, and shall remain at the job site for 30 minutes from the time the hot work is completed unless the contractor's Hot Work Supervisor surveys the affected work area and determines that there is no further fire hazard.

3.3.2.1 The fire watch shall not accomplish other duties while hot work is in progress.

3.3.2.2 In the event that the fire watch leaves his/her post without permission of the person accomplishing the hot work, stop the hot work and immediately report the absence of the fire watch to the ship's fire watch division. Do not resume hot work until a fire watch is assigned and on station.

3.3.3 Where several workers are accomplishing hot work at one site, the fire watch shall have a clear view of and immediate access to each worker accomplishing hot work.

3.3.3.1 No more than 4 workers shall be attended by a single fire watch.

3.3.4 In cases in which hot material from hot work may involve more than one level, as in trunks and machinery spaces, a fire watch shall be stationed at each level unless positive means are available to prevent the spread or fall of hot material.

3.3.5 In cases where hot work is to be accomplished on a bulkhead or deck, combustible material shall be removed from the vicinity of the hot work on the opposite side of the bulkhead, overhead, or deck, and a fire watch shall be posted at each location.

3.3.5.1 If multiple blind compartments are involved in any hot work job, fire watches shall be posted simultaneously in each blind area.

3.4 Locate oxygen, acetylene, fuel gas, or gas supply systems off the ship. Manifolds connected to pierside supply systems may be placed on board ships as long as they are located on a weather deck and equipped with a shutoff valve located on the pier. The pierside shutoff valve shall be in addition to the shutoff valve at the inlet to each portable outlet header required by 2.2.

3.4.1 ***Fuel gas and oxygen hoses must be positively identified by durable unique markings at each end of the hose.***

3.4.2 Liquid oxygen (LOX) tanks used for fuel gas/oxygen operations shall be stored to prevent collisions by trucks, forklifts, falling objects, etc.

3.4.3 LOX tanks shall be staged in designated locations on the quay wall/pier to be determined jointly by the contractor, Ship's Force, and the SUPERVISOR.

3.4.4 When gas cylinders are in use on board ship, they shall be located on the weather decks or in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR and shall be secured and in an upright position. The number of in-use cylinders shall be limited to those which are required for work in progress and which have pressure regulators connected to the cylinder valves. On-board reserve gas cylinders shall not exceed one-half the number of in-use cylinders and shall be located in a remote area of the weather decks or in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR. Reserve acetylene cylinders shall be secured in an upright position.

3.4.5 When not in use, gas cylinders and manifolds on board shall have valves closed, lines disconnected, protective cover (cap) in place, and shall be secured. Acetylene cylinders shall be secured in an upright position.

3.4.5.1 Unattended fuel gas and oxygen hose lines or torches are prohibited in confined spaces.

3.4.5.2 Unattended charged fuel gas and oxygen hose lines or torches are prohibited in enclosed spaces for more than 15 minutes.

3.4.5.3 All fuel gas and oxygen hose lines shall be disconnected at the supply manifold at the end of each shift.

3.4.5.4 All disconnected fuel gas and oxygen hose lines shall be rolled back to the supply manifold or to open air to disconnect the torch; or extended fuel gas and oxygen hose lines shall not be reconnected at the supply manifold unless the lines were given a positive means of identification when they were first connected and the lines are tested using a drop test to ensure the integrity of fuel gas and oxygen burning system. Alternate procedures must be approved by the SUPERVISOR.

3.4.6 Upon completion of oxygen-fuel gas system hook-up, accomplish a pressure drop test to include the torch, hoses, and gages.

3.4.6.1 Apply pressure to the system. Back off pressure by turning off the valve supplying gases to the system. If the pressure on the gage drops, a leak in the system exists. If the pressure on the gage does not drop, the system is tight.

3.4.6.2 After applying pressure, wait 2 minutes to ensure pressure does not drop.

**3.5 *Inert gas/oxygen depleting (OD) hoses must be positively identified by durable unique markings at each end of the hose.***

3.5.1 Unattended inert gas/OD hose lines or torches are prohibited in confined spaces.

3.5.2 Unattended, charged inert gas/OD hose lines or torches are prohibited in enclosed spaces for more than 15 minutes.

3.5.3 All inert gas/OD hose lines shall be disconnected at the supply manifold at the end of each shift.

3.5.4 All disconnected inert gas/OD hose lines shall be rolled back to the supply manifold or to open air to disconnect the torch; or extended inert gas/OD hose lines shall not be reconnected at the supply manifold unless the lines were given a positive means of identification when they were first connected and the lines are tested using a drop test to ensure the integrity of inert gas/OD systems. Alternate procedures must be approved by the SUPERVISOR.

3.5.5 Upon completion of inert gas/OD gas system hook-up, accomplish a pressure drop test to include the torch, hoses, and gages.

3.5.5.1 Apply pressure to the system. Back off pressure by turning off the valve supplying gases to the system. If the pressure on the gage drops, a leak in the system exists. If the pressure on the gage does not drop, the system is tight.

3.5.5.2 After applying pressure, wait 2 minutes to ensure pressure does not drop.

3.6 Use fire retardant materials aboard or immediately adjacent to the ship for staging, screening, temporary covers, shelters, deck covering, and ventilation ducts. Proper documentation of fire retardancy shall be available for review upon request.

3.6.1 Lumber, except that used for pallets, shall be fire retardant in accordance with Category One, Type I, of MIL-L-19140. Plywood and staging boards shall be Category Two, Type II, of MIL-L-19140.

3.6.2 Storage of material aboard ship shall be limited to that which is required for work in progress. Materials, trailers, temporary lights, flammable liquids, fueling of vehicles, and the rigging of hoses/welding leads/temporary lights aboard the ship shall comply with the following: Material, including that stowed in bins that are placed and held temporarily on hangar decks, well decks, or tank decks shall not exceed 8 feet in height. A 20-foot-wide lane shall be maintained the length of hangar decks to act as a



fire break. Material shall occupy a deck space not to exceed 25-feet by 25-feet with adjacent 6-foot-wide aisles on each side for ready hose line access.

3.6.3 Prior to bringing equipment or working material aboard ship, its crating and packing shall be removed. If the equipment or material may be damaged during handling, the crating and packing shall be removed immediately after the equipment or working material is brought aboard and taken ashore for disposal. A small quantity of pallets may be staged in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR aboard ship for use in materials handling operations.

3.6.4 Trailers placed aboard the ship shall be equipped with an automatic or manual sprinkler system designed to provide 0.1 GPM per square foot of floor area and an audible alarm that will sound when the sprinkler system is activated. Tool issue shacks or other walk-in enclosures placed aboard the ship shall be constructed of fire retardant material, provided with at least one fire extinguisher of appropriate size and class at each access. The enclosure shall be supported at least 10 inches above the deck.

3.6.4.1 Smoke alarms, approved by Underwriter's Laboratory, shall be installed in enclosures and shall be audible outside the enclosures.

3.6.5 Temporary lights shall have 3-conductor cable, guard or shield, hook, and lamp holder. Exposed non-current-carrying metal parts of the fixture shall be grounded either through a third wire in the cable containing the current conductors, or through a separate wire that is grounded at the fixture's voltage source.

3.6.6 Flammable or combustible liquids with a flash point of 150 degrees Fahrenheit or less, including degreasers, solvents, and fuels, shall be kept in safety cans when not in actual use or when left unattended. These liquids shall be limited to one day's supply for on board use.

3.6.7 Fueling of vehicles or transfer of fuel between containers shall be accomplished at designated sites on weather decks or in a location determined jointly by the contractor, Ship's Force, and the SUPERVISOR. Notify ship's Officer of the Deck prior to the fueling or transfer operation. When fuel is transferred between containers, the containers shall be bonded and grounded to prevent static discharge.

3.6.7.1 Provide a minimum of 2 dry chemical portable extinguishers, each with an Underwriter's Laboratory rating of at least 60-B:C at the fueling site.

3.6.8 Rigging of hoses, welding leads, and temporary lights shall be kept clear of the decks on temporary trees or brackets and be arranged to minimize tripping and other safety hazards and to allow free access through doors, hatches, and passageways.

3.7 Accomplish temporary access requirements as follows:

3.7.1 Temporary access cuts may be made in fire zone boundaries provided they are equipped with fume-tight steel closures when installed. Boundary degradation by use of temporary access cuts or passage of service lines shall be permitted only upon granting of a written waiver by the SUPERVISOR, in conjunction with the Commanding Officer's designated representative, for a limited time.

3.7.1.1 Submit one legible copy, in electronic media, of a record of boundary openings and their locations to the SUPERVISOR and one additional copy to the Commanding Officer's designated representative. Resubmit boundary opening data when any changes, additions, or deletions of boundary openings occur.

3.7.2 Ensure at least one unobstructed access on ships designed with 3 or fewer accesses to each main and auxiliary machinery space and at least 2 unobstructed accesses on ships designed with 4 or more accesses to each main and auxiliary machinery space.

3.8 Accomplish a fire prevention and housekeeping inspection on a daily basis whenever work is in progress. The inspection shall be made jointly with the SUPERVISOR and the Commanding Officer's designated representative.

3.8.1 Submit one legible copy, in electronic media, of a written report of the discrepancies and corrective actions, **using Attachment A**, to the SUPERVISOR and the Commanding Officer's designated representative within 4 hours after completion of the inspection.

3.9 Determine fire zone boundaries as follows:

3.9.1 The SUPERVISOR, Ship's Force, and the contractor shall establish fire zone boundaries prior to start of production work.

3.9.1.1 Existing transverse watertight, airtight, and fume-tight bulkheads shall be used as fire zone boundaries on ships built prior to the requirements for fire zones.

3.9.1.2 For ships having fire zones by design, the designated bulkheads shall be used as fire zones.

3.9.2 Fire zone boundaries shall be continuous through the vertical extent of the ship, from the keel up to the highest weather deck, excluding the superstructure.

3.9.2.1 For ships that have established fire zone boundaries that run from keel up through the superstructure, the fire zone boundaries as depicted on the ship's damage control diagrams shall be observed.

3.9.2.2 On aircraft carriers, provide for closing of hangar division doors in case of fire in the event division doors being repaired by the contractor are mechanically inoperative. As a minimum, rig chain falls to manually close doors in the event of fire. Exceptions shall be permitted only upon execution of a written waiver approved by the SUPERVISOR.

3.9.3 Ships under 600 feet in length shall have a minimum of 2 fire zone boundaries. Ships 600 feet and over in length shall have a minimum of 3 fire zone boundaries.

3.9.3.1 Indicate each fire zone by installing a sign adjacent to each entrance.

3.9.3.2 Service line(s) shall not be run through fire zone boundaries unless quick disconnects are installed in temporary service lines within 10 feet of the opening, door, or closure. The quick disconnects shall be marked with international orange tape and all service line(s) must be able to be secured and pulled back within 3 minutes. Fuel gas/oxygen/compressed gas hoses, steam lines, high pressure hoses (above 90 PSI), or hoses carrying hazardous/toxic/flammable materials shall not be run through fire zone boundaries unless expressly authorized in writing by the SUPERVISOR. Hose numbers or sizes shall not restrict free and easy access or closure of fire zone boundary doors.

3.10 Develop and implement a written fire safety plan in accordance with 2.2. Review the plan with contractor employees and subcontractors.

#### 4. NOTES:

4.1 Hydrogen sulfide (H<sub>2</sub>S) may be found in AFFF, seawater, and firemain systems.

4.2 Booklet of General Plans and Tank Sounding Tables are available for review at the office of the SUPERVISOR.

**Fire Zone Boundaries**ATTACHMENT A  
ESH Discrepancy and Corrective  
Action Log**Attendees**

Ship name/hull number:

Location:

Prime Contractor:

**Date:****Time:**

No.	Point of Contact	Date Corrected	Location	Discrepancy	Corrective Action	Code

Type Codes: 1-Housekeeping, 2-Fire Prevent./Fire Equipment, 3-Hot Work., 4-FZ Boundary, 5-Electrical, 6-compress gas/hoses/bottles/manifolds, 7-Scaffolding, 8-Egress/Exit, 9- Walking/Working Surfaces, 10-PPE, 11- Containment, 12- Unguarded/Edges/Holes/Openings/Fall Protection, 13-Confined/Enclosed Spaces, 14-Lines & Leads Hazards, 15-Equip. Adrift & Rollback, 16-Ventilation, 17-Machine guarding/hand tools, 18-Crane/Rigging, 19-Environmental & Hazardous Material/Communication, 20-Environmental protection, 21-General Safety

## ATTACHMENT A

### ESH DISCREPANCY AND CORRECTIVE ACTION LOG INSTRUCTIONS

- 1- Fire Zone Boundaries: List the designated Fire Zone Boundaries.
- 2- Attendees: List Company and or Command and names of personnel present for walk thru.
- 3- Ship Name/hull Number: Indicate ship name and hull number of the location of the walk thru.
- 4- Location: Indicate location where ship is moored or docked, i.e. name of contractor facility or pier at Naval Base or Station.
- 5- Prime Contractor: Indicate prime contractor who has the contract with the SUPERVISOR.
- 6- Date: Indicate date of walk thru being accomplished.
- 7- Time: Indicate start time (24 hour clock) of walk thru being accomplished.
- 8- No. (number): List sequentially, each discrepancy noted during the walk thru. Number will continue where the numbering left off the previous day, until the end of the availability.
- 9- Point of Contact: Indicate Company/Command identified with the discrepancy.
- 10- Date Corrected: Date condition was corrected. If condition is not corrected, condition will be carried over to the next walk thru until condition is corrected.
- 11- Location: Indicate location of the condition, i.e. space number or frame number.
- 12- Discrepancy: Indicate condition that needs corrective action, be specific as necessary.
- 13- Corrective Action: Indicate corrective action taken to correct the condition and who is responsible for the corrective action.
- 14- Code: Indicate code, located at the bottom of ATTACHMENT A that condition can be grouped with, i.e. lines on deck causing trip hazard would use code 14- Lines and Leads Hazards.

Type Codes: 1-Housekeeping, 2-Fire Prevent./Fire Equipment, 3-Hot Work., 4-FZ Boundary, 5-Electrical, 6-compress gas/hoses/bottles/manifolds, 7-Scaffolding, 8-Egress/Exit, 9- Walking/Working Surfaces, 10-PPE, 11- Containment, 12- Unguarded/Edges/Holes/Openings/Fall Protection, 13-Confined/Enclosed Spaces, 14-Lines & Leads Hazards, 15-Equip. Adrift & Rollback, 16-Ventilation, 17-Machine guarding/hand tools, 18-Crane/Rigging, 19-Environmental & Hazardous Material/Communication, 20-Environmental protection, 21-General Safety

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-36  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Controller; repair

2. REFERENCES:

2.1 Standard Items

2.2 Equipment Technical Manual

2.3 S9086-KC-STM-010/CH-300, Electric Plant - General

2.4 DOD-STD-2003, Electric Plant Installation Standard Methods for Surface Ships and Submarines

2.5 S9300-A6-GYD-010, Electrical Workmanship Inspection Guide for Surface Ships and Submarines

2.6 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety

3. REQUIREMENTS:

3.1 Disconnect electrically and mechanically and remove each controller. Record and retain electrical hookup data.

3.1.1 Matchmark, identify, and retain shims.

3.1.2 Inspect each foundation for cracks, areas of distortion, and deterioration in excess of 25 percent of the thickness of each member of the structure.

3.1.2.1 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.1.2 to the SUPERVISOR.

3.1.3 Accomplish the requirements of 009-32 of 2.1 for each foundation of the removed equipment.

3.2 Disassemble each controller and clean components free of foreign matter.

3.3 Inspect each controller enclosure, mounting board, and component for mechanical and physical defects, improper values, and internal wiring for conformance to 2.2 and controller wiring diagram.

3.3.1 Test internal wiring and each coil for open circuits. Test insulation resistance to ground and between conductors, using a 500-volt megger. Record readings. Minimum acceptable resistance to ground shall be one megohm.

3.3.1.1 Disconnect solid-state devices prior to measuring insulation resistance.

3.3.2 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.3 and 3.3.1 to the SUPERVISOR.

3.4 Repair each controller, using 2.2 for guidance.

3.4.1 Straighten each enclosure and door. Free-up hinges and align door. Plug and seal unused cable openings.

3.4.1.1 Install ground straps on each door on controllers with door mounted energized components in accordance with MIL-E-2036 in place of those found to be missing or defective.

3.4.2 Accomplish the requirements of 009-32 of 2.1 for the interior and exterior of the enclosure.

3.4.3 Remove existing and install new enclosure gaskets.

3.4.4 Remove existing and install new door fasteners in place of those found to be missing or defective. Install new door fasteners where missing.

3.4.5 Remove existing and install new molded-rubber switch covers.

3.4.6 Remove existing and install new components in place of those found to be missing, defective or of improper value. Remove existing and install new wiring in place of wiring found to be defective or frayed. Install new wiring where missing.

3.4.7 Inspect, dress, and adjust contacts.

3.4.7.1 Install new contacts in place of those found to be missing or defective, or resilver contacts in accordance with ASTM B 700.

3.4.8 **Replace** existing cadmium-plated parts with zinc in accordance with ASTM A 153. |

3.4.9 Wash, dip and bake, tape insulated coils and open transformers. Dipping shall be in varnish conforming to MIL-I-24092, Class 155.

3.4.9.1 Dip and bake coils and open transformers in Dolph 1105, Epoxylite Esterlite 605, or Schenectady International Isolite 862M varnish in localities where MIL-I-24092 varnish does not meet state and local Air Pollution Control District (APCD) Standards.

3.4.9.2 Repair and reinsulate coil and transformer leads.

3.4.10 Free-up and lubricate moving parts.

3.4.11 Adjust timing devices, relays, and contactors.

3.4.12 Repair defective connections.

3.4.13 Install a new wiring diagram and new heater table in each controller. The new diagram shall reflect actual configuration of the controller in which it is installed. New diagrams shall be sealed in transparent plastic and shall be mounted on the inside of each controller so as to be conveniently accessible.

3.5 Assemble each controller.

3.5.1 Dress and shape wiring and wire harnesses for neat appearance. Install wire clamps on both ends of wire hinges. Install flexible insulating tubing over wire hinges to prevent chafing.

3.5.2 Install new threaded fasteners, washers, and lockwashers in place of those found to be missing or defective.

(V) "SHOP OPERATIONAL TEST"

3.6 Accomplish an operational test of each controller and adjust to ensure correct operation in accordance with the wiring diagram of 3.4.13, using 2.2 for guidance.

(V) "INSULATION RESISTANCE TEST"

3.6.1 Accomplish 500-volt megger insulation resistance test, using Paragraphs 300-3.2.2 through 300-3.2.3, 300-3.4.8, 300-3.4.11, and 300-5.3.7.1 of 2.3 for guidance.

3.7 Install each controller, installing new fasteners conforming to MIL-DTL-1222, Type I or II, Grade 5, zinc coated, using shims retained in 3.1.1.

3.7.1 Fasteners requiring a permeability factor of 2.0 or less shall conform to Grade 304 CRES.

3.7.2 Remove existing and install new **conductor identification sleeving** in place of **conductor identification sleeving** found to be illegible



**or** missing. New **conductor identification sleeving** shall conform to SAE-AMS-DTL-23053, Class One, white, marked with indelible ink.

3.7.3 Repair and reinsulate cable ends terminating in the controller in accordance with Section One of 2.4. Resleeve conductors over 9000 circular mils.

3.7.4 Remove defective and install new lugs, using 2.5 for accept or reject criteria. Install new lugs where missing. New lugs shall conform to MIL-T-16366 or SAE-AS7928

3.7.5 Bond and ground equipment in accordance with 2.6.

3.8 Connect each controller with the exception of the motor leads and the brake leads if applicable, using retained data of 3.1.

(V) "PRELIMINARY SEQUENCE TEST"

3.8.1 Accomplish a preliminary sequence test of each controller by cycling the controller through 3 start and stop cycles from each local and remote pushbutton station. Observe controller for proper sequence. Correct deficiencies.

3.8.2 Connect the motor leads and brake leads, if applicable, at completion of preliminary sequence test.

(V)(G) "OPERATIONAL TEST"

3.9 Accomplish an operational test of each controller with its associated motor for designed sequence of operation. Verify correct speed selection, correct motor rotation in each mode, and correct value of overload setting or size of heater coils based on motor nameplate full load running current.

#### 4. NOTES:

4.1 Equipment technical manual and drawings will be listed in the invoking Work Item.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-37  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: General Procedures for Woodwork; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 0900-LP-015-1010, Wood: A Manual for Its Use as a Shipbuilding Material, Basic Wood Technology Applicable to Boat and Shipbuilding

2.3 0900-LP-015-1020, Wood: A Manual for Its Use as a Shipbuilding Material, Techniques and Practices Applicable to Preservation and Storage

2.4 0900-LP-015-1030, Wood: A Manual for Its Use as a Shipbuilding Material, Technical Data Applicable to Boat and Ship Design

2.5 0900-LP-015-1040, Wood: A Manual for Its Use as a Shipbuilding Material, Boat and Ship Construction Techniques

2.6 MIL-STD-1623, Fire Performance Requirements and Approved Specifications for Interior Finish Materials and Furnishings (Navy Shipboard Use)

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.2 through 2.5 for performing woodworking procedures.

3.2 Install flush fitted wood plugs/dowels in holes resulting from the removal of fasteners.

3.2.1 Drill out holes to sound wood and install plugs/dowels. Plugs/dowels shall be set in a **commercial grade phenol and resorcinol resin base adhesive**.

3.2.2 Where deterioration and decay exists around the perimeter of the fastener holes and where through-bolt holes have been elongated, enlarge the holes by drilling to a size (diameter) that will remove the deterioration, decay, and elongation, prior to installing plugs/dowels.

3.2.2.1 Clean-bore drill bit diameter shall not be more than one inch larger than the original fastener hole diameter, unless otherwise specified.

3.2.3 Plugs/dowels shall be of the same wood species as the member being repaired, with their grain installed parallel with the grain of the existing wood, and then driven the full depth of the hole being repaired.

3.2.4 Soak plugs/dowels for a minimum of 10 minutes and saturate the exposed fastener holes with wood preservative conforming to MIL-W-18142, Type A, and allow to dry to a moisture content of 15 percent or less prior to installation of plugs/dowels.

3.3 Install new fasteners conforming to the following requirements, unless otherwise specified.

3.3.1 Fastener material composition requirements:

3.3.1.1 Nickel copper alloy conforming to QQ-N-281, Grades 400 or 405.

3.3.1.2 Nickel copper aluminum alloy conforming to QQ-N-286 (UNS N05500) where greater strength is required.

3.3.1.3 Copper silicon alloy conforming to ASTM B 98, Grades 651 or 655.

3.3.1.4 Corrosion resistant steel (CRES) conforming to SAE-AMS-STD-66, Grades 304 or 316.

3.3.2 Fastener characteristics specifications:

3.3.2.1 Bolts, studs, and cap screws shall conform to MIL-DTL-1222.

3.3.2.2 Wood screws shall conform to FF-S-111.

3.3.2.3 Lag bolts (screws) shall conform to ASME B18.2.1.

3.3.2.4 Round head bolts shall conform to ASME B18.5, Type I, Class One.

3.3.2.5 Nuts shall conform to MIL-DTL-1222.

3.3.2.6 Flat washers shall conform to FF-W-92, Grade I.

3.3.2.7 Lock washers shall conform to FF-W-100.

3.3.3 Fasteners subject to contact with sea water and bilge water shall be manufactured of the materials outlined in 3.3.1.1 through 3.3.1.3 and shall be coated with a light viscosity epoxy resin prior to installation.

3.3.3.1 Corrosion resistant steel (CRES), Grade 316, may be used as an alternative material substitute for the materials listed in 3.3.3 only if so specified in the Work Item.

3.3.4 Aluminum and aluminum alloy components and structural members shall be installed using CRES, Grade 304 or 316 fasteners.

3.3.4.1 Fasteners with compositions of copper alloys shall not be used in contact with aluminum and aluminum alloy components and structural members.

3.3.4.2 Install non-metallic (epoxy plastic, phenolic, polyimide [nylon], Teflon) sleeves over CRES fasteners where they come in contact with the aluminum and aluminum alloy components and structural members.

3.3.4.3 Install insulation tape, minimum thickness 20 mils, conforming to MIL-I-24391 (2 thicknesses) between faying surfaces of aluminum/aluminum alloy-to-CRES to extend approximately 1/4-inch beyond the faying surfaces.

3.3.4.4 Ensure that the surfaces of aluminum and aluminum alloy components and structural members which will come in contact with wood members and CRES fasteners are protected with a minimum of 2 coats of epoxy polyimide primer conforming to MIL-DTL-24441.

3.3.4.5 Apply one coat of phenolic modified clear varnish on wood members which will come in contact with aluminum and aluminum alloy components and structural members. Refer to the Master Painters Institute (MPI) Approved Product List, MPI #28, for procurement of exterior marine spar varnish.

3.3.5 To avoid bi-metallic corrosion, fastener material composition shall be the same material composition as that of the metal components and structural members that they are fastening except as noted in 3.3.4.

3.4 Accomplish installation of new fasteners as follows:

3.4.1 Drill pre-bored pilot holes for screws and fether ring nails prior to installation to prevent damage to wood members.

3.4.1.1 Diameter of pilot holes shall not exceed 70 percent of the root diameter of screws for soft woods, and 90 percent for hard woods. For screw shanks, the hole in the material to be fastened shall be 100 percent shank diameter.

3.4.1.2 Maximum depth of pilot holes shall not exceed 90 percent of the length of screws.

3.4.1.3 Holes for fether ring nails shall be pre-bored not to exceed 60 percent of the nail diameter.

3.4.2 Screws shall not be impact driven. The last 1/4-inch of screws shall be hand-tightened.

3.4.2.1 Fasteners shall be set snug but not so tight as to weaken the material by rupture of wood fibers adjacent to the fasteners.

3.4.3 Bolt holes shall be drilled for a tight fit.

3.4.4 Where watertight integrity shall be maintained, the fasteners shall be body bound.

3.4.5 Through-bolts and hull plank fasteners shall be bedded in marine oakum conforming to T-O-56 or caulking cotton, and a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400.

3.4.6 Counterbore wood fastener holes to permit the installation of a wood plug (bung) over the fasteners, unless otherwise specified. Install wood plugs over fasteners.

3.4.6.1 The depth of counterboring is fixed by the thickness of the planking, which in turn fixes the depth of the wood plug (bung) used. The depth (thickness) of a bung plug shall be one-half to two-thirds its diameter to ensure that it will stay in place. The rule for counterboring for bung plugs is that the plug diameter shall be no larger than necessary to allow the largest part of the fastener to enter the hole.

3.4.6.2 Plugs shall be of the same wood species as the member being plugged and their grain shall be installed parallel with the grain of the existing wood.

3.4.6.3 Soak plugs for a minimum of 10 minutes and saturate the fastener holes with wood preservative conforming to MIL-W-18142, Type A, and allow to dry for a minimum of 72 hours prior to installation of plugs.

3.4.6.4 Coat plugs on faying surfaces with a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400, prior to installation and cut level and smooth with surrounding surfaces, unless otherwise specified.

3.5 New wood materials shall conform to the following requirements, unless otherwise specified.

3.5.1 Wood materials used for new interior finish materials and furnishings shall conform to the requirements of MIL-L-19140 and 2.6.

3.5.2 Types, grades, and species of wood (lumber) shall be as specified in the invoking Work Item.

3.5.3 Lumber shall conform to the specified grade after seasoning to the required moisture content and after being sized to the approximate dimensions of the members to be fashioned from it.

3.5.4 New wood members shall be finished smooth on each side.

3.5.5 Uncaulked seams, joints, and faying surfaces shall be fair and in continuous contact when assembled, except where specifically exempted, such as for hull sheathing.

3.5.6 New wood members, when assembled in place, shall show no rupture as a result of overstraining.

3.5.7 Laminated member construction shall conform to MIL-W-2038 for Douglas Fir and MIL-W-15154 for red or white oak.

3.5.7.1 When bonding together wood surfaces which rely on mechanical fastening for main strength, ***commercial grade phenol and resorcinol resin base adhesive shall be used.***

3.5.8 Plywood shall conform to MIL-P-18066, Class 3A.

3.5.9 Moisture content of new wood materials shall fall within the following parameters.

3.5.9.1 New lumber shall have a moisture content of 13 percent, plus or minus 5 percent, at the time of installation.

3.5.9.2 New plywood shall have a moisture content of 10 percent, plus or minus 5 percent, at the time of installation.

3.6 New lumber and plywood shall be soaked for 10 minutes in wood preservative after boring, shaping, and fairing operations have been completed.

3.6.1 Apply one soaking brush coat of wood preservative on bare wood surfaces exposed by removals and machining operations before surfaces are covered.

3.6.2 Wood preservative shall conform to MIL-W-18142, Type A, unless otherwise specified.

3.6.3 Allow preservative-treated wood to dry to a moisture content of 15 percent or less prior to gluing and/or painting operations.

3.7 Apply a heavy coating of a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400 on the top surfaces of deck beams, frames headers, fillers, planking side of frames, deck beam ends, seams, and butts

(except those to be caulked), and other faying (joining) surfaces before the faying surfaces are covered, except as follows: In between inner and outer layers of hull planking of crafts that do not have caulking seams, a wood bedding/sealant compound conforming to 3M-5200 shall be installed.

3.7.1 Install one layer of canvas conforming to PIA-C-419, Type III (8 ounces or heavier) between faying surfaces of new leveling foundation pads installed on weather decks, in addition to a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400.

3.7.2 Remove surplus bedding/sealing compound after squeeze-out.

3.8 No new butt joints shall be established in any planking strake (hull shell or deck) that will leave a portion that is less than 12 feet in length. No new portion of a planking strake shall be installed which is less than 12 feet in length.

3.8.1 Butt joints in adjacent strakes shall be separated by a minimum of 3 strakes.

3.8.2 Butt joints in the same frame space shall be separated by a minimum of 3 frame spaces.

3.8.3 Planking strakes may be scarf-joined to maintain butt joint schedule. Scarfing shall be in accordance with 2.2 through 2.5.

3.9 Wood members requiring caulking seams shall be installed with their faying surfaces tight and with an outgate (special bevel for caulking) in the side(s) to be caulked.

3.10 Accomplish the following work to ensure watertight integrity of caulked seams (including butt and rabbet seams).

3.10.1 Reef out by hand, defective caulking compound and loose and decayed caulking (cotton/oakum) from existing caulking seams requiring installation of new caulking and caulking compound.

3.10.1.1 Exercise care when reefing out caulking compound and caulking to preclude damage to existing caulking seams. Power tools shall not be utilized for the reefing out process.

3.10.2 Where existing caulking is found to be sound and in good condition, set the existing caulking deeper into the seam opening to ensure that it is driven solidly home and to make room for additional caulking.

3.10.2.1 Set the existing caulking by driving the caulking uniformly, to the same hardness in each seam. To prevent a wedging effect it shall be set to a hardness that would not allow an awl to penetrate more than 3/8-inch.

3.10.3 Caulking seams shall be clean and dry before installing new caulking and caulking compound.

3.10.4 Caulk deck planking caulking seams using treated caulking cotton and spun-type marine oakum conforming to T-O-56. Treat the caulking cotton as follows.

3.10.4.1 The untreated caulking cotton shall be undyed, of not less than 3/4-inch staple length, and shall be free from oil, fire-damaged or scorched cotton, added waste, and substantially free from linters.

3.10.4.2 The untreated caulking cotton shall be soft and fully opened and contain no sizing. The amount or size of specks shall not be objectionably noticeable upon casual examination.

3.10.4.3 The untreated caulking cotton shall be well carded to form a sliver and shall consist of not less than 9 nor more than 12 slivers laid parallel to form a composite untwisted strand. Each sliver untreated shall measure approximately 500, plus or minus 50 feet, to the pound.

3.10.4.4 Treat the caulking cotton with a solvent solution of copper naphthenate-asphaltum to produce caulking cotton having a minimum of one percent metallic copper and 1-1/2 percent, plus or minus 1/2 percent, asphalt, based on the weight of the treated cotton. The copper shall be uniformly distributed throughout the cotton.

3.10.4.5 The treated caulking cotton shall be dry to the touch prior to installation.

3.10.5 Caulk hull shell planking caulking seams using treated caulking cotton conforming to the requirements outlined in 3.10.4.1 through 3.10.4.5 and spun-type marine oakum conforming to T-O-56.

3.10.5.1 Drive one to 2 strands of caulking cotton into the bottom of the seams, prior to installing marine oakum, to ensure that deep/tight seams are filled.

3.10.6 Caulking cotton and marine oakum caulking shall be looped, tucked, and hard-driven to a depth that provides space for installation of seam caulking compound.

3.10.6.1 The size of the seam in width and depth determines the required amount of cotton/oakum caulking and shall be filled to within 1/4-inch to 3/8-inch of the plank surface.

3.10.6.2 The amount of cotton/oakum caulking inserted shall be carefully controlled to limit the possibility to "caulk off" a plank from its frames if too much is driven in and forced beyond the outgate bevel.



3.10.6.3 The cotton/oakum caulking shall be driven uniformly, to the same hardness and depth in each seam, to prevent a wedging effect. It shall be set to a hardness that would not allow an awl to penetrate more than 3/8-inch.

3.10.6.4 Butt caulking seams shall be caulked ahead of adjoining longitudinal caulking seams to ensure that short ends of caulking will be locked in place.

3.10.6.5 The ends of sound existing caulking and new caulking shall be drawn out and tapered so as to be married in a continuous bulk and then be installed as stated in 3.10.6 through 3.10.6.4.

3.10.6.6 Hull shell planking caulking seams of heavy planked ships (e.g., MSOs) shall have the caulking set firmly home by means of a heavy horsing iron driven into the seams with a heavy mallet known as a beetle. This is a 2-man operation that requires one man to hold the long-handled horsing iron while the second man swings the horsing beetle. This operation ensures that the caulking will be well seated, will not work loose, and is the final means to stiffen the hull.

3.10.7 Pay (fill) deck planking caulking seams with polyurethane caulking compound conforming to MIL-S-24340, Type I, or marine glue MIL-G-413, as specified in the invoking Work Item.

3.10.7.1 The depth of the seam caulking compound shall be one to 1-1/2 times the width of the seam but no deeper than 3/8-inch.

3.10.7.2 Seal the surfaces of the seams and the installed cotton caulking with a seam primer that is compatible with the caulking compound.

3.10.7.3 Install one-inch wide masking tape on both sides of each caulking seam to keep the caulking compound from penetrating the open grain areas of the deck planking.

3.10.7.4 Remove the tape installed in 3.10.7.3 upon completion of caulking operations.

3.10.8 Pay hull shell planking caulking seams with caulking compound in accordance with the following requirements.

3.10.8.1 Pay underwater hull caulking seams with Interlux 30 brown underwater seam compound (oleoresinous material cut with an aromatic solvent).

3.10.8.2 Pay hull caulking seams above the waterline with Interlux 31 white seam compound (oleoresinous material cut with an aromatic solvent).

3.10.8.3 The depth of the seam caulking compound shall be one to 1-1/2 times the width of the seam.

3.10.8.4 Paint the surfaces of the seams and the installed cotton/oakum caulking with anti-fouling paint conforming to MIL-PRF-24647, Type II, Class 1, prior to filling underwater hull shell planking seams with caulking compound.

3.10.8.5 Seal the surfaces of the seams and the installed cotton/oakum caulking with a seam primer that is compatible with the caulking compound on hull shell planking seams existing above the waterline.

3.10.9 Prior to paying the caulking compound installed in 3.10.7 and 3.10.8, seams shall be thoroughly cleared and cleaned of foreign matter.

3.10.9.1 The caulking compound may be applied with a caulking gun but shall be handworked into the seams to eliminate air pockets and voids in the seams.

3.10.9.2 Remove surplus caulking compound from surrounding surfaces.

3.10.9.3 Pay and complete seams daily, leaving no exposed cotton/oakum caulking at the end of each work shift to ensure the cotton/oakum caulking remains dry and clean.

3.10.9.4 When installing caulking compound and its compatible primer, the manufacturer's instructions shall be strictly adhered to. Seams greater than 1/2-inch width shall be payed in 2 applications spaced 24 hours apart.

3.11 Blank openings resulting from removals and relocations, unless otherwise specified, in accordance with the following.

3.11.1 Blank deck planking as follows:

3.11.1.1 Route a 3/8-inch deep indentation on both the top and underside of the deck planking, centered over the area to be blanked.

3.11.1.2 The routed area shall extend a minimum of 3 inches beyond the perimeter of the area to be blanked.

3.11.1.3 Fit and install a Douglas Fir insert in the area to be blanked.

3.11.1.4 Fit and install a 3/8-inch thick plywood insert in each routed-out indentation.

3.11.1.5 Bed faying surfaces of the inserts with a NAVSEA approved natural wood bedding compound such as Interlux 214 or Dolchem 3400,

and secure with round head bolts to ensure watertight integrity. Remove surplus wood bedding compound left after squeeze-out.

3.11.2 Blank plywood bulkheads and plywood decks as follows:

3.11.2.1 Enlarge the hole to be blanked to a minimum of 4 inches square.

3.11.2.2 Install a fitted plywood insert in the resulting opening in the deck or bulkhead.

3.11.2.3 Install a plywood lap cover on one side of and centered over the area to be blanked. The lap cover shall extend a minimum of 3 inches beyond the perimeter of the area to be blanked.

3.11.2.4 Bed faying surfaces of the insert and the lap cover in a NAVSEA approved natural wood bedding compound such as Interlux 214 or Dolchem 3400, and secure with round head bolts to ensure watertight integrity. Remove surplus wood bedding compound left after squeeze-out.

3.11.3 Blank double-sheathed bulkheads as follows:

3.11.3.1 Enlarge the opening in the inner sheathing to a minimum of 4 inches square.

3.11.3.2 Enlarge the opening in the outer sheathing to a size that extends a minimum of 3 inches beyond the perimeter of enlarged inner sheathing opening.

3.11.3.3 Install a fitted plywood insert in each opening. The plywood inserts shall be the same thickness as the sheathing.

3.11.3.4 Install one layer of canvas conforming to PIA-C-419, Type III (8 ounces or heavier), between the 2 inserts, the same size as the larger insert.

3.11.3.5 Bed faying surfaces of the inserts and the canvas in a NAVSEA approved natural wood bedding compound such as Interlux 214 or Dolchem 3400, and secure with round head bolts to ensure watertight integrity. Remove surplus wood bedding compound left after squeeze-out.

3.11.4 Sand new plywood blanks and disturbed surfaces to fair in with surrounding areas.

3.11.4.1 Bulkhead sheathing sanded surfaces shall be painted in accordance with 009-32 of 2.1.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-38  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Boiler Dry Lay-up; accomplish

2. REFERENCES:

2.1 S9086-GY-STM-010/CH-221, Boilers

3. REQUIREMENTS:

3.1 Fill or drain water in steam drum to a level below the bottom of the manhole.

3.1.1 Inject 10 pounds of sodium nitrite for each 1,000 gallons of boiler water in a slurry solution to the water in the boiler.

3.1.1.1 If boiler is pressurized, inject sodium nitrite after pressure drops to 100 PSIG or less.

3.2 Fill the steam drum to bring water level to the top of the gage glass using water conforming to the following requirements:

<u>CONSTITUENT</u> or <u>PROPERTY</u>	<u>REQUIREMENT</u>
pH	5.8 to 8.0
Conductivity	2.5 micromho/cm (at point of delivery)
Dissolved Silica	0.2 ppm (0.2 mg/L) max
Hardness	0.10 epm (0.10 meg/L) max

3.2.1 Prevent water level from carrying the solution over into the superheater.

3.3 Remove and dispose of the solution from the boiler immediately.

3.3.1 Do not drain the solution to the bilge.

3.4 Remove each drum manhole plate and header handhole plate from boiler.

3.4.1 Do not remove seal welded handhole plates.

3.5 Blow out horizontal tubes with clean air to remove any water. Dry remaining solution from water walls, economizers, superheater headers, steam and water drums.

3.6 Circulate heated air with positive flow through the firesides and watersides, as long as the boiler is in a dry lay-up condition, in accordance with Paragraph 221-2.3.7.1 of 2.1.

3.6.1 Introduce and exhaust heated air in accordance with Table 221-2 of 2.1.

(V) "INSPECT BOILER LAY-UP"

3.6.2 Inspect the boiler daily and at the end of each work shift and ensure dry lay-up conditions are maintained in accordance with Paragraphs 221-2.4.6.2 and 221-2.4.6.3 of 2.1.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-39  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Technical Manual Contract Requirement (TMCR) for New  
Technical Manuals for Commercial Equipment/Component; provide

2. REFERENCES:

2.1 NDMS-000172-000, Technical Manual Contract Requirement (TMCR);  
Commercial Off-The-Shelf (COTS) Equipment Requirements

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.1.

3.1.1 Deliver the data items listed in Paragraph 1.3 of 2.1 as  
follows:

3.1.1.1 Submit 3 advance copies to the SUPERVISOR for review  
within 10 days upon receipt of equipment/component from the vendor.

3.1.1.2 One copy shall be in a form suitable for offset  
printing.

3.2 Submit supplementary data for commercial manuals in accordance with  
2.1 to the SUPERVISOR.

3.2.1 Deliver the data items listed in Paragraph 1.4 of 2.1 as  
follows:

3.2.1.1 Submit 3 review draft copies (RDC) of the  
supplementary data to the SUPERVISOR for review within 10 days of receipt of  
equipment from vendor.

3.2.1.2 One copy of the commercial manual with supplementary  
data inserted shall be in a form suitable for offset printing.

4. NOTES:

4.1 2.1 is available and can be read on-line at:

<https://nsdsa2.phdnswc.navy.mil>

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-40  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Requirements for Contractor Cranes at Naval Facilities;  
accomplish

2. REFERENCES:

- 2.1 29 CFR Part 1910, Occupational Safety and Health Standards
- 2.2 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment
- 2.3 29 CFR Part 1917, Marine Terminals
- 2.4 29 CFR Part 1926, Safety and Health Regulations for Construction
- 2.5 ASME B30.5, Mobile and Locomotive Cranes
- 2.6 ASME B30.8, Floating Cranes
- 2.7 ASME B30.22, Articulating Boom Cranes
- 2.8 NAVFAC P-307, Management of Weight Handling Equipment

3. REQUIREMENTS:

3.1 Notify the SUPERVISOR 24 hours prior to bringing any crane onto a Naval facility.

3.2 Comply with the requirements of 2.1 through 2.7, and Paragraph 1.7.2 of 2.8, prior to bringing or using any contractor cranes on Naval facilities.

3.2.1 Maintain written documentation of the last weight test of the crane and all related weight handling equipment on site.

3.2.2 Provide a completed and signed Certificate of Compliance, Attachment A, for each crane brought onto a Naval facility.

3.2.2.1 Post a copy of Attachment A in cab of crane.

3.3 Designate in writing the trained and qualified operators and post the designations in the crane at all times.

3.3.1 Provide certification that operators for mobile cranes with gross capacities of 50,000 pounds or greater are designated as qualified by a crane operator qualification source.

3.3.2 Provide certification that the operator is qualified to operate the crane to be used.

3.3.3 Ensure the designated operators comply with the following requirements:

3.3.3.1 Have understanding of all signs, notices, and operating instructions, and the applicable hand signals prescribed by the ASME B30 standard for the type of crane in use. Post an illustration of the signals on the crane.

3.3.3.2 Not have uncorrected defective eyesight or hearing.

3.3.3.3 Not be known to suffer from heart disease, epilepsy, or similar ailments that suddenly could incapacitate him/her.

3.3.3.4 Be at least 18 years of age.

3.4 Ensure the handling and rigging gear and below the hook lifting devices and personnel comply with the following requirements:

3.4.1 Personnel performing rigging shall have an understanding of all signs, notices, and operating instructions, and be familiar with the applicable hand signals prescribed by the ASME B30 standard for the type of crane in use.

3.4.2 Personnel performing rigging shall be familiar with the rigging requirements in 2.1 through 2.4.

3.5 Inspect rigging gear in accordance with 2.1 through 2.4.

3.5.1 Maintain certification records on site available for review during all work.

3.5.2 All current certification records must include at a minimum the date of the inspection and signature of the inspector noting the expiration date of each certification.

(V) "INSPECT CRANE"

3.6 Contractor shall:



3.6.1 Ensure all inspections are performed in accordance with 2.1 through 2.4 (daily, monthly, quarterly, and yearly), and retain the current documentation of inspections. Documents shall be kept on site.

3.6.1.1 Perform daily pre-use inspections and testing on all load hoisting and lowering mechanisms, boom hoisting and lowering mechanisms, swinging mechanisms, traveling mechanisms (if to be used that day), and safety devices.

3.6.2 Cranes that have to be re-rated shall be in accordance with SAE Recommended Practice, Crane Load Stability Test Code J765 and documentation maintained on site.

3.6.3 Post a completed copy of Attachment A in the cab of vehicle.

3.6.4 Have an operational anti-two-block device or a two-block damage prevention feature for all points of two-blocking.

3.6.5 Have a boom hoist disconnect, shutoff, or hydraulic relief to automatically stop the boom hoist when the boom reaches a predetermined high angle.

(V)(G) "INSPECT CERTIFICATION AND TESTING DOCUMENTATION"

3.7 Conduct a joint verification with the Government representative to ensure that a legible and indelible completed copy of Attachment A is maintained on the crane and the following certification and testing documentation is on site prior to entry and use on any Naval facility:

3.7.1 Crane certification

3.7.2 Load testing

3.7.3 Yearly, monthly, and daily inspection logs

3.7.4 Rope/sling certifications

3.7.5 Operator certifications/designations

3.7.6 Designation of person performing log inspections

3.7.7 Cranes that are permanently located on a Naval facility shall have a quarterly joint verification.

3.8 Develop and maintain on site a critical lift plan as follows:

3.8.1 Critical lifts are:

3.8.1.1 Lifts over 75 percent of the capacity of the crane or hoist (lifts over 50 percent capacity of a barge-mounted mobile crane's hoist) at any radius

- 3.8.1.2 Lifts involving more than one crane or hoist
- 3.8.1.3 Lifts of personnel
- 3.8.1.4 Lifts involving non-routine rigging or operation
- 3.8.1.5 Lifts involving sensitive equipment
- 3.8.1.6 Lifts with unusual safety risks

3.8.2 Specify the size and weight of the load to be lifted, including crane and rigging components that add to the weight. The OEM's maximum load capacities for the entire range of the lift shall also be provided.

3.8.3 Specify lift geometry, including the crane position, boom length and angle, height of lift, and radius for the entire range of the lift, and shall apply to both single and multiple crane lifts.

3.8.4 Specify a rigging plan showing the lift points, rigging gear, and rigging procedures.

3.8.5 Specify environmental conditions under which lift operations are to be stopped.

3.8.6 Demonstrate compliance with the requirements of Section 1926.550(g) of 2.4 for lifts of personnel.

3.8.7 Provide data that is needed to establish facility ground loading restrictions/conditions to the SUPERVISOR.

3.8.8 Complete and maintain a copy of Attachment B for each lift.

3.8.9 For barge-mounted mobile crane critical lifts, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. Amount of list and trim shall be within manufacturer's requirements.

3.9 Report verbally each accident to the SUPERVISOR as soon as management becomes aware but not later than 4 hours of such an event.

3.9.1 Secure the accident site and protect evidence until released by the SUPERVISOR.

3.9.1.1 Conduct an accident investigation to establish root cause(s) of any accident.

3.9.2 Withhold further crane operations until the cause is determined and corrective actions are implemented and approved by the SUPERVISOR.

3.9.3 A crane accident is when any of the following occurs during crane operations:

3.9.3.1 Personnel injury or death

3.9.3.2 Material or equipment damage

3.9.3.3 Dropped load

3.9.3.4 Derailment

3.9.3.5 Two-blocking

3.9.3.6 Overload

3.9.3.7 Collision, including unplanned contact between the load, crane, and/or other objects

3.9.4 Provide a formal written report of the event to the SUPERVISOR within 24 hours of each accident.

3.9.5 Submit one legible copy, in electronic media, of the accident report consisting of a summary of circumstances, and explanation of cause(s), and corrective actions taken, using Attachment C, to the SUPERVISOR.

4. NOTES:

4.1 None.

ATTACHMENT A

<b>CERTIFICATE OF COMPLIANCE</b>			
Contractor shall complete this form and submit one copy to the Contracting Officer at least 24 hours prior to bringing any crane on Navy property. This certificate shall be signed by an official of the company that provides cranes for any application under this contract. This certificate is only valid for the contract specified. Cranes will not be allowed on any Naval activity without a signed copy of this certificate posted in cab. All operations are subject to periodic surveillance.			
LOCATION: (Include sketch if necessary)		DATE(S) OF CRANE OPERATION:	
DESCRIPTION OF WORK:		CONTRACTOR OFFICE:	
CONTRACTOR OFFICER/PHONE:		CONTRACT NUMBER:	
PRIME CONTRACTOR:		POINT OF CONTACT/PHONE:	
CRANE SUPPLIER/PHONE: <small>(If different from prime contractor)</small>		POINT OF CONTACT/PHONE:	
CRANE MANUFACTURER:	MODEL:	CAPACITY:	CRANE ID #:
GROSS VEHICLE WEIGHT:  TRAVEL:  OPERATING:	MAXIMUM LIFT DURING OPERATION:	MAX OUTRIGGER LOAD DURING OPERATION:	
CRANE OPERATOR'S NAME(S):			
I certify that 1) The above noted crane and associated rigging gear conform to applicable OSHA regulations (host country regulations for naval activities in foreign countries) and applicable ASME B30 standards. The following OSHA regulations and ASME standards apply: _____ 2) The operators noted above have been trained and are qualified for the operation of the above noted crane. 3) The operators noted above have been trained not to bypass safety devices during lifting operations.			
CONTRACTOR OFFICIAL PRINTED NAME/TITLE:		DATE:	
(Signature)			
<b>POST ON CRANE (IN CAB OF VEHICLE)</b>			

ATTACHMENT B

CONTRACTOR CRANE OPERATION CHECKLIST		YES	NO
1	Does the operator know the weight of the load to be lifted?		
2	Is the load to be lifted within the crane manufacturer's rated capacity in its present configuration?		
3	Is the crane level and on firm ground?		
4	Are outriggers required?		
5	If so, are outriggers fully extended and down, and the crane load off the wheels?		
6	If blocking is required, is the entire surface of the outrigger pad supported and is the blocking material of sufficient strength to safely support the loaded outrigger pad?		
7	If outriggers are not used, is the crane rated for on-rubber lifts by the manufacturer's load chart?		
8	Is the swing radius of the crane counterweight clear of people and obstructions and accessible areas within the swing area barricaded to prevent injury or damage?		
9	Has the hook been centered over the load in such a manner to minimize swing?		
10	Is the load well secured and balanced in the sling or lifting device before it is lifted more than a few inches?		
11	Is the lift and swing path clear of obstructions?		
12	If rotation of the load being lifted is hazardous, is a tag or restraint line being used?		
13	Are personnel prevented from standing or passing under a suspended load?		
14	Is the crane operator's attention diverted?		
15	Are proper signals being used at all times?		
16	Do the operations ensure that side loading is prohibited?		
17	Are personnel prevented from riding on a load?		
18	Are start and stop motions in a smooth fluid motion (no sudden acceleration or deceleration)?		
19	If operating near electric power lines, are the rules and guidelines understood and adhered to?		
20	Is the lift a critical lift?		
21	If so, are critical lift regulations understood, check-off sheets initialed and signed off, and was there an interactive brief conducted with associated personnel?		
22	Is Attachment A current, filled out completely, and posted in the crane?		
Contractor:		Subcontractor:	
Location:		Date:	

# ATTACHMENT C

WEIGHT HANDLING EQUIPMENT ACCIDENT REPORT										Report Date:	
Accident Category		<input type="checkbox"/> Crane Accident				<input type="checkbox"/> Rigging Gear Accident					
From:								To: SUPERVISOR			
UIC:											
Activity:								Report No:			
Crane No:				Cat:		Accident Date			Time:      hrs		
SPS:		GPS:		Crane Type:			Crane Manufacturer:				
Location:						Weather:					
Crane Capacity:				Hook Capacity:			Weight of Load on Hook:				
Fatality/Permanent Total Disability?				YES		NO		Material/Property Cost Estimate:			
Loss of Work Time Beyond the Day or Shift on Which It Occurred?								YES		NO	
Accident Type: <input type="checkbox"/> Personal Injury <input type="checkbox"/> Overload <input type="checkbox"/> Derail <input type="checkbox"/> Damaged Rigging Gear  <input type="checkbox"/> Load Collision <input type="checkbox"/> Two Blocked <input type="checkbox"/> Dropped Load <input type="checkbox"/> Damaged Crane  <input type="checkbox"/> Crane Collision <input type="checkbox"/> Damaged Load <input type="checkbox"/> Other (Specify) _____											
Cause of Accident: <input type="checkbox"/> Improper Operation <input type="checkbox"/> Equipment Failure <input type="checkbox"/> Inadequate Visibility  <input type="checkbox"/> Improper Rigging <input type="checkbox"/> Switch Alignment <input type="checkbox"/> Inadequate Communication  <input type="checkbox"/> Track Condition <input type="checkbox"/> Procedural Failure <input type="checkbox"/> Other (Specify) _____											
Chargeable to: <input type="checkbox"/> Track Walker <input type="checkbox"/> Rigger <input type="checkbox"/> Operator  <input type="checkbox"/> Maintenance <input type="checkbox"/> Management/Supervision <input type="checkbox"/> Other (Specify) _____											
Crane Function:  <input type="checkbox"/> Travel <input type="checkbox"/> Hoist <input type="checkbox"/> Rotate <input type="checkbox"/> Luffing <input type="checkbox"/> Lower <input type="checkbox"/> Telescoping											
Is this accident indicative of a recurring problem? <input type="checkbox"/> Yes <input type="checkbox"/> No  If Yes, list Accident Report Nos.: _____											
ATTACH COMPLETE AND CONCISE SITUATION DESCRIPTION AND CORRECTIVE/PREVENTIVE ACTIONS TAKEN AS ENCLOSURE (1). Include probable cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List corrective/preventive actions assigned and responsible codes.											
Preparer's Signature								Code		Date	
CONCURRENCES (Include Signature, Code, and Date)											
CONTRACTOR CERTIFYING OFFICIAL											

## WEIGHT HANDLING EQUIPMENT ACCIDENT REPORT INSTRUCTIONS

- 1 - Report Date: The date the accident report is completed.
- 2 - Accident Category: Indicate either crane accident or rigging gear accident.
- 3 - From: The Contractor who owns the crane.
- 4 - Activity: The Naval activity where the accident took place.
- 5 - Report No.: The activity-assigned accident number (e.g., 98-001).
- 6 - Crane No.: The activity-assigned crane number (e.g., PC-5).
- 7 - Category: Identify category of crane (i.e., 1, 2, or 3).
- 8 - Accident Date: The date the accident occurred (month/day/year).
- 9 - Time: The time (24 hour clock) the accident occurred (e.g., 1300).
- 10 - Category of Service: Special purpose service (SPS) or general purpose service (GPS).
- 11 - Crane Type: The type of crane involved in the accident (e.g., mobile, bridge).
- 12 - Crane Manufacturer: The manufacturer of the crane (e.g., Dravo, Grove, P&H).
- 13 - Location: The detailed location where the accident took place (e.g., building 213, dry dock 5)
- 14 - Weather: The weather conditions at time of accident (e.g., wind, rain, cold).
- 15 - Crane Capacity: The certified capacity of the crane (e.g., 60 tons).
- 16 - Hook Capacity: The capacity of the hook involved in the accident at the maximum radius of the operation.
- 17 - Weight of Load on Hook: If applicable, the weight of the load on the hook.
- 18 - Fatality or permanent total disability?: Check yes or no.
- 19 - Material/Property Cost Estimate: Estimate total cost of damage resulting from the accident.
- 20 - Loss of work time beyond the day or shift on which it occurred?: Check yes or no.
- 21 - Accident Type: Check all that apply.
- 22 - Cause of Accident: Check all that apply.
- 23 - Chargeable to: Check all that apply.
- 24 - Crane Function: Check the function(s) in operation at time of accident. Check all that apply.
- 25 - Is this a recurring problem?: Check yes or no. Identify any other similar accidents.
- 26 - Situation Description/Corrective Actions: Self-explanatory.
- 27 - Concurrences: Signatures of activity personnel verifying the accident report.
- 28 - Preparer: Self-explanatory.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-41  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Technical Manual Contract Requirement (TMCR) for a Topically Structured Technical Manual; provide

2. REFERENCES:

2.1 NDMS-000173-000, Technical Manual Contract Requirements (TMCR); Hull, Mechanical and Electrical (HM&E) Equipment Technical Manual Requirements

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.1.

3.2 Deliver the data items listed in Paragraph 1.3 of 2.1 as follows:

3.2.1 Submit 3 review draft copies (RDC) to the SUPERVISOR for review within 10 days of receipt of equipment.

3.2.2 Submit one proof copy and one reproducible copy with integrally related art to the SUPERVISOR not later than 30 days after receipt of the reviewed final reproducible copy (FRC).

4. NOTES:

4.1 2.1 is available and can be read on-line at:

<https://nsdsa2.phdnswc.navy.mil>



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-42  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Technical Manual Contract Requirement (TMCR) for Updating  
Technical Manuals; provide

2. REFERENCES:

2.1 NDMS-000174-000, Technical Manual Contract Requirement (TMCR);  
Technical Manual Revision Requirements

2.2 NDMS-000175-000, Technical Manual Contract Requirement (TMCR);  
Technical Manual Change Package Requirements

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.1 or 2.2 as appropriate.

3.2 Deliver the data items listed in Paragraph 1.3 of 2.1 or 2.2 as  
follows:

3.2.1 Submit 3 review draft copies (RDC) to the SUPERVISOR for  
review within 10 days after receipt of equipment/component.

3.2.2 Submit one proof copy and one final reproducible copy (FRC)  
with integrally related art to the SUPERVISOR not later than 30 days after  
receipt of the reviewed draft copy.

4. NOTES:

4.1 2.1 and 2.2 are available and can be read on-line at:

<https://nsdsa2.phdnswc.navy.mil>

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-43  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Light-Off Assessment (LOA) Support for Steam Propulsion System; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Complete work in the main propulsion machinery spaces, steering gear rooms, shaft alleys, pump rooms, auxiliary machinery rooms, designated fuel tanks, and feedwater tanks prior to the scheduled Light-Off Assessment (LOA). For availabilities in excess of 120 days, Production Completion Date (PCD) will be scheduled 14 days prior to the LOA. For availabilities 120 days or less, PCD will be scheduled between 3-14 days prior to propulsion plant light-off. Repairs, installations, testing, and adjustments of auxiliary machinery, systems, and equipment outside those spaces which support the main propulsion system directly, indirectly, or for emergencies shall also be completed.

3.1.1 The term complete is defined to mean the accomplishment of contractor responsible work that is possible without lighting off the boilers. Steam shall not be introduced into propulsion systems from any source until after a successful Light-Off Assessment.

3.1.2 The following work shall be complete:

3.1.2.1 Repair and installation of machinery, equipment, piping systems, gages, thermometers, meters, operating instructions and warning plates, protective guards, flange shields, remote shutdown devices, strainer shields, valves and handwheels, insulation and lagging, check valves, steam traps and orifices, regulators and reducing valves, remote operating gear and pull cables, valve reach rods, pipe hangers and braces, valve locking devices, valve position indicators, gage lines, label plates, relief valves and hand lifting levers, boiler uptakes and stacks, boiler safety valves and easing gear, sight glasses and guards, fuel strainers, fuel burner drip pans, soot blowers and chains, boiler casings, firefighting systems and equipment, automatic boiler control system (combustion and feedwater), main feed pump control systems, deck plates, handrails, ladders, ventilation systems, supply and exhaust vent screens, lighting systems (incandescent, fluorescent, and

emergency battle lanterns), electric cables and runs, cable straps, cable packing, cable tags, alarm systems, interior communication systems, ground straps, resilient mounts, safety devices, stenciling, tachometers, and access closures.

3.1.2.2 Calibration of gages, thermometers, tachometers, pyrometers, and meters

3.1.2.3 Cold setting of relief valves, steam turbine governors, diesel engine governors and overspeed trips, piping spring hangers, regulators and reducing valves, low suction trips, high temperature alarms and switches, high and low pressure control switches, low lube oil pressure alarms, boiler water high and low level alarms

3.1.2.4 Painting

3.1.2.5 Filling of lube oil, fuel oil, and feedwater tanks

3.1.2.6 Boilers in designated lay-up

3.1.2.7 Bilges shall be clean and gas free, "Safe for Workers"

3.1.3 Complete portions of required test procedures that can be completed without steam.

3.2 Correct contractor responsible preliminary LOA discrepancies prior to the turnover of engineering spaces to Ship's Force. The 2-week period prior to the LOA is reserved for Ship's Force preparation for LOA. Contractor work will not be allowed in the engineering spaces during this period unless specifically authorized by the SUPERVISOR.

3.2.1 Submit one legible copy, in electronic media, of a weekly report on the status of completion of preliminary LOA discrepancies. Notify the SUPERVISOR immediately upon determination of any discrepancies that cannot be corrected prior to the scheduled LOA, giving the reason and expected completion date.

3.3 Provide the services of a contractor quick response team during the LOA to correct Government and contractor discrepancies.

3.3.1 Contractor shall coordinate the correction of discrepancies as they are discovered at the direction of the SUPERVISOR.

3.3.2 The quick response team members shall have with them (or readily accessible) the tools of their trade for immediate use in the correction of discrepancies.

#### 4. NOTES:

4.1 The LOA is a comprehensive assessment of the ship in the key areas of: The level of knowledge and state of training of propulsion plant personnel; the adequacy of Engineering Department administrative programs and procedures; the material readiness of the propulsion plant; and the state of cleanliness and preservation of main propulsion and auxiliary machinery spaces. The LOA will be accomplished by the Propulsion Examining Board (PEB) or the Type Commander Staff. The assessment will be conducted immediately prior to scheduled boiler light-off and it must be concluded successfully prior to boiler light-off. The material assessment portion usually takes less than 12 hours. If restrictive discrepancies are identified, those discrepancies must be corrected prior to boiler light-off.

4.2 The SUPERVISOR will establish an inspection team and accomplish a preliminary LOA inspection in conjunction with Ship's Force 4 to 8 weeks prior to the LOA to determine and record discrepancies which would impact upon the LOA. The pre-LOA will be about 4 days in duration and will result in the identification of discrepancies and incomplete work considered necessary to support a successful Light-Off Assessment. Each discrepancy noted in the inspection will be described in simple terms on a 4-part, serialized form. The form will identify the general location of the discrepancy and the associated Work Item number, if applicable. The fourth copy of the form, made of hard card with an attachment wire, will be hung by the SUPERVISOR's inspection team in the immediate proximity of the discrepancy (on the deficient item itself, when practical). Upon completion of the pre-LOA the SUPERVISOR will identify contractor responsible discrepancies to the contractor. Deficient items identified that are the responsibility of the Government will be screened for accomplishment by the Ship's Force. That portion of this work that cannot be accomplished by the Ship's Force will be considered for accomplishment by the contractor.

4.2.1 Any time after completion of the pre-LOA inspection that additional discrepancies are discovered, they will be similarly identified and screened.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-44  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Light-Off Assessment (LOA) Support for Gas Turbine Propulsion System; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Complete work in the main propulsion machinery spaces, steering gear room, shaft alleys, pump rooms, auxiliary machinery rooms, designated fuel tanks, and feedwater tanks prior to the scheduled Light-Off Assessment (LOA). For availabilities in excess of 120 days, Production Completion Date (PCD) will be scheduled 14 days prior to the LOA. For availabilities 120 days or less, PCD will be scheduled between 3-14 days prior to propulsion plant light-off. Repairs, installations, testing, and adjustments of auxiliary machinery, systems, and equipment outside those spaces which support the main propulsion system directly, indirectly, or for emergencies shall also be completed.

3.1.1 The term complete is defined to mean the accomplishment of contractor responsible work that is possible without lighting off the gas turbine engines until after a successful Light-Off Assessment.

3.1.2 The following work shall be complete:

3.1.2.1 Repair and installation of machinery, equipment, piping systems, gages, thermometers, meters, operating instructions and warning plates, protective guards, flange shields, remote shutdown devices, strainer shields, valves and handwheels, insulation and lagging, check valves, steam traps and orifices, regulators and reducing valves, remote operating gear and pull cables, valve reach rods, pipe hangers and braces, valve locking devices, valve position indicators, indicators, gage lines, label plates, relief valves and hand lifting levers, waste heat boiler safety valves and easing gear, sight glasses and guards, fuel strainers, soot blowers, boiler casings, firefighting systems and equipment, handrails, ladders, access door and scuttles, ventilation systems, supply and exhaust vent screens, lighting systems (incandescent, fluorescent, and emergency battle lanterns), electric cables and runs, cable straps, cable packing, cable tags, alarm systems, ground straps, flex hose, resilient-mounts, safety devices, stenciling,

interior communication systems, tachometers, and resiliently mounted pipe hangers.

3.1.2.2 Calibration of gages, thermometers, tachometers, pyrometers, and meters

3.1.2.3 Cold setting of relief valves, gas turbine governors, overspeed trips, piping spring hangers, regulators and reducing valves, high temperature alarms and switches, high and low pressure control switches, low lube oil pressure alarms, waste heat boiler water high and low level alarms

3.1.2.4 Painting

3.1.2.5 Filling of lube oil, fuel oil, and feedwater tanks

3.1.2.6 Bilges shall be clean and gas free, "Safe for Workers"

3.1.3 Complete portions of required test procedures that can be completed without gas turbine engine light-off.

3.2 Correct contractor responsible preliminary LOA discrepancies prior to the turnover of engineering spaces to Ship's Force. The 2-week period prior to the LOA is reserved for Ship's Force preparation for LOA. Contractor work will not be allowed in the engineering spaces during this period unless specifically authorized by the SUPERVISOR.

3.2.1 Submit one legible copy, in electronic media, of a weekly report on the status of completion of preliminary LOA discrepancies. Notify the SUPERVISOR immediately upon determination of any discrepancies that cannot be corrected prior to the scheduled LOA, giving the reason and expected completion date.

3.3 Provide the services of a contractor quick response team during the LOA to correct Government and contractor discrepancies.

3.3.1 Contractor shall coordinate the correction of discrepancies as they are discovered at the direction of the SUPERVISOR.

3.3.2 The quick response team members shall have with them (or readily accessible), the tools of their trade for immediate use in the correction of discrepancies.

#### 4. NOTES:

4.1 The LOA is a comprehensive assessment of the ship in the key areas of: The level of knowledge and state of training of propulsion plant personnel; the adequacy of Engineering Department administrative programs and procedures; the material readiness of the propulsion plant; and the state of cleanliness and preservation of main propulsion and auxiliary machinery spaces. The LOA will be accomplished by the Propulsion Examining Board (PEB)

or the Type Commander Staff. The assessment will be conducted immediately prior to scheduled gas turbine engine light-off and it must be concluded successfully prior to gas turbine engine light-off. The material assessment portion usually takes less than 12 hours. If restrictive discrepancies are identified, those discrepancies must be corrected prior to gas turbine light-off.

4.2 The SUPERVISOR will establish an inspection team, and accomplish a preliminary LOA inspection in conjunction with Ship's Force 4 to 8 weeks prior to the LOA to determine and record discrepancies which would impact upon the LOA. The pre-LOA will be about 4 days in duration and will result in the identification of discrepancies and incomplete work considered necessary to support a successful Light-Off Assessment. Each discrepancy noted in the inspection will be described in simple terms on a 4-part, serialized form. The form will identify the general location of the discrepancy and the associated Work Item number, if applicable. The fourth copy of the form, made of hard card with an attachment wire, will be hung by the SUPERVISOR's inspection team in the immediate proximity of the discrepancy (on the deficient item itself, when practical). Upon completion of the pre-LOA the SUPERVISOR will identify contractor responsible discrepancies to the contractor. Deficient items identified that are the responsibility of the Government will be screened for accomplishment by the Ship's Force. That portion of this work that cannot be accomplished by the Ship's Force will be considered for accomplishment by the contractor.

4.2.1 Any time after completion of the pre-LOA inspection that additional discrepancies are discovered, they will be similarly identified and screened.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-45  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Tapered Plug Valve; repair

2. REFERENCES:

2.1 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Machine, grind, or lap and spot-in plug to bore to obtain an 80 percent minimum surface contact, evenly distributed over 100 percent of the area.

(V) "INSPECT CONTACT"

3.3.1.1 Inspect contact using blueing method.

3.3.1.2 Vertical misalignment of ports in the plug valve and body with the plug fully seated shall not be of a degree that will restrict flow.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.4 Assemble valve installing new packing and gaskets in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.



3.4.1 Lubricate each MIL-V-24509 valve with grease conforming to SAE-AMS-G-6032.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) **"GAGE CHECK"**

3.5.1.3 Master and backup test gages with gage range and graduation shown on Table 504-6-1 of 2.1. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(I) **"SEAT TIGHTNESS"**

3.5.2 Test for seat tightness with valve in closed position with opposite side open for inspection.

3.5.2.1 Plug shall be seated by hand force.

3.5.2.2 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage or, in the event of visible leakage, until accurate determination of leakage can be made.

3.5.2.3 Maximum allowable leakage for a metal-to-metal seated valve: 10 cubic centimeters (cc) per hour, per inch of nominal pipe size; 10 cc maximum per hour for valve sizes less than 1-1/2 inches.

3.5.2.4 Allowable leakage for soft seated plug: None.

(I) **"SEAT TIGHTNESS"**

3.5.3 Test plug valve of duplex strainer to each strainer chamber with unpressurized side top cover removed (2 tests per strainer). Allowable leakage: With the drain valve closed the non-pressurized side shall not fill within one hour.

4. NOTES:

4.1 Test pressures of 3.5.2 and 3.5.3 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-46  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Butterfly Valve, Synthetic and Metal Seated; repair

2. REFERENCES:

2.1 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Polish stem to remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Machine, grind, or lap and spot-in metal-to-metal seat to disc to obtain a leakage rate at or below that allowed in 3.5.5.

3.3.4 Polish seating surface of synthetic seated valve to remove high spots, nicks, and burrs.

3.4 Assemble valve installing new bushings, O-Rings, V-Rings, valve liner, seat assemblies, washers, pins, and fasteners in accordance with manufacturer's specifications or instructions.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) **"GAGE CHECK"**

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.1. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(I) **"SEAT TIGHTNESS"**

3.5.2 Test for seat tightness alternately on each side of the disc with opposite side open for inspection.

3.5.3 Disc shall be seated by hand force.

3.5.4 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage, or in the event of visible leakage, until accurate determination of leakage can be made.

3.5.5 Leakage rate of metal-to-metal seated valves conforming to MIL-V-22133, Type II shall not exceed the following criteria:

<u>Valve size</u> <u>inches</u>	<u>Leakage rate</u> <u>gal/min</u>	<u>Valve size</u> <u>inches</u>	<u>Leakage rate</u> <u>gal/min</u>
2	1.5	10	35
2-1/2	2.25	12	50
3	3.25	14	60
4	6	16	80
5	9.5	18	100
6	14	20	140
8	25	24	200

3.5.5.1 Leakage rate of metal-to-metal seated valves conforming to MIL-V-24624 shall have a maximum seat leakage rate of 10 cubic centimeters per inch of nominal pipe size per hour.

3.5.6 Allowable leakage for synthetic seated valve: None.

4. NOTES:

4.1 The test pressure of 3.5.2 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-47  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Gate Valve; repair

2. REFERENCES:

2.1 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices (Non-Nuclear), User's Guide and General Information

2.2 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

2.3 S9086-RK-STM-010/CH-505, Piping Systems

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Machine, grind, or lap and spot-in gate to seats (including backseat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method. Transfer line shall not exceed 3/16-inch in width and shall appear within the lower 75 percent of the gate seating surface.



(I)(G) "VERIFY LEVEL I PARTS"

3.4 Assemble valve installing new gaskets in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.4.1 Pack feedwater, condensate, and steam valves with valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.1.

3.4.2 Pack valves of systems other than feedwater, condensate, or steam with valve stem packing conforming to MIL-P-24396, Type B.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) "GAGE CHECK"

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.2. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.2 Test for seat tightness alternately on each side of gate for double seated valves, and on outboard side only on single-seated valves, with the opposite side open for inspection.

3.5.2.1 Do not exceed the handwheel closing force specified in Table 505-11-2 of 2.3.

3.5.2.2 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage, or in the event of visible leakage, until accurate determination of leakage can be made. Maximum allowable leakage: 10 cubic centimeters (cc) per hour, per inch of nominal pipe size; 10 cc maximum per hour for valve sizes less than 1-1/2 inches.

4. NOTES:

4.1 The test pressures of 3.5.2 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

4.3 The paragraph referencing this note is considered an (I)(G) if the valve is Level I. If the valve is not Level I, the paragraph is considered a (V)(G).

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-48  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Pressure Seal Bonnet Valve; repair (shop)

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 803-6074287, Repair Guide, Pressure Seal Valves

2.4 803-5001021, Pressure Seal Rings Standard and Oversize Valve Pressure Class 600-1500

2.5 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices (Non-Nuclear), User's Guide and General Information

2.6 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

2.7 S9086-RK-STM-010/CH-505, Piping Systems

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of seats (including back seat), discs, or gate and body inlay area in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Paragraph 7 of 2.2, except hairline cracks in hard-faced areas of seats and discs or gate are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square (RMS) finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Inspect and repair sealing surfaces of inlay area and bonnet as follows:

(V) "VISUAL INSPECT"

3.3.4.1 Inspect valve body to verify that stainless steel inlay is free of steam cuts and cracks and diameter of inlay area is round to within 0.003 inch and free of non-design taper. Measure diameter at top and bottom of inlay area in increments of 45 degrees, on each circle.

3.3.4.2 For the inlay, correct out-of-round, non-design tapered condition and provide 32 RMS finish. Finished inlay diameter shall provide 0.002 to 0.005 inch clearance on the standard size diameter for seal rings described by 2.3.

3.3.4.3 Machine valve bonnet tapered area for concentricity and design angle to within 0.002 inch total indicator reading and 32 RMS finish.

3.3.5 Machine, grind, or lap and spot-in discs or gate to seats (including back seat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.5.1 Inspect contact using blueing method.

3.3.5.2 Transfer line for gate valve shall not exceed 3/16 inch in width and shall appear within the lower 75 percent of the gate seating surface.

3.3.5.3 Transfer line for globe valve shall not exceed 1/16 inch in width.

(I)(G) "VERIFY LEVEL I PARTS AND CLEANLINESS"

3.4 Assemble valve installing new fasteners in accordance with Attachment A.

3.4.1 Install new seal ring in accordance with 2.3, using 2.4 for guidance.

3.4.1.1 The SUPERVISOR must approve fitting new seal ring to inlay bores above first oversize.

3.4.1.2 Attach a metal identification tag to the valve bonnet indicating the size of seal ring installed, straight or tapered body neck, name of installing activity, and date of installation.

3.4.2 Install new valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.5.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) **"GAGE CHECK"**

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.6. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.2 Test gate valve alternately on each side of gate with opposite side open for inspection.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.3 Test globe valve in the direction tending to open valve.

3.5.4 Do not exceed the handwheel closing force specified in Table 505-11-2 of 2.7.

3.5.5 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage, or in the event of visible leakage, until accurate determination of leakage can be made. Maximum allowable leakage: 10 cubic centimeters (cc) per hour, per inch of nominal pipe size; 10 cc maximum per hour for valve sizes less than 1-1/2 inches.



4. NOTES:

4.1 The test pressures of 3.5.2 and 3.5.3 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

4.3 The paragraph referencing this note is considered an (I)(G) if the valve is Level I. If the valve is not Level I, the paragraph is considered a (V)(G).

4.4 Reference 2.4 provides guidance with respect to applicable APLs and other information not in direct conflict with the material and hardness requirements for seal rings specified in 2.3.

ATTACHMENT A

VALVE BODY MATERIAL

	Alloy Steel <sup>1/</sup>	Carbon Steel
Studs and Bolts to MIL-DTL-1222 <sup>2/</sup>	Grade B-16	Grade B-16
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7
Socket Head Cap Screws	FF-S-86	FF-S-86

1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

2/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-49  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Pressure Seal Bonnet Valve; repair (in-line)

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 803-6074287, Repair Guide, Pressure Seal Valves

2.4 803-5001021, Pressure Seal Rings Standard and Oversize Valve Pressure Class 600-1500

2.5 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices (Non-Nuclear), User's Guide and General Information

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of seats (including back seat), discs or gate, and body inlay area in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Paragraph 7 of 2.2, except hairline cracks in hard-faced seats and discs or gate are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square (RMS) finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Inspect and repair sealing surfaces of inlay area and bonnet as follows:

(V) "VISUAL INSPECT"

3.3.3.1 Inspect valve body to verify that stainless steel inlay is free of steam cuts and cracks and that diameter of inlay area is round to within 0.003 inch and free of non-design taper. Measure diameter at top and bottom of inlay area in increments of 45 degrees, on each circle.

3.3.3.2 For the inlay, correct out-of-round, non-design tapered condition and provide 32 RMS finish. Finished inlay diameter shall not exceed oversize number one diameter, plus 0.002 to 0.005-inch clearance described by 2.3.

3.3.3.3 Machine valve bonnet tapered area for concentricity and design angle to within 0.002-inch total indicator reading and 32 RMS finish.

3.3.4 Machine, grind, or lap and spot-in discs or gate to seats (including back seat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method.

3.3.4.2 Transfer line for gate valve shall not exceed 3/16-inch in width and shall appear within the lower 75 percent of the gate seating surface.

3.3.4.3 Transfer line for globe valve shall not exceed 1/16-inch in width.

(I)(G) "VERIFY LEVEL I PARTS AND CLEANLINESS"

3.4 Assemble valve, installing new fasteners in accordance with Attachment A.

3.4.1 Install new seal ring in accordance with 2.3, using 2.4 for guidance.

3.4.1.1 The SUPERVISOR must approve new seal rings to inlay bores above first oversize.

3.4.1.2 Attach a metal identification tag to the valve bonnet indicating the size of seal ring installed, straight or tapered body neck, name of installing activity, and date of installation.

3.4.2 Install new valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.5.

4. NOTES:

4.1 Operational test of the valve will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

ATTACHMENT A

VALVE BODY MATERIAL

	Alloy Steel <sup>1/</sup>	Carbon Steel
Studs and Bolts to MIL-DTL-1222 <sup>2/</sup>	Grade B-16	Grade B-16
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7
Socket Head Cap Screws	FF-S-86	FF-S-86

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-50  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Horizontal Swing Check Valve; repair

2. REFERENCES:

2.1 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Chase and tap exposed threaded areas.

3.3.2 Machine, grind, or lap and spot-in disc to seat to obtain 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.2.1 Inspect contact using blueing method.

3.3.2.2 Transfer line for swing check valve shall not exceed 1/16-inch in width.

3.3.3 Dress and true gasket mating surfaces.

3.4 Assemble valve installing new gaskets, bushings, disc retaining nut, hinge pin, and plug in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) **"GAGE CHECK"**

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.1. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(I) **"SEAT TIGHTNESS"**

3.5.2 Test for seat tightness in the direction tending to close the valve (back pressure) for a minimum of 5 minutes. Allowable leakage as follows:

<u>VALVE SIZE (NOM)</u>	<u>LEAKAGE RATE</u>
Up to 2 inches inclusive	25 cc/hr./in. dia.
2-1/2 inches - 10 inches inclusive	50 cc/hr./in. dia.
Over 10 inches	100 cc/hr./in. dia.

The back pressure applied shall be in accordance with the following:

<u>VALVE PRESSURE RATING</u>	<u>TEST BACK PRESSURE</u>
150 PSIG and Below	50 PSIG
Over 150 PSIG	100 PSIG

4. NOTES:

4.1 None.



ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

2/ Nonferrous Alloy except Aluminum.

3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

5/ Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-51  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Globe, Globe Angle, and Globe Stop Check Valve; repair

2. REFERENCES:

2.1 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices (Non-Nuclear), User's Guide and General Information

2.2 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

2.3 S9086-RK-STM-010/CH-505, Piping Systems

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Machine, grind, or lap and spot-in disc to seat to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method (soft seated valves excluded). Transfer line (hard seated valves) shall not exceed 1/16-inch in width.

(I)(G) "VERIFY LEVEL I PARTS"

3.4 Assemble valve installing new gaskets in accordance with manufacturer's specifications, and fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.4.1 Pack feedwater, condensate, and steam valves with valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.1.

3.4.2 Pack valves of systems other than feedwater, condensate, or steam with valve packing conforming to MIL-P-24396, Type B.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) "GAGE CHECK"

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.2. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.2 Test for seat tightness in the direction tending to open valve.

3.5.2.1 Do not exceed the handwheel closing force specified in Table 505-11-2 of 2.3.

3.5.2.2 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage, or in the event of visible leakage, until accurate determination of leakage can be made. Maximum allowable leakage: 10 cubic centimeters (cc) per hour, per inch of nominal pipe size; 10 cc maximum per hour for valve sizes less than 1-1/2 inches.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.3 Back pressure test globe stop check valve with stem in the open position. Allowable leakage as follows:

<u>VALVE SIZE (NOM)</u>	<u>LEAKAGE RATE</u>
Up to 2 inches inclusive	25 cc/hr./in. dia.
2-1/2 inches - 10 inches inclusive	50 cc/hr./in. dia.
Over 10 inches	100 cc/hr./in. dia.

The back pressure applied shall be in accordance with the following:

<u>VALVE PRESSURE RATING</u>	<u>TEST BACK PRESSURE</u>
150 PSIG and below	50 PSIG
Over 150 PSIG	100 PSIG

4. NOTES:

4.1 The test pressures of 3.5.2 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

4.3 The paragraph referencing this note is considered an (I)(G) if the valve is Level I. If the valve is not Level I, the paragraph is considered a (V)(G).

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	



ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-52  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Relief Valve; repair

2. REFERENCES:

2.1 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square finish and remove raised edges and foreign matter.

3.3.2 Machine, grind, or lap and spot-in metallic disc to seat to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.2.1 Inspect contact using blueing method. Transfer line shall not exceed 1/16-inch in width.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Chase and tap exposed threaded areas.

3.4 Assemble valve installing new packing, soft seats, and gaskets in accordance with manufacturer's specifications and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) **"GAGE CHECK"**

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.1. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(I) **"SHOP TEST"**

3.6 Shop test and set valve to lifting pressure.

3.6.1 Seat tightness test shall be accomplished for a minimum of 3 minutes. Allowable leakage: None.

3.6.2 Purge valve of test medium.

3.6.3 Install wire and lead lock seals.

3.7 Attach a metal tag to valve, stamped with the following information:

3.7.1 Ship name and hull number

3.7.2 Valve number or identification

3.7.3 Valve lifting pressure

3.7.4 Date valve tested and set

3.7.5 Name of repair facility

4. NOTES:

4.1 Test medium, seat tightness, and lifting pressures will be specified in Work Item.

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-53  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Bolted Bonnet Steam Valve; repair (shop)

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices (Non-Nuclear), User's Guide and General Information

2.4 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

2.5 S9086-RK-STM-010/CH-505, Piping Systems

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of seats (including back seat), discs, or gate in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Paragraph 7 of 2.2, except hairline cracks in hard-faced areas of seats and discs or gate are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Machine, grind, or lap and spot-in gate or discs to seats (including back seat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method.

3.3.4.2 Transfer line for gate valve shall not exceed 3/16 inch in width and shall appear within the lower 75 percent of the gate seating surface.

3.3.4.3 Transfer line for globe valve shall not exceed 1/16 inch in width.

(I)(G) "VERIFY LEVEL I PARTS"

3.4 Assemble valve, installing new gaskets in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A.

3.4.1 Install new valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.3.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) "**GAGE CHECK**"

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.4. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***



3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.2 Test gate valve alternately on each side of gate with opposite side open for inspection.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.3)

3.5.3 Test globe valve in the direction tending to open valve.

3.5.4 Do not exceed the handwheel closing force specified in Table 505-11-2 of 2.5.

3.5.5 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage, or in the event of visible leakage, until accurate determination of leakage can be made. Maximum allowable leakage: 10 cubic centimeters (cc) per hour, per inch of nominal pipe size; 10 cc maximum per hour for valve sizes less than 1-1/2 inches.

(V)(G) or (I)(G) "BACK PRESSURE TEST" (See 4.3)

3.5.6 Back pressure test globe stop check valve with stem in the open position. Allowable leakage as follows:

<u>VALVE SIZE (NOM)</u>	<u>LEAKAGE RATE</u>
Up to 2 inches inclusive	25 cc/hr./in.dia.
2-1/2 inches - 10 inches inclusive	50 cc/hr./in.dia.
Over 10 inches	100 cc/hr./in.dia.

The back pressure applied shall be in accordance with the following:

<u>VALVE PRESSURE RATING</u>	<u>TEST BACK PRESSURE</u>
100 PSIG and Below	50 PSIG
Over 150 PSIG	100 PSIG

#### 4. NOTES:

4.1 The test pressures of 3.5.2 and 3.5.3 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

4.3 The paragraph referencing this note is considered an (I)(G) if the valve is Level I. If the valve is not Level I, the paragraph is considered a (V)(G).

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-54  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Bolted Bonnet Steam Valve; repair (in-line)

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices  
(Non-Nuclear), User's Guide and General Information

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of seats (including back seat), discs or gate in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Paragraph 7 of 2.2, except hairline cracks in hard-faced areas of seats and discs or gate are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Clean and spot-in bonnet to body gasket mating surfaces.

3.3.4 Machine, grind, or lap and spot-in gate or discs to seats (including back seat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method.

3.3.4.2 Transfer line for gate valve shall not exceed 3/16-inch in width and shall appear within the lower 75 percent of the gate seating surface.

3.3.4.3 Transfer line for globe valve shall not exceed 1/16-inch in width.

(I)(G) "VERIFY LEVEL I PARTS"

3.4 Assemble valve, installing new gaskets in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A.

3.4.1 Install new valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.3.

4. NOTES:

4.1 Operational test of valve will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-55  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Regulating/Reducing Valve; repair

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of hard-faced metallic seats and discs in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Paragraph 7 of 2.2, except hairline cracks in hard-faced areas of seats and discs are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stems and pushrods to within 0.002-inch total indicator reading. Polish stems and pushrods to a 32 Root-Mean-Square finish in way of packing or seal surfaces and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Machine, grind, or lap and spot-in metallic discs to seats to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method. Transfer line shall not exceed 1/16-inch in width.

3.4 Assemble valve, installing new packing, gaskets, diaphragms, springs, and soft seats in accordance with manufacturer's specifications and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) "**GAGE CHECK**"

3.5.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.3. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(I) "SHOP TEST"

3.5.2 Test and set valve in shop.

3.5.2.1 Test shall be applied for a minimum of 3 minutes.

3.6 Attach a metal tag to valve, stamped with the following information:

3.6.1 Ship name and hull number

3.6.2 Valve number or identification

3.6.3 Valve regulation range and set point

3.6.4 Date valve tested and set

3.6.5 Name of repair facility

4. NOTES:

4.1 Test medium and test pressure for valve inlet and regulated pressure/temperature, shall be specified in the invoking Work Item.

4.2 Nitrogen or air may be used for shop test of steam valves.

4.3 Repairs to pilot control will be specified in Work Item.



ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-56  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Boiler Wet Lay-Up; accomplish

2. REFERENCES:

2.1 S9086-GX-STM-020/CH-220, Boiler Water/Feedwater Test and Treatment

3. REQUIREMENTS:

3.1 Accomplish hydrazine/morpholine wet lay-up of each boiler.

3.1.1 Accomplish the safety and handling of hydrazine in accordance with Paragraph 220-22.71 of 2.1.

3.2 Notify the SUPERVISOR 24 hours prior to lay-up of each boiler.

3.3 Provide the volume of water required to fill the boiler, superheater, economizer, and associated piping by consulting Table 220-22-11 of 2.1. Include an additional 500 gallons for reserve in the total amount required in Table 220-22-11 of 2.1. Water used for lay-up shall conform to the following requirements:

CONSTITUENT or PROPERTY

REQUIREMENT

SHORE STEAM AND CONDENSED SHORE STEAM USED AS FEEDWATER

pH	8.0 to 9.5
Conductivity	25 micromho/cm max
Dissolved Silica	0.2 ppm max
Hardness	0.10 epm max
Total Suspended Solids	0.10 ppm max

SHORE PROCESSED FEEDWATER (DEMINERALIZERS, REVERSE OSMOSIS)

Conductivity	2.5 micromho/cm max (at point of delivery)
Silica	0.2 ppm max

3.3.2 The use of filming amines to control steam/steam condensate pH is prohibited.

3.3.3 Provide a pierside tank that will hold the quantity of feedwater required. The tank shall be used to mix the hydrazine/morpholine solution.

3.3.4 For each 1,000 gallons of water added to the tank, 2,500 milliliters (2/3-gallon) of catalyzed 15-percent hydrazine and 375 milliliters (4/5-pint) of 40-percent morpholine shall be used.

3.3.4.1 Transfer the required amount of hydrazine into narrow mouthed one-gallon or 2-gallon polyethylene bottles with polyethylene or polypropylene screw closures.

3.3.4.2 Transfer the required amount of morpholine to a narrow mouthed pint, quart, or gallon polyethylene bottle as appropriate to the volume needed. Pour the morpholine and hydrazine into the tank.

3.3.4.3 Immediately fill the tank with feedwater to the level calculated in 3.3 for the quantity of hydrazine solution desired.

3.3.5 Remove water from the boiler, superheater, and economizer. Close boiler drains and openings with the exception of steam drum, superheater, and economizer vents.

3.3.6 Immediately fill the boiler, including superheater and economizer, taking suction from the hydrazine/morpholine-treated tank.

3.3.6.1 While filling the boiler, close each vent in turn as the treated water overflows. After the boiler is filled as shown by an overflow from the highest vent, crack each lower vent in turn to ensure that there are no trapped air pockets.

3.4 Maintain positive pressure on the boiler, not to exceed 150 PSIG, using a head tank, nitrogen, or shore steam.

3.5 Determine the hydrazine concentration on the day the boiler is placed under lay-up and weekly thereafter.

3.5.1 Draw a sample through the boiler water sample line after allowing the boiler water to flow for 5 minutes to flush the line. Allow the sample bottle to overflow before capping the bottle to eliminate trapped air.

3.5.1.1 Determine the hydrazine concentration as soon as possible, but within one hour after sampling.

3.5.1.2 The hydrazine concentration will normally be between 30 and 70 ppm. If the hydrazine content falls below 2.5 ppm, the lay-up is lost and the boiler shall be dumped and treated again.

3.6 Drain the superheater and bring the boilers to operating level. Dispose of removed solution in accordance with local, state, and federal regulations.

3.6.1 Do not drain the solution to the bilge.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-57  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Reduction Gear Security Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S9086-H7-STM-010/CH-262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems

2.3 S9086-HK-STM-010/CH-241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components

3. REQUIREMENTS:

3.1 Accomplish the requirements of Paragraph 262-3.10 of 2.2 to prevent entry of foreign matter into the lube oil system during work accomplished by the Work Item.

3.1.1 Notify the ship's Engineering Officer via the SUPERVISOR before opening and closing each main reduction gear or main reduction gear attached components.

3.1.2 Accomplish the requirements of Paragraph 241-3.5.2 of 2.3 to prevent rust/moisture damage to components when the reduction gear is going to remain inoperative in excess of 8 weeks.

3.2 Remove and dispose of system fluids to accomplish the requirements of the Work Item.

3.3 Provide and install temporary machinery protection in accordance with 2.3 and the following requirements:

3.3.1 Establish a limited access area and the physical boundary of the security control area.

3.3.2 The security control area shall be established prior to and maintained during the time an access to the reduction gears is opened.

(V)(G) "INSPECTION/APPROVAL OF SECURITY CONTROL AREA"

3.3.3 Notify the SUPERVISOR prior to opening any clean system or component within the area. The SUPERVISOR shall inspect and approve the security control area prior to start of work.

3.3.4 Maintain on site Accountability Logs, Attachments A and B, of all tools and equipment entering and leaving the security control area to verify adherence to the requirements set forth in 3.6.

3.3.4.1 Inspect the log at the beginning and end of each shift to ensure that it describes the equipment and tools within the security control area.

3.3.4.2 Use Attachment A to log all tools and equipment.

3.3.4.3 Use Attachment B, for shift turnover verification.

3.3.5 Post warning signs at the entry points to the security control area and limited access area to maintain control of the area and inform personnel that the reduction gear is open.

3.3.5.1 Set up Limited Access Area with rope/line and signs to restrict unnecessary traffic.

3.3.6 Provide 24-hour continuous on-site surveillance by contractor personnel in the area as long as the reduction gear is exposed.

3.3.6.1 Policing of limited access area shall be routine while gear is exposed.

3.4 Observe Ship's Force security control/accountability measures.

3.5 Provide reduction gear security during periods that require the gear train to be exposed from access openings where direct or indirect paths to gearing will result.

3.5.1 Notify the ship's Engineering Officer or designated representative prior to disassembly and removal of the following gear casing components:

3.5.1.1 Hinged, pinned, or bolted gear casing covers, inspection ports, and plates

3.5.1.2 Sight flow indicators, gear mesh spray nozzles, thermometers, and associated fittings

3.5.1.3 Oil supply and return piping, vent lines, fittings, and plugs.



3.5.2 The ship's Engineering Officer or designated representative shall be present at all times when external connections are attached to the reduction gear casing, oil sump, and oil piping.

3.5.3 Assemble an enclosure made from Herculite or canvas covering conforming to A-A-55308 over the top of the reduction gear housing, lashing the bottom of the enclosure to the deck structure or piping at deck level.

3.5.3.1 Snaps, staples, or similar shall not be used on enclosure. Utilize heavy duty zippers and Velcro hook-pile. Secure all grommets attached to enclosure with line or lanyard to prevent loss of grommets.

3.5.3.2 Lash the top edge of the enclosure to overhead structural members to form a work area over and around the reduction gear casing.

3.5.3.3 Lace the top flaps to the sides. The top shall utilize a center joint if lifting gear is utilized. Unlace center joint when utilizing lifting gear.

3.5.3.4 Lace all but one of the corners to each other, utilizing stiffeners, to form a secure work area. The unlaced corner shall be used for a security door constructed to be capable of being secured. Stencil "CONTROLLED AREA - AUTHORIZED PERSONNEL ONLY" on the sides and top of the enclosure or install signs at enclosure boundaries.

3.5.4 The surrounding limited access area shall be secured and policed to remove overhead or local dirt, loose objects, or any potential security violating objects prior to and during gear exposure.

(V)(G) "PRE-OPENING CLEANLINESS"

3.5.5 Prior to opening casing, ensure no foreign material exists on adjacent surfaces that could contaminate the internal areas upon lifting casing covers, piping, and associated equipment.

3.5.6 Construct a temporary cover over openings of the gear train, in addition to the required limited access area controls, if it becomes necessary to stop work with the casing/covers removed.

3.6 Prepare an Accountability Log, Attachment A, immediately after limited access area has been approved by the SUPERVISOR, but prior to opening an access. Maintain the Accountability Log while reduction gears and attached components are open.

3.6.1 Station a Control Watch at the enclosure door/flap and maintain Attachment A for all material and hardware which is small enough to fit inside access opening.

3.6.2 The Control Watch shall record the date and time in the appropriate block on Attachment A each time accountability is started or stopped, and each time access is opened or closed. The log shall be turned over to another Control Watch before the access is closed. The outgoing Control Watch and the incoming Control Watch shall sign Attachment B to show that all items recorded as "in" are accounted for.

3.6.3 Any material permanently or temporarily installed shall be noted as such in the remarks column on Attachment A.

3.7 Inspection equipment, tools, and personnel clothing shall be captured, secured, and accounted for to preclude introduction of foreign matter into the reduction gear.

3.7.1 Acceptable methods of capturing are:

3.7.1.1 Drilling and lockwiring

3.7.1.2 Tackwelding or silver brazing

3.7.1.3 Using nylock-type locking devices

3.7.1.4 Upsetting or staking threads

3.7.1.5 Attaching a lanyard

3.7.1.6 Taping with duct tape

3.7.2 All personnel working in or around an open gear casing shall have all eye glasses, buttons, zippers, and other loose items on their clothing properly taped to prevent them from breaking loose and falling into the gear casing. All jewelry, pens, change, metal objects, loose items, etc., shall be removed from the person and clothing pockets prior to entering area.

3.8 Notify the SUPERVISOR in all matters involving foreign material retrieval from the reduction gear. Report all incidents breaching reduction gear security to the ship's Engineering Officer or Engineering Duty Officer via the SUPERVISOR, followed by a written Critique Report Form, Attachment C.

3.8.1 Submit one legible copy, in hard copy or electronic media, of each incident report within 4 hours after notification to the SUPERVISOR.

3.8.2 The SUPERVISOR will review each incident report and decide if a trouble report is required.

3.8.2.1 Use Attachment D for the trouble report.

(V)(G) "INSPECTION PRIOR TO FINAL CLOSURE"

3.9 Accomplish a visual inspection of the exposed reduction gear and associated components prior to installing access covers and openings. Ensure no foreign matter has entered or remains within the reduction gear and/or components. Inspect ledges, including the underside of ledges, pockets, gear teeth, and bearing journals and caps, using mirrors, periscopes, and borescopes.

3.9.1 The inspection shall be made jointly with the SUPERVISOR and the ship's Engineering Officer or designated representative.

3.9.2 Prior to final closure verify that all tools and equipment listed on Attachments A and B have been either logged out satisfactorily or are annotated as installed, permanently or temporarily, in the remarks column.

3.9.2.1 Accountability shall stop when the access is closed.

3.9.3 Turn over Attachments A and B to the SUPERVISOR at time of final closure.

3.10 Disassemble and remove the enclosure and limited area boundary when directed by the SUPERVISOR.

3.11 Accomplish the requirements of 009-32 of 2.1 for new and disturbed surfaces.

#### 4. NOTES:

4.1 In support of emergency inspections, limited inspections or minor repairs to the propulsion reduction gear, the requirements for a security control area may be omitted at the discretion of the SUPERVISOR with the concurrence of the ship's Engineering Officer. If the security control area is precluded during these special circumstances, the security of the reduction gear shall be maintained.

4.1.1 The requirements for contractor accountability cannot be waived.

4.2 Definitions of terms used are:

4.2.1 Clean Work Area: An area requiring a cleanliness/accountability level at least equal to that required for in-shop repair of similar equipment to permit the easy recovery of any dropped tools, material, etc. This area shall be free of excess moisture and contaminants, i.e., abrasive materials resulting from blasting, grinding, or other particle generating processes. Areas where this condition would apply are inspection and/or access covers removed or open.

4.2.2 Security Control Area: An area or enclosure that provides a physical boundary around access opening (Herculite) which will preclude the inadvertent introduction of any uncontrolled personnel, tools, equipment or foreign material. This area shall always meet the requirements of a Clean Work Area and can be upgraded to a Limited Access/Exclusion Area. A Controlled Area shall always require Physical Separation.

4.2.3 Full Enclosure: An enclosure that has all edges (sides, top, and bottom) secured with cabling that is woven through grommets and secured to stanchions, foundations, deck grating, etc. The enclosure will be considered adequately secured if a person cannot enter through any opening other than the designed entry accesses.

4.2.4 Limited Access Area: An area requiring the maximum level of concern and accountability for personnel and material. During this condition a Full Enclosure is required. This type of area isolation is required where the recovery of dropped or broken material would be difficult and/or requires extensive rework of the task in progress. The Full Enclosure shall be locked when unattended by production and during the unattended time keys shall be controlled by the Ship's Engineering Office. An area established outside the security control area to limit the personnel allowed to enter the reduction gear area and is intended to prevent unnecessary traffic.

4.2.5 Accountability: The method used to maintain foreign material exclusion from reduction gears by keeping a formal record (accountability log) of all materials, including tools and hardware that may pass through access opening.

## ACCOUNTABILITY LOG

SHIP/HULL \_\_\_\_\_ SPEC. ITEM \_\_\_\_\_ SYSTEM-LOCATION \_\_\_\_\_

\* The person designated to sign for an action verifies, based on personal observation, and certifies by their signature that the action has actually been performed in accordance with the specified requirements.

ATTACHMENT B

SHIP/HULL\_\_\_\_\_ SPEC. ITEM\_\_\_\_\_ SYSTEM-LOCATION\_\_\_\_\_

Logged items remaining within the exposed location at the change of shift shall be verified present by the in-coming and out-going control watches. This verification shall be accomplished by physically checking the area and confirming those items required to be logged. Both the outgoing and incoming shift control watches shall sign the shift turnover verification to certify that the remaining items have been physically verified, no unnecessary items are left in accountability area, containments are satisfactory, and area is cleaned.

[illegible]

THIS LOG IS CLOSED. ALL ITEMS ARE ACCOUNTED FOR AS INDICATED.

Inspector\*\* \_\_\_\_\_ Date/Time \_\_\_\_\_ Supervisor\*\* \_\_\_\_\_ Date/Time \_\_\_\_\_

\* The person designated to sign for an action verifies, based on personal observation, and certifies by their signature that the action has actually been performed in accordance with the specified requirements.

\*\* The person designated to sign for an action verifies, based on personal observation, certified records of direct reports from control watches, and certifies by their signature that the action has been performed in accordance with the specified requirements.

ATTACHMENT C  
CRITIQUE REPORT FORM

SHIP NO.	PREPARED BY:
TIME/DATE:	CRITIQUE SER NO:
	(Code      Yr.      Seq. No)

NOTE:

- (1) If the information of items 1-14 is available, a formal critique meeting is not required.
- (2) Provide the following information on supplemental sheets. List all facts in detail and in sequences. Provide timing of events and list individuals involved with their respective shop or code number. List temporary corrective actions and determine causes.

Topic of Discussion and Report	Sign	Topic of Discussion and Report	Sign
1. Description of incident		8. List damage incurred	
2. Location of incident.		9. What is the basic cause of this problem? Include background info.	
3. Discovered by/time/date.		10. Is a trouble report recommended? List reason.	
4. List in order the immediate actions taken/actions taken by whom/identify persons notified.		11. Was a formal critique meeting necessary to provide the above info?	
5. Identify any work stopped and by whom; identify what must be accomplished prior to resuming work stopped.		12. Include Ship's CO or EDO or EOOW remarks.	
6. Identify work in progress/related to problem and include system or plant conditions.		13. Provide applicable shop/technical code concurrence.	
7. Were temporary corrective actions adequate? Were additional actions necessary and taken? Identify.		14. Supplementary info attached to this critique report form.	

ATTACHMENT C  
SUPPLEMENTAL PAGES

1. DESCRIPTION OF INCIDENT

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2. LOCATION OF INCIDENT

SPACE (NAME) \_\_\_\_\_

FRAME \_\_\_\_\_

LEVEL \_\_\_\_\_

3. DISCOVERED BY:

NAME \_\_\_\_\_

RANK OR POSITION \_\_\_\_\_

TIME (NAVY) \_\_\_\_\_ DATE \_\_\_\_\_

4. LIST IN ORDER THE IMMEDIATE ACTIONS TAKEN AND BY WHAT PERSONS:

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IDENTIFY PERSONS NOTIFIED:

NAME \_\_\_\_\_ RANK/POSITION \_\_\_\_\_

NAME \_\_\_\_\_ RANK/POSITION \_\_\_\_\_

NAME \_\_\_\_\_ RANK/POSITION \_\_\_\_\_

NAME \_\_\_\_\_ RANK/POSITION \_\_\_\_\_

NAME \_\_\_\_\_ RANK/POSITION \_\_\_\_\_

5. IDENTIFY ANY WORK STOPPED AND BY WHOM:

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(a). IDENTIFY WHAT MUST BE ACCOMPLISHED BEFORE THIS WORK MAY BE RESTARTED:

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6. IDENTIFY WORK CURRENTLY IN PROGRESS WHICH IS RELATED TO THE INCIDENT:

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OPERATING CONDITIONS OF SHIP AND/OR STATUS OF SYSTEMS OR COMPONENTS AT TIME OF INCIDENT:

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7. WERE TEMPORARY CORRECTIVE ACTIONS ADEQUATE?

YES ☐

NO ☐ IDENTIFY:

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(a) WERE ADDITIONAL ACTIONS NECESSARY?

YES ☐

NO ☐ IDENTIFY:

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8. LIST DAMAGE INCURRED:

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ATTACHMENT C (CON'T)

9. WHAT IS THE BASIC CAUSE OF THE PROBLEM?

PERSONNEL ☐  
PROCEDURE ☐  
EQUIPMENT ☐  
OTHER ☐

BRIEF DESCRIPTION:

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10. IS A TROUBLE REPORT RECOMMENDED?

YES ☐

NO ☐ IDENTIFY:

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11. WAS A FORMAL CRITIQUE MEETING NECESSARY TO PROVIDE THE ABOVE INFORMATION?

YES ☐

NO ☐

12. SHIP'S CO, EDO, OR EOOW REMARKS:

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13. APPLICABLE SHOP/TECHNICAL CODE CONCURRENCE:

NAME: \_\_\_\_\_ SHOP/CODE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

14. SUPPLEMENTARY INFORMATION:

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ORIGINATOR

(PRINT OR TYPE)

NAME: \_\_\_\_\_

POSITION: \_\_\_\_\_

DATE: \_\_\_\_\_

\_\_\_\_\_  
SIGNATURE

ATTACHMENT D

TROUBLE REPORT NO. \_\_\_\_\_

SHIP \_\_\_\_\_ DATE OF ISSUE \_\_\_\_\_

TIME/DATE OF INCIDENT \_\_\_\_\_

PRELIMINARY \_\_\_\_\_ FINAL \_\_\_\_\_

1. Summary of incident.

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2. Description of incident and general description of apparent cause.

Design ☐ Material ☐ Personnel ☐ Procedure ☐

A. Description of incident.

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B. Discussion of apparent cause.

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3. Operating conditions of ship and/or status of system or components.

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4. Immediate temporary corrective action taken and results.

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5. PERMANENT CORRECTIVE ACTION.

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ATTACHMENT D (CON'T)

6. AREAS OF RESPONSIBILITY FOR FURTHER SHIPYARD EVALUATIONS.

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7. SIMILAR TROUBLE REPORTS.

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8. ORIGINATOR(S):

\_\_\_\_\_  
DATE: \_\_\_\_\_

\_\_\_\_\_  
DATE: \_\_\_\_\_

9. CONCURRENCES:

\_\_\_\_\_  
Code 605, Repair Dept Control Mgr  
DATE: \_\_\_\_\_

\_\_\_\_\_  
Code 300, Quality Assurance Officer  
DATE: \_\_\_\_\_

\_\_\_\_\_  
Code 240, Chief Design Engineer  
DATE: \_\_\_\_\_

10. Approved:

\_\_\_\_\_  
Code 600, Repair Officer  
DATE: \_\_\_\_\_

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-58  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Pump and Driver Shaft Alignment; accomplish

2. REFERENCES:

2.1 S6226-JX-MMA-010, Instruction Manual for the Indicator Reverse Method of Pump Shaft Alignment

2.2 803-6397419, Standard Machinery Shim Kits

3. REQUIREMENTS:

3.1 Measure pump and driver shaft alignment using the indicator reverse method and the mathematical equations or graphs or alignment computer in accordance with 2.1.

3.1.1 Determine soft foot and correct in accordance with Section 2-2 of 2.1. Shims shall be in accordance with 2.2.

(V) or (V)(G) "INSPECT PIPING ALIGNMENT" (See 4.4)

3.2 Inspect piping alignment in accordance with Section 2-3 of 2.1 prior to removal and at installation.

3.2.1 Submit one legible copy, in hard copy or electronic media, of a report listing results of the requirements of 3.2 to the SUPERVISOR.

3.3 Measure indicator sag in accordance with Section 2-4 of 2.1.

(V)(G) "COLD ALIGNMENT" (See 4.5)

3.4 Align each shaft to the offset and angular alignments in accordance with the cold alignment settings invoked in the Work Item (see 4.1). Cold alignments for horizontally mounted machinery shall be accomplished in accordance with Chapter 2, Sections 2-1 through 2-7 of 2.1, and vertically mounted machinery shall be in accordance with Chapter 5, Sections 5-1 through 5-3 of 2.1.

3.4.1 Submit one legible copy, in hard copy or electronic media, of a completed alignment data collection form (Page 7-2 of 2.1) for the results of the requirements of 3.4 to the SUPERVISOR.

3.5 Align shafts so that offset and angular alignments are acceptable when the unit is hot. Acceptable alignment tolerances shall be based on the rated speed of the pump and the alignment tolerance listed in Table 1-1 of 2.1 (see 4.2). Hot alignments for horizontally mounted machinery shall be accomplished in accordance with Chapter 2, Section 2-1 through 2-8 of 2.1. Accomplish hot alignment check only on units that the cold alignment has been compensated for thermal growth. (Hot alignment readings must be taken within 30 minutes of shutting down unit).

3.5.1 Fit and install new chocks and shims conforming to ASTM A 240 to accomplish alignment. Shims shall be in accordance with 2.2.

3.5.2 Drill and ream foundations. Fit and install new SAE-AMS-QQ-S-763, Grade 304, dowels in each unit to retain final satisfactory unit alignment in accordance with Section 2-8 of 2.1.

(V)(G) "FINAL HOT ALIGNMENT"

3.6 Accomplish a final hot alignment check of horizontally mounted pumps with dowels installed.

3.6.1 Submit one legible copy, in hard copy or electronic media, of a report listing results of the requirements of 3.6 to the SUPERVISOR. The report shall include the following:

3.6.1.1 Ship's name and hull number

3.6.1.2 Contractor and subcontractor

3.6.1.3 Job Order and Work Item number

3.6.1.4 Identity of pump aligned

3.6.1.5 Completed alignment data collection form (Page 7-2 of 2.1) for final hot alignment condition

#### 4. NOTES:

4.1 Reference that contains the cold setting alignment will be identified in the invoking Work Item.

4.2 Hot alignment criteria if different from zero will be identified in the invoking Work Item.

4.3 Motor driven units must be run a minimum of 4 hours to achieve operating temperature. Turbine driven unit must be run a minimum of 2 hours to achieve operating temperature.

4.4 (V) is invoked for prior-to-removal inspection. (V)(G) is invoked for installation inspection.

4.5 (V)(G) is invoked only when hot alignment is not required.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-59  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Organotin Antifouling Material; control

2. REFERENCES:

2.1 S9086-VD-STM-010/CH-631, Preservation of Ships in Service

3. REQUIREMENTS:

3.1 Accomplish work associated with application, removal, or disturbance of organotin materials in accordance with 2.1, using this item for control, clean-up, safety precautions, and environmental practices.

3.1.1 Apply and dispose of organotin material in accordance with federal, state, and local **laws, codes, ordinances, and** regulations.

3.1.2 Personnel with occupational exposure to organotin shall be in the medical monitoring program.

3.1.3 Safety and environmental protection shall include total encapsulation of the work site.

3.1.3.1 Blank ship intake ventilators and close hatches within the work site enclosure to prevent entry of paint, blasting particles, or vapors into the ship. Take precautions to prevent circulation of paint mists and vapors throughout the interior of the ship.

3.1.3.2 Remove all unnecessary equipment from the containment.

3.1.4 Accomplish the following clean-up at the completion of the painting or blasting operation:

3.1.4.1 Sweep (in a wet state) or vacuum all dry dock and equipment surfaces after painting or blasting.

3.1.4.2 Clean up accidental spills immediately.

3.1.4.3 Decontaminate keel blocks, staging, planks, suspended platforms, dry dock, or equipment surfaces contaminated with organotin paint prior to reuse.

3.1.5 Provide personal protective equipment (PPE) for personnel as follows:

3.1.5.1 Organotin workers shall wear protective impervious clothing, including gloves, aprons, suits, hoods, and boots when needed to prevent skin contact.

3.1.5.2 Abrasive blasting operators, in addition to their regular protective clothing, shall wear rubber boots and impervious coveralls as outer garments. All openings shall be taped.

3.1.5.3 Blasters/blasting support personnel (personnel within the work area containment) shall use self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand mode, or a combination supplied-air respirator with full facepiece and an auxiliary self-contained air supply operated in pressure-demand mode.

3.1.5.4 Protective equipment shall be cleaned before/after use.

3.1.5.5 Personnel handling potentially contaminated items shall wear rubber gloves and disposable coveralls.

3.1.5.6 Where small areas of paint removal are required, a small containment shall be set up around the area. Paint removal other than blasting shall be used to remove paint a minimum of 6 inches on either side of repair.

3.1.6 Provide training for all personnel involved in the application, removal, disturbance, or disposal of organotin and support personnel. Training shall be documented.

3.1.6.1 Training shall include the hazards, physical symptoms, appropriate emergency procedures, and proper conditions and precautions for the safe handling or use of organotin to workers in areas where exposure may occur. Additionally, training shall include the use of PPE and shall ensure that personnel have a knowledge of job hazards, proper maintenance, clean up methods, and respirator usage.

3.1.7 As a minimum, the following safety and health precautions shall be enforced:

3.1.7.1 No eating, drinking, or smoking in work areas.

3.1.7.2 Protective clothing must be worn.

3.1.7.3 Avoid inhaling vapor, dust, mist, or fumes.

3.1.7.4 Avoid direct contact of paint with skin.

3.1.7.5 Avoid eye and skin contact with mist or spray.

3.1.7.6 After working with organotin and immediately upon removal of protective clothing, personnel must shower using soap and water unless otherwise informed.

3.1.7.7 Avoid contact between hands and mouth if hands have been exposed to the material.

3.1.8 Post the exposure zone whenever organotin work is in progress.

3.1.8.1 During the application, removal or disturbance of organotin, a sign must be posted at each entrance to the work area and at each entrance to the dry dock reading: ANTI-FOULING PAINT CONTAINING ORGANOTIN BEING APPLIED OR REMOVED.

3.1.8.2 Work areas shall be posted with signs stating PPE requirements.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-60  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Schedule and Associated Reports; provide and manage

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Definitions.

3.1.1 Production Schedule: The schedule used by contractor and subcontractor personnel as a means of planning, tracking, and coordinating the accomplishment of contract work.

3.1.2 Activity: A portion of an individual Work Item which is a logical subdivision of the Work Item representing a manageable unit of work which must be accomplished at a specific period of time in relation to other activities of the Job Order.

3.1.3 Event: The beginning or ending point of an activity.

3.1.4 Key Event: An event that, if slippage occurs, could impact or delay the overall schedule. Key events may be identified by either the contractor or the SUPERVISOR.

3.1.5 Milestone: A significant event identified in the solicitation.

3.1.6 Critical Path: That sequence of activities which forms the longest duration, and directly affects the completion of the availability. Factors in determining critical path are: time duration required for the activity, space limitations, manpower available, and the interface between Work Item activities.

3.1.7 Controlling Work Items: Those Work Items which are on the critical path of the Job Order and those Work Items which, by virtue of scope, material requirements, complexity, or other considerations, have the potential for impact on the scheduled completion of the availability.

3.1.8 Network: A graphic display showing the planned sequence and interdependent relationship of activities, milestones, and key events within the Job Order.

3.1.9 Total Float: The total number of days that a path of activities can be delayed without affecting the project finish date.

3.2 Prepare, provide, and submit one legible copy, in electronic media, of a production schedule to the SUPERVISOR for availabilities of 10 days to 64 days in duration 5 days after award. For availabilities of 65 to 120 days in duration, provide no later than 15 days after contract award. For availabilities greater than 120 days in duration, provide no later than 30 days after contract award. The production schedule shall establish an orderly and systematic overhaul program that reflects the manner in which the project will be performed. Schedule shall be inclusive of milestones and key events, and known Alteration Installation Team (AIT), Commercial Industrial Services (CIS), and Fleet Maintenance Activity (FMA) work.

3.2.1 Schedule each Work Item to the activity level that shall list the start and completion dates for each activity in sufficient detail that can be measured toward each milestone.

3.2.2 Assign each activity in the production schedule a short title to describe the nature of the activity and equipment or machinery involved.

3.2.3 Schedule shall identify submission dates of required reports.

3.2.4 Schedule shall identify the critical path and controlling Work Items within the Job Order.

3.2.5 Identify the amount of total float available on each Work Item activity based on a 5-day workweek unless otherwise specified. Show each early and late start and finish date.

3.2.6 The Production Schedule shall be revised weekly to include additions, deletions, modifications, progress, and completions.

3.2.6.1 Submit one legible copy, in electronic media, of the Production Schedule to the SUPERVISOR one day prior to the weekly progress meeting.

3.3 Prepare a time-oriented work package network that displays critical path Work Items and controlling Work Items, milestones, key events, and Work Items that interrelate with controlling Work Items. Display critical path and controlling Work Items at the activity level.

3.3.1 The network may be partitioned into sub-networks by milestones, ship's system, ship area, or other logical divisions.

3.3.2 The network or any sub-network thereof may be continued on additional pages. Each page of the network or sub-networks shall be clearly identified and show all off page interdependencies.

3.3.3 Label each Work Item, activity, milestone, and key event of the network with the activity or event identifier (ID) and title.

3.3.4 Submit one legible copy, in electronic media, of the network to the SUPERVISOR in accordance with the requirements of 3.2.

3.3.5 Schedule 5 additional controlling Work Items as designated by the SUPERVISOR during the availability.

3.3.6 Revise the network weekly in support of the weekly production schedule revisions of 3.2.6.

3.3.6.1 Each revised network shall be available for review by the SUPERVISOR.

3.3.6.2 Submit one legible copy, in electronic media, of the revised network to the SUPERVISOR at the 50 percent point in the availability. The SUPERVISOR may, at his discretion, designate the submittal of a revised network at 2 other times during the availability.

3.4 Provide milestone and key event listing.

3.4.1 After development of the schedule and network, generate a listing of milestones and key events, showing for each: Event Title, Original Schedule Date, Revised Schedule Date, and Actual Date of Accomplishment.

3.4.1.1 The revised schedule date and actual date of accomplishment shall be left blank on the initial submission and filled in to reflect actual conditions on subsequent submission of the listing.

3.4.1.2 Submit one legible copy, in electronic media, of the milestone and key event list to the SUPERVISOR in accordance with the requirements of 3.2, and provide subsequent weekly reports to the SUPERVISOR reflecting contemporary contract performance.

3.5 Provide manpower management information.

3.5.1 Develop a total manpower loading curve showing proposed manning throughout the contract period in men per day. The curve shall indicate that portion of the total that is subcontractor provided.

3.5.2 Develop individual key trade manning curves showing proposed manning by trade throughout the contract period in men per day. The curves shall indicate that portion of the total that is subcontractor provided.

3.5.3 Prepare a weekly manpower utilization report showing total mandays expended during the previous week, indicating that portion of the

total that is subcontractor provided. Indicate the number of days worked during the previous week.

3.5.4 Submit one legible copy, in electronic media, of the manpower curves developed in 3.5.1 and 3.5.2 to the SUPERVISOR in accordance with the requirements of 3.2.

3.5.5 Update the manpower curves of 3.5.1 and 3.5.2 when the schedule and network revisions are completed.

3.5.5.1 Submit one legible copy, in electronic media, of the updated manpower curves to the SUPERVISOR at the 25, 50, and 75 percent points in the availability.

3.6 Manage and schedule subcontractor's performance with respect to work progress, material procurement, and interface control to support the production schedule.

3.6.1 Submit one legible copy, in electronic media, of a complete list of subcontractors, by Work Item to the SUPERVISOR at the same time the production schedule is submitted. The subcontractor list shall include:

3.6.1.1 Work Item paragraph number

3.6.1.2 Specific work to be accomplished

3.6.1.3 Subcontractor's business address

3.6.2 Submit one legible copy, in electronic media, of a report to the SUPERVISOR of the changes to the original list prior to making the change whenever any subcontractor is added or deleted.

3.7 Prepare a test plan by Work Item for hydrostatic, operational, weight, and safety device tests required by the Job Order, indicating start dates for tests scheduled.

3.7.1 The test plan shall include:

3.7.1.1 Work Item and paragraph.

3.7.1.2 Description of equipment(s) undergoing test(s) and type of test(s), e.g., hydrostatic, operational, etc.

3.7.1.3 Reference document(s), e.g., Technical Manual, Design Test Memo (DMT), Test Procedure, etc.

3.7.1.4 Scheduled start and completion dates of test(s).

3.7.2 Submit one legible copy, in electronic media, of the test plan to the SUPERVISOR in accordance with the requirements of 3.2.

3.7.3 Revise the test plan of 3.7 weekly to reflect the addition, deletion, or modification of Work Items, and changes made by the contractor.

3.7.3.1 Submit one legible copy, in electronic media, of the revised test plan to the SUPERVISOR one day prior to progress meeting.

3.7.4 Coordinate tests to be accomplished with the SUPERVISOR one working day prior to execution. This coordination is in addition to test/inspection notification requirements.

3.8 Provide cognizant shipyard management representation to participate in the weekly progress meeting at the time and location mutually agreeable to all parties. The representative must be authorized to make management decisions relative to the routine requirements of the Job Order that, in good faith, commit the contractor.

3.8.1 Submit one legible copy, in electronic media, of the following information to the SUPERVISOR one working day prior to the weekly progress meeting:

3.8.1.1 The manpower utilization data required by 3.5.3.

3.8.1.2 A report listing for each Work Item of the Job Order, the Work Item number, Work Item title, scheduled start date, scheduled completion date, actual start date, and the percentage complete. The report shall address changes to the milestones and key events list and major problems of each Work Item and proposed corrective action. The Work Items shall be listed in increasing order, by Work Item number. The report shall reflect the addition, deletion, or modification of Work Items. Completed Work Items need not be addressed.

3.8.1.3 A report listing contractor and Government furnished material not received, showing the Work Item number and title, material description, expected delivery date, required delivery date, and action proposed to resolve problems resulting from late delivery. Material with expected delivery dates before the required delivery date need not be listed in this report.

3.8.1.4 A report listing late or deficient government furnished information, showing the associated Work Item number, deficiency description, and proposed corrective action.

3.8.1.5 A report of overdue contractor condition reports by Work Item number and expected submission date. The report shall also include those deficiency and condition reports for which Government response is outstanding.

3.8.1.6 The revised weekly test schedule required by 3.7.3.

3.9 Provide a representative whose only function is to coordinate Ship's Force, AIT, CIS, and FMA work with contractor work.



3.9.1 Representative shall meet with the Ship's Force, AIT, CIS, and FMA no later than 5 days prior to availability start date and then daily thereafter commencing on the first day of the availability to compare and coordinate programmed Ship's Force, AIT, CIS, and FMA work with the contractor schedule. The representative shall submit a report at the weekly progress conference of conflicts where programmed Ship's Force, AIT, CIS, and FMA work interferes with the contractor schedule.

3.9.2 Representative shall identify at the weekly progress conference Ship's Force, AIT, CIS, and FMA actions necessary to support contractor testing and equipment operation schedule.

3.10 Participate in review conferences at the 25, 50, and 75 percent points in the availability. Data required to be provided at the 25, 50, and 75 percent points will be used at the review conferences. The conferences will be scheduled at a time and place mutually agreeable to all parties. The contractor shall:

3.10.1 Be prepared to discuss planned production manning versus actual production manning by total, individual key trades and subcontractors.

3.10.2 Address known factors that may impact milestones and the contract completion. Provide recommended courses of action to resolve problem areas.

3.10.3 Determine the most realistic completion date of the Job Order.

3.10.4 Two days prior to the 25 percent review conference, provide the SUPERVISOR with the status of open and inspect reports and be prepared to discuss possible impact of growth in these items at the 25 percent review conference.

3.10.5 Three days prior to the 50 percent review conference, provide the SUPERVISOR with the following:

3.10.5.1 A machinery reinstallation plan showing projected dates for installing the equipment on the foundation, hook-up of the equipment, and operational tests of the equipment.

3.10.5.2 A valve status list showing projected completion and reinstallation dates.

3.10.5.3 A list of items not complete that are required for Production Completion Date (PCD), formerly known as machinery space turnover. Annotate those items on the list that may be in jeopardy of completing by PCD.

3.10.6 Two days prior to the 75 percent review conference, provide the following to the SUPERVISOR:

3.10.6.1 A list of outstanding Light-Off Assessment (LOA) items with projected completion dates.

3.10.6.2 A test schedule for underway replenishment equipment.

4.NOTES:

4.1 The SUPERVISOR will provide the Ship's Force, AIT, CIS, and FMA availability data required in 3.9.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-61  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Shipboard Use of Fluorocarbons; control

2. REFERENCES:

2.1 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

2.2 NFPA Standard 306, Standard for the Control of Gas Hazards on Vessels

2.3 40 CFR Part 82, Protection of Stratospheric Ozone, Subpart F

3. REQUIREMENTS:

3.1 Accomplish work associated with the use of fluorocarbons aboard ship in accordance with this item.

3.2 Maintain at the work site a copy of the credentials of the Competent/Qualified Person who will monitor atmosphere, inspect and certify spaces are safe to enter, and who will supervise all activities.

3.2.1 A Qualified Person is defined as a National Fire Protection Association Certified Marine Chemist, an Industrial Hygienist, or a Competent Person as defined in 2.1. These Qualified Persons shall be capable of specifying the necessary protection and precautions to be taken during fluorocarbon operations, as designated in 2.1 and 2.2.

3.3 Maintain a copy of the following at the work site:

3.3.1 Identification of hose/piping routes and steps to be taken to protect hoses along those routes

3.3.2 Type and location of warning signs

3.3.3 Type and location of portable ventilation required

3.3.4 Means of communication to be utilized

3.3.5 Type of hoses and material compatibility to fluorocarbons

3.3.6 Type of emergency breathing devices that are immediately accessible

3.3.7 Type and location of portable oxygen and halide monitoring detectors/alarms

3.3.8 Emergency evacuation and rescue procedures

3.3.9 Open flame and hot work controls

3.3.10 Results of preliminary tests, ensuring system integrity and absence of leakage

3.3.11 Provisions for periodic inspections that include adjacent spaces to ensure work area containment and work practices are effective

3.4 Submit written notification to the SUPERVISOR and the Commanding Officer's designated representative at least 4 hours, but not more than 24 hours prior to commencement, each time fluorocarbons are utilized aboard ship for any purpose. Identify the time, location, and purpose of each evolution. Notify the SUPERVISOR and designated ship's representative immediately prior to the actual start and upon completion of each evolution.

3.4.1 Deliver notification of work planned Tuesday through Friday to the Commanding Officer's designated representative at least 30 minutes and not more than 24 hours preceding start of work.

3.4.2 Deliver notification of work planned over a weekend or Monday following that weekend to the Commanding Officer's designated representative no later than 0900 on the Friday immediately preceding that weekend.

(I) "INSPECT FLUOROCARBON EQUIPMENT"

3.5 A certified technician shall, as required by 2.2, pressure test the fluorocarbon charging and flushing handling equipment, i.e., hoses, piping, valves, fittings, and manifolds, using dry nitrogen with trace amounts of HCFC-22 compound at 150 percent of charging equipment working pressure within 30 days prior to use aboard ship. Hold test pressure for 15 minutes. Allowable leakage: None.

3.5.1 Attach a solid metal tag with the following to each piece of equipment passing test:

3.5.1.1 Name and address of testing facility

3.5.1.2 Description of equipment

3.5.1.3 Date of test

3.5.1.4 Test pressure

(I)(G) "INSPECT WORK SITE AND PROCESS PRIOR TO FLUOROCARBON OPERATIONS"

3.6 Inspect work site to ensure the following prior to fluorocarbon operations:

3.6.1 Provide ventilation to maintain oxygen content above 19.5 percent and not greater than 22.0 percent by volume in spaces where fluorocarbon compounds are in use.

3.6.2 Establish and maintain telephone communication between the pumping station and the space involved when the fluorocarbon compound is being transferred by hose or pipe.

3.6.3 Ensure that all personnel in a space where fluorocarbon operations are being carried out have an emergency escape breathing device (EEBD) in their possession or in the immediate area so that they can quickly don the units in case of a leak.

3.6.3.1 Each person shall have received instruction and practice in the use of the particular EEBD to be used, prior to entering each space where fluorocarbon operations are being carried out.

3.6.4 Suspend hot work in spaces prior to hook-up, test, and disconnect operations in which fluorocarbon compounds are exposed to the atmosphere.

3.6.4.1 Hot work is permitted in spaces traversed by lines carrying fluorocarbon compounds provided the lines are clearly tagged and no hot work is attempted within 3 feet of a tagged line.

3.6.5 Provide a halide monitor with alarm or equivalent instrument to continuously monitor the atmosphere in spaces where fluorocarbon compounds are used. If the concentration of fluorocarbon compound in the space exceeds the threshold limit value for the compound (where the instrument is set to alarm), clear the space of personnel, notify Quarterdeck Watch immediately and the SUPERVISOR as soon as practical but not more than 30 minutes after the instrument alarms.

3.6.6 Post a caution sign in the area and at each entrance to the area.

3.6.6.1 The sign shall read: CAUTION: No open flames. Do not enter without testing the air for fluorocarbons.

3.6.6.2 The sign letters shall be at least one-inch high.

3.6.7 Provide a minimum of 2 people familiar with the operation while a fluorocarbon compound is being used in quantities exceeding 10 pounds.

3.7 Accomplish preliminary pressure tests of charging/flushing equipment after connecting aboard ship each time equipment is used. Pressure shall

equal 100 percent of charging/flushing equipment working pressure. Hold test pressure for 15 minutes. Allowable leakage: None.

3.7.1 Ensure charging equipment is isolated from equipment to be charged prior to test.

3.8 A certified technician shall, as required by 2.3, ensure that fluorocarbon gases are not vented to the interior of the ship or to the atmosphere when pressure is released from the system by utilizing reclaiming/recycling equipment tested and certified by an Environmental Protection Agency (EPA) approved laboratory or organization.

3.8.1 Collect CFC's and HFC's for either recycling back into the same system/piece of equipment from which the material was removed or recovering the CFC's for turn-in.

#### 4. NOTES:

4.1 Following are examples of commonly used fluorocarbon compounds:

Trichlorofluoromethane, Freon 11, R-11 (CFC-11)  
Dichlorodifluoromethane, Freon 12, R-12 (CFC-12)  
Chlorotrifluoromethane, R-13 (also component of R-503) (CFC-13)  
Pentachlorofluoroethane (CFC-111)  
Tetrachlorodifluoroethane (CFC-112)  
1,1,2 Trichloro-1,2,2 Trifluoroethane, Freon 113, Freon TF,  
Freon PCA, Genetron 113 (CFC-113)  
1,2 Dichlorotetrafluoroethane, R-114, Freon 114 (CFC-114)  
Chloropentafluoroethane, R-115 (also component of R-502) (CFC-115)  
Heptachlorofluoropropane (CFC-211)  
Hexachlorodifluoropropane (CFC-212)  
Pentachlorotrifluoropropane (CFC-213)  
Tetrachlorotetrafluoropropane (CFC-214)  
Trichloropentafluoropropane (CFC-215)  
Dichlorohexafluoropropane (CFC-216)  
Chloroheptafluoropropane (CFC-217)  
Tetrafluoroethane (HFC-134a)

4.2 EEED equipment for Government representatives will be provided by the Government.

4.3 ODS material must be procured as Government Furnished Material (GFM) from the DOD ODS Reserve. Notify the SUPERVISOR at least 14 working days prior to anticipated usage.

4.4 The following definitions are delineated by Navy policy:

4.4.1 Recover - To remove refrigerant in any condition from a system and store it in an external container without necessarily testing or processing it in any way.

4.4.2 Recycle - To reduce contaminants in used refrigerant by oil separation and single or multiple passes through devices such as replaceable core filter dryers that reduce moisture, acidity and particulate matter. The term usually applies to procedures implemented at the field job site or at a local service shop.

4.4.3 Reclaim - To reprocess refrigerant to new product specifications by means that may include distillation. Chemical analysis of the refrigerant is required to determine that appropriate product specifications are met. This usually implies the use of processes or procedures that are available only at refrigerant reprocessing or manufacturing facilities.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-62  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Boiler Handhole and Manhole Seats and Plates; inspect

2. REFERENCES:

2.1 S9221-C1-GTP-010, Repair and Overhaul Main Propulsion Boiler

2.2 803-841216, Handhole Plates and Arch Bars for Boilers

3. REQUIREMENTS:

3.1 Remove handhole and manhole plates from headers and drums of boilers. Plates shall be identified and tagged as to respective boilers.

3.2 Wire brush clean to bare metal handhole and manhole plates, studs, strongbacks, and fasteners. Wire brush clean to bare metal handhole and manhole gasket seating surfaces using a power driven wire cup brush. Ensure complete removal of rust and gasket material.

3.2.1 Wire brush clean to bare metal external surfaces in way of "B" and "C" measurement contact areas using a power-driven wire wheel or needle gun.

3.3 Visually inspect gasket seating surfaces of handhole and manhole plates and the drum and header for erosion, corrosion, gouges, steam cuts, crack indications, excessive pitting, grooves, and any irregularities that may cause poor or leaky joints. Inspect external surfaces of headers in way of "B" and "C" measurement areas for erosion and corrosion. Inspect studs and nuts for deterioration and damaged and stripped threads.

3.3.1 Visually inspect, measure, and record the following handhole and manhole gasket seating surface criteria in accordance with Paragraph 5-8.2 of 2.1 and Attachment A.

3.3.1.1 Seat taper: Use template of flat stock and feeler gage to measure maximum taper around periphery of handhole and manhole seats.

3.3.1.2 Minimum wall thickness: Measure header wall thickness using a point micrometer at each side of the header cross sectional minor axis.



3.3.1.3 Minimum seat thickness: Measure header seat thickness with a flat-faced micrometer at the 4 points of the header cross sectional major and minor axis.

3.3.1.4 Handhole Plate Overlap: Measure maximum gap clearance between shoulder of the handhole plate and handhole with handhole plate located in the most extreme misaligned position. Subtract the measurement from the plate seat width to establish the amount of plate overlap. Handhole plates used for measurements shall conform to 2.2.

3.3.1.5 Manhole Plate Clearance: Measure clearance between shoulder of manhole plate and manhole at 8, 45-degree increments, with the manhole plate accurately centered.

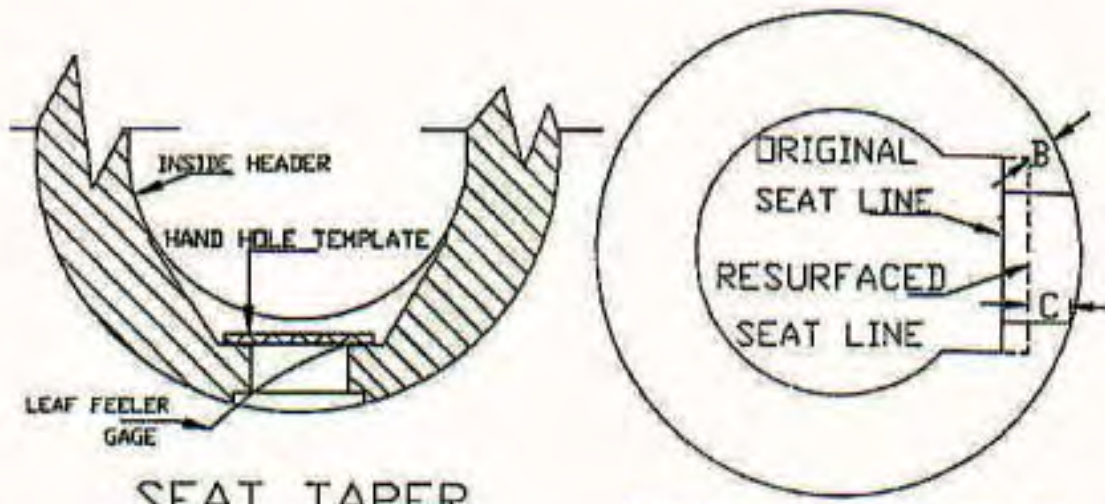
3.4 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.3 to the SUPERVISOR. Report shall list each handhole and manhole seat which failed to meet the minimum allowable values listed in Appendices 5D, 5E, and 6C of 2.1.

3.5 Install handhole and manhole plates, using new gaskets conforming to MIL-G-15342 and applicable boiler technical manual.

4. NOTES:

4.1 Equipment technical manual will be listed in the invoking Work Item.

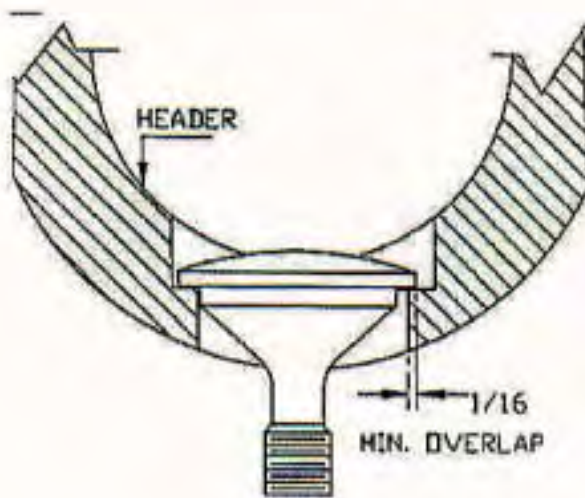
ATTACHMENT A



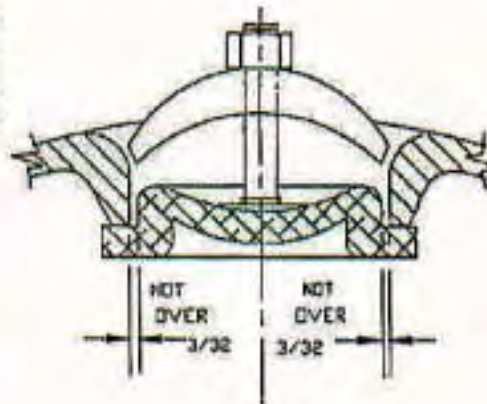
SEAT TAPER

MIN.WALL THICKNESS-DIM. B  
MIN.SEAT THICKNESS-DIM. C

MIN. WALL & SEAT \_



OVERLAP



MANHOLE  
CLEARANCE

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-63  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Lubricating Oils and Hydraulic Fluids; analyze

2. REFERENCES:

2.1 S9086-H7-STM-010/CH-262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems

2.2 S9086-S4-STM-010/CH-556, Hydraulic Equipment (Power Transmission and Control)

2.3 S9086-HB-STM-010/CH-233, Diesel Engines

3. REQUIREMENTS:

3.1 Provide samples (lubricant oil or hydraulic fluids) to a certified laboratory as listed in Table 262-4-2 of 2.1.

3.2 Accomplish tests of each sample in accordance with the specified test methods of Attachment A or Attachment B.

3.2.1 Test selections shall be based on the sample type and service.

3.3 Analyze samples for metal content and water contamination by utilizing a spectrographic analysis in accordance with ASTM D-6595.

3.3.1 Determine if water contamination is fresh or salt water based on high sodium levels.

3.3.2 Record and report the concentration of the following elements in ppm with the indicated degree of accuracy:

IRON	COPPER	TIN	MAGNESIUM	LEAD
ALUMINUM	SILVER	CHROMIUM	NICKEL	SILICON
SODIUM				

3.3.2.1 The sensitivity and reliability of the equipment used for the test shall be in accordance with ASTM D-6595.

3.4 Accomplish specific gravity test for each MIL-H-19457 hydraulic fluid sample and determine hydrocarbon oil content in accordance with Table 556-8-1 of 2.2.

3.5 Submit one legible copy, in hard copy or electronic media, of a report listing completed test results of 3.2 through 3.4 for each sample to the SUPERVISOR.

3.5.1 Reports shall be submitted within 48 hours after the qualified chemical laboratory receives each sample.

3.5.2 Reports shall include recommendations for continued use, disposal, or re-sampling of each tested oil or fluid sample.

3.6 Use Table 262-4-1 of 2.1 and Table 556-8-1 of 2.2 for guidance for test accept and reject criteria for each in-service sample.

3.6.1 Use Table 233-8-2 of 2.3 for test accept and reject criteria for 9000 Series lube oil/MIL-PRF-2104 lube oil.

3.7 Submit one legible copy, in hard copy or electronic media, of original manufacturer's certificate of compliance and material conformance test data in accordance with Military Specifications listed in Attachment A and Attachment B, 7 working days prior to use of new fluids and oils.

4. NOTES:

4.1 Ship's Force will label all samples in accordance with 2.1 and 2.2.

ATTACHMENT A  
LUBRICATING OILS

ASTM TEST METHOD	MIL-PRF-17672 MS-2075-TH MS-2110-TH MS-2135-TH	MIL-PRF-17331 MS-2190-TEP	MIL-PRF-9000 9250	MIL-PRF-2104 15W/40	MIL-PRF-23699	VV-L-825
FUEL DILUTION VIA FLASH POINT ASTM D93			X	X		
PERCENT WATER ASTM D6304	X	X		<b>X</b>		X
VISCOSITY ASTM D445		X	X	X	X	
ACID NO. ASTM D974	X	X		<b>X</b>	X	X
TOTAL BASE NO. ASTM D2896			X	X		
SPECTROGRAPHIC ANALYSIS ASTM D6595	X	X	X	X	X	X

ATTACHMENT B  
HYDRAULIC FLUIDS

ASTM TEST METHOD	MIL-DTL-17111	MIL-H-19457	<b>MIL-PRF-2104</b> MIL-PRF-17672 MS-2075-TH MS-2110-TH MS-2135-TH	MIL-PRF-17331 MS-2190-TEP	MIL-H-22072
FLASH POINT ASTM D92	X				X
PERCENT WATER ASTM D95					X
PERCENT WATER ASTM D6304	X	X	X	X	
VISCOSITY ASTM D445	X		X	X	
ACID NO. ASTM D974	X	X	X	X	
PARTICLE COUNT NAS/SAE 4059 (Automatic Particle Count Method)	X	X	X	X	X

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-64  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Synthetic Fire-Resistant Hydraulic Fluid; control

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Accomplish the following for control of MIL-H-19457 and/or MIL-H-22072 Synthetic Fire-Resistant Hydraulic Fluid:

3.1.1 Monitor and exercise positive control of accesses to and egresses from areas in which the hydraulic fluid is being handled.

3.1.1.1 Post warning signs at entrances and in work areas (2-inch minimum letters on signs) stating: CAUTION: SYNTHETIC FIRE-RESISTANT HYDRAULIC FLUID HANDLING. UNAUTHORIZED PERSONNEL KEEP OUT.

3.1.1.2 All areas shall be roped off or otherwise secured and identified.

3.1.2 Hydraulic fluid shall be contained and immediately cleaned up in event of spill.

3.1.2.1 Rags in sufficient quantity shall be on hand to clean up and control spills.

3.1.2.2 Plastic bags for disposal of oily rags shall be available and partially filled or filled bags removed at the end of each shift.

3.1.2.3 Used fluid shall be pumped into drums stenciled: USED SYNTHETIC FLUID, for disposal.

3.1.3 Requirements for handling:

3.1.3.1 In addition to normal personal protective equipment (PPE), rubber gloves, face shields, and rubber aprons shall be used by personnel handling fire-resistant hydraulic fluid.

3.1.3.2 Spills on clothing shall be cause to remove clothing and rinse in fresh water.

3.1.3.3 Spills on skin shall be washed with soap and rinsed with fresh water.

3.2 Report verbally each spill in excess of 5 gallons as soon as management becomes aware of such an event.

3.2.1 Submit one legible copy, in electronic media, of a formal written report of the event to the SUPERVISOR within 24 hours.

3.3 Upon completion of work the contractor shall notify the SUPERVISOR in writing of the completion of the work, certifying that the area is cleaned and that the area is safe to enter.

4. NOTES:

4.1 None.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-65  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Polychlorinated Biphenyls (PCBs); control

2. REFERENCES:

2.1 40 CFR Part 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

2.2 Toxic Substances Control Act (TSCA)

3. REQUIREMENTS:

3.1 Visually inspect equipment suspected of containing PCBs for leaks, deterioration, and corrosion prior to opening, removing, or installing equipment.

3.1.1 Submit one legible copy, in electronic media, of a report | listing results of the inspection conducted in 3.1 to the SUPERVISOR if PCBs are identified.

3.2 Consider wool felt to contain PCB's and chromium.

3.2.1 Submit one legible copy, in electronic media, of a report | listing the type of wool felt (gasket or damping material), location, and approximate quantity to the SUPERVISOR.

3.3 Provide a copy of a control, method of removal, and disposal plan in accordance with 2.1 and/or 2.2 to the SUPERVISOR.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-66  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Light-Off Assessment (LOA) Support for Diesel Propulsion System; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Complete work in the main propulsion machinery spaces, steering gear room, shaft alleys, pump rooms, auxiliary machinery rooms, designated fuel tanks, and feedwater tanks prior to the scheduled Light-Off Assessment (LOA). For availabilities in excess of 120 days, Production Completion Date (PCD) will be scheduled 14 days prior to the LOA. For availabilities 120 days or less, PCD will be scheduled between 3-14 days prior to propulsion plant light-off. Repairs, installations, testing, and adjustments of auxiliary machinery, systems, and equipment outside those spaces which support the main propulsion system directly, indirectly, or for emergencies shall also be completed.

3.1.1 The term complete is defined to mean the accomplishment of contractor responsible work that is possible without lighting off the main propulsion diesel engines until after a successful Light-Off Assessment.

3.1.2 The following work shall be complete:

3.1.2.1 Repair and installation of machinery, equipment, blowers, piping systems, gages, thermometers, meters, operating instructions and warning plates, protective guards, flange shields, remote shutdown devices, strainer shields, valves and handwheels, insulation and lagging, check valves, steam traps and orifices, regulators and reducing valves, remote operating gear and pull cables, valve reach rods, pipe hangers and braces, valve locking devices, valve position indicators, indicators, gage lines, label plates, relief valves and hand lifting levers, boiler safety valves and easing gear, sight glasses and guards, fuel strainers, soot blowers, boiler casings, fire fighting systems and equipment, handrails, ladders, access doors and scuttles, ventilation systems, supply and exhaust vent screens, lighting systems (incandescent, fluorescent, and emergency battle lanterns), electric cables and runs, cable straps, cable packing, cable tags, alarm systems,

ground straps, flex hoses, resilient mounts, safety devices, stenciling, interior communication systems, tachometers, and resiliently-mounted pipe hangers.

3.1.2.2 Calibration of gages, thermometers, tachometers, pyrometers, and meters.

3.1.2.3 Cold setting of relief valves, diesel engine governors, overspeed trips, piping spring hangers, regulators and reducing valves, high temperature alarms and switches, high and low pressure control switches, low lube oil pressure alarms, ship service boiler water high and low level alarms.

3.1.2.4 Painting.

3.1.2.5 Filling of lube oil, fuel oil, and feedwater tanks.

3.1.2.6 Bilges shall be clean and gas free, "Safe for Workers."

3.1.3 Complete portions of required test procedures that can be completed without diesel engine light-off.

3.2 Correct contractor responsible preliminary LOA discrepancies prior to the turnover of engineering spaces to Ship's Force. The 2-week period prior to the LOA is reserved for Ship's Force preparation for LOA. Contractor work will not be allowed in the engineering spaces during this period unless specifically authorized by the SUPERVISOR.

3.2.1 Submit one legible copy, in electronic media, of a weekly report on the status of completion of preliminary LOA discrepancies. Notify the SUPERVISOR immediately upon determination of any discrepancies that cannot be corrected prior to the scheduled LOA, giving the reason and expected completion date.

3.3 Provide the services of a contractor quick response team during the LOA to correct Government and contractor discrepancies.

3.3.1 Coordinate the correction of discrepancies as they are discovered at the direction of the SUPERVISOR.

3.3.2 The quick response team members shall have with them (or readily accessible), the tools of their trade for immediate use in the correction of discrepancies.

#### 4. NOTES:

4.1 The LOA is a comprehensive assessment of the ship in the key areas of: The level of knowledge and fire fighting capability of propulsion plant personnel; the adequacy of Engineering Department administrative programs and procedures; the material readiness of the propulsion plant; and the state of

cleanliness and preservation of main propulsion and auxiliary machinery spaces. The LOA will be accomplished by the Propulsion Examining Board (PEB) or the Type Commander Staff. The assessment will be conducted immediately prior to scheduled diesel engine light-off and it must be concluded successfully prior to diesel engine light-off. The material assessment portion usually takes less than 12 hours. If restrictive discrepancies are identified, those discrepancies must be corrected prior to diesel engine light-off.

4.2 The SUPERVISOR will establish an inspection team and accomplish a preliminary LOA inspection in conjunction with Ship's Force 4 to 8 weeks prior to the LOA to determine and record discrepancies which would impact upon the LOA. The pre-LOA will be about 4 days in duration and will result in the identification of discrepancies and incomplete work considered necessary to support a successful Light-Off Assessment. Each discrepancy noted in the inspection will be described in simple terms on a 4-part, serialized form. The form will identify the general location of the discrepancy and the associated work Item number, if applicable. The fourth copy of the form, made of hard card with an attachment wire, will be hung by the SUPERVISOR'S inspection team in the immediate proximity of the discrepancy (on the deficient item itself, when practical). Upon completion of the pre-LOA the Supervisor will identify contractor responsible discrepancies to the contractor. Deficient items identified that are the responsibility of the Government will be screened for accomplishment by the Ship's Force. That portion of this work that cannot be accomplished by the Ship's Force will be considered for accomplishment by the contractor.

4.2.1 Any time after completion of the pre-LOA inspection that additional discrepancies are discovered, they will be similarly identified and screened.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-67  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Integrated Total Ship Testing; manage

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Prepare and manage an Integrated Total Ship Test Management Plan.

3.1.1 Define and document the responsibility, lines of authority, and interrelation of personnel who manage, perform, or verify work.

3.1.2 Include a schedule of the restoration of ship's installed services to support completion of Stage 5 testing.

3.1.3 Include a procedure for reporting problems in delivery dates of the Contractor furnished material (CFM), Government furnished material (GFM), Government furnished equipment (GFE), and Government furnished information (GFI) for ship's systems.

3.1.4 Include organizational responsibility for equipment and system installation, repair, maintenance, start-up, operation, and test.

3.1.5 Submit one legible copy, in electronic media, of the Management Plan to the SUPERVISOR not later than 15 working days prior to availability start date.

3.2 Develop an Integrated Total Ship Test Plan, using GFI for guidance.

3.2.1 Include a shipyard Test Sequence Network (TSN) and test schedule, with Government and Contractor responsibilities defined.

3.2.2 Include required external services, with Government and Contractor responsibilities.

3.2.3 Include a list of necessary test equipment and software, with required dates and responsible provider.

3.2.4 Include organizational responsibility for equipment operation and accomplishment of testing, including Government and Contractor manning requirements.

3.2.5 Include a list of SUPERVISOR, contractor, Alteration Installation Team (AIT), and Ship's Force key test team personnel, with test sign-off authority.

3.2.6 Include administrative procedures for submittal of Test Problem Reports (TPRs), Test Procedures (TPs), Test Failure Reports (TFRs), and test status.

3.2.7 Include identification and display of the combat system critical path for testing.

3.2.8 Include provision for completion of total ship testing through Stage 5 prior to dock trials.

3.2.9 Define the requirements of both Contractor and Government for general and special purpose test equipment, weapon test shapes, dummy loads, and test weights, to accomplish total ship testing. Identify known and anticipated deficiencies in required type, quantity, calibration, or availability, to support the production or test schedule.

3.2.10 Submit one legible copy, in electronic media, of the Test Plan to the SUPERVISOR at the start of the availability.

### 3.3 Develop and manage a Total Ship Testing Task Group.

3.3.1 The group shall consist of representatives of the SUPERVISOR, Contractor, AIT Team(s) on scene, and Ship's Force.

3.3.2 A Contractor representative shall act as Chairman. Decisions remain subject to approval of the SUPERVISOR.

3.3.2.1 Provide the status of Total Ship Testing. Document problems impeding progress of meeting scheduled dates or of satisfying technical requirements.

3.3.2.2 Maintain minutes and agendas. Minutes shall include a list of attendees, action items with assignments, highlights of proceedings, and identified problems with their potential impact.

3.3.2.3 Distribute copies of the minutes to the members not later than 2 working days after each meeting.

### 3.4 Manage Total Ship Testing.

3.4.1 Accomplish the requirements of the Test Plan of 3.2.

3.4.2 Coordinate testing in accordance with the Test Plan.

3.4.3 Coordinate stationing of test personnel in accordance with the Test Plan. Provide test procedures and test data sheets to test personnel.

3.4.4 Coordinate the performance of each test procedure and the recording of each test result on data sheet provided in Attachment A.

3.4.4.1 Ensure sufficient information is provided on the comment sheet for any identified discrepancy, including corrective action.

3.4.4.2 Submit one legible copy, in hard copy or electronic media, of completed data sheets and test procedures for each test in accordance with the Test Plan to the SUPERVISOR within 5 working days of test completion. Include the documentation of each test procedure not completed, and reasons for incompleteness.

3.4.5 Coordinate preparations for sea trials.

3.4.6 Develop a test status report that summarizes the results of the test and certification program.

3.4.6.1 Provide the rationale for test procedures not attempted, incomplete, or failed.

3.4.6.2 Provide details and status of test procedures that were completed with discrepancies.

3.4.7 Submit one legible copy, in hard copy or electronic media, of the test status report to the SUPERVISOR not later than 5 working days after completion of availability.

#### 4. NOTES:

4.1 The ship's Commanding Officer will provide personnel for recording data during Ship's Force/Government responsible total ship testing.

4.2 GFI required to develop the Test Plan may include: Integrated Test Package (ITP), Total Ship's Test Requirements Index (TSTR), Test Index, Test Summary, and known AIT test requirements.

4.3 Stage 5 testing is that testing normally conducted between 2 or more sub-elements within the combat, mobility, support, or containment areas of the ship.

ATTACHMENT A

TEST PERFORMANCE, RESPONSIBILITY/WITNESS RECORD

TEST PROCEDURE: \_\_\_\_\_ TITLE: \_\_\_\_\_

SHIP'S NAME: \_\_\_\_\_ HULL NO.: \_\_\_\_\_

TEST PERFORMANCE

TEST RESULTS / STATUS (Check all that apply)

- |   |  |
|---|--|
| <input type="checkbox"/> Complete                 | <input type="checkbox"/> Failed        |
| <input type="checkbox"/> Complete w/Discrepancies | <input type="checkbox"/> Not attempted |
| <input type="checkbox"/> Incomplete               | <input type="checkbox"/> Aborted       |

If TPR issued TPR #: \_\_\_\_\_

Comments: \_\_\_\_\_

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TEST RESPONSIBILITY / WITNESS

Test performed by:    ☐ Contractor    ☐ Ship's Force    ☐ Government

Print and Sign Name: \_\_\_\_\_

Position and Responsibility: \_\_\_\_\_

If SF/GOV:    Ship/Agency Name: \_\_\_\_\_

Dept/Code: \_\_\_\_\_

Tel/Fax Number: \_\_\_\_\_

Test witnessed by:    ☐ Contractor    ☐ Ship's Force    ☐ Government

Print and Sign Name: \_\_\_\_\_

Position and Responsibility: \_\_\_\_\_

If SF/GOV:    Ship/Agency Name: \_\_\_\_\_

Dept/Code: \_\_\_\_\_

Tel/Fax Number: \_\_\_\_\_

Test record received by:    ☐ SUPERVISOR (Only)

Print and Sign Name: \_\_\_\_\_

Position and Responsibility: \_\_\_\_\_

Tel/Fax Number: \_\_\_\_\_



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-68  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Bolted Bonnet Valve; repair

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 S9253-AD-MMM-010, Maintenance Manual for Valves, Traps, and Orifices  
(Non-Nuclear), User's Guide and General Information

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of seats (including back seat), discs, or gate in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Paragraph 7 of 2.2, except hairline cracks in hard-faced areas of seats and discs or gate are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002-inch total indicator reading. Polish stem to a 32 Root-Mean-Square finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Clean and spot-in bonnet to body gasket mating surfaces.

3.3.4 Machine, grind, or lap and spot-in gate or discs to seats (including back seat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.4.1 Inspect contact using blueing method.

3.3.4.2 Transfer line for gate valve shall not exceed 3/16 inch in width and shall appear within the lower 75 percent of the gate seating surface.

3.3.4.3 Transfer line for globe valve shall not exceed 1/16 inch in width.

(I)(G) "VERIFY LEVEL I PARTS"

3.4 Assemble valve, installing new gaskets in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.4.1 Pack feedwater, condensate, and steam valves with valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.3.

3.4.2 Pack valves of systems other than feedwater, condensate, or steam with valve stem packing conforming to MIL-P-24396, Type B.

4. NOTES:

4.1 Operational test of valve will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-69  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Heavy Weather Plan; provide

2. REFERENCES:

- 2.1 845-6686999 Rev E, US Navy Vessel Water Depth, Mooring and Hull/Appendage Clearance Requirements for Transit and Berthing
- 2.2 DDS 582-1, Design Data Sheet, Calculations for Mooring Systems
- 2.3 S9086-TW-STM-010/CH-582, Mooring and Towing
- 2.4 UFC 4-159-03, Mooring Design

3. REQUIREMENTS:

3.1 **Maintain** a written plan that shall be implemented during gales, storms, hurricanes, and destructive weather, including mooring calculations in accordance with 2.1 and 2.2, using 2.3 and 2.4 for guidance. **The documented Heavy Weather Plan shall be submitted to the SUPERVISOR for a document review and acceptance. The contractor shall have an acceptable documented Heavy Weather Plan, in accordance with this Standard Item, in place no later than 15 days prior to availability start date. The Heavy Weather Plan shall be subject to periodic conformity audits by the SUPERVISOR throughout the contract.**

3.1.1 Submit updated or changed plans to the SUPERVISOR as they occur.

3.2 Ensure that the plan designates responsibility and implements procedures for prevention of damage to naval ships, craft, barges, and lighters. This includes periods when ships, craft, barges, and lighters are physically located in private contractors' plants; during times when work on ships, craft, barges, and lighters at naval facilities requires openings to hulls or decks; and when contractor owned/furnished floating equipment is tied alongside ships, craft, barges, and lighters.

3.2.1 The plan shall contain specific responsibilities and detailed actions to be taken during the weather conditions listed below.

3.2.2 Conditions where there is substantial advance warning for approaching adverse weather are addressed by the following 4 categories:

3.2.2.1 Gale/Storm/Hurricane Condition IV: Trend indicates a possible threat of destructive winds of force indicated within 72 hours.

3.2.2.2 Gale/Storm/Hurricane Condition III: Destructive winds of force indicated are possible within 48 hours.

3.2.2.3 Gale/Storm/Hurricane Condition II: Destructive winds of force indicated are anticipated within 24 hours.

3.2.2.4 Gale/Storm/Hurricane Condition I: Destructive winds of force indicated are anticipated within 12 hours or less.

3.2.3 Conditions where there is little or no advance warning for approaching adverse weather are addressed by the following 2 categories:

3.2.3.1 Thunderstorm/Tornado Condition II: Destructive winds accompanying the phenomenon indicated are reported or expected in the general area within 6 hours. Lightning and thunder are also anticipated.

3.2.3.2 Thunderstorm/Tornado Condition I: Destructive winds accompanying the phenomenon are imminent. Lightning and thunder are also anticipated.

3.3 Ensure that the plan contains, as a minimum, the following information as dictated by conditions listed in 3.2:

3.3.1 Steps to be taken to remove or secure staging items or equipment on decks of ships, craft, barges, and lighters, pier or dry dock, including cranes that could become wind-borne.

3.3.2 Protection of ships, craft, barges, and lighters from damage from other floating equipment, such as barges, doughnuts, work floats, and other ships, craft, barges, and lighters.

3.3.3 Provisions for protection of government equipment and material in custody of the contractor from damage by pierside flooding.

3.3.4 Provisions for removal of temporary hoses, welding lines, air lines, oxygen/acetylene lines, etc., extending through watertight closures.

3.3.5 Provisions for security, emergency fire and flooding protection, emergency shipboard dewatering and fire main capability, emergency shipboard electrical generation, and emergency shipboard communications.

3.3.5.1 Specific requirements for emergency shipboard fire main capability are shown on Attachment A.

3.3.5.2 The minimum requirements for emergency shipboard electrical generation equipment are shown on Attachment B.

3.3.5.3 One portable dewatering pump and associated equipment shall be available adjacent to each damage control equipment box such that 200 gal/min at a discharge head of 50 feet of dewatering capacity can be used at the scene of a casualty within 3 minutes of receiving an alarm. Additional dewatering capacity to provide 1,000 gal/min at a discharge head of 50 feet at the scene shall be available within 15 minutes. During the waterborne overhaul period, no damage control system associated with flooding prevention and control or any portion thereof shall be removed or made inoperable without prior notification of the Supervisor and to the casualty-control station and until a back-up system has been established.

3.3.6 Provisions for access to the ship for personnel and emergency equipment during and immediately following the storm consistent with prudent safety precautions.

3.3.7 Assurance that all hull/deck openings are made watertight.

3.3.8 Steps to be taken to secure floating piers during high winds/high tides.

3.3.9 Provisions for messing contractor, Ship's Force, and SUPSHIP duty personnel for 3 days (minimum). The maximum number of Navy personnel will be 15.

3.3.10 The name and telephone number (business and residential) of the private contractor's single point of contact. This person shall have the authority to commit the contractor to take necessary actions as requested by the SUPERVISOR.

3.3.11 Provisions for operation and manning of a Hurricane Control Center, with capabilities of telephone and portable radio communications with the ship and SUPSHIP duty personnel.

3.4 Ensure that the plan contains the following mooring related information:

3.4.1 Specify steps to be taken to secure ships, craft, barges, and lighters to contractor's pier, dry dock, graving dock, marine railway, or **contractor's** other facility. Information must define specific precautions to be taken and supporting calculations, to include limits of docking blocks and dock stability for both normal and heavy weather conditions. Calculations for heavy weather configurations shall include wind and tidal considerations.

3.4.1.1 Provide the heavy weather state at which the ship must be undocked.

3.4.2 Submit mooring calculations for the worst anticipated loading condition during the availability. For ships with a self-compensating fuel



system, the loading condition shall show the self-compensation fuel system full of water, fuel, or some combination of fuel and water, projecting the worse possible condition as shown in calculations for maintaining ship's stability. Determine the combined loading due to wind load from each direction and both peak flood and ebb current loads at low and high tides. Calculations may require re-submittal if significant changes occur from the original estimate on which the calculations were based.

3.4.3 For ships in dry dock, provide limits and supporting calculations for listed conditions. Analyze both the "normal" dock configuration and the "heavy weather" configuration.

3.4.3.1 Maximum safe wind speed and surge for side block strength and stability. Include maximum loading of the side blocks on ship.

3.4.3.2 Maximum safe wind speed and surge for dry dock strength and stability.

3.4.3.3 Surge required to float ship.

3.4.3.4 Table or graph showing safe combinations of wind speed and surge.

3.4.4 For ships pierside, provide limits and supporting calculations for ship loading conditions specified in 3.4.2. Analyze the "heavy weather" mooring configuration that would be used during the conditions specified in 3.2. Analyze worst-case wind directions including frontal, broadside, and quartering.

3.4.4.1 Maximum safe wind speed for mooring strength. Include strength of pier, pier fittings, mooring lines, and shipboard fittings. Maximum applied load on any mooring line shall be the breaking strength of the mooring line divided by 2.5 (factor of safety of 2.5).

3.4.4.2 Maximum safe surge for mooring.

3.4.4.3 Maximum safe elongation of mooring lines. Include the following information:

Size and type of mooring line;  
Percent elongation of mooring line at failure;  
Tattletale-free length and length between attachments.

3.4.4.4 Sketch, showing size, type, and location (vertical and horizontal angles) of all securing devices including fenders, bumpers, and camels.

3.4.5 Include the following statement, providing the necessary data:  
USS \_\_\_\_\_ can be safely moored to withstand a maximum of \_\_\_\_ mph winds with a \_\_\_\_ knot current and a \_\_\_\_ foot storm surge.

4. NOTES:

4.1 The SUPERVISOR will set Conditions of Readiness consistent with the forecasts and advisories of the local Weather Service Office of National Oceanic and Atmospheric Administration (NOAA).

4.2 NOAA defines the 5 categories of hurricanes as follows:

<u>CATEGORY</u>	<u>WIND SPEED</u>		<u>STORM SURGE</u>
1	74 - 95 MPH	OR	4 - 5 FT ABOVE NORMAL
2	96 - 110 MPH	OR	6 - 8 FT ABOVE NORMAL
3	111 - 130 MPH	OR	9 - 12 FT ABOVE NORMAL
4	131 - 155 MPH	OR	13 - 18 FT ABOVE NORMAL
5	GREATER THAN 155 MPH	OR	GREATER THAN 18 FT ABOVE NORMAL

4.3 Attachment C contains regional heavy weather conditions based on historical data and is provided as information only; the historical data is not intended to place limitations/restrictions on other values appropriate and/or previously authorized by a Naval Supervising Activity for their cognizant contractor(s) sites.

***4.4 The Heavy Weather Plan submitted in 3.1 requires a one-time submittal/acceptance unless this NAVSEA Standard Item and/or references change or contractor's status changes.***

ATTACHMENT A  
FIRE PROTECTION WATER SUPPLY REQUIREMENTS

<u>SHIP TYPE</u>	<u>FLOW, GPM *</u>	
AD	Destroyer Tender	1500
ADG	Degaussing Ship	500
AE	Ammunition Ship	1500
AF	Store Ship	1500
AFS	Combat Store Ship	1500
AG	Miscellaneous Auxiliary Ship	1500
AGEH	Hydrofoil Research Ship	500
AGF	Miscellaneous Flagship	2000
AGFF	Frigate Research Ship	1000
AGM	Missile Range Instrumentation Ship	1500
AGMR	Major Communications Relay Ship	1500
AGOR	Oceanographic Research Ship	500
AGP	Gunboat Support Ship	2000
AGS	Surveying Ship	1000
AH	Hospital Ship	1000
AK	Cargo Ship	1500
AKS	Store Issue Ship	1500
AKR	Vehicle Cargo Ship	1500
ANL	Net Laying Ship	500
AO	Oiler	1500
AOE	Fast Combat Support Ship	1500
AOG	Gasoline Tanker	1000
AOR	Fleet Replenishment Oiler	1500
AP	Transport Ship	1000
APB	Self-propelled Barracks Ship	500
AR	Repair Ship	1500
ARB	Battle Damage Repair Ship	500
ARC	Cable Repair and Laying Ship	1000
ARG	Internal Combustion Engine Repair Ship	1500
ARL	Landing Craft Repair Ship	1000
ARS	Salvage Ship	500
ARSD	Salvage Lifting Ship	500
ARST	Salvage Tender	1000
ARVA	Aircraft Repair Ship	1000
ARVE	Aircraft Engine Ship	1000
ARVH	Helicopter Tender	1500
AS	Submarine Tender	1500
ASR	Submarine Rescue Ship	600
ATA	Ocean Tug	500
ATF	Ocean Tug Fleet	500
ATS	Salvage and Rescue Tug	500
AVM	Guided Missile Ship	1500
CV, CVN	Aircraft Carrier	3000
CG, CGN	Guided Missile Cruiser	1000
DD	Destroyer	1000

ATTACHMENT A  
FIRE PROTECTION WATER SUPPLY REQUIREMENTS (Con't)

<u>SHIP TYPE</u>		<u>FLOW, GPM</u> *	
DDG	Guided Missile Destroyer	1000	
FF	Frigate	1000	
FFG	Guided Missile Frigate	1000	
FFR	Radar Picket Frigate	1000	
IX	Unclassified Miscellaneous	1500	
LCC	Amphibious Command Ship	1000	
LFR	Inshore Fire Support Ship	500	
LHA	Amphibious Assault Ship	2500	**
LKA	Amphibious Cargo Ship	1500	
LPA	Amphibious Transport Ship	1500	
LPD	Amphibious Transport Dock	1500	***
LPH	Amphibious Assault Ship	2500	**
LPR	Amphibious Transport-Small	500	
LSD	Landing Ship Dock	2000	***
PTF	Fast Patrol Crafts	500	
YRB	Repair and Berthing Barge	500	
YRBM	Repair, Berthing and Messing Barge	500	
YRBL	Repair, Berthing and Messing Barge (large)	500	
LST	Landing Ship Tank	1500	***
<b>MCM</b>	Mine Counter Measures Ship	<b>500</b>	
MSF	Fleet Minesweeper Ship	500	
MSH	Minesweeper-Hunter	500	
MSI	Minesweeper-Inshore	500	
MSO	Minesweeper-Ocean	500	
MSS	Minesweeper-Special	1000	
PCH	Hydrofoil Patrol Craft	500	
PG	Patrol Combatants	500	
PGH	Hydrofoil Gunboat	500	
PHM	Hydrofoil Missile Patrol Combatants	500	

\* All flows are from the pier or drydock outlet and are available at adequate residual pressures from those systems in compliance with present design criteria for drydocks and piers as reflected in NAVFAC design manuals (DM-29 and DM-25).

\*\* Includes supply to operate two hangar sprinkler groups and two 2 1/2-inch hoselines.

\*\*\* Includes supply to operate one sprinkler group and two 2 1/2-inch hoses.

## ATTACHMENT B

HEAVY WEATHER  
EMERGENCY POWER REQUIREMENT

		<u>SHIP TYPE (NOTE 3)</u>	<u>MINIMUM POWER REQUIREMENT (KILOWATTS EXCEPT AS NOTED)</u>
AD	15, 18, 19	Destroyer Tender	358
AD	37, 38		529
AD	41, 42, 43, 44		809
AE	21CL	Ammunition Ship	202
AE	26CL		264
AFS	1CL	Combat Stores Ship	342
AGDS	2	Deep Submergence Support Ship	186
AGF	3, 11	Miscellaneous Flagship	498
AGM		Missile Range Instrumentation Ship	
AGOR	11, 23	Oceanographic Research Ship	
AGOS	1	Ocean Surveillance Ship	109
AGOS	19	Ocean Surveillance Ship	246
AGS		Survey Ship	221
AH		Hospital Ship	628
AK		Cargo Ship	
AKR		Vehicle Cargo Ship	
AO(J)	51, 98, 99	Oiler	186
AO	105, 143, 187	Oiler	
AO	177CL		373
AO	177 (JUMBO)	Oiler	451
AOE	1CL	Fast Combat Support Ship	436
AOE	6	Fast Combat Support Ship	1090
AOR	1-6	Fleet Replenishment Oiler	264
AOR	7		295
AOT	168	Transport Oiler	
AP	122	Transport Ship	
APL		Berthing and Messing Barge	
AR	5, 6, 7, 8	Repair Ship	373
ARC		Cable Repair and Laying Ship	264
ARD		Auxiliary Repair Dock	
ARDM		Medium Auxiliary Repair Dock	

ATTACHMENT B  
(CON'T)

HEAVY WEATHER  
EMERGENCY POWER REQUIREMENT

		<u>SHIP TYPE (NOTE 3)</u>	<u>MINIMUM POWER REQUIREMENT (KILOWATTS EXCEPT AS NOTED)</u>
ARS	8, 38CL	Salvage Ship	15
ARS	50CL	Salvage Ship	100
AS	11	Submarine Tender	327
AS	18		436
AS	19		559
AS	31, 32		622
AS	33, 34		529
AS	36, 37		467
AS	39, 40, 41		653
ASR	9, 13, 14, 15	Submarine Rescue	16
ASR	21CL		124
ATF	91, 113	Ocean Tug Fleet	16
ATS	1CL	Salvage and Rescue Tug	93
BB		Battleship	436
CG	16-24	Guided Missile Cruiser	467
CG	26CL		358
CG	47CL		638
CG	52CL		623
CGN	9	Guided Missile Cruiser (Nuclear)	872
CGN	25		872
CGN	35		872
CGN	36CL, 38CL		653
CV	60-62, 66	Aircraft Carrier	1152
CV	63, 64, 67		1339
CVN	65	Aircraft Carrier (Nuclear)	1837
CVN	68-70		2491
CVN	71		
CVN	72		

ATTACHMENT B  
(CON'T)

HEAVY WEATHER  
EMERGENCY POWER REQUIREMENT

		<u>SHIP TYPE (NOTE 3)</u>	<u>MINIMUM POWER REQUIREMENT (KILOWATTS EXCEPT AS NOTED)</u>
DD	963-992, 997	Destroyer	498
DDG	2CL	Guided Missile Destroyer	280
DDG	37CL		358
DDG	51CL		1121
DDG	993CL		662
FF	1052CL		202
FFT	1052CL		202
FFG	7CL		436
LCC	19, 20	Amphibious Command Ship	436
LCU*		Landing Craft	
LHA	1CL	Amphibious Assault Ship	840
LHD	1CL		
LKA	113CL	Attack Cargo Ship	218
LPD	1, 2, 4CL, 7CL, 14CL	Amphibious Transport	218
LPH	2, 3, 7, 9-12	Amphibious Assault Ship	280
LSD	36CL	Landing Ship Dock	295
LSD	41CL		334
LST	1179CL	Landing Ship Tank	280
MCM	1	Mine Countermeasures	80
MHC	1	Minehunter Coastal	
MSO	443, 448, 490	Minesweep Ocean	35
PC		Patrol Coastal	50
PHM	1-6	Guided Missile Patrol Combatants	35 (NOTE 2)
YD		Floating Crane	

\* Type includes ASDV, YFU, YFB

ATTACHMENT B  
(CON'T)

HEAVY WEATHER  
EMERGENCY POWER REQUIREMENT

		MINIMUM POWER REQUIREMENT (KILOWATTS <u>EXCEPT AS NOTED</u> )
	<u>SHIP TYPE</u> (NOTE 3)	
YRB	Repair & Berthing Barge	
YRBM	Repair, Berthing and Messing Barge	
YTB	Harbor Tug (Large) Yard Craft (Misc.)	

GENERAL NOTES: The power requirement listed is the minimum considered necessary for emergency power if the main source of shore power is lost during heavy weather situations. Each contractor's heavy weather plan shall specify the individual power capacity for each ship connected to the ship's shore power distribution system. Electrical information referenced from MIL-HDBK-1025/2.

NOTES:

1 - CAPACITY IS GIVEN IN KW. UNLESS OTHERWISE INDICATED. INPUT VOLTAGE IS 450 VOLTS, 3 PHASE, 3 WIRE, 60 HERTZ, UNGROUNDED. POWER FACTOR IS APPROXIMATELY 0.8.

2 - REQUIREMENT IS TO SUPPORT AN EXISTING PORTABLE MOTOR GENERATOR SET WHICH CONVERTS THE 60 HERTZ POWER TO 400 HERTZ POWER. THE MOTOR GENERATOR SET NORMALLY ACCOMPANIES THE SHIP SUPPORT FACILITIES.

3 - POWER REQUIREMENTS FOR ANY SHIP TYPE NOT LISTED SHALL BE DETERMINED BY COMPARISON WITH A SHIP(S) OF SIMILAR DESIGN LOAD AND APPROPRIATE SHIP'S INFORMATION BOOK.



## ATTACHMENT C

## HEAVY WEATHER CONDITIONS

SITE	WIND (Knots)	CURRENT (Knots)	SURGE (Feet)
Bath, ME	83	2.5	8.7
Portsmouth NSY, NH	84	3.8	12.8
SUBBASE New London, CT	87	0.2	10.8
Norfolk NSY, VA	82	0.4	8.9
NAVSTA Norfolk, VA	87	0.8	8.4
NAB Little Creek, VA	91	0.3	7.1
Newport News Ship Building, VA	87	1.3	8.4
SUBBASE Kings Bay, GA	96	0.3	9.1
NAVSTA Mayport, FL	96	3.1	7.5
NAVSTA Pascagoula, MS	104	Negligible	6.1
NAVSTA Ingleside, TX	109	2	16.2
NAVSTA Everett, WA	74	0.6	14.4
SUBBASE Bangor, WA	64	1.1	14.7
Puget Sound NSY, WA	64	0.5	15.4
NAS North Island, CA	52	0.6	8.4
Pearl Harbor NSY, HI	87	Negligible	3.5
Guam	122	2	4.7
La Maddelana, Italy	89	Negligible	Not Available

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-70  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Confined Space Entry, Certification, Fire Prevention and Housekeeping for Unmanned Craft; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

2.3 29 CFR Part 1910.134, Occupational Safety and Health Standards, Respiratory Protection

2.4 NFPA Standard 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

2.5 NFPA Standard 312, Standard for Fire Protection of Vessels During Construction, Repair, and Lay-up

3. REQUIREMENTS:

3.1 Comply with the requirements of 2.2 through 2.5 and this item to determine whether or not an explosive or other dangerous atmosphere exists in tanks, spaces, and associated piping, including adjacent tanks, spaces, and piping, aboard the craft and control hot work and entry to those spaces to preclude damage to the craft or injury to personnel during accomplishment of this Job Order.

3.1.1 Submit one legible copy, in electronic media, of a list of tanks or spaces to be opened or certified to the SUPERVISOR at least 24 hours prior to commencement of work.

3.1.1.1 Comply with additional requirements of 009-88 of 2.1 when accomplishing work in Collection, Holding and Transfer (CHT) and Mogas tanks, spaces, or associated piping.

3.1.2 Provide initial and annual update training for Competent Persons by utilizing a National Fire Protection Association (NFPA) Certified

Marine Chemist or NFPA training program meeting the requirements of Section 1915.7 of 2.2. The length of the initial training class shall be at least 24 hours. Annual update training shall be at least 8 hours.

3.1.3 Post a copy of the Marine Chemist's certificate (MCC), Certified Industrial Hygienist's test/inspection record, or Competent Person's test/inspection record at each access to the affected space while work in the space is in progress. A copy of the MCC or test/inspection record shall also be delivered to a location designated by the SUPERVISOR. In the event that the space is found to be NOT SAFE FOR WORKERS/NOT SAFE FOR HOT WORK, the space shall be posted accordingly and the SUPERVISOR and the craft shall be notified immediately. The posted copy shall be clearly visible and legible.

3.1.3.1 Initial certification of spaces that require a Certified MCC or Certified Industrial Hygienist's test/inspection record in support of work operations shall be effective until conditions change which would void the certificate or test/inspection record.

3.1.3.2 For those certified spaces which employees will enter, a Competent Person shall visually inspect and test each space certified as ENTER WITH RESTRICTIONS or SAFE FOR WORKERS as often as necessary, and as a minimum, prior to entry by employees on a daily basis. If a space is not to be entered on any given day, it is not required to be inspected and tested by a Competent Person. The initial MCC remains valid if conditions have not changed, unless noted on the MCC.

3.1.3.3 For those certified spaces affected by hot work, a Competent Person shall visually inspect and test each space certified as SAFE FOR HOT WORK as often as necessary and, as a minimum, daily prior to commencement of hot work to ensure that conditions established by the certificate are maintained. When hot work is continuous, the affected spaces shall be visually inspected, tested, and recorded on a daily basis to maintain the SAFE FOR HOT WORK certification.

3.1.3.4 If a Competent Person finds that the conditions within a certified space fail to meet the applicable requirements for which it was certified, work in the space shall be stopped and may not be resumed until the space has been recertified by a Marine Chemist.

3.1.3.5 For those spaces where only Competent Person tests and inspections are required in accordance with 2.2, a Competent Person shall visually inspect and test each space as often as necessary and, as a minimum, daily prior to entry or commencement of hot work to ensure that conditions are safe.

3.1.3.6 After the Competent Person has determined initially that a space is safe for entry and finds subsequently that the conditions within the tested space fail to meet the requirements of 2.2, work shall be stopped until the conditions in the tested space are corrected, the space is retested, and a new record of tests/inspections is recorded and posted.

3.1.4 Tank cleaning personnel shall be trained annually on safety practices to include a discussion of safety information found in Subparts A, B, and Section 1915.152 of Subpart I of 2.2.

3.1.5 Maintain current copies of the documents listed in 3.1.5.1 through 3.1.5.4 for reference by the SUPERVISOR. Submit one legible copy, | in electronic media, of specific documents when requested by the SUPERVISOR.

3.1.5.1 A roster of designated Competent Persons, along with contractor certification that the training in 3.1.2 has been completed within the past year. Updates to the roster each time Competent Persons are added, deleted, or retrained.

3.1.5.2 A list of Competent Person(s) and tank cleaning personnel who will enter or work in confined spaces, including company name, badge number, and date training was provided in accordance with 3.1.2 and 3.1.4.

3.1.5.3 A list of the names of the Shipyard/Plant Rescue Team Members, along with contractor certification that training requirements of Subpart B of 2.2 have been accomplished and are current for each Rescue Team Member, or documentation of arrangements made for an outside rescue team to respond promptly to a request for rescue service in a contractor facility. At a naval facility, the Navy will respond.

3.1.5.4 A copy of the program to be utilized to train fire watches in accordance with the requirements of 2.2 and 2.4, including steps to be taken by the fire watch and hot work operator prior to accomplishment of hot work, proper selection and use of fire extinguishing equipment and other safety equipment, relationship between the fire watch and hot work operator, proper fire reporting procedures and other sounding of fire alarms, and reporting of fires to the craft's Quarterdeck. This training shall include theory and practical (hands-on) fire suppression techniques. This training shall be provided to all newly assigned fire watches, with annual updates provided to personnel. Provide visible means of identifying trained fire watches, i.e., badge, sticker, vest, etc.

3.1.6 Spaces that are determined to contain Immediately Dangerous to Life or Health (IDLH) atmospheres shall never be entered except for emergency rescue or for short duration for installation of ventilation equipment in accordance with 2.2 and 2.3. When entering IDLH spaces for the purpose of installing ventilation, notify the SUPERVISOR prior to entry. Notifications of rescue shall be made as soon as possible.

3.1.7 Confirm that all personnel have exited the space prior to closure of tanks, voids, and cofferdams. Designate one person to account for all personnel who may have entered the space.

3.2 Provide a written notice for each job or separate area of hot work aboard craft.

3.2.1 The notice shall state a description of the work to be done, the specific location of the hot work and compartments adjacent to decks, bulkheads, and similar structures upon which hot work is to be accomplished, the time hot work will commence, current gas-free status of the area (if required), the absence or existence of combustible material within 35 feet in any direction of the operation (or further, if affected by the operation), and if combustible material exists, what action shall be taken to protect the material from fire, the provision and assignment of a fire watch, and the affirmation that conditions at the work site (ventilation, temporary lighting, accesses) permit the fire watch(es) to have a clear view of and immediate access to all areas included in the fire watch.

3.2.2 The notice shall affirm that a suitable, fully-charged fire extinguisher shall be available at the job site and provide for an inspection of the area 30 minutes after completion of the hot work or the cessation of hot work at the job site unless the contractor's Hot Work Supervisor surveys the affected work area and determines that there is no further fire hazard as the final action to complete the notice.

3.2.3 The notice shall be signed by a supervisor specifically designated as responsible for coordination of the hot work and the fire watch requirement.

3.2.4 One copy of each notice shall be given to the SUPERVISOR, and at a minimum, one copy of each notice shall also be conspicuously posted at the location where the hot work is being accomplished.

3.2.4.1 Deliver written notification of hot work planned Tuesday through Friday to the SUPERVISOR at least 30 minutes and not more than 24 hours preceding start of work.

3.2.4.2 Deliver written notification of hot work planned over a weekend or Monday following that weekend to the SUPERVISOR no later than 0900 on the Friday immediately preceding that weekend.

3.2.4.3 Deliver written notification of hot work planned on a federal holiday and on the day following the federal holiday to the SUPERVISOR no later than 0900 of the last working day preceding the federal holiday.

3.2.4.4 The notice shall be effective for 24 hours unless a shorter period is specified in the contract or the gas-free status of the work area or system requires stopping the work. A new notice is required if work is interrupted due to loss of gas-free status.

3.3 Provide fire watches, trained as outlined in 3.1.5.4, at all affected areas where hot work is being accomplished. Provide fire extinguishing equipment as described in 2.2, 2.4, and 2.5. Fire watches and equipment shall meet the following requirements, as a minimum:

3.3.1 A fire watch must be posted if during hot work any of the following conditions are present:

3.3.1.1 Slag, weld splatter, or sparks might pass through an opening and cause a fire.

3.3.1.2 Fire-resistant guards or curtains are not used to prevent ignition of combustible materials on or near decks, bulkheads, partitions, or overheads.

3.3.1.3 Combustible material closer than 35 feet (10.7 meters) to the hot work in either the horizontal or vertical direction cannot be removed, protected with flame-proof covers, or otherwise shielded with metal or fire-resistant guards or curtains.

3.3.1.4 The hot work is carried out on or near insulation, combustible coatings, or sandwich-type construction that cannot be shielded, cut back, or removed, or in a space within a sandwich type construction that cannot be inerted.

3.3.1.5 Combustible materials adjacent to the opposite sides of bulkheads, decks, overheads, metal partitions, or sandwich-type construction may be ignited by heat conduction or radiation.

3.3.1.6 The hot work is close enough to cause ignition through heat conduction or radiation on the following: (a) insulated pipes, bulkheads, decks, partitions, or overheads; or (b) combustible materials and/or coatings.

3.3.1.7 The hot work is close enough to unprotected combustible pipe or cable runs to cause ignition.

3.3.1.8 A Marine Chemist or a Competent Person, as defined in 2.2, requires that a fire watch be posted.

3.3.1.9 Equipment cannot be protected from falling sparks.

3.3.1.10 Ducts and conveyor systems cannot be blanked off, protected, or shut down.

3.3.2 Each fire watch attending worker(s) accomplishing hot work shall be equipped with a fully-charged and operable fire extinguisher, and shall remain at the job site for 30 minutes from the time the hot work is completed unless the contractor's Hot Work Supervisor surveys the affected work area and determines that there is no further fire hazard.

3.3.2.1 The fire watch shall not accomplish other duties while hot work is in progress.

3.3.3 Where several workers are accomplishing hot work at one site, the fire watch shall have a clear view of and immediate access to each worker accomplishing hot work.

3.3.3.1 No more than 4 workers shall be attended by a single fire watch.

3.3.4 In cases in which hot material from hot work may involve more than one level, as in trunks and machinery spaces, a fire watch shall be stationed at each level unless positive means are available to prevent the spread or fall of hot material.

3.3.5 In cases where hot work is to be accomplished on a bulkhead or deck, combustible material shall be removed from the vicinity of the hot work on the opposite side of the bulkhead, overhead, or deck, and a fire watch shall be posted at each location.

3.3.5.1 If multiple blind compartments are involved in any hot work job, fire watches shall be posted simultaneously in each blind area.

3.4 Locate oxygen, acetylene, fuel gas, or gas supply systems off the craft. Manifolds connected to pierside supply systems may be placed on board as long as they are equipped with a shutoff valve located on the pier. The pierside shutoff valve shall be in addition to the shutoff valve at the inlet to each portable outlet header required by 2.2.

3.4.1 ***Fuel gas and oxygen hoses must be positively identified by durable unique markings at each end of the hose.***

3.4.2 Liquid oxygen (LOX) tanks used for fuel gas/oxygen operations shall be stored to prevent collisions by trucks, forklifts, falling objects, etc.

3.4.3 LOX tanks shall be staged in designated locations on the quay wall/pier to be determined jointly by the contractor and the SUPERVISOR.

3.4.4 When gas cylinders are in use on board the craft, they shall be located on the weather decks or in a location determined jointly by the contractor and the SUPERVISOR and shall be secured and in an upright position. The number of in-use cylinders shall be limited to those which are required for work in progress and which have pressure regulators connected to the cylinder valves. On-board reserve gas cylinders shall not exceed one-half the number of in-use cylinders and shall be located in a remote area of the weather decks or in a location determined jointly by the contractor and the SUPERVISOR. Reserve acetylene cylinders shall be secured in an upright position.

3.4.5 When not in use, gas cylinders and manifolds on board shall have valves closed, lines disconnected, protective cover (cap) in place, and shall be secured. Acetylene cylinders shall be secured in an upright position.

3.4.5.1 Unattended fuel gas and oxygen hose lines or torches are prohibited in confined spaces.

3.4.5.2 Unattended charged fuel gas and oxygen hose lines or torches are prohibited in enclosed spaces for more than 15 minutes.

3.4.5.3 All fuel gas and oxygen hose lines shall be disconnected at the supply manifold at the end of each shift.

3.4.5.4 All disconnected fuel gas and oxygen hose lines shall be rolled back to the supply manifold or to open air to disconnect the torch; or extended fuel gas and oxygen hose lines shall not be reconnected at the supply manifold unless the lines were given a positive means of identification when they were first connected and the lines are tested using a drop test to ensure the integrity of fuel gas and oxygen burning system. Alternate procedures must be approved by the SUPERVISOR.

3.4.6 Upon completion of oxygen-fuel gas system hook-up, accomplish a pressure drop test to include the torch, hoses, and gages.

3.4.6.1 Apply pressure to the system. Back off pressure by turning off the valve supplying gases to the system. If the pressure on the gage drops, a leak in the system exists. If the pressure on the gage does not drop, the system is tight.

3.4.6.2 After applying pressure, wait 2 minutes to ensure pressure does not drop.

**3.5 *Inert gas/oxygen depleting (OD) hoses must be positively identified by durable unique markings at each end of the hose.***

3.5.1 Unattended inert gas/OD hose lines or torches are prohibited in confined spaces.

3.5.2 Unattended, charged inert gas/OD hose lines or torches are prohibited in enclosed spaces for more than 15 minutes.

3.5.3 All inert gas/OD hose lines shall be disconnected at the supply manifold at the end of each shift.

3.5.4 All disconnected inert gas/OD hose lines shall be rolled back to the supply manifold or to open air to disconnect the torch; or extended inert gas/OD hose lines shall not be reconnected at the supply manifold unless the lines were given a positive means of identification when they were first



connected and the lines are tested using a drop test to ensure the integrity of inert gas/OD systems. Alternate procedures must be approved by the SUPERVISOR.

3.5.5 Upon completion of inert gas/OD gas system hook-up, accomplish a pressure drop test to include the torch, hoses, and gages.

3.5.5.1 Apply pressure to the system. Back off pressure by turning off the valve supplying gases to the system. If the pressure on the gage drops, a leak in the system exists. If the pressure on the gage does not drop, the system is tight.

3.5.5.2 After applying pressure, wait 2 minutes to ensure pressure does not drop.

3.6 Use fire retardant materials aboard or immediately adjacent to the craft for staging, screening, temporary covers, shelters, deck covering, and ventilation ducts. Proper documentation of fire retardancy shall be available for review upon request.

3.6.1 Lumber, except that used for pallets, shall be fire retardant in accordance with Category One, Type I, of MIL-L-19140. Plywood and staging boards shall be Category Two, Type II, of MIL-L-19140.

3.6.2 Storage of material aboard the craft shall be limited to that which is required for work in progress.

3.6.3 Prior to bringing equipment or working material aboard the craft, its crating and packing shall be removed. If the equipment or material may be damaged during handling, the crating and packing shall be removed immediately after the equipment or working material is brought aboard and taken ashore for disposal. A small quantity of pallets may be staged in a location determined jointly by the contractor and the SUPERVISOR aboard the craft for use in materials handling operations.

3.6.4 Temporary lights shall have 3-conductor cable, guard or shield, hook, and lamp holder. Exposed non-current-carrying metal parts of the fixture shall be grounded either through a third wire in the cable containing the current conductors, or through a separate wire that is grounded at the fixture's voltage source.

3.6.5 Flammable or combustible liquids with a flash point of 150 degrees Fahrenheit or less, including degreasers, solvents, and fuels, shall be kept in safety cans when not in actual use or when left unattended. These liquids shall be limited to one day's supply for on board use.

3.6.6 Rigging of hoses, welding leads, and temporary lights shall be kept clear of the decks on temporary trees or brackets and be arranged to minimize tripping and other safety hazards and to allow free access through doors, hatches, and passageways.

3.5.7 Ensure at least one unobstructed access to each main and auxiliary machinery space.

3.7 Accomplish a fire prevention and housekeeping inspection on a weekly basis whenever work is in progress. The inspection shall be made jointly with the SUPERVISOR.

3.7.1 Submit one legible copy, in electronic media, of a written report of the discrepancies and corrective actions, **using Attachment A**, to be taken to the SUPERVISOR within 4 hours after completion of the inspection.

3.8 Develop and implement a written fire safety plan in accordance with 2.2. Review the plan with contractor employees and subcontractors.

4. NOTES:

4.1 Hydrogen sulfide (H<sub>2</sub>S) may be found in AFFF, seawater, and firemain systems.

4.2 Booklet of General Plans and Tank Sounding Tables are available for review at the office of the SUPERVISOR.

**Fire Zone Boundaries**ATTACHMENT A  
ESH Discrepancy and Corrective  
Action Log**Attendees**

Ship name/hull number:

Location:

Prime Contractor:

**Date:****Time:**

No.	Point of Contact	Date Corrected	Location	Discrepancy	Corrective Action	Code

Type Codes: 1-Housekeeping, 2-Fire Prevent./Fire Equipment, 3-Hot Work., 4-FZ Boundary, 5-Electrical, 6-compress gas/hoses/bottles/manifolds, 7-Scaffolding, 8-Egress/Exit, 9- Walking/Working Surfaces, 10-PPE, 11- Containment, 12- Unguarded/Edges/Holes/Openings/Fall Protection, 13-Confined/Enclosed Spaces, 14-Lines & Leads Hazards, 15-Equip. Adrift & Rollback, 16-Ventilation, 17-Machine guarding/hand tools, 18-Crane/Rigging, 19-Environmental & Hazardous Material/Communication, 20-Environmental protection, 21-General Safety

## ATTACHMENT A

### ESH DISCREPANCY AND CORRECTIVE ACTION LOG INSTRUCTIONS

- 1- Fire Zone Boundaries: List the designated Fire Zone Boundaries.
- 2- Attendees: List Company and or Command and names of personnel present for walk thru.
- 3- Ship Name/hull Number: Indicate ship name and hull number of the location of the walk thru.
- 4- Location: Indicate location where ship is moored or docked, i.e. name of contractor facility or pier at Naval Base or Station.
- 5- Prime Contractor: Indicate prime contractor who has the contract with the SUPERVISOR.
- 6- Date: Indicate date of walk thru being accomplished.
- 7- Time: Indicate start time (24 hour clock) of walk thru being accomplished.
- 8- No. (number): List sequentially, each discrepancy noted during the walk thru. Number will continue where the numbering left off the previous day, until the end of the availability.
- 9- Point of Contact: Indicate Company/Command identified with the discrepancy.
- 10- Date Corrected: Date condition was corrected. If condition is not corrected, condition will be carried over to the next walk thru until condition is corrected.
- 11- Location: Indicate location of the condition, i.e. space number or frame number.
- 12- Discrepancy: Indicate condition that needs corrective action, be specific as necessary.
- 13- Corrective Action: Indicate corrective action taken to correct the condition and who is responsible for the corrective action.
- 14- Code: Indicate code, located at the bottom of ATTACHMENT A that condition can be grouped with, i.e. lines on deck causing trip hazard would use code 14- Lines and Leads Hazards.

Type Codes: 1-Housekeeping, 2-Fire Prevent./Fire Equipment, 3-Hot Work., 4-FZ Boundary, 5-Electrical, 6-compress gas/hoses/bottles/manifolds, 7-Scaffolding, 8-Egress/Exit, 9- Walking/Working Surfaces, 10-PPE, 11- Containment, 12- Unguarded/Edges/Holes/Openings/Fall Protection, 13-Confined/Enclosed Spaces, 14-Lines & Leads Hazards, 15-Equip. Adrift & Rollback, 16-Ventilation, 17-Machine guarding/hand tools, 18-Crane/Rigging, 19-Environmental & Hazardous Material/Communication, 20-Environmental protection, 21-General Safety

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-71  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Testing Requirements for Piping Systems; accomplish

2. REFERENCES:

2.1 S9086-RK-STM-010/CH-505, Piping Systems

2.2 ***S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments***

2.3 S9074-AR-GIB-010/278, Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels

2.4 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.5 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

3. REQUIREMENTS:

3.1 Accomplish testing of new and disturbed piping systems in accordance with 2.1.

(V) **"GAGE CHECK"**

3.1.1 Each master and backup test gage shall conform to gage range and graduation ***shown on Table 504-6-1 of 2.2. The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.1.1.1 Each master and backup test gage used for vacuum testing shall consist of 2 compound gages with a 30 inch-0-30 PSI range.

(I) "LIQUID PENETRANT INSPECTION" or "MAGNETIC PARTICLE INSPECTION"

3.1.2 Accomplish liquid penetrant or magnetic particle test on root layer of all P-1 and/or P-LT welded joints in accordance with Paragraph

505-11.1.2.6.a(1) of 2.1, and the requirements of 2.3 and 2.4. The accept or reject criteria shall be in accordance with Class One of 2.5.

(I) "LIQUID PENETRANT INSPECTION"

3.1.3 Accomplish liquid penetrant tests on final layer of all P-1 and/or P-LT welded joints in accordance with Paragraph 505-11.1.2.6.a(1) of 2.1, and P-2 welded joints in accordance with Paragraph 505-11.1.2.6.a(2) of 2.1 for operating conditions greater than 200 degrees Fahrenheit or 200 PSIG, and the requirements of 2.3 and 2.4. The accept or reject criteria shall be in accordance with Class One of 2.5 for P-1 and/or P-LT, and Class 2 of 2.5 for P-2.

(V)(G) or (I)(G) "VISUAL INSPECTION - SHOP TEST" (See 4.2)

3.1.4 Accomplish a shop hydrostatic test of replacement piping, fittings, and components for evidence of external leakage and/or deformation. Allowable external leakage and/or deformation: None.

(V)(G) or (I)(G) "VISUAL INSPECTION - HYDROSTATIC, LOW PRESSURE AIR, VACUUM, OR OPERATING PRESSURE TEST" (See 4.2)

3.1.5 Visually inspect the pressurized system or system under vacuum for evidence of external leakage and/or deformation. Allowable external leakage and/or deformation: None.

3.1.5.1 Joints requiring inspection shall remain uninsulated and unpainted until completion of successful inspection.

3.1.5.2 Provide a sketch of that portion of the system to be tested, showing the location of blanks, isolation valves, test connection, and the location of air vents to vent air. Sketch shall be on the test site during the accomplishment of the test.

(I) "STATIC TEST"

3.2 Accomplish a static head pressure test of new and disturbed gravity drain piping (unpressurized piping), using clean, fresh water for a minimum of 30 minutes. Allowable leakage: None.

(V)(G) "OPERATIONAL TEST"

3.3 Accomplish an operational test of new and disturbed gravity drain piping for proper operation and unobstructed flow.

(V)(G) "OPERATIONAL TEST"

3.4 Accomplish an operational test of new and disturbed sounding tube piping by inserting a 16-inch theft sampler into sounding tube until it bottoms. Accomplish the test a minimum of 4 times for each sounding tube. There shall be no binding or sticking of sampler during this test.

4. NOTES:

4.1 Boiler pressure vessel piping is defined as, "The piping from the pressure vessel drum or header up to the first valve off the pressure vessel drum or header."

4.2 The paragraph referencing this note is considered an (I)(G) if the system is P-1, P-LT, or P-3a. If the system is P-2 or P-3b, then the paragraph is considered (V)(G).

4.3 Test pressure and test medium will be specified in invoking Work Item.

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NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-72  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Physical Security at Private Contractor's Facility; accomplish

2. REFERENCES:

2.1 33 CFR Part 165, Regulated Navigation Areas and Limited Access Areas

2.2 33 CFR Part 334, Danger Zone and Restricted Area Regulations

3. REQUIREMENTS:

3.1 The requirements of 3.2.5, 3.2.6, 3.2.7, 3.2.8, and 3.2.9 are Force Protection measures the Contractor shall be able to meet under Force Protection Conditions Normal, Alpha, Bravo, Charlie, and Delta, respectively. The solicitation shall define the Force Protection Condition. Implementation of any other measures, when directed by the SUPERVISOR, will be the subject of an equitable adjustment.

3.2 Provide a written plan which shall be implemented for the protection of personnel, U.S. Naval vessels, work in process, the material and equipment to be installed therein, and GFM dry docks (as applicable) at the Contractor's facility, which addresses the requirements of this Standard Item. The written plan shall, as a minimum, be identified as "For Official Use Only (FOUO)".

3.2.1 Provide written designation to the SUPERVISOR of the individual who will be in charge of the security effort.

3.2.2 Conduct a security conference with federal, state, and local authorities, Ship's Force, and the SUPERVISOR within 30 calendar days prior to ship's arrival.

3.2.3 Attend security coordination meeting with Ship's Force and the SUPERVISOR to brief the Contractor's security plan and procedures prior to security conference of 3.2.2.

3.2.4 Coordinate the establishment of the land and water areas adjacent to U.S. Naval vessels as restricted areas or limited waterway areas in accordance with 2.1 or 2.2, in cooperation with the Navy, U.S. Coast Guard, and Army Corps of Engineers.



3.2.5 Under Force Protection Condition NORMAL, establish and maintain physical security boundaries, positive access controls, and other security measures to provide safeguards against hazards, including unauthorized entry, malicious mischief, theft, espionage, sabotage, and terrorism at Contractor's facility in accordance with Attachment A, to include the following:

- 3.2.5.1 Perimeter physical barriers
- 3.2.5.2 Perimeter openings control
- 3.2.5.3 Access and circulation control
- 3.2.5.4 Armed security force
- 3.2.5.5 Protective lighting
- 3.2.5.6 Signs and posting of boundaries
- 3.2.5.7 Security force communications
- 3.2.5.8 Random antiterrorism measures (RAM)

3.2.6 Under Force Protection Condition ALPHA, establish and maintain the following requirements in addition to 3.2.5:

- 3.2.6.1 Additional plant boundary protection
- 3.2.6.2 Assistance from state, local, and other law enforcement agencies
- 3.2.6.3 Increased personnel, property, and perimeter security checks
- 3.2.6.4 Increased security force manning commensurate with the additional actions directed under this section
- 3.2.6.5 Increased waterfront surveillance
- 3.2.6.6 Place vehicle barriers to reduce ease of vehicular access adjacent to the ship
- 3.2.6.7 Brief the security force and the SUPERVISOR concerning the threat, the security precautions being implemented, and what action is to be taken with respect to strangers, unidentified vehicles, abandoned parcels or suitcases, or unusual activity in or near the Contractor's facility.
- 3.2.6.8 Increase security spot-checks of vehicles, persons, and buildings near U.S. Naval vessels.

3.2.6.9 Limit access points for vehicles and personnel commensurate with performance of the Job Order.

3.2.6.10 Inspect 100 percent of commercial vehicles entering the controlled industrial area and/or piers.

3.2.7 Under Force Protection Condition BRAVO, establish and maintain the following requirements in addition to 3.2.5 through 3.2.6:

3.2.7.1 Request the Captain of the Port or U.S. Coast Guard District Commander to activate the Naval Vessel Protection Zones in accordance with 2.1.

3.2.7.2 Establish communications with state, local, and other law enforcement, fire, and emergency management agencies.

3.2.7.3 Secure and regularly inspect buildings, rooms, and storage areas not in regular use for unusual conditions or suspicious activity.

3.2.7.4 Clear the area within 100 feet (30.5 meters) of U.S. Naval vessels of all non-mission-essential materials as determined by the SUPERVISOR.

3.2.7.5 Review requirements related to implementing additional security actions in the event of an increasing threat.

3.2.7.6 Identify paths for critical materials to maintain production.

3.2.7.7 Brief all employees working at the facility, including the ship's crew and subcontractor employees, concerning the threat, the security precautions being implemented and what action is to be taken with respect to strangers, unidentified vehicles, abandoned parcels, containers or suitcases, and any other suspicious or unusual activity.

3.2.8 Under Force Protection Condition CHARLIE, establish and maintain the following requirements in addition to 3.2.5 through 3.2.7:

3.2.8.1 Inspect the interior and exterior of buildings in regular use for suspicious activity or objects at frequent intervals.

3.2.8.2 Increase protection for crew berthing to reduce vulnerability.

3.2.8.3 List work that would be required to permit safe relocation of the vessel and its crew to the nearest Government facility as designated by the SUPERVISOR.

3.2.8.4 Determine work that will be stopped if the next higher Force Protection Condition is implemented. Determine a list of and

inform mission-essential personnel, including Contractor work force. Communicate critical Work Items to the SUPERVISOR, ship's Commanding Officer, and/or Shipyard Commander.

3.2.8.5 Position floats, work boats, and barges along the sides of the U.S. Naval vessel and any occupied berthing barges to create a buffer zone.

3.2.8.6 Inspect all vehicles entering the controlled industrial area and/or pier.

3.2.9 Under Force Protection Condition DELTA, establish and maintain the following requirements in addition to 3.2.5 through 3.2.8:

3.2.9.1 Immediately notify state and local law enforcement agencies and the U.S. Coast Guard of the incident or imminent threat.

3.2.9.2 Limit access points to the absolute minimum.

3.2.9.3 Strictly control all facility access points, ensure positive identification of all personnel, and search all vehicles, suitcases, briefcases, and packages entering the Contractor's facility.

3.2.9.4 Accomplish continuous security patrols of areas, to include the waterfront, occupied by U.S. Naval vessels and personnel.

3.2.9.5 Prepare U.S. Naval vessels for movement away from the Contractor's facility when directed by the SUPERVISOR.

3.2.9.6 Discontinue work except that directly related to the integrity of the vessel and as otherwise directed by the SUPERVISOR.

3.3 Submit one legible copy, in electronic media, of the plan to the SUPERVISOR for review and approval no later than 15 days prior to availability start date.

3.3.1 Accomplish the requirements of the approved plan.

3.3.2 Any changes at the Contractor's facility affecting physical security or the approved plan shall be submitted to the SUPERVISOR for approval within 24 hours.

3.4 Provide procedures for coordinating the Contractor's security efforts with those of the SUPERVISOR and the Commanding Officer's designated representative.

3.5 Prepare an itemized statement of cost incurred for the work covered by this Standard Item. Submit one legible copy, in electronic media, of the statement to the SUPERVISOR within 30 days of delivery or redelivery (as applicable) of the ship. The statement shall itemize the total direct labor hours with the applicable direct labor rates, overhead, General and

Administrative (G&A) and/or other indirect rates, material, material handling charges, subcontractor costs, Other Direct Costs (ODC), and freight costs (as applicable). Where final overhead rates are not available, use the most current billing rate(s).

3.5.1 The Government may perform an audit of the Contractor's statement of cost incurred. The Contractor, upon request, shall make available to the SUPERVISOR all records, related correspondence, and the substantiating data upon which the statement of cost incurred is based.

4. NOTES:

4.1 U.S. Naval vessel means any vessel owned, operated, chartered, or leased by the U.S. Navy; any pre-commissioned vessel under construction for the U.S. Navy, once launched into the water; and any vessel under the operational control of the U.S. Navy or a Combatant Command.

4.2 The term SUPERVISOR is defined as the local Government activity responsible for the execution and contract administration of Navy maintenance and modernization work.

4.3 Controlled Industrial Area (CIA) means an area of the shipyard in which construction, conversion, repair, or overhaul of U.S. Navy vessels is conducted.

4.4 COMFLTFORCOMINST C3300.2A, Installation and Shipboard Security Standards, provides general security requirements for Fleet Forces. The SUPERVISOR will use this reference as a guide in applying Force protection measures appropriate to the unique situation at each Contractor's facility.

ATTACHMENT A  
OTHER SECURITY MEASURES

1. Perimeter Physical Barriers:

- a. Physical barriers, including both natural (e.g., mountains, swamps, thick vegetation, rivers, bays, cliffs) and structural (e.g., fences, walls, doors, gates, vehicle barriers) which control, delay, impede, and discourage access by unauthorized persons. To be effective, such barriers shall be augmented by armed security force personnel or other means of protection and assessment.
- b. Physical barriers shall be employed along Contractor facility perimeters. The barrier or combination of barriers used shall afford an equal degree of continuous protection along the entire perimeter.
- c. Structural barriers such as fences or walls shall be a minimum of 8 feet in height, and any uncontrolled opening shall be securable to afford protection against unauthorized entry.

2. Perimeter Openings: Openings in the perimeter barrier shall be kept to the minimum necessary for the safe and efficient operation of the Contractor facility. Access through such openings shall be controlled, or the openings shall be secured.

3. Access and Circulation Control:

- a. A system of personnel and vehicle movement control is required at Contractor facilities. The degree of control shall be in keeping with efficient operations yet afford defense-in-depth to provide graduated levels of protection.
- b. Establish positive access control measures at entry control points to the Contractor's facility to protect against unauthorized access.
- c. Establish procedures for inspecting persons, their property and vehicles at entry and exit points.

4. Armed Security Force: The Contractor security force shall consist of designated persons specifically organized, trained, armed, and equipped to provide physical security.

5. Protective Lighting:

- a. Protective lighting, to include work lighting, increases the effectiveness of security forces and has considerable deterrent value.
- b. Contractors shall provide adequate illumination to discourage or detect attempts to enter facilities and reveal the presence of unauthorized persons within such areas.

- c. Lighting shall support security force activities such as identification of badges and personnel at perimeter openings, surveillance of facility perimeter/avenues of approach, and inspection of unusual or suspicious circumstances.

6. Signs and Posting of Boundaries:

- a. Trespass laws applicable to the jurisdiction in which the facility is located will govern signs and posting of perimeter boundaries at Contractor facilities.
- b. Size, placement, and use of any language in addition to English should be appropriate for the stated purpose. Signs will read essentially as follows:

WARNING  
RESTRICTED AREA  
KEEP OUT

Authorized  
Personnel Only

- c. Signs shall be posted at regularly-used points of entry and at intervals along the facility perimeter such that any reasonable person would conclude that everyone crossing the boundary into the facility would have been informed of the above.
7. Security Force Communications: The activity security force requires sufficient equipment to maintain continuous, secure 2-way voice communications between elements (fixed/mobile posts, and supervisory personnel) of the security force and U.S. Naval vessel's watch section. Establish communications between the Contractor's security force and the U.S. Naval vessel's watch section.
8. Random Antiterrorism Measures (RAM): As a deterrent, randomly apply the measures from higher Force Protection Conditions and other RAM including:
- a. Keep personnel involved in implementing increased security requirements on call.
  - b. Inspect deliveries to protect against the introduction of unauthorized material.
  - c. Cars and other non-mission essential items shall be moved 100 feet from U.S. Naval Vessels and buildings where the crew is located or work is in progress.
  - d. Inspect mail for letter or parcel bombs.

- e. On entry of visitors to the facility, physically inspect them and accompanying items.
- f. Search vehicles entering the facility.
- g. Erect barriers and obstacles to provide additional traffic controls to areas where U.S. Naval Vessels and crews are located.
- h. Consult local authorities about closing public roads and facilities that might make sites more vulnerable.
- i. Other site-specific RAM that shall be incorporated into the Contractor's physical security plan and/or company-specific implementation procedures.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-73  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Shipboard Electrical/Electronic/Fiber Optic Cable; remove, relocate, repair, and install

2. REFERENCES:

2.1 Standard Items

2.2 DOD-STD-2003, Electric Plant Installation Standard Methods for Surface Ships and Submarines

2.3 MIL-STD-2042, Fiber Optic Cable Topology Installation Standard Methods for Naval Ships

2.4 S9300-A6-GYD-010, Electrical Workmanship Inspection Guide for Surface Ships and Submarines

2.5 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB), Section IX, Installation Standards (Source CD: N0002400003)

2.6 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety

2.7 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB), Section VII, Industrial Electromagnetic Compatibility (IEMC) Work Process Instructions (Source CD: N0002400003)

2.8 IA PUB-5239/31, Information Assurance Shipboard Red/Black Installation Publication

2.9 NSTISSAM TEMPEST/2-95, Red/Black Installation Guidance (FOUO)

3. REQUIREMENTS:

3.1 Isolate and remove each cable designated for removal or replacement by the individual Work Items.

3.1.1 Remove each cable in its entirety.



3.1.1.1 Blank each bulkhead, deck penetration, and multi-cable transit device from which cable was removed and which will not be reused, in accordance with Section 3 of 2.2 and Part 3 of 2.3.

3.1.1.2 Blank each hole not required to be used in equipment from which cable was removed.

3.1.1.3 Remove unused hangers from which cable was removed and which will not be reused, and grind areas flush in way of removals.

3.1.1.4 Install new banding for cableways affected by cable removals, in accordance with Section 4 of 2.2 and Part 4 of 2.3.

3.2 Identify and isolate each cable to be pulled back, rerouted, relocated, or reused to support work required by the individual Work Items.

3.2.1 Inspect each cable end to be disconnected for correct **conductor** identification sleeving, including size, type, and legible lettering in accordance with referenced drawings. Ensure lugs are secured to leads and are of correct size and type, and the insulation is not damaged. Ensure optical connectors are secured to the cable, the correct type, and the cable jacket is not damaged. Accept and reject criteria for lugs and sleeving for non-fiber optic cables shall be in accordance with Chapters 3 and 4 of 2.4.

3.2.1.1 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.2.1 to the SUPERVISOR.

3.2.2 Disconnect each cable. Record and retain electrical and optical hook-up data.

3.2.2.1 Accomplish the requirements of 009-22 of 2.1 for disconnected non-fiber optic cables.

3.2.2.2 Accomplish the requirements of Method 6D1 of Part 6 of 2.3 for fiber optic cable.

3.2.3 Remove each cable from equipment and pull back to predetermined locations. Coil each cable and secure to prevent damage.

3.2.3.1 Protect disconnected connectors and wiring from the environment.

3.2.4 Install each cable to equipment or component in accordance with 2.2 and 2.5 for non-fiber optic cable, and 2.3 for fiber optic cable.

3.2.5 Band disturbed cable in accordance with Section 4 of 2.2 for non-fiber optic cable, and Part 4 of 2.3 for fiber optic cable.

3.2.6 Bond and ground non-fiber optic cable in accordance with 2.6.

3.2.7 Accomplish the requirements of 009-22 of 2.1 for non-fiber optic cables upon completion of banding and prior to reconnecting.

3.2.8 Accomplish the requirements of Method 6D1 of Part 6 of 2.3 for fiber optic cables upon completion of banding and prior to reconnection.

3.2.9 Prepare each cable end and serve the lead bundles in accordance with 2.2 and 2.5 for non-fiber optic cable and 2.3 for fiber optic cable.

3.2.10 Connect each cable, using referenced drawings or retained hook-up data.

3.2.11 Install new cable identification tags in accordance with 2.2 and Part 4 of 2.3, using 2.5 for guidance.

3.3 Isolate and splice non-fiber optic cables in accordance with Section One, Group E of 2.2, to support work required by the individual Work Items. Fiber optic cables shall not be spliced.

3.3.1 Accomplish the requirements of 009-22 of 2.1 for each spliced non-fiber optic cable.

3.3.2 Accomplish the requirements of 3.2.5 through 3.2.11.

3.4 Isolate and repair non-fiber optic cables in accordance with Section One, Group A through D of 2.2, and fiber optic cable in accordance with Part One of 2.3, to support work required by the individual Work Items.

3.4.1 Accomplish the requirements of 009-22 of 2.1 for each non-fiber optic cable.

3.4.2 Accomplish the requirements of Method 6D1 of Part 6 of 2.3 for each fiber optic cable.

3.4.3 Accomplish the requirements of 3.2.5 through 3.2.11.

3.5 Install each new cable, cableway, penetration, lug, and connector in accordance with 2.2, 2.5, and 2.6 for non-fiber optic cable and 2.3 for fiber optic cable, and referenced drawings, to support work required by the individual Work Items.

3.5.1 New cable shall conform to MIL-DTL-24643 (low smoke), and MIL-DTL-24640 (lightweight) in lieu of MIL-DTL-915. New Radio Frequency (RF) cables shall conform to MIL-DTL-17 (Rev) low smoke. New fiber optic cable shall conform to MIL-PRF-85045.

3.5.1.1 Preserve the cable data package provided with new fiber optic cable. Retain the original cable data package with the unused portion of the cable.

3.5.1.2 Submit one legible copy, in electronic media, of a report containing copies of the cable data packages obtained in 3.5.1.1 and cable number listings of the cables taken from each reel to the SUPERVISOR.

3.5.2 Accomplish a visual and continuity test of each fiber optic cable in accordance with Method 6A1 and Method 6D1 of 2.3.

3.5.2.1 Maintain a copy of a report listing results of the requirements of 3.5.2 for reference by the SUPERVISOR.

3.5.3 Use existing cableways and penetrations wherever possible. Penetrations shall be correct size in accordance with 2.2 and 2.3.

3.5.4 For hard-wired cables, install new **conductor identification sleeving** conforming to SAE-AMS-DTL-23053, Class One, white, marked with indelible ink.

3.5.4.1 Mark in accordance with the referenced drawings and/or equipment technical manual.

3.5.4.2 Install new lugs of correct size and shape conforming to MIL-T-16366 or SAE-AS7928. Do not cut off strands of copper to reduce size of lead to fit lug. Use correct barrel and hole size.

3.5.4.3 Install new fiber optic connectors of the correct size and type conforming to MIL-C-83522 or MIL-PRF-28876.

3.5.5 Accomplish the requirements of 009-22 of 2.1 upon completion of lugging, connector attachment, and banding of non-fiber optic cables.

3.5.6 Accomplish the requirements of Method 6C1 of Part 6 of 2.3 upon the completion of connector attachment, slack management, and banding for fiber optic cables.

3.5.6.1 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.5.6 to the SUPERVISOR, using Attachment A.

3.5.7 Connect leads to terminal boards and connectors to equipment using referenced drawings.

3.6 Weatherproof and seal connectors exposed to the weather in accordance with 2.7.

3.7 Submit a written procedure to the SUPERVISOR for review and approval prior to the initiation of production work for the installation of multi-pin, coaxial, and fiber optic connectors, using 2.2, 2.3, and 2.5 for the minimum requirements.

3.7.1 This procedure only requires a one-time submittal/approval unless the Standard Items change and/or references change or are updated, and shall contain the following minimum information:

3.7.2 Reference the appropriate fabrication document for which the procedure is applicable.

3.7.3 Qualification requirements for the personnel performing the work.

3.7.4 Inspection and documentation forms.

3.7.5 Acceptance and rejection criteria.

3.8 Provide written designation of the Qualified Persons who will prepare electrical/fiber optic cable endings to receive connectors, assemble connector parts on the cable endings, and attach the connectors to the cable endings. Provide written designation of the Qualified Person or Persons who will supervise and inspect the execution of the process.

3.8.1 Submit one legible copy, in electronic media, of any additions or modifications to the SUPERVISOR prior to the start or continuation of work.

3.8.2 Maintain current copies of the credentials of the Qualified Persons for reference by the SUPERVISOR.

3.8.2.1 Submit one legible copy, in electronic media, of specific documents when requested by the SUPERVISOR.

3.9 Inspect existing cable installations affected as a result of work required by the individual Work Items and interferences within the first 25 percent of contract completion. Ensure that cable installations are in accordance with 2.2, and 2.3 for fiber optic cable.

3.9.1 Submit one legible copy, in hard copy or electronic media, of a report of cable installation conditions not in compliance with 2.2 and 2.3 to the SUPERVISOR, using Attachments B and C, within 72 hours of completion of inspections.

3.10 Install new fasteners conforming to MIL-DTL-1222, Type One, Grade 316, stainless steel, for areas exposed to weather and high moisture areas, and Type One, Grade 2 or 5, carbon steel, zinc plated, for other areas to support work required by the individual Work Items.

3.11 Remove, install, and relocate cables which are part of the secure electrical information processing systems or are located within a secure processing space in accordance with 2.8 and 2.9 to support work required by the individual Work Items.

3.12 ***After installation of cables***, accomplish the requirements of 009-25 of 2.1 for the local air hose test of each new and disturbed multi-cable transit device, ***multi-cable penetrators, stuffing tubes, kick pipes, and cable penetrations*** of tightness boundaries.

3.13 Accomplish the requirements of 009-32 of 2.1 for new and disturbed surfaces.

4. NOTES:

4.1 A new circuit is defined as a cable not previously installed.

4.2 Pulled-back cables are those which are disconnected and physically removed from a wireway, conduit, or cableway to protect the cable from industrial work.

4.3 Reused cables are those cables disconnected from the equipment to facilitate equipment removal.

4.4 Electrical connector fabrication is the preparation of cable endings to receive multi-pin connectors, coaxial connectors, fiber optic connectors, assembly of connector parts on cables, and securing connectors to cables.

4.5 A Qualified Person is defined as a person who has successfully completed connector fabrication training and meets the qualification requirements stated below.

4.5.1 Emphasizes the importance of connector fabrication to the performance and long-term reliability of shipboard combat systems.

4.5.2 Uses 2.2 through 2.5 for basic instructional material supplemented by connector manufacturer's instructional material as desired.

4.5.3 Requires classroom lecture, study, and demonstration of each topic in Group A of Section 5 of 2.2, and 2.3.

4.5.4 Requires individual student practice in the use of specified tools and performance of connector fabrication techniques and procedures described in Groups B through H of Section 5 of 2.2, Parts One through 6 of 2.3, and Paragraph 2-20.2 of 2.5.

4.5.5 Requires a minimum of 32 hours of combined classroom lecture and laboratory practice in the type of connectors to be fabricated, either electrical/electronic or fiber optic.

4.6 Connector fabrication qualifications consist of:

4.6.1 Connector Fabricator Qualification requirement: Successful completion of the training course required in 4.5.5 plus successful completion of 40 hours on-the-job training under the tutelage of a qualified connector

fabricator or a qualified connector fabrication supervisor in the type of connectors to be fabricated, either electrical/electronic or fiber optic.

4.6.2 Connector Fabrication Supervisor Qualification requirement: Successful completion of the classroom training required in 4.5.5 plus be the incumbent of a supervisory electrical or electronic mechanic position.

4.6.3 Connector Fabrication Quality Assurance Inspector Qualification requirement: Successful completion of the classroom training required in 4.5.5 plus be the incumbent of a quality assurance specialist or inspector position.

4.7 Cable installations consist of cable, banding, equipment, penetrations, cableways, cable separation and connection(s), and associated hardware.

4.8 Attachment C is provided as an aid to completion of Electrical Cableway Inspection Form Attachment B.

***4.9 Attachment D is provided as an aid to accomplishing required documentation of electrical/electronic disconnect/reconnect reporting requirements.***

ATTACHMENT A  
OPTICAL MEASUREMENT RECORD

DATE \_\_\_\_\_ HULL NUMBER \_\_\_\_\_  
 INSPECTED BY \_\_\_\_\_ CODE \_\_\_\_\_ INSPECTING ORGANIZATION \_\_\_\_\_ TELEPHONE \_\_\_\_\_  
 ENDPOINT LOCATIONS OR EQUIPMENT NAME: SOURCE \_\_\_\_\_ DETECTOR \_\_\_\_\_  
 INSTALLATION/CONFIGURATION DRAWING \_\_\_\_\_ CABLE SERIAL NUMBER \_\_\_\_\_  
 CABLE TYPE<sup>1</sup> \_\_\_\_\_ REFRACTIVE INDEX OF FIBER<sup>2</sup> \_\_\_\_\_ ATTENUATION/KM<sup>3</sup> @1300 NM \_\_\_\_\_ @850 NM \_\_\_\_\_  
 CONNECTOR TYPE(S)<sup>1</sup> \_\_\_\_\_ TEST EQUIPMENT MANUFACTURER/MODEL NO. \_\_\_\_\_  
 SERIAL NO. \_\_\_\_\_ CALIBRATION DUE DATE \_\_\_\_\_ SOURCE WAVELENGTH(S)(NM) \_\_\_\_\_ / \_\_\_\_\_

SOURCE CABLE NO. <sup>4</sup>	DETECTOR CABLE NO. <sup>4</sup>	1300NM/850NM WINDOW (CIRCLE ONE)									
FIBER COLOR <sup>5</sup> OR NUMBER	FIBER COLOR <sup>5</sup> OR NUMBER	ACCEPTABLE LOSS (dB)	FORWARD REFERENCE POWER	FORWARD MEASURED POWER	FORWARD LOSS (dB)	FORWARD RETURN LOSS (dB)	REVERSE REFERENCE POWER	REVERSE MEASURED POWER	REVERSE LOSS (dB)	REVERSE RETURN LOSS (dB)	CABLE/LINK LENGTH (M)

NOTES: <sup>1</sup>RECORD MIL-SPEC NUMBER IF APPLICABLE.

<sup>2</sup>RECORD VALUE FROM CABLE REEL DATA SHEET, IF UNAVAILABLE DEFAULT TO 1.490.

<sup>3</sup>RECORD VALUES FROM CABLE REEL DATA SHEET.

<sup>4</sup>FOR LINK MEASUREMENTS ONLY.

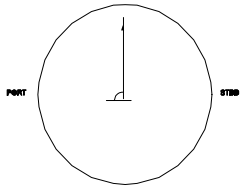
<sup>5</sup>STANDARD COLORS: BLUE, ORANGE, GREEN, BROWN, SLATE, WHITE, RED, BLACK, YELLOW, VIOLET, PINK, TAN

CONNECTOR END FACE QUALITY: \_\_\_\_\_

CONNECTION LIST: \_\_\_\_\_

REMARKS: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_



ELECTRICAL CABLEWAY INSPECTION FORM

DATE \_\_\_\_\_ HULL NUMBER \_\_\_\_\_  
INSPECTED BY \_\_\_\_\_ INSPECTING ORGANIZATION \_\_\_\_\_

SER #	COMPT	DECK	FRAME	P/S	POS	CABLE CIRCUIT DESIG	CABLE TYPE	*CAT	*NAVSEA DWG NO.	EQUIPMENT
DESCRIPTION										
DESCRIPTION										
DESCRIPTION										
DESCRIPTION										

\* SEE ATTACHMENT C FOR "CATEGORY" GUIDANCE



# ATTACHMENT C

## INSPECTION CRITERIA FOR ELECTRICAL CABLES AND CABLEWAYS

CATEGORY 1 - Immediate Hazard  
 CATEGORY 2 - Potential Hazard  
 CATEGORY 3 - Non-Hazardous

ITEM	CRITERIA	CATEGORY
I. CABLES		
A. Installation		
1.	Minimum bend radius exceeded, causing visual damage to cable.	1
2.	Minimum bend radius exceeded; No visual cable damage, cable rings out and meggers satisfactorily.	3
3.	Equipment connector supporting weight of cable (more than 32 inches of cable from last support to end use equipment). (18" from shock mounted motors).	1
4.	Cables run on or near hot objects (steam or exhaust pipes, griddles, ovens, etc.	1
5.	Cable run outside of hangers.	3
6.	Lack of slack at expansion joints.	2
7.	Excess slack between hangers. (Minimum distance of 6'4" between deck and cables.)	3
8.	Excess cable slack stored in wireway.	3
B. Damaged		
1.	Bulging, bubbling or discoloration of cable jacket (evidence of overloading, overheating or hot spots.)	1
2.	Bulging, bubbling or discolored cable jacket; but cable rings out and meggers satisfactorily.	2
3.	Cable chafed or cut through outer jacket only.	2
4.	Cable chafed or cut through, inner wire insulation damage.	1
5.	Cable pulled out of equipment/junction box penetrations and leads exposed	1
6.	Armored and unarmored cables in contact at an oblique angle causing chafing of unarmored jacket.	2
7.	Fiber cable chafed or cut beyond the cable outer jacket to the kevlar strength members	1
C. Dead-ended		
1.	Cable dead-ended, not end sealed and labeled (serialized) properly at both ends.	1
2.	Cable for future use not properly sealed on both ends and labeled at both ends for the specific use.	1

ITEM		CRITERIA	CATEGORY
	3.	Cable dead-ended, end sealed and labeled (serialized) properly.	3
	D. Spliced		
	1.	Improper materials/methods used for splicing, or evidence of loose joints.	1
	2.	Splice located in bend of cable.	2
II. BANDING			
	A. All Cable Runs		
	1.	Banding cuts cable outer jacket (banding too tight).	1
	2.	Banding compressing outer jacket (banding too tight but not cutting jacket).	3
	3.	Plastic tie wraps used in place of banding straps (metal banding strap required).	2
	4.	Cables secured to hanger with bailing wire or rope.	1
	5.	Bands cut and left in wireway.	2
	6.	Channel rubber not installed where required.	2
	B. Horizontal Cable Runs		
	1.	Banding not installed at breakout hangers before and after penetrations or at change of direction of wireway.	2
	C. Vertical Cable Runs		
	1.	No banding or loose banding (banding required on every hanger).	2
III.			
	A. Cableways		
	1.	Cable hangers or hardware cutting into the cable jacket.	1
	2.	Improper hanger spacing (Cable hangers are required at least every 32 inches except that hangers for multiple tier overhead aluminum decks shall be spaced every 16 inches).	2
	3.	Inadequate cableway support (hangers, hardware, tiers, or cable straps missing) or welds cracked.	2
	4.	Overload/Overcrowded cable hangers.	3
	5.	Maximum no. of tiers exceeded.	3
	6.	Inadequate fastener length.	3
	7.	½" clearance between cable run and hangers above or structure not provided.	2

IV. EQUIPMENT			
	A. Covers		
	1.	Junction box or equipment covers loose or missing.	1
	B. Mounting		
	1.	Cable supporting the weight of equipment (power junction boxes, lighting fixtures switch boxes, etc.)	1
	2.	Missing loose or improperly installed mounting hardware on equipment.	2
	C. Cable Entrance		
	1.	Watertight penetrators not utilized for entrance to watertight equipment enclosures.	1
	2.	Drip loops, drip shields plastic sealer or bottom penetration not utilized for entrance to non-watertight drip proof equipment.	1
	3.	Cable can be moved in and out of tube. Improperly packed or not packed.	1
	4.	Nylon tube base loose in enclosure. (O-ring missing)	1
V. DECK/BULKHEAD PENETRATION			
	A. Non-watertight Deck or Bulkhead Cable Penetration		
	1.	No plastic sealer around cables through collars where required.	1
	2.	Chafing protection not installed at non-watertight deck or bulkhead cableway penetrations.	2
	3.	Chafing ring overloaded.	3
	4.	Inadequate chafing protection and damage evidence.	1
	B. Watertight Deck or Bulkhead Cable Penetration		
	1.	No plastic sealer around cable at stuffing tubes which are exposed to the weather. Note: If plastic sealer is installed at locations other than those exposed to the weather, it is not required to be removed.	2
	2.	Stuffing tube or kickpipe not utilized (cable installed without tube).	1
	3.	Unused stuffing tube or kickpipe not plugged.	1
	4.	Stuffing tube or kickpipe assembly incomplete (missing gland nut, packing, or pipe connector).	1
	5.	Stuffing tube assembly incorrect (improper packing).	2
	6.	Stuffing tube or kickpipe too large for size of cable.	3
	7.	Multiple cables in a single stuffing tube or kickpipe.	2

	8.	Stuffing tube or kickpipe damaged to point where complete assembly not possible (cracked welds, damaged threads, out-of-round, etc.) if firestop material is installed.	2
	C. Watertight Deck or Bulkhead Penetrations Utilizing Multiple Cable Penetration		
	1.	Insert blocks, compression bolts or filler blocks missing.	1
	2.	Improper size blocks used for size cable installed violating watertight integrity.	2
	3.	Incorrect type of RTV used to seal armored cable through MCP blocks.	1
	4.	RISE type MCP not properly sealed.	1

**ATTACHMENT D**

**SHIPBOARD ELECTRIC CABLE: DISCONNECT & RECONNECT**

DATE:	HULL NUMBER:	JOB ORDER:	WORK ORDER:
WORK ITEM NO:	TITLE:		
NAMEPLATE DATA:			
MANUFACTURER:		VOLT:	AMPS:
HZ:	HP:	CAT#:	ID#:

Calibrated Inst #:

CABLE TYPE	CIRCUIT ID	CONDUCTOR ID	LEAD COLOR	CABLE START TERM PT	CABLE END TERM PT	Megger Readings		Continuity	Cable Condition			Cable Length *
						Disconnect	Reconnect		Term Lug	Insulation	Sleeving	

\* Report Cable Length for Defective Cables Only.

Disconnected by: \_\_\_\_\_  
 Reconnected by: \_\_\_\_\_

Date: \_\_\_\_\_  
 Date: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-75  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Circuit Breaker; repair

2. REFERENCES:

2.1 Equipment Technical Manual

3. REQUIREMENTS:

3.1 Disconnect electrically and mechanically and remove each circuit breaker, using 2.1 for guidance.

3.1.1 Matchmark and retain mounting hardware and fasteners.

3.1.2 Protect exposed terminal connections and internal switchboard parts from dirt and damage.

3.1.2.1 Each phase shall be isolated and protected from other phases.

3.2 Disassemble each circuit breaker, using 2.1 for guidance.

3.2.1 Inspect and test electrical and mechanical components, assemblies, subassemblies, internal circuitry, and hardware to design characteristics and determine missing and defective components, circuitry, and hardware in accordance with 2.1.

3.2.1.1 Acceptance criteria for silver contacts is that wear shall be less than 50 percent of original thickness after dressing, contacts shall have no evidence of copper migration, and shall have no irregular, burnt, or pitted interface after dressing.

3.2.1.2 Acceptance criteria for non-silver contacts is that, after dressing, wear shall be less than 10 percent of original thickness and contacts shall have no irregular, burnt, or pitted interface after dressing.

3.2.2 Test internal wiring, coils, and transformers for open and short circuits and 500 volt megger insulation resistance to ground. Record readings. Minimum acceptable resistance to ground shall be one megohm.

3.2.3 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.2.1 and 3.2.2 to the SUPERVISOR.

3.3 Remove defective and install new electrical and mechanical components, assemblies, subassemblies, internal circuitry, and hardware. Install new electrical and mechanical components, assemblies, subassemblies, internal circuitry, and hardware where missing. New material shall conform to the requirements of 2.1 and shall be obtained from the Federal Stock System or the Original Equipment Manufacturer (OEM), except for non-restricted parts.

3.3.1 Clean each component free of dirt, lubricants, and other foreign matter.

3.3.1.1 Steam cleaning of circuit breakers is not authorized.

3.3.2 Resilver previously silver plated contacts in accordance with ASTM B 700.

3.3.3 Dress, burnish, adjust, and align arcing and main contacts (contacts that experience arcing in functional duty) in accordance with 2.1.

3.3.4 **Replace** existing cadmium-plated parts with zinc in accordance with ASTM **A 153**.

3.3.5 Dip and bake taped insulated coils and open transformers in varnish conforming to MIL-I-24092, Class 155.

3.3.5.1 Dip and bake insulated coils and open transformers in Dolph Varnish 1105, Epoxylite Esterlite 605, or Schenectady International Isolite 862M varnish in localities where MIL-I-24092 varnish does not meet state and local air pollution control district standards.

3.3.6 Remove existing and install new coil and transformer leads in place of those found to be missing or defective.

3.3.7 Repair defective connections.

3.3.8 Free-up and adjust moving parts and latching mechanisms.

3.3.9 Lubricate the current-carrying parts (except for interrupting contacts) and sliding joints with lubricant conforming to MIL-L-87177, Type I, Grade B. Lubricate mechanical pivots, excluding latch roller face components, with high performance multi-purpose grease conforming to DOD-G-24508.

3.3.9.1 Apply new lubricant sparingly and wipe off excess.

3.3.10 Test and inspect molded and insulation parts in accordance with the following criteria:

3.3.10.1 Phase-to-phase dielectric strength 2000 volts minimum.

3.3.10.2 Surface burn marks and hairline cracks are acceptable but shall not deteriorate the mold surface or impair physical strength. Cracks are not permitted in wall section between phase and a ground plane when there is a conducting part in contact with the wall section. Cracks should not exceed 0.75 inch in length, and in no case should be greater than 50 percent of the length of the surface in which the crack appears.

3.3.10.3 Surface cracks should not exceed 1.5 inches in length, and in no case should be greater than 50 percent of the length of the surface in which the crack appears.

3.3.10.4 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.3.10 to the SUPERVISOR.

(V) "SHOP TEST"

3.4 Shop test and inspect each motor operator and motor in accordance with 2.1.

3.4.1 Submit one legible copy, electronic media, of a report to the SUPERVISOR listing defects.

(V) "SETTINGS AND MILLIVOLT DROP TEST"

3.5 Reassemble each circuit breaker and accomplish adjustments and settings in accordance with 2.1.

3.5.1 Align and true each set of stationary and movable contacts to the manufacturer's specifications.

3.5.2 Accomplish millivolt drop test to each set of contacts in accordance with 2.1 or Original Equipment Manufacturer (OEM) requirements.

(V) "TEST, CALIBRATION, AND ADJUSTMENT"

3.6 Test, calibrate, adjust, and certify the trip units of each circuit breaker for time delay and instantaneous trip settings in accordance with 2.1.

3.6.1 Accomplish a heat run test for repaired type ACB and AQB circuit breakers.

3.6.1.1 Connect each ACB type circuit breaker to a test set and apply rated current to each individual phase of the circuit breaker for 30 minutes. After 5 minutes, measure the voltage across the line to load contacts of each pole and calculate the contact impedance. Satisfactory impedance for 1600-4000 ampere ACB's is below 225 microhms, and below 1050 microhms for 600-900 ampere ACB's.



3.6.1.2 Connect each AQB-type molded case circuit breaker to a test set and apply rated current to each phase simultaneously for one hour. The AQB shall not trip within that hour.

3.6.2 Submit one legible copy, in hard copy or electronic media, of a report listing results of the requirements of 3.6.1 to the SUPERVISOR.

3.6.3 Attach a calibration label to the face of each circuit breaker denoting the name and location of the calibration facility and date of calibration. In the event there is insufficient room on the face of the circuit breaker, attach the calibration label to the right hand side of the breaker as viewed from the front.

3.7 Install and connect each circuit breaker.

3.7.1 Install new threaded fasteners, washers, and lockwashers to replace those found to be missing or defective.

(V)(G) "OPERATIONAL TEST"

3.8 Accomplish final adjustments and test operate each circuit breaker, including control and safety devices.

3.8.1 Close and trip each circuit breaker electrically from local and remote stations. Four consecutive successful times required.

3.8.1.1 Ensure generator heater interlock is de-energized by the generator circuit breaker.

3.8.2 Repeat the requirements of 3.8.1 manually.

#### 4. NOTES:

4.1 Equipment technical manual will be listed in the invoking Work Item.

4.2 Repair and overhaul will be accomplished by the Navy Designated Overhaul Point (DOP) at Puget Sound Naval Shipyard, the OEM, or a commercial repair facility that has demonstrated to the SUPERVISOR the capability to perform the work. Capability to perform circuit breaker overhaul and repair work includes having the facilities, trained mechanics, and access to the OEM's qualified parts and repair procedures. Use of non-qualified restricted parts violates the integrity of the circuit breaker, nullifying the breakers prior qualification under the QPL process. Restricted parts must be obtained from the OEM either directly or via (if available) the Federal stock system. If a restricted part is replaced with an unqualified part, the qualification of the particular circuit breaker is revoked until the full set of QPL required tests are repeated and submitted to NAVSEA for approval.

4.3 Non-restricted parts are defined as nuts, bolts, screws, washers, lockwashers, cotter pins, O-rings, indicator lights, and indicator light globes (colored and clear) only.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-76  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Waveguide and Transmission Line Temporary Lay-Up,  
Pressurization, and Purging; accomplish

2. REFERENCES:

2.1 Equipment Technical Manual

2.2 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB),  
Section IX, Installation Standards (Source CD: N0002400003)

3. REQUIREMENTS:

3.1 Disconnect each dry air pressure line at last mechanical joint prior  
to connection to ship's dry air panel, using 2.1 for guidance.

3.2 Accomplish uninterrupted nitrogen or dry air lay-up for waveguides  
and rigid coaxial cables in accordance with Paragraph 5-2.7 of 2.2 and lay-up  
procedures of 2.1.

3.2.1 Do not connect unregulated pressurized air to equipment sub-  
assemblies or components. Ensure that temporary dry air pressure source(s)  
are connected in accordance with lay-up procedures of 2.1 to prevent equipment  
damage due to over-pressurization. No pressurization shall be supplied to  
waveguide in excess of the normal operating pressures specified for that  
equipment.

3.2.2 Ensure temporary dry air meets the requirements of Paragraph  
5-1.14 and 5-1.15 of 2.2, and the following:

3.2.2.1 Dew Point: Minus 40 degrees Fahrenheit at 80 PSIG.

3.2.2.2 Quality of Air: Filtered to remove all particulate  
matter greater than one micrometer and filtered for a total amount of  
contamination (including oil contaminants) not to exceed one part per million  
by weight.

3.2.3 Pressurize each line as specified in the lay-up procedures of  
2.1.

3.2.3.1 Where specific lay-up instructions are not available, pressurize those lines to 3 PSIG.

3.2.3.2 Install relief valve downstream of temporary source, setting relief pressure at 5 PSIG.

3.2.4 Identify leaks in accordance with Paragraph 5-2.7.2 and 5-2.7.3 of 2.2.

3.2.4.1 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.2.4 to the SUPERVISOR.

3.3 Remove temporary pressurization when directed by the SUPERVISOR.

3.3.1 Connect the dry air pressure line disconnected in 3.1.

3.3.2 Purge and pressurize in accordance with Paragraph 5-2.7 of 2.2.

4. NOTES:

4.1 Equipment technical manual will be listed in the invoking Work Item.

4.2 Where lay-up conditions permit, ensure equipment's dry air control/monitor panels are operational for continuous monitoring of temporary dry air in the equipment space(s).

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-77  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Cofferdam Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S0600-AA-PRO-160/CH-16, Underwater Ship Husbandry Manual, Cofferdams

3. REQUIREMENTS:

3.1 Maintain watertight integrity to a level 4 feet above the maximum anticipated draft, including but not limited to the following operations: access openings, hull plating replacement, welding to the hull when pre-heating is required, modifications or repairs to damage or deterioration that will degrade watertight integrity or stability, or piping and mechanical repairs that are expected to result in less than double-valve protection.

3.2 Accomplish the requirements of 009-09 of 2.1 for the installation of each cofferdam (plug, patch, dry chamber, and stern tube seal) in accordance with 2.2, including the following:

3.2.1 Include the Operational Checklist, Table 16-9 of 2.2, in the Process Control Procedure (*PCP*).

3.2.2 Prior to the start of the *PCP*, any time the installed cofferdam will serve as the only barrier to the sea (single valve protection), ensure Ship's Commanding Officer sign-off via the SUPERVISOR, as required by Paragraph 16-4.7.1.4 (plugs), or Paragraph 16-5.2.10 (patches), or Paragraph 16-6.6 (dry chambers), or Paragraph 16-7.6.4 (stern tube seals) of 2.2.

3.3 Submit one legible copy, in electronic media, of the design and maintenance records in accordance with Paragraph 16-5.2.7 (patches), or Paragraph 16-6.6.4 (dry chambers), or Paragraph 16-7.6.2 (stern tube seals) of 2.2, to the SUPERVISOR.

3.4 Prior to the start of the *PCP*, submit one legible copy, in electronic media, of Ship's Force notification in accordance with Paragraph 16-4.7.1.3 (plugs), or Paragraph 16-5.2.9 (patches), or Paragraph 16-6.6 (dry chambers),

or Paragraphs 16-7.6.4 and 16-7.6.6 (stern tube seals) of 2.2, to the SUPERVISOR.

3.5 Remove each cofferdam (plug, patch, dry chamber, or stern tube seal) and all associated components upon completion of repairs.

4. NOTES:

4.1 2.2 and associated forms are available at:

<http://www.supsalv.org/manuals/uwsh/intro.html>

**4.2 *Attachment A is provided as an aid to cofferdam PCP development.***

**ATTACHMENT A**  
**COFFERDAM PCP REVIEW GUIDE (Corrected copy)**  
Minimum Requirements and Critical Factors

References

1. NAVSEA STD ITEM 009-09, Process Control Procedure (PCP); provide and accomplish
2. NAVSEA STD ITEM 009-77, Cofferdam Requirements
3. S0600-AA-PRO-160 Underwater Ship Husbandry Manual, Chapter 16 (Appendix C, D, E, F, G; Table 16-9)
4. NAVSEA STD ITEM 009-24, Authorization, Control, Isolation, Blanking and Tagging Requirements; accomplish
5. 845-4612172, Test Blanks
6. MIL-STD-777, Schedule of Piping, Valves, Fittings, and Associated Piping Components for Naval Surface Ships
7. NAVSEA STD ITEM 009-01, General Criteria; accomplish
8. NAVSEA STD ITEM 009-03, Toxic and Hazardous Substances; control
9. NAVSEA STD ITEM 009-04, Quality Management System; provide

**All cofferdam PCPs shall include the following MINIMUM criteria, including Critical Factors<sup>1</sup>, as appropriate, preferably in the order shown below (for further elaboration, see the applicable Reference):**

Criteria	Ref	Justification	YES	NO	N/A
<b>1. ADMINISTRATIVE CONTROLS.</b>					
1.1. SHIP'S NAME	7	3.2.4.1			
1.2. SHIP'S HULL NUMBER	7	3.2.4.1			
NUCLEAR VESSEL?					
1.3. CONTRACTOR'S NAME	1 1	3.1.1 Attachment A			
1.4. CONTRACTOR'S ADDRESS	1 1	3.1.1 Attachment A			
1.5. WORK ITEM AND PARAGRAPH	1 7	Attachment A 3.2.4.1			
1.6. PCP TITLE	1 1	3.1.2 Attachment A			
1.7. PCP NUMBER (WITH REVISION)	1 1	3.1.2 Attachment A			
1.8. DATE OF PCP DEVELOPMENT	1 1	3.1.2 Attachment A			
1.9. PCP SUBMISSION DATE	1 1 7	3.1.10 Attachment A 3.2.4.4			
1.10. TITLE OF CONTRACTOR'S REPRESENTATIVE. The individual responsible for creating the PCP.	1 7	3.1.10 3.2.4.4			
1.11. APPROVAL SIGNATURE	1 1	3.1.10 Attachment A			

**ATTACHMENT A**  
**COFFERDAM PCP REVIEW GUIDE (Corrected copy)**  
Minimum Requirements and Critical Factors

2.	<b>PURPOSE/SCOPE.</b> Describe the process and:				
	(a) Type of cofferdam	1	3.1.3 Attachment A Appendix C		
	(b) Affected hull opening	1			
	(c) Affected equipment/system(s)	3			
3.	<b>PERSONNEL QUALIFICATIONS.</b>	1 1 3	3.1.4 Attachment A 16-10.2.3		
3.1.	<b>Diver Training Plan.</b> Note the Diving Contractor's Training Plan & documentation complies with Reference 3, 16-10.2.1 & 10.2.2.	3 3 3 3 3	16-10.2.1 16-10.2.2 16-10.2.4.1 16-10.2.4.2 16-10.2.4.3		
3.2.	<b>Diver Competency.</b> Note the Divers: (a) Are ADCI recognized with 7 years (min.) commercial diving experience; (b) Have current medical physical screening; (c) Have current CPR and First Aid certification; (d) Have cofferdam program qualification; (e) Have performed six (6) cofferdam installations; (f) Have performed a cofferdam installation within the past six (6) months.	3 3 3 3 3	16-1.6 16-10.2.3.3.1 16-10.2.3.3.2 16-10.2.4.2.5 16-10.2.4.2.8		
3.2.1.	<b>Minimum Diver Cofferdam Training Requirements.</b> Require the completion of Reference 3, Appendix E demonstrating Diver fundamental cofferdam knowledge.	3 3 3 3	16-5.2.20 16-10.2.2 16-10.2.3.3.4.(c) Appendix E		
3.3.	<b>Engineering.</b> Specify NON-standard cofferdam(s) <sup>2</sup> were designed by a degreed Engineer or Professional Engineer.	3 3	16-3.11 16-10.2.3.1		
3.4.	<b>Fabrication Personnel.</b> Note Contractor Welders are qualified to Company's approved welding procedure.	3 3	16-10.2.3.2 16-10.2.4.3		
4.	<b>SAFETY GUIDELINES.</b>				
CF	4.1. <b>Personnel Protective Gear.</b> Note that the minimum required PPE will be used and provide several examples.	1	Attachment A		
	4.2. <b>Hazardous Materials.</b> Note Hazardous Material Identification and minimization methods comply with Reference 8, as required.	1 1	3.1.9 Attachment A		

**ATTACHMENT A**  
**COFFERDAM PCP REVIEW GUIDE (Corrected copy)**  
Minimum Requirements and Critical Factors

<p>4.3. <b>Emergency Flooding Plan.</b> Whenever single-valve protection is in place, include in the written notification to the ship a specific plan for immediate installation of a replacement piping component or internal sealing blank. Provide a note indicating that S/F is responsible for developing an on-site Emergency Flooding Plan (dewatering response), which includes additional emergency dewatering equipment that shall be operationally ready before commencing work and available for the entire time single valve protection is in place.</p>	<p>3 3 3 3 3</p>	<p>16-4.7.1.5 16-5.2.10 16-7.6.4 16-10.2.6 16-10.2.6.9</p>			
<p>4.4. <b>Joint Safety Brief.</b> Note participation in a pre-job Joint Safety Brief, if Contractor attendance was required.</p>	<p>1</p>	<p>3.4</p>			
<p>CF 4.5. <b>Posted Safety Precautions – Warning Signs.</b> Specify and describe each of the following (e.g., figure, sketch, etc.):</p>					
<p>4.5.1. Warning Sign posted at Quarter Deck to space that contains the system impacted by the PCP.</p>					
<p>4.5.2. Warning Sign posted at entrance to space that contains the system impacted by the PCP.</p>					
<p>4.5.3. Warning Sign posted at seawater supply manifold (eductor), if applicable.</p>					
<p>4.5.4. Warning Sign at deck edge in way of cofferdam support rigging, if applicable.</p>					
<p>5. <b>COFFERDAM AND INTERNAL BLANK DESIGN.</b></p>	<p>1</p>	<p>3.1.3</p>			



**ATTACHMENT A**  
**COFFERDAM PCP REVIEW GUIDE (Corrected copy)**  
Minimum Requirements and Critical Factors

5.1. <b>Cofferdam Design.</b> Specify a suitable capacity cofferdam, including:  <i>Note: Wooden DC plugs are only authorized above the anticipated waterline (16-4.1; 4.2; 4.9.1)</i>	3 3 3 3	16-3.7 16-3.8.(7) 16-10.2.4.5 Appendix C: 1-7			
5.1.1. <b>Supporting Documentation.</b> Require design and maintenance records that comply with Reference 3, Paras. 16-5.2.7 (patches), or 16-6.6.4 (dry chambers), or 16-7.6.2 (stern tube seals), including, as necessary: (a) Fabrication drawing(s) (b) Inspections (c) Engineering Calculations (d) Cofferdam Rated depth (e) Maximum hull opening size (f) Gasket requirements (g) Eductor and vent line requirements (h) Patch specific hull opening (i) Attachment and alignment requirements  <i>Note: Commercially procured plugs from an approved manufacturer do not require a design sketch. Cofferdam designs from NAVSEA approved DWGs or Reference 3 do not require engineering calculations.</i>	2 3 3 3 3 3	3.2.1 16-5.2.7 16-5.2.8 16-6.6.4 16-6.7.4			
5.1.2. <b>Identification.</b> Require an installed data plate or engraved serial number on cofferdams, corresponding to supporting documentation.	3 3	16-5.2.7 16-6.6.4			
5.1.3. <b>Templating.</b> Note the cofferdam is contoured to fit the hull curvature, as necessary.	3 3 3 3 3 3 3 3 3 3	16-2.1.2.2 16-2.1.2.3 16-3.10 16-5.3.3 16-6.7.3 16-7.7.3 16-8.1 16-8.2 Appendix C			
5.1.4. <b>Overall Dimensions.</b> Specify the gross dimensions of the cofferdam <sup>3</sup> .	3 3	16-10.2.4.5 16-3.8			
5.1.5. <b>Material Types and Thicknesses.</b> Specify the appropriate material types and thicknesses conforming to Reference 3, Section 9 <sup>3</sup> .	3 3	16-3.8 16-10.2.4.5			
5.1.6. <b>Stiffeners.</b> Specify the size and spacing of the stiffeners, as necessary <sup>3</sup> .	3 3 3 3 3 3 3	16-2.1.2.2 16-3.8 16-5.1.1 16-6.2 16-9.1.1.2 16-9.2.3.7 16-9.5.4			

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CF	<p>5.1.7. <b>Eductor, Air Supply and Vent.</b> Specify:</p> <p>(a) As necessary, attachment locations of the eductor, air supply and vent, including suction side closure valves<sup>3</sup>.</p> <p><i>Note: All patch pipe nipples used to attach external vent lines must have valves installed to secure the space when dewatering is complete.</i></p> <p>(b) As necessary, size and type of eductor, air supply and vent<sup>3</sup>.</p> <p><i>Note: External vent lines shall be non-collapsible hoses.</i></p> <p>(c) As necessary, that the cofferdam shall be vented to atmosphere by an internal vent or an external non-collapsible vent line.</p> <p><i>Note: When using an internal vent, communications must be established between topside and internal space workers to ensure that the internal vent valve is open prior to eductor operation.</i></p> <p>(d) As necessary, that a vent line (internal or external) must be installed and opened before dewatering to prevent a vacuum and overloading the patch.</p> <p>(e) As necessary, a caution tag on all internal vents stating: "EXTERNAL COFFERDAM VENT VALVE. IF WATER PRESENT OR PRESSURIZED AIR RELEASED WHEN OPENED, TAKE ACTION TO CONFIRM COFFERDAM ADEQUACY."</p>	<p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p>	<p>16-3.8</p> <p>16-3.9</p> <p>16-5.2.2</p> <p>16-5.2.14</p> <p>16-5.3.4</p>			
	<p>5.1.8. <b>Gasket Design.</b> Require gasket to be fabricated from ASTM D 1056-00 Type 2, Class B or C, Grade 1 or 2 closed cell foam and a minimum of 3 inches in width (complying with Reference 3, 16-9.3.1 or 16-9.3.2, as applicable).</p>	<p>3</p> <p>3</p> <p>3</p>	<p>16-3.8</p> <p>16-9.3.1</p> <p>16-10.2.4.5</p>			
	<p>5.1.9. <b>Gasket Adhesive.</b> Specify that a marine-grade adhesive was used to mount the gasket to the cofferdam flange.</p>	<p>3</p>	<p>16-5.1.1</p>			
	<p>5.1.10. <b>Positive Securing Device Design.</b> Specify the method used to secure the cofferdam to the hull (e.g., J-bolt, hogging lines, etc.)</p>	<p>3</p> <p>3</p>	<p>16-3.8</p> <p>Appendix F</p>			
	<p>5.1.10.1. <b>J-Bolt Minimum Requirements.</b> Refer to, and include, Reference 3, Appendix F if a j-bolt is used.</p>	<p>3</p> <p>3</p>	<p>16-9.2.3.4</p> <p>Appendix F</p>			
	<p>5.1.11. <b>Mechanical Fasteners.</b> Specify the fastener type, as necessary.</p>	<p>3</p> <p>3</p>	<p>16-3.8</p> <p>16-9.4</p>			

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<p>5.2. <b>Internal Sealing Blank Design and Documentation.</b> If an internal sealing blank is necessary, require the installation of a less than ½-inch vent valve in the blank and specify:</p> <p><i>Note: Vent lines shall be less than ½" IPS or else a temporary reducer shall be installed to make the opening less than ½" IPS.</i></p>	3 3 3 3 3 3 3	16-3.4.2.1.(2) 16-4.7.1.1 16-4.7.1.2 16-4.7.1.5 16-5.2.1 16-5.2.2 App D: 2, 19			
5.2.1. Blank conforms to Standard DWG# 845-4612172(latest applicable revision).	4	3.6.1			
5.2.2. Gasket conforms to MIL-PRF-1149(latest revision).	4 6	3.6.1 Cat D-1 & D-3			
5.2.3. Fasteners conform to with MIL-DTL-1222J.	4 6	3.6.1 4.15			
5.2.4. Positive attachment of a Danger Tag.	3 4	Appendix D: 19 3.6.1.1			
5.2.5. Require the blank to be documented on a certified check-off sheet (Reference 3, Appendix D) verifying its installation and removal.	3	App D: 2, 19, 22, 23			
<p>5.3. <b>Rigging Plan.</b> Specify a rigging plan to positively secure the cofferdam to the hull, including, as necessary:</p> <p>(a) Lifting requirements</p> <p>(b) Suitable rigging equipment (e.g., chainfalls, turnbuckles, shackles, bellybands, hogging lines, chafing gear, counterweights)</p> <p>(c) Securing and attachment requirements (e.g., padeye dimensions and locations) and consideration of rigging load requirements, per Reference 3, Section 9</p> <p>(d) Manufacturer and weight testing requirements (Lifting Straps, Padeyes, Wire)</p> <p>(e) Direction and magnitude of expected loads from installation, use, and removal of the cofferdam</p> <p>(f) Rigging points and supporting structure designed with the factors of safety from Reference 3, Table 16-6.</p> <p><i>Note: If rigging to existing ship structure include the following statement: "All existing ship structure selected for rigging purposes, in accordance with this procedure, shall be visually inspected, before its use, for any questionable indications that would appear to compromise its strength (e.g., cracks, unintentional holes, severe corrosion) or items or structure that appear insufficient to carry the intended load(s). This authorization is ONLY applicable to the installation and removal of the cofferdam of this procedure." If Contractor personnel are unclear or unsure as to whether an item is acceptable to rig from, contact SERMC Engineering C-241 immediately for clarification / approval.</i></p>	3 3 3 3 3 3	16-3.12 16-5.2.6 16-9.2.3.4 16-9.5.2 16-10.2.5.2			

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<b>5.4. PREPARATION.</b>					
CF	5.4.1. <b>Patch and Plug Inspection.</b> Include Reference 3, Appendix C Patch and Plug Inspection Checksheet and require its completion confirming cofferdam inspection.	3 3 3 3 3 3 3 3 3	16-3.7.3.(b) 16-3.8.(7) 16-4.7.1.3 16-4.7.1.6 16-5.2.8 16-5.2.11 16-6.6.5 16-6.7.4 Appendix C		
	5.4.2. <b>Freeboard.</b> Note that watertight integrity of 4-feet (MIN) above the maximum anticipated draft shall be maintained.	2	3.1		
	5.4.3. <b>Hull Opening or Access Cut Location.</b> To locate cofferdam, specify, as necessary:				
	5.4.3.1. <b>Hull Opening Item#.</b> Referenced on docking drawing.				
	5.4.3.2. <b>Hull Opening Size.</b> Referenced on docking drawing.				
	5.4.3.3. <b>Hull Fairing.</b> Referenced on docking drawing.				
	5.4.3.4. <b>Hull Opening Strainer Bars.</b> Detailed on the seachest drawing and referenced on the piping drawing.				
	5.4.3.5. <b>Access Cut.</b> In lieu of hull opening, detail the location and access cut size.				
	5.4.3.6. <b>Surface Preparation.</b> Inspect and clean hull surfaces to obtain a 100% seal.	3 3 3 3 3 3	16-4.8.6 16-4.9.2 16-5.4.2 16-6.8.1 16-7.8.1 Appendix C		
	5.4.3.7. <b>Sealing Surface, Hull.</b> A 3-inch minimum sealing surface on the hull around the opening to accommodate the minimum cofferdam gasket width.	3 3	16-9.3.1.(b) App D: 5		
	5.4.4. <b>Briefing.</b> Specify a method ensuring cognizant personnel shall have direct knowledge of the requirements before starting the process.	1 1	3.1.7 Attachment A		

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5.4.5. <b>On-site Documentation.</b> Specify that the following on-site documentation shall be available for the duration of the process, separately or as part of the PCP. (a) Applicable System Drawings. (b) Docking Plan Drawing. (c) Approved PCP (d) Reference 3 (e) Applicable Standard Forms. Including but not limited to, Reference 3, Appendices C, D and G, as necessary (f) Rigging Plan (g) Cofferdam Design Package (h) Emergency Flooding Plan (i) Diving Contractor's Safe Practices Manual	1 1 3	3.1.7 Attachment A 16-10.2.6			
5.4.6. <b>PCP Control.</b> Specify a method establishing administrative control of the authorized PCP for the duration of the process, including a record of the data demonstrating satisfactory completion of the procedure.  <i>Note: This is normally accomplished by a First-Line Supervisor ensuring all personnel shall maintain compliance with PCP requirements.</i>	1 1 1	3.1.8 3.2 Attachment A			
5.4.7. <b>Notifications.</b>					
5.4.7.1. <b>Government.</b> Notify the Government (G) of the start of the process, in compliance with Reference 9, Para 3.8.2. Label the notification sign-off as: "(V)(G) START OF PROCEDURE".	1 1 1 9	3.1.11 4.1 Attachment A 3.8.2			
5.4.7.2. <b>Ship's Force Notification of Cofferdam Installation (Location) and Single Valve Protection.</b> Include, and complete, as required, Reference 3, Appendix G <i>Report of Ship's Responsibility for Patch Installation and/or Single Valve Protection</i> confirming the Ship's C.O. or Designated Representative have been notified and acknowledge the cofferdam's location (if installed) and level of valve protection.  <i>Note: Unlike single/double valve protection, weld repairs to the hull do not require App. G as implied by Ref. 3, 16-10.2.6.6.</i>	2 2 3 3 3 3 3 3 3 3 3 3 3 4	3.2.2 3.2.4 16-4.7.1.3 16-4.7.1.4 16-5.2.1 16-5.2.2 16-5.2.9 16-5.2.10 16-6.6.10 16-7.6.4 16-7.6.6 16-10.2.6.6 3.1			
5.4.8. <b>Leak Rate.</b> Specify an appropriate leak rate.	3 3 3	16-4.7.1.8 16-5.2.17 16-7.6.6			

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Minimum Requirements and Critical Factors

	5.4.9. <b>Inspection Dive.</b> Note a pre-installation inspection dive shall be accomplished verifying existing conditions.	3 3	16-3.6 16-7.7.4			
CF	5.4.10. <b>Communications.</b> Specify mandatory two-way communication (e.g., hand-held radio, sound powered telephone) between the Contractor (Surveillance Personnel) and Ship's Force (Quarterdeck or OOD Station) for the duration of the process.	3 3 3 3 3 3	16-3.4.2.6 16-4.8.4 16-5.2.14 16-5.5.1 16-10.2.5.1 App D: 14, 21			
CF	5.4.11. <b>Dewatering.</b>					
	5.4.11.1. <b>Dewatering.</b> If necessary, require installation, tagging (as required) and inspection of all vent lines, eductors and air supply lines (dry chambers), in accordance with Reference 3, Appendix D, as necessary.	3 3 3 3 3 3 3 3 3 3	16-5.2.2 16-5.2.14 16-5.2.15 16-5.2.18.1 16-5.2.18.2 16-5.3.4 16-6.6.7 16-6.7.5 16-7.6.6 Appendix D			
CF	5.4.11.2. <b>Pumping, Seawater Supply.</b> If necessary, require maintenance of a seawater supply (supply valve wired open and either a backup fire pump or secondary fire main).					
CF	5.4.12. <b>Operational Compliance Check-List.</b> Include, and complete, the Operational Check-List, Reference 3, Table-16-9.	2 3	3.2.3 16-10.3.1			

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<b>5.5. INSTALLATION.</b>					
	5.5.1. <b>Installation Checksheet.</b> Include Reference 3, Appendix D Patch and Plug Installation Check sheet and complete only those steps pertaining to cofferdam installation.	3 3 3 3 3 3	16-3.13 16-4.7.1.3 16-4.7.1.9 16-5.2.11 16-5.2.19 Appendix D		
	5.5.2. <b>Verify System and Hull Opening.</b> Verify the removed valve or system corresponds to the system blanked and the hull opening.	3	16-5.4.1		
CF	5.5.3. <b>Locate and Position Cofferdam.</b> Require: (a) Cofferdam to be located in conjunction with the Rigging Plan and Inspection Dive. (b) A 4-foot minimum freeboard (conforming to GOS, S9AA0-AB-GOS-010, Section 045) (c) A 6-inch minimum clearance between the cofferdam side and hot work area, if applicable. If the 6-inch minimum clearance cannot be maintained provide written justification.	2 3 3 3 3 3 3	3.1 3.6 3.12 5.3.5 6.7.6 7.7.5 App C: 1b, 1c App D: 1		
CF	5.5.4. <b>Verify Cofferdam Seal (Watertight Integrity).</b> Require Divers to verify cofferdam's watertight integrity, and, if necessary, retightening of the primary means of cofferdam attachment to establish a watertight seal.	3	Appendix D		
	5.5.4.1. <b>Notification of Cofferdam Seal.</b> Require Lead Shop notification that a seal has been established.	3	Appendix D		
CF	5.5.5. <b>Internal Seal Blank.</b> If necessary, require: (a) The installation of an internal seal blank, conforming to the specified design requirements, immediately after removal of the damaged (or repair) component (internal piping or watertight boundary is opened) to maintain double-valve protection. (b) The Contractors to confirm that an internal seal blank with a less than ½" diameter vent valve has been installed immediately after removal of the damaged (or repair) component.	3 3 3 3 3 3 3	16-3.4.2.1.(2) 16-4.7.1.1 16-4.7.1.2 16-4.7.1.5 16-5.2.1 16-5.2.2 App D: 2, 19		
CF	5.5.6. <b>Test &amp; Inspection Plan; Acceptance &amp; Rejection Criteria.</b> Include a Test & Inspection Plan denoting the relevant acceptance and rejection criteria, in compliance with Reference 9; Paras. 3.4.1 and 3.5.1.	1 1 9 9	3.6.1 Attachment A 3.4.1 3.5.1		

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	<p>5.5.7. <b>Monitoring.</b> Require cognizant personnel (e.g., Divers or Ship's Force) to monitor watertight integrity of all applicable cofferdams (with dewatering equipment secured) while actually providing single or double-valve protection at intervals no greater than every 7 days for patches and continuously for dry chambers (when occupied).</p> <p><i>Note 1: The vent valve on internal seal blanks facilitates internal vent cofferdam monitoring.</i></p> <p><i>Note 2: The blank vent valve may be left shut when not temporarily opened by the ship's sounding and security detail for patch or plug seal monitoring or, upon <u>approval by the Ship</u>, the blank vent valve may be left continuously open to maintain cofferdam differential pressure.</i></p>	<p>3</p> <p>3</p> <p>3</p> <p>3</p>	<p>16-5.2.2</p> <p>16-5.2.18</p> <p>16-6.7.2</p> <p>Appendix D: 19</p>			
	5.6. <b>REMOVAL.</b>					
	<p>5.6.1. <b>Removal Checklist.</b> Remove cofferdam and complete those remaining steps in Reference 3, Appendix D Patch and Plug Installation Checksheet applicable to the removal phase of the cofferdam procedure.</p>	<p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p> <p>3</p>	<p>16-3.13</p> <p>16-4.7.1.3</p> <p>16-4.7.1.9</p> <p>4.8.1</p> <p>4.9.7</p> <p>16-5.2.11</p> <p>16-5.2.19</p> <p>5.5</p> <p>7.9</p> <p>Appendix D</p>			
CF	<p>5.6.2. <b>Removal/Reinstallation Equipment, On-site.</b> Equipment to move/manipulate the component shall be available on-site.</p>					
CF	<p>5.6.3. <b>Cofferdam Seal Verification.</b> Either open the ½-inch vent valve or loosen blank fasteners to slightly spread (open) the seal and verify the cofferdam is holding back sea pressure. If leakage exists correct cofferdam seal.</p>	<p>3</p> <p>3</p> <p>3</p>	<p>4.8.9</p> <p>4.8.10</p> <p>Appendix D</p>			
CF	<p>5.6.4. <b>Internal Sealing Blank.</b> Remove internal sealing blank and retain on-site for immediate installation, if necessary.</p>	<p>3</p>	<p>Appendix D</p>			
CF	<p>5.6.5. <b>Double Valve Protection.</b> Verify reestablishment of double-valve protection after component has been installed and 24-hour surveillance or diver stand-by for single-valve protection is no longer required.</p>	<p>3</p>	<p>Appendix D</p>			
CF	<p>5.6.6. <b>Divers Stand-By, Removal.</b> Require Divers to be on stand-by during removal of internal blank and re/installation of component.</p>	<p>3</p>	<p>Appendix D</p>			



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CF	5.6.7. <b>Verify System Integrity.</b> Require loosening of cofferdam after the component is installed to verify the flange seal is tight (zero leaks) and, if not, the Divers shall retighten the cofferdam to reestablish watertight integrity of the component. When seal is verified, remove the cofferdam.	3	Appendix D			
<p>Notes.</p> <ol style="list-style-type: none"> <li>Items referenced to this note are considered “critical factors, which have direct bearing on the process quality and safety” in accordance with Reference 1, Para. 3.1.3 and are either only generally implied in the References or are not readily specified but are nevertheless considered critical and required for a successful cofferdam process. These Items are marked “CF” in this Review form.</li> <li>Non-standard cofferdams are cofferdams other than those provided by Reference 2, Section 9.</li> <li>Can be included as part of design sketch.</li> </ol>						

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-78  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Passive Countermeasures System (PCMS) Material Repair/  
Installation Requirements; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 RIM 05T1-99, Passive Countermeasures System (PCMS)  
Repair/Installation Methods

2.3 PHS&T 05T1-07, Passive Countermeasures System Packaging, Handling,  
Storage and Transportation Plan

2.4 ACD 05T1-05, Passive Countermeasures System (PCMS) Access, Material  
Control and Disposal Manual

3. REQUIREMENTS:

3.1 Install new PCMS material in accordance with 2.2 through 2.4.

3.1.1 Accomplish additional PCMS material handling and storage  
requirements in accordance with 2.3.

(V) "ENVIRONMENTAL REQUIREMENTS"

3.1.2 Verify the environmental requirements of Section C.1 of 2.2  
are met prior to application of primers, tiles, caulking, and paint.

(V) "WELD FAIRING"

3.1.3 Verify the fairing of weld seams is in accordance with Section  
C.3 of 2.2.

(V)(G) "FINAL INSPECTION"

3.1.4 Accomplish a final inspection of newly installed PCMS material  
to verify correct installation.

3.1.5 Accomplish surface preparation and preservation for topcoat of new PCMS material in accordance with Section C.6 of 2.2.

3.2 Accomplish the requirements of 009-32 of 2.1 for new and disturbed surfaces.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-79  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Government Owned Material (GOM); status reporting

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Provide an accurate accounting of Government Owned Material (GOM), traceable to the Lowest Replaceable Unit (LRU), in the custody of the contractor. For this tasking, GOM is defined as government furnished material (GFM) and contractor acquired material (CAM) which the Navy has either paid for or provided directly to the contractor.

3.2 Prepare GOM Status Reports by selecting one of the following methods:

3.2.1 Magnetic Tape

3.2.1.1 The EBCDIC Characteristics:

- (1) Density: 9 Track, 1600BPI
- (2) Mode: EBCDIC
- (3) Parity: Odd
- (4) Block Size: 10
- (5) Record Size: 126
- (6) Labeling: No internal labels; external labels are:
  - (a) Activity Name
  - (b) Date
  - (c) GOM Status Report
  - (d) 1600 BPI
  - (e) EBCDIC
  - (f) Internal Label: None
  - (g) 10 X 126
  - (h) GOMSTAT.TXT (File Name)

#### 3.2.1.2 The ASCII Characteristics:

- (1) Density: 9 Track, 1600BPI
- (2) Mode: ASCII
- (3) Parity: Odd
- (4) Block Size: 10
- (5) Record Size: 126
- (6) Labeling: No internal labels; external labels are:
  - (a) Activity Name
  - (b) Date
  - (c) GOM Status Report
  - (d) 1600 BPI
  - (e) ASCII
  - (f) Internal Label: None
  - (g) 10 X 126
  - (h) GOMSTAT.TXT (File Name)

3.2.2 Floppy characteristics of the GOM Status Report shall be as follows:

- (1) Density: High, 1.44 MB
- (2) Mode: ASCII
- (3) Compression: PKZIP (2.04 G or later)
- (5) Record Size: 126
- (6) Labeling: No internal labels; external labels are:
  - (a) Activity Name
  - (b) Date
  - (c) GOM Status Report
  - (d) PKZIP ver 2.04G (version of PKZIP)
  - (e) ASCII
  - (f) Internal Label: None
  - (g) Record size: 126
  - (h) GOMSTAT.TXT (File Name)

3.2.3 This report shall specify all the current inventory of GOM baseline, residual, and excess assets including COSAL material, installation and checkout (INCO) spares, GFM, and CAM. Specific content requirements shall be as specified in 3.2.4 and shall include the following:

3.2.3.1 Allowance Parts List/Allowance Equipage List (APL/AEL). An alphanumeric code, minimum of 8 characters and maximum of 11 characters, that identifies the unique characteristics of an equipment or system provisioned by the Naval Inventory Control Point, or the non-installed material collectively known as equipage.

3.2.3.2 Document GFM Requisition/CFM purchase order number.

3.2.3.3 National Item Identification Number. Represents the last 9 digits of the 13-digit Naval Stock Number and identifies a specific item catalogued in the Federal Supply System.

3.2.3.4 Part Number. Any number other than a government activity stock number used to identify an item of production or supply; includes manufacturer's part numbers, drawing numbers, and model, type, or source controlling numbers.

3.2.3.5 Commercial and Government Entity (CAGE). A 5-digit number assigned to an individual supplier, manufacturer, corporation, or government activity for identification purposes.

3.2.3.6 Unit of Issue. A 2-character abbreviation code used to identify the types of units under which material is issued. For example, shoes would be issued as a pair (PR), while hammers would be issued one at a time or each (EA).

3.2.3.7 Allowance/Required Quantity. The total number of a given item of replacement allowed onboard.

3.2.3.8 Quantity on Order. The number of a given item for which requisitions are in process.

3.2.3.9 Quantity Received. The number of a given item acquired as a result of a requisition.

3.2.3.10 Quantity on Hand. The number of a given replaceable item currently in the storeroom/storage location.

3.2.3.11 Unit Price. The cost of the unit of issue (i.e., gross, pair, each, quart, gallon, ton, ounce, etc.).

3.2.3.12 Extended Price. The cost calculated by multiplying the unit price by the quantity of items.

3.2.3.13 Material Accessibility Code (MAC). A 2-character alphabetic code that defines the material's intended use and disposition. Generally speaking, excess assets are available as free issue redistributions while baseline and residual assets are either non-available for redistribution or are negotiable at the program manager's discretion. A single item may have multiple MACs assigned to it; some of its quantity on hand could be in each category. Valid MACs include IC (Inaccessible and contractually required), ID (Inaccessible and Deferred), and AR (Accessible and Residual).

3.2.3.14 Unit Identification Code. A 5-digit accounting number that identifies a ship, shore activity, operational unit, agency, contractor or other organized entity that may be involved in acquiring and/or managing material.

3.2.3.15 Type Number Code. A one-digit alphabetic code that identifies the data in position 12-28 as either a document number [R] or a contract number (P).

3.2.3.16 Condition Code. A one-digit alphabetic code that identifies the condition of the material, whether it is ready for issue or in need of some level of repair.

3.2.3.17 Cognizance Code. A 2-position code. The first position identifies the stores account to which the item belongs and the second position identifies the combined technical and inventory manager having jurisdiction over the item.

3.2.3.18 Federal Supply Classification. A 4-position code assigned to designate various groups of common use, commercial type items.

3.2.3.19 COAR/Material Group. A 6-position code locally assigned by the SUPSHIP to indicate the modernization program under which the work on the ship is being performed or the outfitting material group material is being purchased to support.

3.2.3.20 Item Name. A 48-position nomenclature assigned to an item to describe the item for allowance purposes.

3.2.3.21 Technical Characteristics. A 200-character field used to describe the technical characteristics of an item.

3.2.4 The GOM Report Format (character positions, data element numbers, and field lengths) shall use the following table as an illustration of the data elements with their respective character positions and field lengths:

POSITION	DEN PICTURE	REMARKS	DATA DESCRIPTION	
1-11	D008G	APL/AEL	X (11)	
12-28	K002/P699	Document/Contract Number	X (17)	
29-37	D046D	NIIN	X (9)	N/R if no NSN assigned
38-67	D001W	Part Number	X (30)	N/R if NSN assigned
68-72	C035	CAGE	X (5)	N/R if NSN assigned
73-74	C005	Unit of Issue	X (2)	
75-79	E372	Allowance Quantity	9 (5)	
80-84	F977C	Quantity on Order	9 (5)	
85-89	F977D	Quantity Received	9 (5)	
90-94	A012	Quantity on Hand	9 (5)	
95-105	B053	Unit Price	9 (11)	
106-116	G101A	Extended Price	9 (11)	
117-118		Material Access Code (AF)	X(2)	

POSITION	DEN PICTURE	REMARKS	DATA DESCRIPTION	
119-120		Material Access Code (AR)	X(2)	
121-122		Material Access Code (IC)	X(2)	
123-124		Material Access Code (ID)	X(2)	
125-129	A002	Unit Identification Code	X (5)	
130	T088	Type Number Code	X	
131	SD041	Condition Code	X	
132-133	C003	Cog	X(2)	
134-137	C042	FSC	X(4)	
138-143		COAR	X(6)	
144-191	C004C	Item Name	X(48)	
192-392	T059B	Technical Characteristics	X(200)	N/R if NSN assigned

N/R = Not Required

3.3 Submit the GOM Status Report to the SUPERVISOR 4 working days prior to the 50 percent conference and 5 working days after the end of the availability.

#### 4. NOTES:

4.1 The GOM Status Report will be invoked in the solicitation for multi-ship/multi-year availabilities.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-80  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Ship's Facilities; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Accomplish the following requirements to keep the ship habitable and maintain the ship's facilities operational at times when spaces are inhabited by the crew.

3.1.1 Maintain operational sanitary services.

3.1.2 Identify span of time each CHT zone will be taken out of service.

3.1.3 Install and maintain temporary, primary, and back-up CHT pumps during such time that ship's CHT system is inoperative.

3.1.4 Ensure that the ship's power, steam, fire main, seawater service system, flushing system, heating system, CHT system, potable water, air conditioning, and ventilation is maintained operational.

3.1.5 Install temporary cables, jumpers, pumps, spool pieces, valves, hoses, and ducts when required to maintain systems operational.

3.2 Coordinate disruption of the facilities listed in 3.1 and systems listed in 3.1.4 with the ship via the SUPERVISOR.

3.3 Submit one legible copy, in electronic media, of a detailed schedule showing when each facility/system will be disrupted to accomplish 3.1.5 and include the following:

3.3.1 Original schedule is due 5 calendar days prior to availability start date.

3.3.2 Submit updated schedules weekly throughout the entire availability.

3.3.3 Include each compartment disrupted and specify the system(s) affected, with the scope of the disruption.

3.4 Remove the temporary installations and restore the systems to operational conditions when directed by the SUPERVISOR.

4. NOTES:

4.1 The contractor is only required to maintain those systems operational which he disturbs or disrupts in the performance of work in the Job Order, and only to the extent possible, using temporary methods consistent with 3.1.5.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-81  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Compartment Closeout Schedule; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Submit one legible copy, in electronic media, of a compartment closeout schedule to the SUPERVISOR no later than the 50 Percent Review Conference.

3.1.1 The compartment closeout schedule shall contain the following minimum information:

3.1.1.1 A list of compartments where work has been or remains to be accomplished. Include each compartment number and name. Work not completed shall be identified by the Work Item number.

3.1.1.2 A brief of the work that remains to be accomplished by the contractor.

3.1.1.3 Any impact that known Ship's Force work will have on the contractor.

3.1.1.4 The date when the contractor expects to complete his work within each compartment. Highlight major trouble spots.

3.1.1.5 Index the compartment closeout schedule by compartment number listing the page number of where the information about the compartment can be located.

3.1.2 The compartment closeout schedule shall provide for completion of the following compartments, including associated machinery, equipment, electrical, alarm, control, piping, and ventilation systems, prior to the crew move aboard milestone date:

3.1.2.1 Messing, berthing, and living compartments, including galley, scullery, pantry, mess decks, walk-in freezer, chill and thaw boxes, dry provisions and breakout storerooms, wardroom, CPO mess, berthing compartments, staterooms, lounges, wash rooms, water closets and showers, laundry, and associated passageways and access routes

3.1.2.2 Refrigeration and air conditioning machinery rooms

3.1.2.3 CHT machinery spaces and tanks

3.1.2.4 Medical and dental spaces

(V)(G) "COMPARTMENT INSPECTION"

3.2 Accomplish a joint inspection with the SUPERVISOR and the Commanding Officer's designated representative upon completion, inspection, and acceptance, by the contractor, of work within each compartment.

3.2.1 Submit one legible copy, in electronic media, of a report to the SUPERVISOR after each compartment inspection, listing the discrepancies. Identify each discrepancy as Contractor responsibility or Government responsibility. The 3 parties will sign the above report as work being complete. Turn over each compartment to Ship's Force for maintenance and indicate on the updated compartment closeout schedule as complete.

3.3 Update the compartment closeout schedule at the weekly progress meeting after the first report is published.

3.3.1 Highlight changes from the previous compartment closeout schedule.

3.3.2 Highlight each discrepancy in the spaces in 3.1.2 that cannot be corrected prior to crew move aboard milestone date, providing the reason and expected completion date.

#### 4. NOTES:

4.1 The ship's Commanding Officer will furnish the SUPERVISOR the work by compartment, including the schedule, which is planned for accomplishment by Ship's Force on a weekly basis.

4.2 For purposes of this item, the term compartment includes compartments, tanks, and voids.

4.3 The crew move aboard evolution is a difficult and complex one. Key areas of concern are: safety of the crew; sanitation and serviceability of food preparation, serving, and eating areas; livability of berthing and sanitary spaces; cleanliness.

4.4 Interface conflicts in the closeout schedule will be resolved as they occur.

4.5 For purposes of this item, the terms "space/spaces", "room/rooms", and "compartment/compartments" are synonymous.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-82  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Data Requirements When Installing an Equal Component Vice Specified Component; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Submit one legible copy, in electronic media, of the following data to the SUPERVISOR in each instance when the Work Item allows, and the contractor chooses, to install "an equal component" in lieu of the component specified by the Work Item. Provide data to compare the equal component to that specified including the following:

3.1.1 Physical dimensions of each

3.1.2 Bolting pattern required to install the component

3.1.3 Power requirements

3.1.4 Size, location, and type of miscellaneous service connections

3.1.5 Modifications required for installation

3.1.6 Comparison of the characteristics, i.e., gallons per minute, cubic feet per minute, and temperature ranges

3.1.7 Submission of the reports shall be 20 days after award of CNO availabilities and 2 days after award for other availabilities.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-83  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Wire Rope Fitting Verification; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Comply with the following specifications when procuring wire rope fittings.

3.1.1 SOCKETS - RR-S-550

3.1.2 FIEGE-TYPE - MIL-S-21433

3.1.3 SWAGE SLEEVES - Commercial, supplied by the same manufacturer as the swaging machine

3.1.4 THIMBLES - FF-T-276 Type 3 only

3.1.5 SHACKLES - RR-C-271

3.1.6 BLOCKS - MIL-B-24141

3.2 Submit one legible copy, in electronic media, to the SUPERVISOR of certification from the manufacturer that states wire rope rigging and fittings installed comply with the requirements of the specifications listed in 3.1.

3.3 Verify each fitting is legibly marked with manufacturer's name or trademark and size.

3.3.1 Shackles and blocks shall also be marked with safe working load.

3.3.2 Thimbles are not required to be marked.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-84  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Accountability of Temporary Fasteners; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Maintain a single log/file of installed/removed temporary fasteners with the following information:

3.1.1 System

3.1.2 Component (valves, flanges, foundations, brackets)

3.1.3 Location (deck, frame, port, starboard, tank, manhole)

3.1.4 Company name/badge number/name of mechanic

3.1.5 Date installed/date removed

3.2 Paint temporary fasteners blaze orange.

3.3 Remove temporary fasteners prior to any testing, lagging, and/or painting of systems or components.

3.4 Logging-in of temporary fasteners shall be accomplished no later than the end of the work shift.

4. NOTES:

4.1 For purposes of this item, temporary fasteners are defined as those fasteners that are installed in lieu of the final fasteners that are specified for system installation. Examples would include temporary fasteners used to hold fittings, valves, or machinery in place.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-85  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Government Sponsored Planning Yard/Configuration Data Manager (CDM) On-Site Representative Facility; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Provide a separate, lockable, and secure office space for use by the Government Sponsored Planning Yard/CDM On-Site Representative furnished with 2 desks with chairs, lights, heat, air conditioning, electrical outlets, sanitary facilities, filing cabinets, telephone service, janitorial service, and 2, 15-pound fire extinguishers and 24-hour service for the entire contract period.

3.1.1 The facility shall have a minimum of 240 square feet of floor space.

3.1.2 The facility shall be located within one-quarter mile of the ship.

3.1.2.1 Provide a parking area adjacent to the facility. The area shall be lighted and accommodate 2 automobiles simultaneously.

3.1.3 Lighting shall provide 28 foot candles of illumination measured at the desktop level.

3.1.4 Heating and air conditioning shall be capable of maintaining the temperature between 65 and 78 degrees Fahrenheit.

3.1.5 Provide 2 double-pedestal desks 30-inches wide by 60-inches long.

3.1.5.1 Provide one telephone desk set and one 115-volt, shock resistant, double electrical receptacle for each desk. Each receptacle shall be a convenient height and located adjacent to each desk.

3.1.5.2 Provide one swivel chair and one straight-back chair for each desk.

3.1.6 Provide telephone communications with separate circuits for each desk set, between the facility, shipyard, ship, and the municipal telephone system. One telephone line shall be capable of digital transmission.

3.1.6.1 Telephone systems designated long distance shall be installed in such a manner that the only way long distance calls can be made will be with a long distance calling card (credit card) that shall be obtained by the On-Site Representative prior to availability start date.

3.1.7 Provide 4-drawer filing cabinets with lock and keys.

3.1.8 Provide sanitary facilities equipped with drains, hot and cold potable water, and the following:

3.1.8.1 Hot water shall be maintained at 120 to 140 degrees Fahrenheit.

3.1.8.2 One lavatory

3.1.8.3 One water closet

3.1.8.4 One soap dispenser

3.1.8.5 One towel dispenser

3.1.9 Facilities shall be provided 2 days prior to contract start date through 2 days after the contract completion date unless otherwise specified.

3.2 Provide janitorial services to include sweeping, mopping, buffing, and trash pickup on a daily basis.

3.3 The facility shall be in accordance with local building codes, sanitary and current fire regulations. The facility shall include smoke alarms, 2, 15-pound fire extinguishers, and sprinkler systems.

3.4 Furnishings and equipment in this item shall be maintained in a fully operable condition by the contractor.

3.5 The facility shall be delivered to the Government clean, sanitary, damage free, and vermin free.

#### 4. NOTES:

4.1 The On-Site Representative will retain the keys during the entire contract period.

4.2 The SUPERVISOR will identify the Government Sponsored Planning Yard/CDM On-Site Representatives upon request of the contractor.

4.3 The Government Sponsored Planning Yard/CDM On-Site Representatives shall obtain the telephone credit card specified in 3.1.6.1 from their command.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-86  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Recovery of Chlorofluorocarbon (CFC) Refrigerants and Fire Suppressant Halon (H) Materials; accomplish

2. REFERENCES:

2.1 49 CFR Part 173, General Requirements for Shipments and Packagings

3. REQUIREMENTS:

3.1 Recover CFC refrigerants and halon materials listed in 4.2 that are not recycled back into the specific system's equipment from which they were removed as follows:

3.1.1 Fire suppression (halon) cylinders and canisters with electrical charges or initiators must be deactivated and safety caps must be used to cover exposed actuating mechanisms and discharge ports prior to shipping the intact cylinder.

3.1.2 Recover other halon and CFC materials for turn-in to the DoD ODS Reserve at the Defense Depot Richmond VA (DDRV). Empty cylinders shall be used to recover the materials. Empty recovery cylinders can be requisitioned through normal MILSTRIP stock ordering procedures from DDRV. The cylinders used to recover CFC shall be painted orange and cylinders used for halon shall be painted red. Both cylinders shall have yellow tops and shall also have dual port valves to ease the recovery process.

3.1.2.1 Do not mix new materials with used materials and do not mix different types of materials in the same cylinders.

3.1.3 Ensure the recovered materials cylinder is tagged. The tag should be placed beneath the cylinder protective cap or attached securely to the container. Do not stencil on cylinder. The tag shall contain the following information:

3.1.3.1 The shipper's DOD Activity Address Code (DODAAC). If the turned-in material originates from a ship or submarine, use the DODAAC of the ship/submarine on the tag.

3.1.3.2 The shipping activity with point of contact and telephone number.

3.1.3.3 The National Stock Number (NSN) that applies to the filled cylinder being returned.

3.1.3.4 The identity of the recovered material (Navy recovered R-XXX, CFC-XXX, or HALON-XXXX).

3.1.3.5 The amount, in pounds, of recovered materials in the cylinder. Do not fill more than 80 percent of its water weight capacity.

3.1.3.6 Apply a warning/hazardous label to the cylinder in compliance with 2.1.

3.1.3.7 The quantity of containers on the pallet or within the shipping crate. When multiple containers with the same NSN are shipped palletized or in a box/crate, apply only one tag/label to the shipment, not to each item.

3.2 Prior to shipping the reclaimed materials to DDRV, notify the SUPERVISOR so that a DD Form 1348-1 MILSTRIP can be prepared and transaction authorization procured.

3.3 Upon receipt of the completed DD Form 1348-1, and transaction authority from the SUPERVISOR, ship the reclaimed materials to:

Defense Depot Richmond Virginia (DDRV)  
SWO400  
Cylinder Operations  
8000 Jefferson Davis Highway  
Richmond, VA 23297-5000

#### 4. NOTES:

4.1 If your activity is personally transporting ODS to the DoD ODS Reserve, be sure to schedule your delivery with the DDRV Dispatch Office at DSN 695-3834 or (804) 279-3834.

#### 4.2 Recovery Material - CFC's and Halons:

<u>PRODUCT TYPE</u>	<u>PRODUCT TYPE WEIGHT</u>	<u>CYLINDER WATER WEIGHT</u>
R-11	59	42
	170	122
	1400	1000
	100 (drum)	N/A
	200 (drum)	N/A
	650 (drum)	N/A

<u>PRODUCT TYPE</u>	<u>PRODUCT TYPE WEIGHT</u>	<u>CYLINDER WATER WEIGHT</u>
R-12	45	42
	145	122
	1190	1000
R-113	6 ounces	N/A
	1 pint	N/A
	1 quart	N/A
	1 gallon	N/A
	5 gallons (60 lbs)	N/A
	100 lbs (can)	N/A
	200 lbs (drum)	N/A
	55 gallons (drum)	N/A

Note: Only unused CFC-113 solvent contained in original drums or cans with unbroken seals shall be returned to DDRV. Used R-113 refrigerant can also be returned. Call (804) 279-5203 or DSN 695-5203 for specific turn-in guidance.

R-114	57	42
	165	122
	1350	1000
R-500	43	42
	127	122
	1045	1000
R-502	44	42
	125	122
	1050	1000
H-1202	160	122
H-1211	1-5	
	6-10	
	11-20	
	21-60	
	61-125	
	126-200	122
	200	122
	201-340	
	341-1500	1000
	1500	1000

<u>PRODUCT TYPE</u>	<u>PRODUCT TYPE WEIGHT</u>	<u>CYLINDER WATER WEIGHT</u>
H-1301	1-5	
	6-10	
	11-20	
	21-70	
	71-100	
	101-117	
	117	
	118-125	
	126-150	
	150	122
	151-200	
	201-260	
	261-350	
	351-530	
	531-600	
	601-1240	
	1240	1000

4.3 Current NSNs for cylinders are available from the SUPERVISOR.

4.4 Condition codes for cylinders are as follows:

4.4.1 Condition Code A: To be used for returning original cylinders whose seal was never broken or for recovery cylinders.

4.4.2 Condition Code B: To be used for returning full, original cylinders or for standard DOD refillable cylinders.

4.4.3 Condition Code F: To be used to return partially depleted cylinders whose purity cannot be guaranteed or for returning other (non-standard/commercial) cylinders.

4.5 Definition of Recover - To remove refrigerant in any condition from a system and store it in an external container without necessarily testing or processing it in any way.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-87  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Chlorination Procedures; accomplish

2. REFERENCES:

2.1 NAVMED P-5010-6, Manual of Naval Preventive Medicine, Chapter 6,  
Water Supply Afloat

3. REQUIREMENTS:

3.1 Accomplish chlorination of each affected potable water system in  
accordance with 2.1.

3.2 Accomplish a halogen (chlorine) residual test for each affected  
potable water tank and system. Acceptable free available chlorine (FAC) shall  
meet minimum levels specified in 2.1.

3.2.1 Submit one legible copy, in electronic media, of the  
chlorine residual test to the SUPERVISOR not later than 24 hours after the  
completion of the test, stating that minimum FAC level has been met in  
accordance with 2.1.

3.3 Secure and tag out each affected potable water system upon completion  
of the chlorine residual test.

3.4 Accomplish a bacteriological test for each affected potable water  
system.

3.4.1 Bacteriological testing must be accomplished at laboratories  
certified by state regulatory agencies in states having primacy, or by the  
Regional EPA Office in states not having primacy.

3.4.2 Submit one legible copy, in electronic media, of completed  
report to the SUPERVISOR not later than 24 hours after the completion of the  
test, with certification that the water is safe for human consumption.

3.5 Remove each tag upon completion of satisfactory bacteriological test  
and release each potable water system for Ship's Force use.



4. NOTES:

4.1 Do not take calcium hypochlorite in dry powder form aboard ship.  
Mixing is to be done ashore.

4.2 2.1 can be accessed at:

<http://navymedicine.med.navy.mil> (use link to Navy Medicine  
Directives, Publications and Manuals)

or

<http://www-nehc.med.navy.mil/downloads/prevmed/NewP-5010-6.pdf>

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-88  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Collection, Holding and Transfer (CHT) and Mogas Tanks, Spaces, and Piping, including Sewage or Mogas-Contaminated Tanks, Spaces, and Piping; certify

2. REFERENCES:

2.1 Standard Items

2.2 29 CFR Part 1915, Occupational Safety and Health Standards for Shipyard Employment

2.3 NFPA Standard 312, Standard for Fire Protection of Vessels During Construction, Repair, and Lay-up

2.4 NFPA Standard 306, Standard for the Control of Gas Hazards on Vessels

2.5 S9086-T8-STM-010/CH-593, Pollution Control

2.6 Compressed Gas Association Commodity Specification for Air, Pamphlet G-7.1

2.7 29 CFR Part 1910.134, Occupational Safety and Health Standards, Respiratory Protection

3. REQUIREMENTS:

3.1 Certify ENTER WITH RESTRICTIONS, SAFE FOR WORKERS and/or SAFE FOR HOT WORK in accordance with 2.2 through 2.4, using 2.5 and 2.6 for guidance, Collection, Holding and Transfer (CHT) and Mogas tanks, spaces, and associated piping, and inspect and certify adjacent tanks, spaces, or piping, where the scope of repairs will result in a need for certification during the accomplishment of this Job Order.

3.1.1 A National Fire Protection Association (NFPA) Certified Marine Chemist shall be present during the opening of CHT or Mogas tanks, spaces, or associated piping. The Marine Chemist shall personally certify all CHT or Mogas tanks, spaces, and associated piping for initial entry.

3.1.2 Submit one legible copy, in electronic media, of a list of tanks or spaces to be certified to the SUPERVISOR at least 24 hours prior to commencement of work.

3.1.3 Accomplish the requirements of 009-09 of 2.1 for a step-by-step procedure of how the certification process will be accomplished.

3.1.3.1 Procedures for CHT systems shall include, as a minimum, personnel requirements, notification of emergency response personnel, disinfecting of CHT tank and associated piping, removal of product, diagram and tag-out of affected piping, protective clothing, respiratory protection, ventilation requirements, and a list of spaces affected.

3.1.3.2 Procedures for Mogas systems shall include, as a minimum, personnel requirements, notification of emergency response personnel, removal of product from the draw-off tank and Mogas tank and associated piping, removal of inert gas (carbon dioxide) from the cofferdam around the Mogas tank, tag-out of affected Mogas and inert gas (CO<sub>2</sub>) piping, fire protection/fire prevention, protective clothing, respiratory protection, ventilation requirements, and control of other hazards such as benzene and lead.

3.2 Provide a written notice of opening of CHT and Mogas tanks, spaces, and associated piping.

3.2.1 Deliver written notification to the SUPERVISOR and the Commanding Officer's designated representative at least 4 hours prior to the planned opening of CHT or Mogas tanks, spaces, and associated piping.

3.2.2 Deliver written notification to the SUPERVISOR and the Commanding Officer's designated representative of opening of CHT or Mogas tanks, spaces, and associated piping planned over a weekend or Monday following that weekend no later than 0900 on the Friday immediately preceding that weekend.

3.2.3 Deliver written notification to the SUPERVISOR and the Commanding Officer's designated representative of opening of CHT or Mogas tanks, spaces, and associated piping planned on a federal holiday and on the day following the federal holiday no later than 0900 of the last working day preceding the federal holiday.

3.3 Accomplish the requirements of 2.2 for tanks, spaces, or piping that have the potential to become Immediately Dangerous to Life or Health (IDLH).

3.3.1 Spaces that are determined to contain IDLH atmospheres shall never be entered except for emergency rescue or for short duration for installation of ventilation equipment in accordance with 2.2 and 2.7, and the requirements of 3.3.1.1 and 3.3.1.2. When entering IDLH spaces for the purpose of installing ventilation, notify the SUPERVISOR prior to entry. Notifications of rescue shall be made as soon as possible.

3.3.1.1 Provide a full facepiece, pressure demand, self-contained breathing apparatus (SCBA) certified by National Institute for Occupational Safety and Health (NIOSH) for a minimum service life of 30 minutes, or a combination, full facepiece, pressure demand supplied-air respirator (SAR) with an auxiliary self-contained air supply. The size/volume of the auxiliary self-contained air supply shall be based on the contractor's assessment of the unique characteristics/hazards of the space being entered to allow employees to safely escape.

3.3.1.2 In the case of Mogas tanks and the associated cofferdams, the auxiliary self-contained air supply shall be a minimum of 15 minutes or more depending on the required assessment in 3.3.1.1.

3.3.2 NIOSH-approved atmosphere-supplying respirators shall be used by personnel entering CHT tanks, Mogas tanks or spaces, or opening associated piping. Atmosphere-supplying respirators may be either a combination, full facepiece, pressure demand SAR, or a full facepiece, pressure demand SCBA. The source of breathing air for SARs shall be either a compressor capable of delivering an adequate quantity of breathing air at the pressure required by the respirators used and meeting the requirements of the specification for Grade D breathing air described in 2.6, or a bank of cylinders cascading to provide at least 4 to 6 hours of breathing air meeting the above specifications at the pressure needed by the respirators used. The source of breathing air for SCBAs shall meet the requirements of 2.6. Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen. Compressed oxygen shall not be used in atmosphere-supplying respirators that have previously used compressed air. SCBA respirators shall have a minimum service life of 30 minutes.

3.3.3 All personnel required to use the respiratory equipment mentioned above shall receive training in accordance with 2.2 in the actual use of the respirator equipment including operation of all controls and breathing under pressure-demand conditions.

3.3.4 An adequate and attended lifeline shall be utilized for each employee who must enter the IDLH or potentially IDLH atmosphere.

3.4 An observer, whose only duty shall consist of oversight of the work area and spreading the alarm in the event of a casualty, shall be stationed at the access to the work site. The observer must be able to have visual contact or communication with persons in the space at all times.

3.4.1 The observer shall be provided with and trained to use the same personal protective equipment required for the personnel accomplishing the work. In addition, the observer shall be knowledgeable in the work process being accomplished.

3.4.2 The observer shall establish communication between the ship's designated 24-hour manned casualty control location, e.g., Quarterdeck, Damage Control Center (DCC), Casualty Control Station (CCS), and the

observer's location to facilitate notification of the ship in the event of a casualty. This communication may be in the form of 2-way radios, temporary portable-wired alarm system, or other effective devices. The communication devices shall be tested every 30 minutes, as a minimum, to ensure the observer's ability to sound the alarm in the event of a casualty.

3.5 Ventilation suckers, suction ducting, tools, flashlights, and other equipment shall be non-sparking type.

4. NOTES:

4.1 Booklet of General Plans and Tank Sounding Tables are available for review at the office of the SUPERVISOR.

4.2 Refer to 009-07, 009-35, or 009-70 of 2.1, as appropriate, for other requirements concerning confined space entry, certification, fire prevention, and housekeeping.

***4.3 For the purpose of this Standard Item, the words "associated piping" means any piping or fixture physically connected to the CHT or Mogas system.***

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-89  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Purchase and Inspection Requirements for Contractor-Furnished Zinc Anodes; accomplish

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Purchase of zinc anodes shall meet the requirements of MIL-A-18001.

3.2 Accomplish a visual inspection to ensure that each zinc anode displays the following information:

3.2.1 MILSPEC revision letter

3.2.2 Manufacturer name or logo

3.2.3 Heat or melt number

3.3 Maintain a chain of custody record for pencil-type anodes that are unable to display the information listed in 3.2.

3.4 Submit one legible copy, in hard copy or electronic media, of the chemical analysis of each heat or melt number for each zinc anode furnished.

3.5 Maintain segregation of zinc anodes by lot numbers.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-90  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Technical Representative; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Provide the services of a qualified on-site Technical Representative to provide assistance in the process or processes, including NAVSEA pilot coating system application, and repair and testing of the equipment specified in the invoking Work Item. The Technical Representative shall meet the following minimum qualification requirements:

3.1.1 Have technical knowledge of the specified equipment or process and have a documented history of successful performance or repairs on similar equipment or processes.

3.1.2 Have demonstrated competency in analyzing repair requirements and process performance and making recommendations based on process or disassembly inspection results.

3.1.3 Have documented and verified access to Original Equipment Manufacturer (OEM) proprietary plans, specifications, procedures, material, and parts.

3.1.3.1 The Chief Engineer of the SUPERVISOR is the only representative who may waive specific requirements of 3.1.3.

3.1.4 Submit one legible copy, in electronic media, of the name and qualifications of the Technical Representative to the SUPERVISOR for approval **15 days prior to commencement of work**. Qualification documentation shall include information supporting the requirements of 3.1.1 through 3.1.3.

3.1.4.1 Written approval from the SUPERVISOR is required prior to substituting the Technical Representative.

3.2 The Technical Representative shall review all required reports, including Process Control Procedures, for technical adequacy prior to submittal to the SUPERVISOR for acceptance.

3.3 The Technical Representative shall meet periodically, weekly at a minimum, with the Chief Engineer of the SUPERVISOR or his/her designated representative to address problems and status of repairs.

3.4 The Technical Representative and contractor shall receive Technical Authority briefing by the Chief Engineer of the SUPERVISOR or his/her designated representative.

3.5 The Technical Representative does not have the authority to direct modifications to the equipment, processes, or items specified in the invoking Work Item without signed authorization from the Chief Engineer of the SUPERVISOR.

3.6 Minimum requirements for the services of the Technical Representative are as follows:

3.6.1 Witness pre-repair operational tests, adjustments, and inspections to determine equipment condition, when required by the Work Item.

3.6.2 Inspect equipment and component parts during disassembly, to include process material and process performance.

3.6.3 Verify process documents where as-found reports are required, to include clearances and conditions, and submit as-found report. Include in as-found report the information required by 3.6.3.1 through 3.6.3.4.

3.6.3.1 Provide dimensional measurements and comparisons to minimum/maximum design tolerances for equipment.

3.6.3.2 Provide sketches of suspect and defective areas with notations to describe defects.

3.6.3.3 Provide list of recommended repair parts or material in addition to those specified in the invoking Work Item.

3.6.3.4 Provide recommendations for future process improvements.

3.6.4 Inspect new and repaired areas and component parts of the equipment prior to re-assembly to ensure compliance with Navy technical manual requirements and Standard Items.

3.6.4.1 Any deviations or departure from the specifications and/or the requirements of 3.6.4 require an approval from the SUPERVISOR prior to equipment re-assembly.



3.6.5 Inspect and provide technical guidance and assistance during process performance, equipment re-assembly and adjustment, and when specified, coating application. Verify re-assembly procedures, sizes, and clearances comply with manufacturer's requirements, Navy technical manual requirements, and coating application procedures when specified.

3.6.5.1 Verify and document mechanical and electrical alignments, final closing sizes, and clearances.

3.6.6 Witness operational tests, make adjustments, and document test and process performance results, including, when required, final inspections of coating systems.

3.6.7 Submit one legible copy, in electronic media, of an overall condition report to the SUPERVISOR within 5 days of completion of the requirements of the Work Item and/or coating system application or other process specified in the invoking Work Item.

3.6.7.1 The report shall provide a brief of the repairs accomplished and the Technical Representative's opinion of the post-overhaul equipment condition or process performance.

3.7 Notify the SUPERVISOR upon arrival and prior to departure of the Technical Representative.

4. NOTES:

4.1 The Technical Representative shall not "accept or reject" work for the SUPERVISOR.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-91  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Propeller In-Place Inspection; accomplish

2. REFERENCES:

2.1 S9086-HP-STM-010/CH-245, Propellers

3. REQUIREMENTS:

(I) "VISUAL **INSPECTION**"

3.1 Clean and **accomplish a visual inspection of** each propeller and propeller cap in accordance with Section 3 of 2.1.

3.2 Record all inspection data taken in 3.1.

3.2.1 Submit one legible copy, in electronic media, of completed Propeller Visual Technical Inspection Report Forms, NAVSEA 9245/3, listing results of the visual inspection and a sketch showing the size and location of any cracks or defects to the SUPERVISOR.

3.2.2 Cover the entire periphery of each propeller blade with metal edge guards and secure them with steel straps in accordance with 2.1.

3.3 Stake each screw and plug on the exterior of each propeller cap to prevent backing out.

(V) "INSPECT BLADE ALIGNMENT"

3.4 Inspect for the existence and accuracy of the word "BLADE" in line with each propeller blade on the coupling flange at the main reduction gears.

3.4.1 Stamp coupling hub with the word "BLADE" in line with each propeller blade. Stamping shall be 1/8-inch to 1/4-inch lettering, low stress markings. Etching is prohibited.

3.5 Just prior to undocking, remove blade edge protection installed in 3.2.2.

(V) "INSPECT BLADE EDGE PROTECTION REMOVAL"

3.5.1 Inspect to ensure that blade edge protection has been removed.

4. NOTES:

4.1 Additional inspections or requirements will be specified in invoking Work Item.

4.2 NAVSEA Form 9245/3 is available on the Web at:

<http://spt.dcmdw.dcm.mil/technical.html>

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-92  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Resilient Mount; remove and install

2. REFERENCES:

2.1 Standard Items

2.2 Equipment Technical Manual

2.3 S9073-A2-HBK-010, U.S. Navy Resilient Mount Handbook

3. REQUIREMENTS:

3.1 Notify the SUPERVISOR of the presence of heavily mis-loaded or deformed mounts prior to mount removal.

3.2 Remove resilient mount assemblies, using 2.2 and 2.3 for guidance.

3.2.1 Inspect each equipment foundation for structural integrity, deterioration, pitting, cracks, and areas of damage or distortion.

3.2.1.1 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.2.1 to the SUPERVISOR within 5 working days after equipment removal.

3.2.2 Accomplish the requirements of 009-32 of 2.1 for disturbed surfaces of each foundation where resilient mount assemblies have been removed.

3.3 Select, procure, assemble, install, load, and adjust new resilient mount assemblies including load bolts, foundation bolts, nuts, and snubbers in accordance with 2.3.

3.3.1 Stamp the installation date on each resilient mount flange adjacent to the identification date. The date shall be visible and legible when the mount is installed with 1/8-inch minimum lettering size.

3.3.2 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.3 and 3.3.1 to the SUPERVISOR. The report shall include the following:

- 3.3.2.1 Ship's name and hull number
- 3.3.2.2 Contractor and subcontractor
- 3.3.2.3 Job Order and Work Item number
- 3.3.2.4 Identity of equipment
- 3.3.2.5 Amount and designation of mounts installed

4. NOTES:

4.1 Equipment technical manual and drawings referenced in invoking Work Item may identify mount designation and loading requirements.

4.2 This item does not apply to turbine enclosure mounts.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-93  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Emergency Planning and Community Right-to-Know Act (EPCRA) and Pollution Prevention Act (PPA) Information; provide

2. REFERENCES:

2.1 42 U.S.C. 110001, et seq (1986) Emergency Planning and Community Right-to-Know (EPCRA)

2.2 Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Section 102(a)

2.3 40 CFR Parts 300, 302, 355, 370, and 372, Protection of Environment

3. REQUIREMENTS:

3.1 Contractor facility availabilities:

3.1.1 Designate a primary and secondary point of contact to receive reports applicable under this item.

3.1.2 Submit the names of the primary and secondary point of contact to the SUPERVISOR in writing prior to availability start date.

3.2 Government facility availabilities:

3.2.1 Provide reports/notifications required in 3.2.2 through 3.2.6.2 to the SUPERVISOR regardless of threshold quantities delineated in 2.1 through 2.3.

3.2.2 EPCRA Section 302 requirements:

3.2.2.1 Submit one legible copy, in electronic media, of Material Safety Data Sheet (MSDS) for each Extremely Hazardous Substances (EHS) listed in 2.3 brought aboard the Government facility.

3.2.2.2 Report quantities of all chemical products containing EHS brought aboard the Government facility.

3.2.3 EPCRA Section 304 requirements:

3.2.3.1 Provide verbal notification of the release of a reportable quantity of a EHS or Hazardous Substance (HS) released at the Government facility to the SUPERVISOR immediately after initial applicable notifications have been made in accordance with local regulations. This verbal notification shall be followed by a written notification to the SUPERVISOR within 24 hours.

3.2.4 EPCRA Section 311 requirements:

3.2.4.1 Provide MSDS and quantity (by weight) of each HS and EHS in accordance with 2.3, stored on the Government facility.

3.2.5 EPCRA Section 312 requirements:

3.2.5.1 Provide MSDS and Tier I and Tier II reports, including quantities processed or used, of all products or substances listed in accordance with 2.3.

3.2.6 EPCRA Section 313 requirements:

3.2.6.1 Provide MSDS and quantities processed or used of all products or substances listed in Section 313 lists in accordance with 2.3.

3.2.6.2 The Standard Industrial Classification (SIC) Code exception for reporting under Section 313 of 2.1 shall be disregarded when making the required reports.

3.3 All availabilities:

3.3.1 Submit one legible copy, in electronic media, of non-emergency reports and copies of MSDS(s) to the SUPERVISOR prior to availability start date. These copies or reports shall be supplemented or updated when significant new data is available. Negative reports are required.

3.3.2 All emergency reports shall be made immediately upon becoming aware of the existence of the release.

3.3.3 Utilize individual contract numbers on all reports/notifications.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-94  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: General Environmental Requirements for Work at Contractor's Facility; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 40 CFR, Protection of Environment

2.3 49 CFR, Transportation

2.4 29 CFR 1910, Occupational Safety and Health Standards

3. REQUIREMENTS:

3.1 Observe the following requirements, in addition to the specific requirements of the Job Order, for work accomplished on Naval ships and craft within the contractor's facility.

3.2 Prepare a written Environmental Management Plan (EMP) that shall be implemented to ensure no adverse environmental impact occurs.

3.2.1 Submit one legible copy, in electronic media, of the EMP when requested by the SUPERVISOR.

3.2.2 Submit revisions to the EMP when personnel, telephone numbers, or plan processes change. A cover letter indicating EMP previously submitted has been reviewed and is applicable or a revised plan shall be submitted.

3.3 The EMP shall address controls and operational actions that will be employed to ensure no adverse environmental impact and shall include the following:

3.3.1 Spill Prevention, Control, and Countermeasure (SPCC) Plan:

3.3.1.1 Provide name and telephone number for a 24-hour emergency coordinator with alternate.



3.3.1.2 Describe the method and work practices to be employed to prevent discharges of any volume to the river or waters adjacent to the contractor's facility.

3.3.1.3 Describe the contractor's spill clean-up capability (i.e., equipment such as oil skimmer, absorbent pads/booms, etc.).

3.3.1.4 Identify a standby subcontractor in case a discharge exceeds the prime contractor's clean-up capability. Provide name of proposed subcontractor, estimated response time, clean-up capabilities, and certify that the subcontractor will respond if called regardless of time/weather, etc.

3.3.1.5 Provisions for notification of the SUPERVISOR (after normal working hours) or Occupational Safety Health and Environmental Office (during normal working hours) immediately upon discovery of any improper discharge.

3.3.1.6 Provide documentation of successful accomplishment of spill training for all spill team members.

3.3.2 Pumping operations (liquid transfer to barge/tank or vice versa or in combination).

3.3.2.1 Describe the continuous communications between pump tender and barge/tank tender to allow immediate shutdown if a problem occurs during pumping/transfer operations.

3.3.2.2 Specific method for gauging compartment volume in barge/tank; maximum volume to be 90 percent of capacity in receiving barge/tank.

3.3.2.3 Describe provisions to tag pump lines to indicate where line is originating from (i.e., ship/craft tank/void pump number).

### 3.3.3 Waste Disposal:

3.3.3.1 Hazardous waste is defined by 2.2 and applicable state Hazardous Waste Management Regulations.

3.3.3.2 Indicate that the contractor is responsible for properly determining waste identification, including laboratory analysis if necessary under the requirements of 2.2, so that the proper Department of Transportation (DOT) shipping name can be determined for disposal of the hazardous waste in accordance with 2.3. Copies of all laboratory analyses shall be provided to the SUPERVISOR along with manifests.

3.3.3.3 Identify the proposed transporter and transporter EPA ID number who will deliver the hazardous waste to the disposal site. Certify in writing that the proposed transporter meets all Federal, state, and local laws/requirements for the services to be provided. This information shall be submitted to the SUPERVISOR.

3.3.3.4 Describe the segregated storage area that will be utilized by the contractor for storage of hazardous waste.

3.3.3.5 Develop and use a checklist to ensure that transporter's vehicles comply with all applicable DOT requirements of 2.3.

3.3.3.6 Provide certification that the disposal site is legally authorized to accept the identified hazardous waste.

3.3.3.7 Provide documentation of hazardous waste training for all required personnel in accordance with 2.2 through 2.4.

3.3.4 Hazardous Material:

3.3.4.1 Provide documentation of training for personnel using hazardous materials as required by 2.4.

3.3.4.2 Indicate that no hazardous material shall be stored on the ship or craft, except while the material is in daily use or while located in storage areas assigned by the SUPERVISOR.

4. NOTES:

4.1 The SUPERVISOR will:

4.1.1 Retain the right to inspect all hazardous waste/material management activities performed by the contractor as a result of this Job Order.

4.1.2 Retain the right to take any/all wastes/materials from the contractor as deemed necessary to protect the Government's interests. In this event, appropriate credit may be taken by the Navy for any and all work not performed.

4.1.3 Retain the right to stop contractor work/operations in the event of serious safety and environmental problems/violations.

4.1.4 Provide oversight (as necessary) to all spill clean-up operations.

4.1.5 Review all manifests (Navy and co-generated waste) prior to shipment.

4.1.6 Review documentation of all contractor efforts to comply with Federal, state, and local environmental laws, codes, ordinances, and regulations. This review includes, but is not limited to, compliance with any minimization efforts chosen by the contractor.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-95  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Mechanically Attached Fittings (MAFs) for Piping Systems;  
install

2. REFERENCES:

2.1 S9086-RK-STM-010/CH-505, Piping Systems

3. REQUIREMENTS:

3.1 Provide control over the use of mechanically attached fittings (MAFs) as an alternative to the standard welding or brazing of fittings in shipboard systems. Select and install MAFs in accordance with Paragraph 505-6.8 of 2.1.

3.2 Prepare a written procedure for approval by the SUPERVISOR identifying the specific MAF process that may be utilized. The procedure requires a one-time submittal/acceptance unless Standard Items and/or references change or contractor's status changes.

3.2.1 The procedure shall be in accordance with 2.1 and shall include quality control requirements, safety requirements, installation criteria (procedures), responsibilities, and training program requirements.

3.2.2 Submit one legible copy, in electronic media, of the procedure to the SUPERVISOR at least 7 working days prior to initial implementation of procedure.

3.2.2.1 Submit updated or changed procedures to the SUPERVISOR at least 3 working days prior to implementation.

3.3 Accomplish the requirements of the approved procedure.

3.3.1 Submit one legible copy, in electronic media, of a report to the SUPERVISOR identifying the type of MAF, location (space), and system where the contractor has decided to substitute MAFs for weld fittings.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-96  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Ball Valve; repair

2. REFERENCES:

2.1 S9086-RJ-STM-010/CH-504, Pressure, Temperature and Other Mechanical and Electromechanical Measuring Instruments

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

3.3 Repair valve as follows:

3.3.1 Polish the seating surface of the valve ball to a 32 Root-Mean-Square finish to remove high spots, nicks, and burrs.

3.3.2 Remove existing and install new valve soft seats using those compatible with the system fluid, in accordance with manufacturer's specifications.

3.3.3 Chase and tap exposed threaded areas.

3.3.4 Dress and true gasket mating surfaces.

3.4 Assemble valve installing new O-rings, packing and gaskets in accordance with the manufacturer's specifications, and new fasteners in accordance with Attachment A, or for DDG-51 class, Attachment B.

3.4.1 Lubricate each MIL-V-24509 valve with grease conforming to SAE-AMS-G-6032.

(V) "INSPECT ALIGNMENT"

3.5 Inspect alignment of ports in the ball valve and body with the ball fully seated. Ball misalignment shall not be of a degree that will restrict flow.

3.6 Hydrostatically test valve as follows:

3.6.1 Hydrostatic test equipment shall have the following capabilities:

3.6.1.1 Manual overpressure protection release valve.

3.6.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

(V) "**GAGE CHECK**"

3.6.1.3 Master and backup test gages with gage range and graduation in accordance with Table 504-6-1 of 2.1. ***The backup gage shall be cross-checked to the master hydrostatic test gage up to the maximum test pressure just prior to start of testing. Master and backup gages shall track within 2 percent of each other.***

3.6.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(V)(G) "SEAT TIGHTNESS"

3.6.2 Test for seat tightness with valve in closed position with opposite side open for inspection.

3.6.2.1 Ball shall be seated by hand force.

3.6.2.2 Test shall be continued for a minimum of 3 minutes if there is no evidence of leakage or, in the event of visible leakage, until accurate determination of leakage can be made.

3.6.2.3 Allowable leakage for a soft-seated ball valve:  
None.

#### 4. NOTES:

4.1 Test pressures of 3.6.2 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

ATTACHMENT A

VALVE BODY MATERIAL

	<sup>1/</sup> Alloy Steel	Carbon Steel	<sup>2/</sup> Nonferrous
<sup>3/</sup> Studs and Bolts to MIL-DTL-1222	Grade B-16	Grade B-16	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A <sup>4/</sup>
Nuts to MIL-DTL-1222	Grade 4 or 7	Grade 4 or 7	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B <sup>5/</sup>
Socket Head Cap Screws	FF-S-86	FF-S-86	

<sup>1/</sup> Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

<sup>2/</sup> Nonferrous Alloy except Aluminum.

<sup>3/</sup> Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud and, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.

<sup>4/</sup> Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

<sup>5/</sup> Nuts of Nickel Copper Alloy, conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

ATTACHMENT B

VALVE BODY MATERIAL

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
3/ Studs and Bolts to MIL-DTL-1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	4/ 5/ Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A
	For services to 775 degrees Fahrenheit; Grade B-7 or B-16	
	For services to 1,000 degrees Fahrenheit; Grade B-16	
	For services in which JP-5 lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature, which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 2, 5 or 8 steel	
	Bolting subject to seawater corrosion (other than hull integrity bolting; for hull integrity bolting see Note 4) Connections in contact with bilge regions. Where strength requires ferrous bolting and is exposed to the weather; Class A Nickel - Copper alloy to QQ-N-281 or silicon bronze to ASTM B 98 with dimensions of MIL-DTL-1222. Where greater strength is required, use Nickel - Copper - Aluminum alloy QQ-N-286.	
Nuts to MIL-DTL- 1222	5/ For services up to and including 650 degrees Fahrenheit; Grade 5 steel	Phosphor Bronze - Any Grade Silicon Bronze - Any Grade Nickel Copper - Class A or Class B  4/ 5/
	For service to 775 degrees Fahrenheit; Grade 2H or 4 steel	
	For services to 1,000 degrees Fahrenheit; Grade 4 steel	

ATTACHMENT B  
(Con't)

	1/ Alloy Steel/Carbon Steel	2/ Nonferrous
	For services in which JP-5, lubricating oil, or inflammable gas or liquid of any kind, regardless of pressure and temperature which are within 3 feet of hot surfaces (above 650 degrees F) and where steel tubing is required; Grade 5 or 8 steel	
	Nuts subject to seawater corrosion. Connections in the bilge regions. Where strength requires ferrous material and is exposed to the weather; Class A or B Nickel Copper Alloy to QQ-N-281 or Silicon Bronze to ASTM B 98 with dimensions to MIL-DTL-1222	

NOTES

- 1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.
- 2/ Nonferrous Alloy except Aluminum.
- 3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 200 degrees Fahrenheit. The thread locking compound shall conform to ASTM D 5363. Check Class 3 fit stud ends in accordance with SAE-J2270.
- 4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.
- 5/ Where these materials would constitute part of a galvanic couple, proposals for alternate materials shall be submitted for approval.



NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-97  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Shipbuilding and Ship Repair Operations National Emission Standard for Hazardous Air Pollutants (NESHAPS) for Surface Coating Information; provide

2. REFERENCES:

2.1 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart II

3. REQUIREMENTS:

3.1 Contractor facility availabilities:

3.1.1 Designate a contractor primary and secondary point of contact to receive reports applicable under this item.

3.1.2 Submit one legible copy, in electronic media, of the names of the primary and secondary point of contact to the SUPERVISOR prior to availability start date.

3.2 Government facility availabilities:

3.2.1 Provide certification to the SUPERVISOR, using Attachment A for Volatile Organic Compounds (VOC) (for Option 1, 2, and 3 thinning requirement use only), or Attachment B for Volatile Organic Hazardous Air Pollutants (VOHAP) (for Option 4 thinning requirement), on the as-supplied coating by the manufacturer, or similar form as authorized by the SUPERVISOR.

3.2.1.1 For coatings to which thinners must not be added, the coating container must have a label stating "NO THINNING".

3.2.1.2 For coatings to which thinners are to be added, designate a single thinner to be used and determine the maximum allowable thinning ratio using Equation One of 2.1, apply a label to the coating container stating that "THINNER MAY BE ADDED" and also supply the maximum allowable thinning ratio.

3.2.2 No later than the 15th of each month, or at the end of each job, whichever is earlier, submit one legible copy, in electronic media, of a report listing the following to the SUPERVISOR: |

3.2.2.1 Volume and type of each coating used the previous month.

3.2.2.2 Volume and type of thinner used the previous month.

3.2.2.3 Calculations used to determine the maximum allowable thinning ratio for each coating that was thinned the previous month.

3.2.3 All handling, thinning, and transfer of coatings, solvents, and related waste shall be done in a manner that minimizes spills.

3.2.3.1 All containers of coatings, solvents, and related waste shall be free of cracks, holes, defects, etc., and remain closed unless materials are being added or removed from the container.

3.2.3.2 All waste materials including rags, brushes, and rollers shall be kept in tightly closed containers that minimize evaporation.

4. NOTES:

4.1 None.

ATTACHMENT A  
(For Option 1,2,& 3 Thinning Requirement Use Only)  
VOC DATA SHEET  
PROPERTIES OF THE COATING "AS SUPPLIED" BY THE MANUFACTURER

Coating Manufacturer: \_\_\_\_\_  
Coating Identification: \_\_\_\_\_  
Batch Identification: \_\_\_\_\_  
Supplied To: \_\_\_\_\_

Properties of the coating as supplied to the customer:

- A. Coating Density:  $(D_c)_2$  \_\_\_\_\_ g/L  
\_\_\_\_\_ ASTM D 1475-90 \_\_\_\_\_ Other<sup>1</sup>
- B. Total Volatiles:  $(m_v)_s$  \_\_\_\_\_ Mass Percent  
\_\_\_\_\_ ASTM D 2369-93 \_\_\_\_\_ Other<sup>1</sup>
- C. Water Content:
1.  $(m_v)_s$  \_\_\_\_\_ Mass Percent  
\_\_\_\_\_ ASTM D 3792-91 \_\_\_\_\_ ASTM D 4017-90 \_\_\_\_\_ Other<sup>1</sup>
2.  $(v_w)_s$  \_\_\_\_\_ Volume Percent  
\_\_\_\_\_ Calculated \_\_\_\_\_ Other<sup>1</sup>
- D. Organic Volatiles:  $(m_o)_s$  \_\_\_\_\_ Mass Percent
- E. Nonvolatiles:  $(v_n)_s$  \_\_\_\_\_ Volume Percent  
\_\_\_\_\_ Calculated \_\_\_\_\_ Other<sup>1</sup>
- F. VOC Content  $(VOC)_s$ :
1. \_\_\_\_\_ g/L solids (nonvolatiles)
2. \_\_\_\_\_ g/L coating (less water and exempt compounds)
- G. Thinner Density:  $D_{th}$  \_\_\_\_\_ g/L  
\_\_\_\_\_ ASTM \_\_\_\_\_ Other<sup>1</sup>

Remarks: (use reverse side)

H. Certification:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

<sup>1</sup> Explain the other method used under "Remarks"

ATTACHMENT B  
(For Option 4 Thinning Requirement Use Only)  
VOHAP DATA SHEET  
PROPERTIES OF THE COATING "AS SUPPLIED" BY THE MANUFACTURER

Coating Manufacturer: \_\_\_\_\_  
Coating Identification: \_\_\_\_\_  
Batch Identification: \_\_\_\_\_  
Supplied To: \_\_\_\_\_

Properties of the coating as supplied to the customer:

- A. Coating Density:  $(D_c)_2$  \_\_\_\_\_ g/L  
\_\_\_\_\_ ASTM D 1475-90 \_\_\_\_\_ Other<sup>1</sup>
- B. Total Volatiles:  $(m_v)_s$  \_\_\_\_\_ Mass Percent  
\_\_\_\_\_ ASTM D 2369-93 \_\_\_\_\_ Other<sup>1</sup>
- C. Water Content:
1.  $(m_v)_s$  \_\_\_\_\_ Mass Percent  
\_\_\_\_\_ ASTM D 3792-91 \_\_\_\_\_ ASTM D 4017-90 \_\_\_\_\_ Other<sup>1</sup>
2.  $(v_w)_s$  \_\_\_\_\_ Volume Percent  
\_\_\_\_\_ Calculated \_\_\_\_\_ Other<sup>1</sup>
- D. HAP Volatiles:  $(m_{hap})_s$  \_\_\_\_\_ Mass Percent
- E. Nonvolatiles:  $(v_n)_s$  \_\_\_\_\_ Volume Percent  
\_\_\_\_\_ Calculated \_\_\_\_\_ Other<sup>1</sup>
- F. VOHAP Content  $(VOHAP)_s$ :
1. \_\_\_\_\_ g/L solids (nonvolatiles)
2. \_\_\_\_\_ g/L coating (less water and exempt compounds)
- G. Thinner VOHAP Density:  $D_{th(vohap)}$  \_\_\_\_\_ g/L  
\_\_\_\_\_ ASTM \_\_\_\_\_ Other<sup>1</sup>

Remarks: (use reverse side)

H. Certification:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

<sup>1</sup> Explain the other method used under "Remarks"

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-98  
DATE: 19 JUL 2007  
CATEGORY: II

1. SCOPE:

1.1 Title: Monel Fasteners; inspect

2. REFERENCES:

2.1 S9086-CJ-STM-010/CH-075, Fasteners

3. REQUIREMENTS:

3.1 Maintain fastener accountability to ensure fasteners meeting the criteria of this item are reused in the same joint from which they came.

3.2 Clean each fastener free of foreign matter (including paint).

3.2.1 Chase and tap exposed threaded areas.

(V) "INSPECT FASTENER"

3.3 Visually inspect each fastener in accordance with the following requirements:

3.3.1 General inspection: Fasteners shall bear markings identifying material to be compatible with the system. Fasteners without markings are not acceptable. Joints with mixed material fasteners are not acceptable.

3.3.2 Engaged Thread Area:

3.3.2.1 Cracks are not acceptable.

3.3.2.2 Broken, chipped, or missing threads or other indications of brittle material failure, are not acceptable.

3.3.2.3 Gallings, spalling, or pitting is not acceptable.

3.3.2.4 Major defects are not acceptable. A major defect is a single defect (after removal of sharp edges and raised metal) that has a depth over one-half the thread depth.

3.3.2.5 Isolated minor defects are acceptable. A minor defect is a single nick, gouge, or flattened thread (after removal of sharp

edges and raised metal) that has a depth greater than 1/64-inch, but less than one-half the thread height (depth), and a width less than the thread spacing (pitch). Defects less than 1/64-inch deep may be ignored.

3.3.2.6 An isolated minor defect that exceeds the width criteria for a minor defect is acceptable when the total length of the defect does not exceed 15 percent of one thread length in any one complete thread.

3.3.2.7 Any combination of minor defects are acceptable when the total combined length of the defects does not exceed 15 percent of one thread length in any one complete thread.

3.3.2.8 Repaired threads that engage with a non-self-locking Class 3-B fit nut, turned with fingers, are acceptable.

### 3.3.3 Non-Engaged Thread Area:

3.3.3.1 Cracks are not acceptable.

3.3.3.2 For externally threaded fasteners, no minimum thread form is required, except as needed to provide initial thread engagement and passing of the nut.

3.3.4 Self-locking nuts shall have positive reinstallation torque. Cuts, tears, or looseness in self-locking elements or the adjacent metal are not acceptable.

3.3.4.1 Determine adequate torque values (i.e., positive reinstallation, breakaway, running) in accordance with Table 075-5-1 of 2.1.

3.3.5 Deformed or damaged flats on fasteners are not acceptable.

3.4 Discard fasteners not meeting the acceptance requirements of this item.

## 4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-99  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Ship Departure Report; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Provide the following completion data, which will be used to close all completed 2-Kilos and generate the Ship Departure Report, no later than 30 days after the availability end date **for scheduled CNO and scheduled Fleet Maintenance Availabilities** and no later than 30 days after completion of the work **for unscheduled and emergent Fleet Maintenance Availabilities**. Provide this data in the Navy Maintenance Database (NMD), either directly in the application or indirectly via another computer system using a web interface.

3.1.1 Verify that the following fields are correct: Execution Availability, Contractor, Definitized Amount, Contract Number, Availability Start Date, and Availability End Date.

3.1.2 Verify that the following Work Item fields are correct for each Work Item completed in the work package: SPEC and RCC.

3.1.3 For MSMO contracts, provide the following data for each Work Item and Request for Contract Change (RCC) completed in the work package: M/D, LABOR, CFM, subcontractor information, COMPLETION DATE, ACTION TAKEN code (see 4.2), and AS FOUND CONDITION (if required by the Work Item).

3.1.4 For FFP contracts, provide the following data for each Work Item and Request for Contract Change (RCC) completed in the work package: COMPLETION DATE, ACTION TAKEN code (see 4.2), and AS FOUND CONDITION (if required by the Work Item).

3.1.5 Return cost data shall be entered separately for each base Work Item and RCC. The RCC costs are those costs above and beyond the costs of doing the original Work Item.

3.1.6 The sum of all Work Items, including all RCC costs and new Work Items, shall equal the final cost of the contract minus any award fees.

3.2 Costs provided should be accurate at the time of submission. However, when final costs are not available within the 30-day reporting timetable, enter preliminary completion data showing any final costs for Work Items/RCCs as well as predictions/estimates for any unsettled Work Items/RCCs.

3.3 For MSMO contracts, verify the proration percentages are correct or adjust as necessary. (See 4.3)

3.4 Report completion to the SUPERVISOR.

4. NOTES:

4.1 Departure reports are not accounting documents; however, they will be handled as business sensitive material.

4.2 Definitions for Action Taken codes can be found in NAVSEAINST 4790.8, Paragraph B-2.5.2.

4.3 If the distribution of subcontractor information is known, enter the data in the appropriate fields (SUB-M/D, SUB-LABOR, and SUB-MAT). If only a total cost of subcontracted work is known, enter that cost in the SUB-MAT field and leave SUB-M/D and SUB-LABOR blank.

4.4 For non-alteration Work Items and RCCs, if only GFM was used, enter an ACTION TAKEN Code of 1 (Maintenance Action Completed; Parts Drawn From Supply). If only CFM was used, enter an ACTION TAKEN Code of 2 (Action Complete; Parts Not Drawn From Supply). If no material was required, enter an ACTION TAKEN Code of 3 (Action Complete; No Parts Required). If both GFM and CFM were used, enter an ACTION TAKEN Code of 1 (Maintenance Action Completed; Parts Drawn From Supply).

4.5 Attachment A defines terms used in this Standard Item.

4.6 For activities not using NMD, Attachments B and C are provided as examples of the required format for departure reports.



ATTACHMENT A

GLOSSARY

ACTION TAKEN CODE: Code which describes the final disposition of the Work Item/RCC

AS FOUND CONDITION: Code which describes the necessity of the Work Item/RCC

AVAILABILITY END DATE: Date of actual availability completion (month/day/year)

AVAILABILITY START DATE: Date of actual availability start (month/day/year)

CFM: Contractor-furnished material cost

CONTRACT NUMBER: Identifying number of the contract authorizing the work

CONTRACTOR: Name of contractor

DEFINITIZED AMOUNT: Contract price plus growth pool

EXECUTION AVAILABILITY: Number assigned to the availability, showing contractor, SPP (code to describe the availability type and contract method), and the fiscal year of execution

GFM: Government furnished material cost

JCN: The 5-digit ship UIC plus the 8-character Job Sequence Number

LABOR: Cost for contractor labor

LLTM: Long Lead Time Material, only to be filled in by the SUPERVISOR

M/D: Man-days; contractor man-hours divided by 8

RCC: Request for contract change

SPEC: Work Item

SUB-LABOR: Cost for subcontractor labor (if known)

SUB-MAT: Subcontractor-furnished material cost (or total subcontractor cost if SUB-M/D, SUB-LABOR, and SUB-MAT are not known)

SUB-M/D: Subcontractor man-days; subcontractor man-hours divided by 8 (if known)

TYPE AVAIL: The type of availability. Examples: ROH - Regular Overhaul; COH - Complex Overhaul; SRA - Selected Restricted Availability; DSRA - Docking Selected Restricted Availability; PMA - Phase Maintenance Availability; DPMA - Docking Phase Maintenance Availability; INA - Inactivation; ACT - Activation; CONV - Conversion; CMAV - Continuous Maintenance Availability; PSA - Post Shakedown Availability; PIA - Planned Incremental Availability; DPIA - Docking Planned Incremental Availability; RCOH - Refueling Complex Overhaul

ATTACHMENT B

FOUO. FOR OFFICIAL USE ONLY. THIS REPORT CONTAINS BUSINESS SENSITIVE INFORMATION.

## SHIP DEPARTURE REPORT

USS \_\_\_\_\_ (\_\_\_\_\_) FY-\_\_ \_\_

[illegible]

ATTACHMENT C

FOUO. FOR OFFICIAL USE ONLY. THIS REPORT CONTAINS BUSINESS SENSITIVE INFORMATION.

SHIP DEPARTURE REPORT

NAVSEAINST 4790.14 Series

REPORT NO:

ISSUE DATE:

SHIP/HULL  
SSP NO.  
UIC  
FY/TYPE AVAIL.  
AVAIL.NO.  
AVAIL. START  
AVAIL. COMPLETION  
INDUSTRIAL ACTIVITY  
CONTRACTOR  
JOB ORDER NO.

CUSTOMER/ TYPE OF WORK	COAR	M/D RATE	GLM	M/D	MAT'L	COST	APA
TYCOM REPAIRS							

TYCOM ALTERATIONS

NAVSEA ALTERATIONS

NAVSEA ORDALTS

ADMINISTRATIVE SERVICES  
(DSA FUNDED)

OTHER

TOTALS

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-100  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Ship's Stability Process Control Procedure (PCP); maintain

2. REFERENCES:

2.1 Standard Items

2.2 541-6687001, Compensating Fuel Oil Tanks on CG-47, DD-963, and DDG-993 Class Ships, Guidance for Process Control Procedure Preparation While Waterborne

2.3 541-6686789 Rev A, Compensating Fuel Oil Tanks on DDG-51 Class Ships, Guidance for Process Control Procedure Preparation While Waterborne

3. REQUIREMENTS:

3.1 Accomplish the requirements of 009-09 of 2.1, to include engineering calculations, for maintaining ship's stability during the accomplishment of modifications, repairs, removal **or repositioning** of equipment, **ballasting, and off-loading/on-loading of fluids** for the duration of the availability, using 2.2 (CG-47) or 2.3 (DDG-51) and the following for criteria:

3.1.1 The ship's list shall not exceed 2 degrees.

3.1.1.1 If the ship's list exceeds 2 degrees, it shall be corrected within 4 hours.

3.1.1.2 Provide weights or water boxes at the locations and amounts as determined by the engineering calculations.

3.1.1.3 Add and remove weights or water to maintain the ship's stability.

3.1.2 Submit the PCP to the SUPERVISOR within 10 days after award for CNO scheduled availabilities.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-101  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Requirements for Mooring, Entry to and Departure from Contractor's Facility; accomplish

2. REFERENCES:

2.1 845-6686999 Rev E, US Navy Vessel Water Depth, Mooring and Hull/Appendage Clearance Requirements for Transit and Berthing

2.2 DDS 582-1, Design Data Sheet, Calculations for Mooring Systems

2.3 S9086-TW-STM-010/CH-582, Mooring and Towing

2.4 UFC 4-159-03, Mooring Design

3. REQUIREMENTS:

3.1 Channels, berth, turning basin, and mooring shall comply with 2.1 and 2.2, using 2.3 and 2.4 for guidance.

3.1.1 Minimum water depth shall be maximum navigable draft plus 2 feet at mean low water.

3.1.1.1 The approach channel, vessel turning radius, and berth/pier shall be clearly marked with channel markers in areas where the 2 feet minimum does not extend beyond the minimum approach channel, vessel turning radius, and berth/pier requirements specified in 2.1.

3.1.1.2 Install temporary fixed reference points at each end of the approach channel and berth. The reference points shall mark the center of the approach channel and berth.

3.2 Maintain a minimum of 4 feet between the highest point on the ship and overhead projections at mean high water.

3.3 Maintain a minimum horizontal clearance of 17 feet 6 inches between each side of the ship's extreme beam (35 feet total) and any fixed structures such as bridges.

3.4 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.1 through 3.3 to the SUPERVISOR 15 days prior to availability start date.

4. NOTES:

4.1 This item is for all ships over 100 feet in length entering contractor's facility.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-102  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Alteration Verification; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Accomplish reporting of alterations in accordance with the following:

3.1.1 Meet with the ship's Commanding Officer's designated representative and the SUPERVISOR within one day after start of the availability. Accomplish required reporting for each alteration in accordance with Attachments A through C.

3.1.2 Meet with the Commanding Officer's designated representative to obtain necessary information and signatures as required throughout the availability.

3.1.3 Submit one legible copy, in electronic media, of completed Attachments A through C to the SUPERVISOR for each alteration within 3 days after alteration completion.

4. NOTES:

4.1 Alterations may include Ship Alterations (ShipAlts), Ordnance Alterations (ORDALTs), Engineering Changes (ECs), Field Changes (FCs), Machinery Alterations (MACHALTs), Ship Change Document (SCD), Alteration Equivalent to Repair (AER), and other configuration changes authorized for accomplishment.

4.2 The requirements of this NAVSEA Standard Item will be accomplished by the activity installing the alteration.

ATTACHMENT A  
EXCEPTIONS TO ILS VERIFICATION

ALTERATION IDENTIFICATION: \_\_\_\_\_  
(Type Hull-Class-Alteration Number)

SHIP: \_\_\_\_\_ ALTERATION ACCOMPLISHMENT DATE: \_\_\_\_\_  
(Hull No./Name) (From - To)

INSTALLING ACTIVITY: \_\_\_\_\_

1. The following ILS was not provided upon completion of this alteration:

- a. Technical Manuals (listed by identification number and equipment application).
- b. Spares Support that is without RIC/PAL No./Interim Repair Parts (listed by Equipment Nomenclature)
- c. COSAL Updates (list documentation not onboard)
- d. Test Equipment (listed by Equipment Nomenclature)
- e. PMS Documentation (listed by Maintenance Index Pages (MIPs), Maintenance Requirements Card (MRC) Numbers)
- f. Ship Selected Record Drawings (SSRD) Markups (list mark-ups not onboard)
- g. Installation Drawings (list drawings not onboard)

2. The following information is provided for items indicated in paragraph (1):

- a. Information on how and when this missing ILS was ordered (i.e. Requisition Number, Letter/Transmittal Number, etc.).
  - b. Information on the current status/estimated receipt date/reason for late arrival (if known) (i.e. out of stock, not developed, etc.).
  - c. Information on the anticipated method of transfer to the ship when received (i.e. transshipment, forwarding letter, to be accomplished by someone other than NSA/AIT, etc.).
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



ATTACHMENT B  
PHYSICAL CONFIGURATION AUDIT REPORT

ALTERATION IDENT: \_\_\_\_\_  
(Type Hull-Class-Alteration Number)

SHIP: \_\_\_\_\_ ALTERATION ACCOMP DATE: \_\_\_\_\_  
(Hull No./Name) (From - To)

INSTALLING ACTIVITY: \_\_\_\_\_

EQUIPMENT NOMENCLATURE \_\_\_\_\_

SERIAL NO.: \_\_\_\_\_

LOCATION: \_\_\_\_\_

EQUIPMENT DISPOSITION:

☐ INSTALLED      ☐ REMOVED      ☐ MODIFIED

EIC NO.: \_\_\_\_\_

TECHNICAL MANUAL(S):  
(New/Revised/Copies)

\_\_\_\_\_  
\_\_\_\_\_

APL/AEL/PAL: \_\_\_\_\_

TEST EQUIPMENT: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

PMS DOCUMENTATION: \_\_\_\_\_ (MIP NO.)

REMARKS: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

ATTACHMENT C  
SHIP ALTERATION COMPLETION REPORT

REPORT NO:

ISSUE DATE:

SHIP/HULL  
SSP NO.  
UIC  
FY/TYPE AVAIL.

NAVSEA SUMMARY		COMPLETE	
SHIPALT NO.	BRIEF DESCRIPTION	(Yes/No)	REMARKS

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TYCOM SUMMARY		COMPLETE	
SHIPALT NO.	BRIEF DESCRIPTION	(Yes/No)	REMARKS

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NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-103  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Weight and Moment Change Data; provide

2. REFERENCES:

2.1 None.

3. REQUIREMENTS:

3.1 Provide final weight and moment data in the format identified in Attachment A.

3.1.1 Maintain an account of weight and moment changes resulting from work accomplished during the availability as follows:

3.1.1.1 Weights removed and location of removal

3.1.1.2 Weights added and location of addition

3.1.1.3 Longitudinal, vertical, and transverse moment of removed weights

3.1.1.4 Longitudinal, vertical, and transverse moment of added weights

3.1.2 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.1.1 to the SUPERVISOR.

3.1.2.1 The data shall be a summation of total weight and moment (longitudinal, vertical, and transverse) changes resulting from weights added, removed, and relocated during the availability.

3.1.2.2 Submit a separate data sheet for each applicable Work Item number.

3.1.2.3 Submissions shall be progressive as Work Items are completed.

4. NOTES:

4.1 Weight and moment changes are to reflect alterations made as a result of ShipAlts and/or repair Work Items.

4.2 The technical point of contact for the requirements contained in this NAVSEA Standard Item is the local NSA Engineering and Planning Department representative.

ATTACHMENT A

SHIP NAME: \_\_\_\_\_ HULL (\_\_\_\_\_) CONTRACT/JOB ORDER NO: \_\_\_\_\_

REPORT DATE: \_\_\_\_\_ WORK ITEM NO: \_\_\_\_\_ TITLE: \_\_\_\_\_

WT GROUP	ITEM DESCRIPTION	DWG NO.	REV	WT LBS	VCG FT	LCG FT	TCG FT	ABBREVIATED DWG TITLE

Abbreviations:

WT - weight; DWG - drawing; REV - revision; VCG - vertical center of gravity; LCG - longitudinal center of gravity;  
TCG - transverse center of gravity; FT - feet; I - install; R - remove; F - forward; A - aft; P - port; S - starboard;  
O - centerline; LBS - pounds

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-104  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Vibration Testing and Analysis; accomplish

2. REFERENCES:

2.1 S9073-AX-SPN-010/MVA, Vibration Analysis, Machinery

2.2 Equipment Technical Manual

3. REQUIREMENTS:

3.1 Minimum personnel qualifications:

3.1.1 For vibration testing, personnel shall have the equivalent of 1,000 man hours of combined experience in: vibration concepts and terminology, the use of vibration equipment, performing equipment calibration, using electronic data collectors for monitoring and recording of vibration data, the attachment of transducer mounting disks and blocks, the selection and location of transducers, calculating machine frequencies, and have a qualified Vibration Category I certification from the Vibration Institute, or equivalent experience and training.

3.1.2 For vibration analysis, personnel shall have the equivalent of 3,000 man hours experience in: the use of FFT analyzers and data collectors, identifying machinery faults, performing spectral analysis, performing vibration testing, and have a knowledge of the engineering units involved, have a qualified Vibration Category II certification from the Vibration Institute, or equivalent experience and training.

3.1.3 Submit one legible copy, in hard copy or electronic media, of written substantiation of the credentials of the personnel to the SUPERVISOR 7 working days prior to the start of vibration testing.

3.1.3.1 Submit any change of certification and/or personnel as it occurs to the SUPERVISOR.

(V) "TESTING AND ANALYSIS"

3.2 Accomplish vibration testing and analysis of the equipment in accordance with 2.1, using the ship's applicable Vibration Test and Analysis Guide (VTAG), and the following.

3.2.1 Test the equipment at normal operational speed and load, using 2.2 for guidance.

3.2.2 Vibration data shall be recorded after obtaining stabilized bearing temperatures for continuous duty equipment.

3.2.2.1 Prior to collecting any data, operate pumps with electric motor drivers a minimum of 4 hours.

3.2.2.2 Operate pumps with auxiliary turbine drivers a minimum of 2 hours.

3.2.2.3 Operate other equipment a minimum of one hour.

3.2.2.4 For auxiliary turbine drivers or other variable speed equipment, data shall be acquired within plus or minus 5 percent of the specified speed.

3.2.3 Intermittent or special duty equipment shall have vibration data collected during the normal operating cycle.

3.2.4 Acceptable vibration data results shall not exceed like unit average machine values (statistically averaged signatures maintained in the ship's/Class program database). New or newly overhauled units shall be compared to the Mean plus one Standard Deviation of the statistically averaged machine data as criteria. If only one component, the driver or the driven component, was replaced or overhauled and no repair action was accomplished to the other, the unit vibration signature shall be compared to the Mean plus 2 Standard Deviations of the statistically averaged machine data as criteria.

3.2.5 If VTAG information is not available, collect and analyze vibration data in accordance with the following:

3.2.5.1 Record vibration data in accordance with Paragraph 3.1.2 and 3.3 of 2.1.

3.2.5.2 Vibration data shall not exceed the criteria of Paragraph 3.4.3 of 2.1.

3.2.5.3 Test equipment in accordance with 3.2.1 through 3.2.3.

3.2.5.4 For reciprocating machinery, take a minimum of 2 data points, one at each end of the crankshaft centerline, or as close to centerline as possible.

3.2.5.5 Number each vibration measurement location, starting on the driver end furthest from the driven unit. For 2 drivers on a single driven unit, the numbering shall be from one driver end to the other. For 2

driven units from a single driver, the numbering shall be from one driven unit to the other.

3.2.5.6 Provide a sketch of the unit with the following information:

- Drive Unit(s)
- Driven Unit(s)
- Location of Bearings
- Location and numbering of vibration measurement points

3.2.5.7 Scale vibration amplitudes on plot to show the best representation of the magnitudes.

3.2.5.8 For machinery consisting of a drive and driven unit, take vibration data on both pieces of equipment, even if only one piece of equipment was subject to overhaul, to allow a complete analysis of the vibration data, including vibration transmitted between the pieces of equipment.

3.2.6 Record results of vibration analysis on a test data sheet, Attachment A.

3.2.6.1 Submit one legible copy, in hard copy or electronic media, of the following to the SUPERVISOR within 48 hours of completion of vibration analysis:

- Completed Attachment A
- Machine's vibration data plots
- VTAG applicable to the machine
- Average machine values applicable to the machine

#### 4. NOTES:

4.1 Equipment performance shall satisfy vibration requirements of specific average machine values if the machinery item is included in the ship's machinery vibration analysis (MVA) program. Such programs are in compliance with 2.1 and depend on the ship's applicable VTAG to identify machinery, provide pertinent measurement locations, numbering conventions, test conditions, manufacturer's configuration information, analysis ranges and major forcing frequencies.

4.2 For surface ships, other than aircraft carriers, VTAG and average machine values are available **from Technical Points of Contact** (TPOCs) at 215-897-7467 or 215-897-8471. |

4.3 For aircraft carriers, VTAG and average machine values are available from Supervisor of Shipbuilding Newport News, Aircraft Carrier Planning Office (757-688-5183).

4.4 Equipment Technical Manual will be listed in the invoking Work Item.



4.5 For new or newly overhauled equipment, start of vibration testing can only commence upon satisfactory completion of shipboard operational testing, which will be addressed in the invoking Work Item. Also consider any other adjacent work in the machinery space that may affect accomplishment of vibration testing.

ATTACHMENT A

MACHINERY VIBRATION ANALYSIS REPORT

DATE OF VIBRATION TEST: \_\_\_\_\_

SHIP NAME \_\_\_\_\_ HULL: \_\_\_\_\_

CONTRACT/JOB ORDER NO.: \_\_\_\_\_ WORK ITEM NO.: \_\_\_\_\_

IDENTIFY: DRIVER OVERHAULED ☐ YES ☐ NO  
DRIVEN OVERHAULED ☐ YES ☐ NO

EQUIPMENT NAME: \_\_\_\_\_ EQUIP. NO.: \_\_\_\_\_

DRIVER MANUFACTURER: \_\_\_\_\_ SERIAL NO.: \_\_\_\_\_

DRIVEN MANUFACTURER: \_\_\_\_\_ SERIAL NO.: \_\_\_\_\_

VTAG USED: HULL APPLICABILITY: \_\_\_\_\_, SWAB: \_\_\_\_\_, MID: \_\_\_\_\_

RECORD ACTUAL OPERATING CONDITIONS:  
(SPEED, LOAD, PRESSURE, ETC., OR OTHER CONDITIONS AFFECTING THE TEST)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

TEST RPM: \_\_\_\_\_

RECORD VIBRATION TEST EQUIPMENT USED:

COMPONENT	MANUFACTURER	MODEL
ANALYZER		
ACCELEROMETER		
CALIBRATOR		

REPORTING CONTRACTOR: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

TESTS RESULTS: SAT ☐ UNSAT ☐ (Provide recommendation for corrective action(s) if UNSAT)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SIGNATURE: \_\_\_\_\_ PHONE \_\_\_\_\_

SIGNATURE OF PERSON PERFORMING ANALYSIS (INDICATES VIBRATION TESTING  
IS COMPLETE INCLUDING RECORDING RESULTS/DATA)

ATTACH COPY OF VIBRATION SIGNATURES, APPLICABLE VTAG AND AVERAGE MACHINE DATA.  
FOR NON-VTAG UNITS, PROVIDE BASIC SKETCH.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-105  
DATE: 14 JUL 2005  
CATEGORY: II

1. SCOPE:

1.1 Title: Thermal Sprayed Coatings for Machinery Component Repair;  
accomplish

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-1687, Thermal Spray Processes for Naval Ship Machinery  
Applications

2.3 0948-LP-045-7010, Material Control Standard

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.2 for thermal spray coatings.

3.2 Maintain segregation and record identification markings of Material  
Identification and Control (MIC) LEVEL I material. Restore LEVEL I markings  
after coating process in accordance with 2.3.

3.2.1 Accomplish the requirements of 009-27 of 2.1.

4. NOTES:

4.1 None.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-106  
DATE: 01 AUG 2008  
CATEGORY: I

1. SCOPE:

1.1 Title: Work Authorization Form Coordinator (WAFCOR); provide

2. REFERENCES:

2.1 Joint Fleet Maintenance Manual (JFMM)

2.2 S0400-AD-URM-010/TUM, Tag-Out Users Manual

3. REQUIREMENTS:

3.1 Provide a representative whose function is to coordinate the Work Authorization and Control Process, known as the Work Authorization Form (WAF) Coordinator (WAFCOR), from 30 days prior to the actual scheduled start date of shipboard work to the completion of shipboard work.

3.2 The WAFCOR shall be responsible for the work authorization control process for all Repair Activity (RA) work being performed during the contract performance period. The WAFCOR shall receive, process, compare, and coordinate all WAFs and Technical Work Documents (TWDs) submitted by RAs in accordance with the requirements of Volume IV, Chapter 10, of 2.1. The WAFCOR shall meet daily with the designated representatives from each RA, the Commanding Officer's designated representative, and the SUPERVISOR to eliminate any tag-out conflicts, and to advise the SUPERVISOR of any work authorization problems that could impact the RA's or the ship's work operations and testing.

3.2.1 The WAFCOR shall ensure that each RA submits a **properly filled out** WAF. The WAF/TWD shall show or explain the job description for each work authorization. The WAFCOR shall assign a tracking number and submit the WAF to the Commanding Officer's designated representative. The Commanding Officer's designated representative will determine if adequate isolation and plant/system conditions exist to safely and properly conduct the work, authorize and hang tag-outs, and sign the WAF. Each individual RA must submit work authorizations even if multiple RAs are working on the same components.

3.2.2 The WAFCOR shall legibly sign and release the WAF for start of work upon receipt of legible signature from the cognizant RA's designated representative.

3.2.2.1 Post a copy of the released WAF at the worksite prior to and during productive work. Maintain the WAF in the work authorization log until notified by the cognizant RA's designated representative that the work is complete and ready for tags to be cleared. The WAFCOR and the RA's designated representative will obtain ship's concurrence to clear the tag and sign the completion block. Additional sign-offs required by the WAF for work complete, testing, and closure shall be made as the work progresses.

3.2.3 The WAFCOR shall ensure that the cognizant RAs submit a copy of revisions or changes to the WAF or TWD at the time of revision or change. The WAFCOR will submit all changes to the Commanding Officer's designated representative for processing. Accomplish all applicable verifications required by the original WAF including any tag-out actions. Signatures by all applicable parties shall be reentered on the original WAF or attached sheet. The system tag-outs shall be verified by the Commanding Officer's designated representative and the cognizant RA prior to the accomplishment of the work.

#### 4. NOTES:

4.1 Repair Activity (RA) is any activity (public or private) other than Ship's Force involved in the construction, testing, repair, overhaul, refueling, or maintenance of the ship. Repair Activities include the prime contractor, all subcontractors, government provided contractors or agencies, Alteration Installation Teams, Fleet Maintenance Activities, Naval Shipyards, and others.

4.2 Training requirements are listed in NAVSEA Standard Item 009-24.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-107  
DATE: 01 AUG 2008  
CATEGORY: II

1. SCOPE:

1.1 Title: Piping System Cleanliness (Non-Nuclear); accomplish

2. REFERENCES:

2.1 Standard Items

2.2 S9AAO-AB-GOS-010, General Specifications for Overhaul of Surface Ships (GSO)

2.3 0902-018-2010, General Specifications for Deep Diving SSBN/SSN Submarines

2.4 S9086-RK-STM-010/CH-505, Piping Systems

2.5 MIL-STD-1330, Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, and Nitrogen Systems

2.6 MIL-STD-419, Cleaning and Protecting Piping, Tubing, and Fittings for Hydraulic Power Transmission Equipment

2.7 MIL-STD-1622, Cleaning of Shipboard Compressed Air Systems

2.8 S9086-RW-STM-010/CH-516, Refrigeration Systems

3. REQUIREMENTS:

3.1 Accomplish the general cleaning requirements of 2.2 through 2.4 for new, modified, or repaired non-nuclear piping systems and components of nuclear and non-nuclear powered naval vessels. Accomplish the system cleaning requirements of 2.5 through 2.8.

3.1.1 Clean to the following acceptance standard:

3.1.1.1 Cleanliness Level II: Surface shall be visually free of grease, oil, flux, scale, dirt, loose particles and any other contamination foreign to the base metal. Tap water residues on all metals and light superficial rust on carbon steel surfaces, caused by short time exposure to the atmosphere, are permitted. Light dust on cleaned surfaces is not objectionable, provided that the quantity and size of the particle does not adversely affect system operations.

3.1.1.2 Cleanliness Level III: Surface shall be reasonably free of contamination and any remaining residue on the surface does not interfere with system operations or damage system components.

3.2 Accomplish local cleaning to areas where existing system cleanliness has been lost in a localized area (such as metal shavings deposited in a pipeline while removing a section for replacement). Restore cleanliness by locally swabbing, wiping, vacuuming, etc., the area to meet the acceptance criteria.

3.3 Accomplish cleaning, flushing, and acceptance criteria of compressed air systems in accordance with Section 551 of 2.2 and 2.7.

3.4 Accomplish cleaning, flushing, and acceptance criteria of oxygen, nitrogen, and helium systems in accordance with Section 552 of 2.2 and 2.5.

3.5 Accomplish cleaning, flushing, and acceptance criteria of hydraulics in accordance with Section 556 of 2.2 and 2.6.

3.6 Accomplish cleaning, flushing, and acceptance criteria of fuel oil systems in accordance with Section 541 of 2.2.

3.7 Accomplish cleaning, flushing, and acceptance criteria of steam systems in accordance with Section 253 of 2.2.

3.8 Accomplish cleaning, flushing, and acceptance criteria of condensate systems in accordance with Section 255 of 2.2.

3.9 Accomplish cleaning, flushing, and acceptance criteria of lube oil systems in accordance with Section 262 of 2.2.

3.10 Accomplish cleaning, flushing, and acceptance criteria of fresh and potable water systems in accordance with Section 532 of 2.2.

3.11 Accomplish the requirements of 009-09 of 2.1 for each cleaning operation of refrigerant systems. The PCP shall incorporate the requirements of 2.8.

3.12 Accomplish cleaning, flushing, and acceptance criteria of HP/LP steam drains in accordance with Section 534 of 2.2.

#### 4. NOTES:

4.1 This Standard Item does not apply to systems of nuclear-powered ships | covered by NAVSEAINST 9210.36, Steam Plant Cleanliness Control, or nuclear piping systems on nuclear-powered ships.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-108  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Aircraft Carrier Requirements for Mooring, Entry to, Movement within, and Departure from Contractor's Facility; accomplish

2. REFERENCES:

- 2.1 845-6686999 Rev E, US Navy Vessel Water Depth, Mooring and Hull/Appendage Clearance Requirements for Transit and Berthing
- 2.2 DDS 582-1, Design Data Sheet, Calculations for Mooring Systems
- 2.3 S9086-TW-STM-010/CH-582, Mooring and Towing
- 2.4 UFC 4-159-03, Mooring Design

3. REQUIREMENTS:

3.1 Channels, berth, and mooring shall comply with 2.1 and 2.2, using 2.3 and 2.4 for guidance. Turning basin shall meet the requirements of 2.1 unless physically impossible, in which case turning area shall meet all other clearance requirements specified in this item.

3.1.1 Minimum water depth shall be maximum draft plus 6 feet minimum at mean low water. List and trim effects shall be considered to determine the 6-feet minimum.

3.1.1.1 The approach channel, vessel turning area, and berth/pier shall be clearly marked with channel markers in areas where the 6-feet minimum does not extend beyond the minimum approach channel, vessel turning area, and berth/pier requirements specified in 2.1.

3.1.1.2 Install temporary fixed reference points at each end of the approach channel and berth. The reference points shall mark the center of the approach channel and berth.

3.1.1.3 The 6-feet minimum shall be for the duration of time at a berth/pier.



3.2 Maintain a minimum of 4 feet between the highest point on the ship and overhead projections at mean high water.

3.3 Maintain a minimum horizontal clearance of 17 feet 6 inches between each side of the ship's extreme beam (35 feet total) and any fixed structures such as bridges.

3.4 Submit one legible copy, in electronic media, of a report listing results of the requirements of 3.1 through 3.3 to the SUPERVISOR 15 days prior to availability start date.

4. NOTES:

4.1 This item is for all aircraft carriers for all conditions, including "dead stick" (towed) conditions that enter into a contractor's facility.

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-109  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Special Requirements for Non-SUBSAFE Work on SUBSAFE-Certified Vessels; accomplish

2. REFERENCES:

2.1 0924-LP-062-0010, Submarine Safety (SUBSAFE) Requirements Manual

2.2 0905-LP-485-6010, Control of Testing and Ship Conditioning

2.3 S9510-AB-ATM-010/U, Nuclear Powered Submarine Atmosphere Manual

2.4 Joint Fleet Maintenance Manual (JFMM)

3. REQUIREMENTS:

3.1 Provide a written training plan for accomplishing non-SUBSAFE work on SUBSAFE-certified vessels, using 2.1 through 2.3 and Volume IV, Chapter 10 of 2.4 for guidance.

3.1.1 Submit one legible copy, in electronic media, of the training plan to the SUPERVISOR no later than 15 days prior to availability start date.

3.1.2 Submit revisions to the training plan to the SUPERVISOR for review and acceptance prior to use.

3.1.3 Implement the approved training plan prior to commencement of non-SUBSAFE work on SUBSAFE-certified vessels.

3.2 Train all personnel (including subcontractors) assigned to perform work on SUBSAFE-certified vessels in accordance with the approved training plan of 3.1 prior to start of work.

3.2.1 All personnel shall have direct knowledge of work control procedures, be able to recognize and initiate alarms, be familiar with actions to be taken to evacuate the vessel, and reporting submerged safety draft marks.

3.2.2 Submit one legible copy, in electronic media, of a list of qualified contractor and subcontractor personnel to the SUPERVISOR no later than 15 days prior to start of work. The list shall include company name, badge number, and date training was provided, along with certification documentation showing that training requirements have been met.

3.2.2.1 Submit updates to the list as changes occur throughout the availability.

3.3 Accomplish a joint on-site brief and walkthrough of the work site with the SUPERVISOR and the Commanding Officer's designated representative prior to start of work.

3.3.1 Include identification of SUBSAFE components and/or systems located in the area of work, components and/or systems which may be affected by the work, and lessons learned from previous or similar work. Include identification of Unrestricted Operations (URO) Maintenance Requirement (MRC)-related equipment located in the area of work.

3.3.2 Ensure that URO MRC-measured parameter is not violated. (See V-I-5-5.12.1.c of 2.4.)

3.4 Maintain approved written instructions for accomplishing non-SUBSAFE work on the work site at all times.

3.4.1 Do not accomplish work or disturb any system or component without specific approved written instructions for accomplishing non-SUBSAFE work.

3.5 Prohibit the following items from being brought onboard any nuclear-powered vessel or nuclear support vessel:

3.5.1 Any mercury bearing equipment such as mercury thermometers, portable fluorescent lights, black lights or any other items containing mercury.

3.5.2 Nickel-Cadmium fasteners.

3.5.3 Any device that contains a source of radioactivity.

3.5.4 Bright yellow tools, bags, or equipment.

#### 4. NOTES:

4.1 The SUBSAFE program is a certification program implemented by NAVSEA to ensure strict work controls, material controls, and testing to verify submarine system integrity and prevent loss of submarine personnel and equipment.

4.2 The URO MRC program was developed by NAVSEA to monitor specific areas of interest to determine if the conditions of these areas are suitable for continued unrestricted operations.

4.2.1 URO MRC Manuals:

4.2.1.1 T9081-AD-MMO-010 & 020 (SSN 21 Class)

4.2.1.2 0924-LP-064-8010 (SSN 688 Class)

4.2.1.3 T0700-AA-PRO-010 (SSBN/SSGN 726 Class)

4.2.1.4 T9081-AE-MMO-010 (SSN 774 Class)

4.2.1.5 0924-040-2010 (NR-1 Only)

4.2.1.6 0924-021-1010 (AGSS 555 Only)

NAVSEA  
STANDARD ITEM

FY-10

ITEM NO: 009-110  
DATE: 19 JUL 2007  
CATEGORY: I

1. SCOPE:

1.1 Title: Special Requirements for Non-Nuclear Work on Nuclear Vessels;  
accomplish

2. REFERENCES:

2.1 Joint Fleet Maintenance Manual (JFMM)

3. REQUIREMENTS:

3.1 Provide a written training plan for accomplishing non-nuclear work on nuclear vessels, using Volume IV, Chapter 10 of 2.1 for guidance.

3.1.1 Submit one legible copy, in electronic media, of the training plan to the SUPERVISOR no later than 15 days prior to availability start date.

3.1.2 Submit revisions to the training plan to the SUPERVISOR for review and acceptance prior to use.

3.1.3 Implement the approved training plan prior to commencement of non-nuclear work on nuclear vessels.

3.2 Train all personnel (including subcontractors) assigned to perform work on a nuclear vessel in accordance with the approved training plan of 3.1 prior to start of work.

3.2.1 All personnel shall have direct knowledge of work control procedures, be able to recognize and initiate alarms, and be familiar with actions to be taken to evacuate the vessel.

3.2.2 Submit one legible copy, in electronic media, of a list of qualified contractor and subcontractor personnel to the SUPERVISOR no later than 15 days prior to start of work. The list shall include company name, badge number, and date training was provided, along with certification documentation showing that training requirements have been met.

3.2.2.1 Submit updates to the list as changes occur throughout the availability.

3.3 Accomplish a joint on-site brief and walkthrough of the work site with the SUPERVISOR and the Commanding Officer's designated representative prior to start of work.

3.3.1 Include identification of all nuclear equipment including nuclear temporary/support systems and radiological containment materials located in the area of work, components and/or systems which may be affected by the work, and lessons learned from previously accomplished or similar work.

3.3.2 Evaluate services/temporary systems to be installed by the contractor that run through spaces containing nuclear equipment for possible leakage/spray protection.

3.3.3 The contractor shall identify all possible contact with nuclear equipment or nuclear temporary/support system identified in the space prior to start of work.

3.3.4 Evaluate the rigging path for potential collateral damage to nuclear components/piping. All inadvertent contact with nuclear equipment or nuclear temporary/support system in the work area during the work shall be brought immediately to the attention of the SUPERVISOR.

3.4 Maintain approved written instructions for accomplishing non-nuclear work on the work site at all times.

3.4.1 Do not accomplish work or disturb any system or component without specific approved written instructions for accomplishing work on nuclear vessels.

3.5 Material (permanent or temporary) shall not contact nuclear piping/components unless specifically authorized by the SUPERVISOR. Some examples are cleaning fluid sprays, dripping grease or liquids, inadvertent paint splatter, attaching rope or strings, wood, tape, plastic bags, temporary contractor's services that contact hot or cold nuclear piping and components.

3.6 Report immediately inadvertent contact with or damage to nuclear equipment regardless of how minor (e.g., gouges, scratches, dents, slag, carbon arc, corrosion) to the SUPERVISOR.

3.7 Prohibit the following items from being brought onboard any nuclear-powered vessel or nuclear support vessel:

3.7.1 Any mercury bearing equipment such as mercury thermometers, portable fluorescent lights, black lights or any other items containing mercury.

3.7.2 Nickel-Cadmium fasteners.

3.7.3 Any device that contains a source of radioactivity.

3.7.4 Bright yellow tools, bags, or equipment.

4. NOTES:

4.1 None.