

# UNIFORM INDUSTRIAL PROCESS INSTRUCTION

TITLE: DOORS – NON-BALLISTIC --  
WATERTIGHT/AIRTIGHT –  
MANUALLY OPERATED – WELDED  
INSTALLATION – SURFACE SHIP

NO.	<b>1671-450</b>
CANCELS	None
EFFECTIVE DATE	02 MAY 2001
TYPE	B
SHIP CLASS CODE	B – Surface Ship
SHIP SYSTEM	Doors
TSD	S1, S5
KEY SHOP	11
ASSIST SHOPS	26, 31, 71, 72

- SECTIONS
- I EQUIPMENT
  - II MATERIAL
  - III OSHE/ENVR
  - IV QA
  - V TRAINING/SKILL
  - VI METHOD
  - VII FEEDBACK



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NAVSEA 05P7

THIS TYPE "B" INSTRUCTION SHALL ALWAYS BE FOLLOWED ON AUTHORIZED WORK WHEN SPECIFICALLY INVOKED AND CITED ON THE WORK AUTHORIZING DOCUMENT.

**PERIODIC REVIEW: THIS INSTRUCTION SHALL BE REVIEWED EVERY THREE (3) YEARS.**

NORFOLK NAVAL SHIPYARD  
Portsmouth, VA 23709-5000

**IPI/UIPI REVISION SHEET**

**INSTRUCTION NO.** \_\_\_\_\_ **REV.** \_\_\_\_\_

**Revision – Brief Description:**

**This document has been reviewed by Codes/Shops:** \_\_\_\_\_

\_\_\_\_\_

All comments from reviewing Codes/Shops have been incorporated in this document or otherwise resolved.

ORIGINATOR SIG. \_\_\_\_\_ CODE 251

FIRST LEVEL SUPERVISOR SIG. \_\_\_\_\_ DATE \_\_\_\_\_

SECOND LEVEL SUPERVISOR SIG. \_\_\_\_\_ DATE \_\_\_\_\_

**References:** (Always use latest revision)

References (a) through (d) are for background information and are not normally required in the work package for trained production personnel.

- (a) OPNAVINST 5090.1, Environmental and Natural Resources Program Manual
- (b) \_\_\_\_\_  
ADD LOCAL ACTIVITY'S HAZARDOUS MATERIALS INSTRUCTION HERE
- (c) \_\_\_\_\_  
ADD LOCAL ACTIVITY'S EMERGENCY SPILL RESPONSE INSTRUCTION HERE
- (d) \_\_\_\_\_  
ADD LOCAL ACTIVITY'S WASTE MANAGEMENT INSTRUCTION HERE
- (e) 805-1362325, Reinforcement for W.T. and A.T. door openings
- (f) S9169-AW-DCB-010/01, Damage Control, Watertight Closures Inspection, maintenance and Repair Booklet
- (g) MIL-DTL-15024F, Plates, Tags and Bands for Identification of Equipment, General Specification
- (h) 605-2540769, Label Plate Standards

**Enclosures:**

- (1) 167-7379842, Procedure & Welding Sequence for Non-Ballistic, Watertight & Airtight Quick Acting or Individually Dogged Personnel Doors
- (2) Welded Installation of Watertight/Airtight Door Process Flow Chart
- (3) IPI/UIPI Feedback Record Form

**PURPOSE**

This Uniform Industrial Process Instruction (UIPI) establishes the corporate procedures, responsibilities, requirements, and standards for the welded installation of non-ballistic, watertight/airtight, manually operated doors for surface ships.

**SCOPE**

This UIPI applies to all surface ship non-ballistic, watertight/airtight, manually operated doors. Due to the wide variety of different type doors, this UIPI provides only general work procedures. Detailed instructions, where required, must be provided on a case basis. Regardless, this UIPI establishes minimum technical requirements for surface ship, door installation production work. Prior to commencing work, obtain local facility environmental instructions as required by reference (a). Reference (b) through (d) shall be reviewed to ensure compliance with facility requirements.

## SECTION I

### 1. **EQUIPMENT**

- 1.1 Installation of structural closures has been a standard production job for many years. Equipment required to perform work on closures herein are numerous, widely used, and currently readily available (i.e., wrenches screwdrivers, press, etc.). Since no special equipment is required, equipment/tool identification will not be covered here.

**SECTION II**

**2. MATERIAL**

- 2.1 Materials required to perform work on closures herein are currently readily available and widely used (i.e., cleaning solvents, adhesives, etc.). Since no special material is required, none will be identified here.

### SECTION III

#### 3. **OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENTAL (OSHE)**

**NOTE:** All local, state, and federal OSHE rules and regulations shall apply along with any locally developed instruction.

**NOTE:** Prior to ordering and use, ensure all cleaning solvents, paints, and other hazardous materials used in this process are currently on the Authorized Use List (AUL) prior to Obtaining them in accordance with reference (b).

3.1 This UIPI provides basic requirements and does not deal in specific detail. All cases of work required to install structural closures cannot be covered in a single document, nor is it warranted. Therefore, this section on safety and health provides general awareness of possible hazards and means for personnel protection while performing work outlined in Section VI.

3.1.1 Safety and Health Hazards:

3.1.1.1 Minor burns or skin irritation may result from skin contact with cleaning solvents (dry or compound) or adhesives (Phillybond TA-30 or Loctite 404).

3.1.1.2 Contact with Cyanoacrylate adhesives (Loctite, A-A-3097) will result in rapid bonding of tissues and may bond skin-to-skin or skin to other materials. In case of contact flush with plenty of water. Eyelids should be held open and flushed with water. Prolonged soaking in warm water may hasten loosening of adhesive.

3.1.1.3 Severe burns may result from welding operations and/or grinding.

3.1.1.4 Solvents adhesives specified (see 3.1.1.1 and 3.1.1.2) may give off vapors that will irritate the Respiratory System. They must be used with adequate ventilation.

3.1.1.5 Damage of eyes may result from contact with solvents/glue (3.1.1.1 above) and airborne metallic particles from grinding and/or welding operations.

#### 3.2 **Safety Equipment**

3.2.1 Standard safety equipment as required for the area work site shall be used. In addition, heat resistant welder's gloves shall be worn when handling hot work pieces and while welding. Rubber gloves and face shield required for solvent/adhesives operation. Aprons, Tyvek coveralls and/or sleeves may be worn as necessary to prevent skin and street clothing contact with hazardous materials.

3.2.2 The required eyewear for the various work situations is specified as follows:

3.2.2.1 Grinding: Double eye protection (face shield over industrial safety glasses, chipper's goggles or other approved eye protection).

3.2.2.2 Welding: Welding helmets or welding shields utilized over primary eye protection.

3.2.2.3 Chemicals/corrosives: Cup or cover type goggles. (For severe exposures, the additional protection of a face shield is required.)

### **3.3 Precautions**

3.3.1 Ensure compliance with all applicable hot work and hazardous material safety regulations.

### **3.4 Chemical Storage and Handling**

3.4.1 Solvents/adhesives will be stored in dry, closed containers as received from the Supply Department. Label on containers of chemicals shall be marked plainly. All containers shall then be stored according to the recommendations of the manufacturer. Manufacturer's labels specify proper storage. Good housekeeping practices will prevail.

3.4.2 For spills of hazardous chemicals/solvents, follow the requirements of reference (c). Notify NESCOM (Naval Emergency Systems Communication) for large and small spills.

3.4.3 For spills, ventilate area and, if flammable liquid, remove all sources of ignition. Do not throw electric switches.

3.4.3.1 All spill cleanup material (rags, absorbent materials, and PPE) shall be managed per the requirements of reference (d).

### **3.5 Environmental/Waste Management Plan**

3.5.1 Each activity shall add locally developed instruction references (b) through (d) as prescribed by reference (a) where applicable.

3.5.2 Manage all waste generated by this UIPI in accordance with Federal, State and Local laws, rules, regulations and the applicable facilities waste management plans (i.e. Solid Waste, PCB, Hazardous Waste).

- 3.5.3 All waste/scrap/PPE/ excess hazardous materials/spilled material (determined to be waste) must be properly managed in accordance with the requirements of reference (c) and (d).

## SECTION IV

### 4. QUALITY ASSURANCE

- 4.1 Cognizant key shop supervisor is responsible for proper removal, overhaul and installation of access closures in accordance with the applicable Technical Work Documents (TWD) this Uniform Industrial Process Instruction, applicable hull standard closure drawing (s) and Ship Installation Drawings (SID).
- 4.2 Cognizant key shop supervisor shall ensure that all closures are both chalk tested and tightness tested after final installation. Tightness testing shall be accomplished in accordance with appropriate "Tightness Requirements" document invoked by the TWD.
- 4.3 Cognizant key shop supervisor shall insure Quality Assurance of door assembly prior to install, bulkhead opening prior to install and final installation.
- 4.3.1 It is important to note that both the door and bulkhead opening need to pass inspection and be certified satisfactory by a competent inspector to assure complete installation in accordance with specifications.

## SECTION V

### 5. TRAINING/SKILL REQUIREMENTS

- 5.1 The minimum training competency required for this UIPI is as follows:
- 5.2 Cognizant key shop supervisors shall ensure that all employees assigned to work structural closures are familiar with this UIPI and its content. This may involve briefing the employees, reviewing this UIPI with the employees, or ensuring that the employees have had on-the-job training with an experienced worker.
- 5.3 No specialized training will be required.
- 5.4 No Corporate Training Plan is to be developed for this UIPI.

**SECTION VI**

**6.        METHOD**

**6.1        General Information**

- 6.1.1      This UIPI provides general instructions and minimum requirements for installation of new doors. Numerous special purpose closures have been developed and work procedures here generally are applicable.
- 6.1.2      Due to the wide variety of watertight closures on naval vessels, all cases cannot be covered. For special case closures and problems encountered and not covered by this UIPI or applicable drawing, contact cognizant Engineering Code for resolution.
- 6.1.3      No deviations from as-built or new construction drawings are allowed unless specifically approved, in writing, by Engineering.

<b>STEP NO.</b>	<b>ACCOUNTABLE SHOP/CODE</b>	<b>ACTION</b>
<b>6.2</b>	<b><u>Job Planning</u></b>	
6.2.1		Review authorized repair package and alteration drawings for structural closure installation requirements. Issue job order with appropriate funding to install and tightness test closures, in accordance with work requirements herein, as authorized.
6.2.2		Reference and invoke this Uniform Industrial Process Instruction, via job order, for all watertight/airtight closure work involving installation or replacement.
6.2.3		Reference applicable hull type drawings and Ship Installation Drawings (SID) for each closure to be installed. Issue one (1) copy with job order of applicable type drawing(s) and SID (s).
6.2.4		Reference and invoke applicable "Tightness Requirements" document issued by Engineering for each structural closure authorized for work.

STEP NO.	ACCOUNTABLE SHOP/CODE	ACTION
6.2.5		Issue supplementary work orders, with appropriate funding, to correct discrepancies as necessary. Any material ordered or manufactured in-house shall be in accordance with applicable standard closure drawing or as directed by Engineering. Forward any requests for deviations of drawing requirements to Engineering for resolution.
6.2.6		Issue job summary / Ship Installation Drawings (SID) for new closure installation as required by authorized alteration work package. Job summary / SID shall clearly identify type of closure, applicable closure detail drawings, installation details and reference "Tightness Requirements" document. When required attributes are not adequately specified, issue supplemental production instructions as necessary.
6.2.7		Issue "Tightness Requirements" document which provides quality assurance test requirements for structural closures.
6.2.8		Provide tightness support services as requested by Production. Provide technical review and resolution of deviation requests and document.
<b>6.3</b>	<b><u>New Closure Installation</u></b>	
6.3.1		Receive closure in shop. Inspect for missing or damaged parts in accordance with enclosure (1). Repair or replace deficient pieces.
6.3.1.1		Inspect gasket. Replace any gasket that does not meet Federal Specification ZZ-R-765, Class 3B, Grade 30 in accordance with enclosure (1).
6.3.1.2		Set up closure in shop in the position the closure will be installed (vertical/horizontal). Operate closure and perform chalk test. Adjust closure as required to obtain smooth operation and continuous chalk impression on gasket.
6.3.2		Accomplish inspections of adjacent ship structure and structural door clear opening for fairness, cracks, splits and broken welds per written instruction.

<b>STEP NO.</b>	<b>ACCOUNTABLE SHOP/CODE</b>	<b>ACTION</b>
6.3.3		V-out and weld any splits, cracks and broken welds on the adjoining areas of the ship's structure in way of each structural door assembly. Repair per written instruction and process.
6.3.4		Bulkhead panel at door frame shall be straightened as necessary to ensure a flat surface in accordance with enclosure (1).
6.3.5		Install each new structural door assembly in accordance with job order, ship installation drawing, references (e) and (f); along with enclosure (1) for guidance.
6.3.5.1		Follow weld sequence of enclosure (1) to avoid warpage, distortion and heat damage to door components. Note that maintaining the fairness of the knife-edge with the door panel throughout the welding procedure is critical for the installation to be successful.
6.3.6		Accomplish the final inspection of each structural door assembly in accordance with enclosure (1).
6.3.7		Inspect each door assembly and adjacent areas for specific treatment/installation requirements of Passive Countermeasures (PCM) special coating material. PCM shall be installed where necessary as authorized and identified by the Fleet Technical Support Center (FTSC) representative.
6.3.8		Fabricate or purchase and install new damage control classification label plates conforming to reference (f) on each structural door assembly in accordance with reference (g).
6.3.8.1		Closure classification shall be in accordance with Ship's Damage Control Book, which is available in the ship's log room.

STEP NO.	ACCOUNTABLE SHOP/CODE	ACTION
6.4	<b><u>Closure Quality Assurance Tests</u></b>	
6.4.1		After final installation, operate closure checking for ease of operation, equal dog/wedge pressure, and proper gasket compression (1/8 inch maximum). Properly operating structural closures should readily close and dogs engage pre-forming watertight/airtight seal. If exerting force on closure panel is required to initiate dog/wedge contact, closure is not properly aligned and/or adjusted. (An exception is when shutting a ballistic closure. Here, a minimum force is required to force the closure panel over the centering wedge to obtain proper panel to frame seat.) Correct operating linkage alignment and/or properly adjust dogs.
6.4.2		Ensure that frame warpage is not binding operating linkage causing difficult operation.
6.4.3		When conducting chalk and tightness test as directed by applicable "Tightness Requirement" document issued by Engineering in accordance with enclosure (1); adjust dogs and/or operating linkage as required to obtain specified tightness. Ensure proper closure operation is maintained.

## SECTION VII

### 7. **FEEDBACK**

- 7.1 Norfolk Naval Shipyard is responsible for the preparation, review, changes, and maintenance of this UIPI. All activities shall provide recommendations for action on this UIPI to Norfolk Naval Shipyard, Industrial Engineering (Code 223).
- 7.2 The quality and timeliness of the productive effort is every organization's goal; therefore, any positive feedback that would improve procedures or eliminate any "bottleneck" in the work package is encouraged. Any additional comments may be made on the reverse side of the IPI/UIPI Feedback Record Form, enclosure (3). The comments may also be written in memo or e-mail form and forwarded to the originator.

SHIP	REV	SHIPCK BY	DT
SHIP APPLICABILITY			

<del>                 CONTRACT NO.                  FSCM NO.             </del>	
PREPARED	DATE
CHECKED	
ENGINEER	
APPROVED	

AUTHORITY:	
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APPROVED W.E. Kennedy	5/7/99

PROCEDURE & WELDING SEQUENCE FOR  
 NON-BALLISTIC, WATERTIGHT & AIRTIGHT  
 QUICK ACTING OR INDIVIDUALLY DOGGED  
 PERSONNEL DOORS

ACCEPTED FOR NAVSEA
APPROVED BY NAVSEA NOT REQUIRED

PR	O	C	&	W	E	D	S	E	Q	F	O	R	P	E	R	S	D	R
SIZE	FSCM NO.			WT GRP		NAVSEA DRAWING NO.				REV								
A	53711			167		7379842				A								
SCALE:				CODE: 243				SHEET 1 OF 12										





GENERAL NOTES:

Ⓐ

THIS SKETCH WAS DEVELOPED TO PROVIDE GUIDANCE PROCEDURES FOR INSTALLATION OF NEW AND/OR REPLACEMENT OF EXISTING NON-BALLISTIC, WATERTIGHT OR AIRTIGHT, QUICK ACTING OR INDIVIDUALLY DOGGED PERSONNEL DOORS.

**NOTE:** INSTALLING A DOOR AND FRAME ASSEMBLY IS A DIFFICULT PROCESS THAT REQUIRES GREAT CARE TO ENSURE SUCCESSFUL INSTALLATION. FOUR CRITICAL INSTALLATION STEPS ARE:

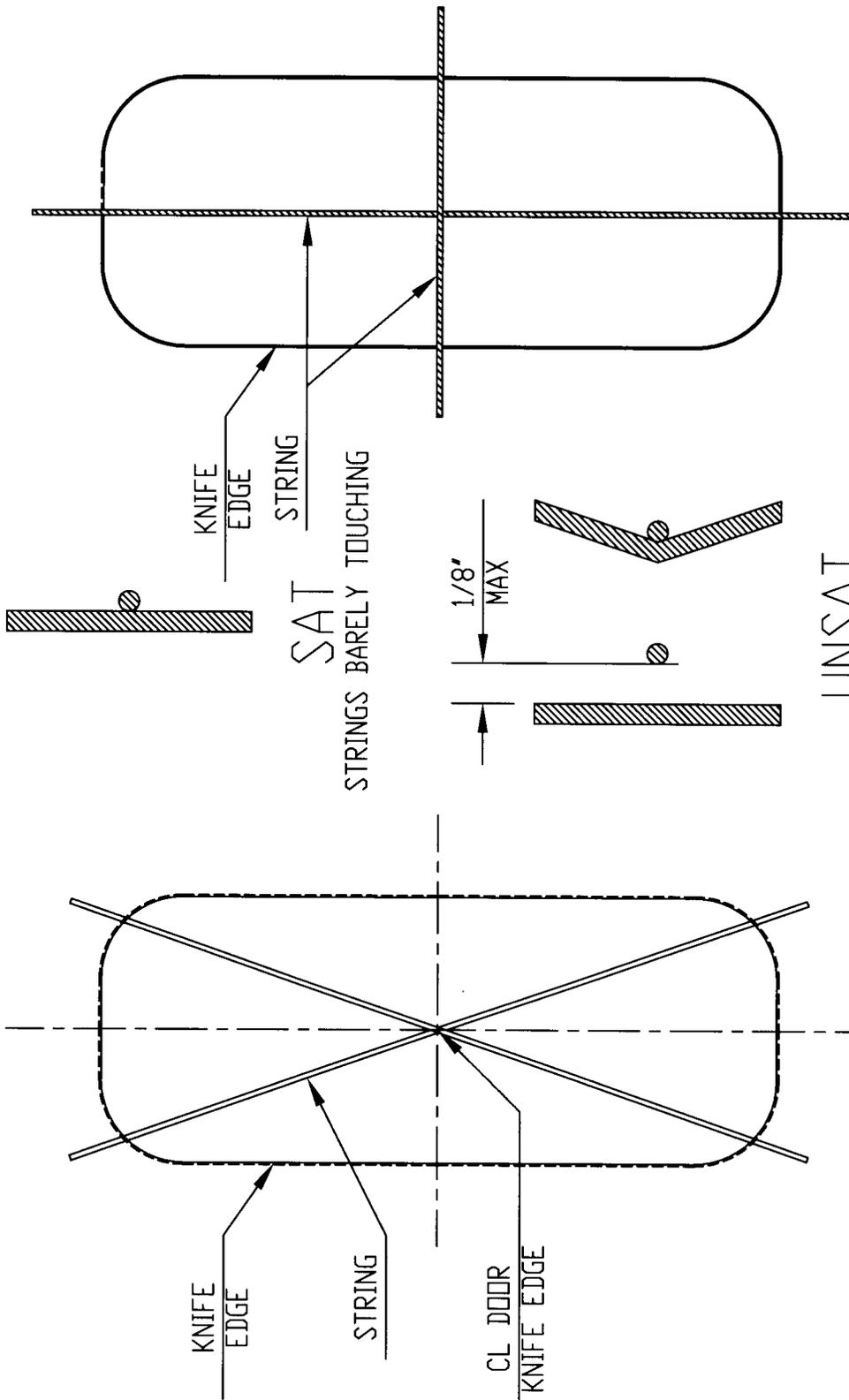
- o INSPECTION OF DOOR ASSEMBLY PRIOR TO INSTALLATION (TO DETECT ANY DOOR MANUFACTURER DISCREPANCIES, ORDERING DISCREPANCIES, SHIPPING DAMAGE, OR STORAGE DAMAGE).
- o INSPECTION AND PREPARATION OF BULKHEAD PRIOR TO DOOR INSTALLATION (TO ENSURE ACCEPTABLE BULKHEAD FAIRNESS).
- o CONTROLLED WELDING INSTALLATION PROCEDURE (TO MINIMIZE BULKHEAD AND DOORFRAME DISTORTION).
- o FINAL INSPECTION OF DOOR ASSEMBLY UPON INSTALLATION (TO ENSURE WATER-TIGHT/AIRTIGHT INTEGRITY).

**1. INSPECTION OF DOOR ASSEMBLY:**

ACCOMPLISH INSPECTION OF DOOR ASSEMBLY IMMEDIATELY UPON RECEIPT OF DOOR TO DETERMINE IF THERE ARE MANUFACTURER OR SHIPPING RELATED DISCREPANCIES AND AGAIN ON THE SHIP JUST PRIOR TO INSTALLATION IN THE BULKHEAD TO DETERMINE IF THERE ARE ANY DISCREPANCIES RESULTING FROM STORAGE & HANDLING.

- 1.1 USING CURRENT DOOR DRAWINGS ENSURE THAT THE DOOR IS PROPERLY CONSTRUCTED WITH REGARDS TO MATERIAL, SIZE, SWING (LEFT OR RIGHT HAND), PRESSURE RATING, PROPER HARDWARE, DOG QUANTITY AND TYPE (QUICK ACTING OR INDIVIDUALLY DOGGED). LOW OR HIGH TYPE HINGE HEIGHT (DIMENSION FROM FACE OF DOOR FRAME TO CENTERLINE OF HINGE PIN (2-15/16 INCHES FOR LOW TYPE AND 4-17/32 INCHES FOR HIGH TYPE), SURFACE TREATMENT (i.e. WSA, POWDER COATING, ETC.), AND MANUFACTURERS LABEL PLATE.
- 1.2 INSPECT THE DOORFRAME FOR EXCESSIVE WARPING. THE WARPING TOLERANCE SHALL NOT EXCEED 1/8 INCH. USE THE CROSS-STRING METHOD TO CROSS DIAGONAL CORNERS AT DOOR KNIFE-EDGE; ALSO CHECK VERTICAL AND HORIZONTAL PLANES, SEE FIGURE 5-A. KNIFE-EDGE GRINDING SHALL NOT BE USED TO CORRECT FRAME WARPING.
- 1.3 INSPECT FOR COMBINED WARPING BETWEEN FRAME AND PANEL. LIGHTLY HOLD DOOR PANEL CLOSED (UNDOGGED) AGAINST THE KNIFE-EDGE. GAP BETWEEN THE KNIFE-EDGE AND GASKET SHALL NOT EXCEED 1/8 INCH.
- 1.4 INSPECT ALIGNMENT OF DOOR PANEL WITH RESPECT TO THE DOORFRAME. KNIFE-EDGE SHALL CONTACT THE MIDDLE 3/5ths OF THE GASKET AROUND ENTIRE DOOR.
- 1.5 INSPECT POSITION OF DOGS. WHEN FULLY DOGGED, EACH DOG SHALL BE CENTERED ON THE FLAT PORTION OF THE DOG WEDGE.

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 4 OF 12	



INSPECTION FOR TWISTING

UNSAT

STRINGS TOUCHING HARD OR  
LARGE GAP BETWEEN STRINGS

INSPECTION FOR WARPAGE

Ⓐ FIGURE 5-A  
KNIFE EDGE INSPECTION FOR WARPAGE  
AND/OR TWISTING WITH STRING PULLED TAUT  
SCALE: NONE

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 5 OF 12	

GENERAL NOTES CONTINUED:

- 1.6 INSPECT OPERATING HANDLES ON QUICK ACTING DOORS FOR SNUG FIT. SPRING CLIP SHALL POSITIVELY ENGAGE AND RETAIN HANDLE.
- 1.7 INSPECT LINKAGE ALIGNMENT, ENSURE ALL COMPONENTS ARE ATTACHED AND THAT NONE ARE MISSING OR LOOSE. LINKAGE SHALL NOT PROTRUDE INTO CLEAR OPENING WHEN IN THE FULL UNDOGGED POSITION.
- 1.8 INSPECT DOG LOCK NUTS OR JAM NUTS. NUTS SHALL BE STAINLESS STEEL (CRES 316) AND SPINDLE THREADS SHALL EXTEND SLIGHTLY BEYOND THE JAM OR LOCK NUT.
- 1.9 INSPECT HINGE AND YOKE WASHERS FOR CORRECT SIZE, MATERIAL (BRASS) AND QUANTITY (FOR HINGE PIN WASHERS, 3 WASHERS NOMINAL +/- ONE WASHER, 1/16 INCH THICK; FOR YOKE PIN WASHER, ONE WASHER, 1/8 INCH THICK).
- 1.10 INSPECT HINGE AND YOKE PINS. HINGE AND YOKE PINS SHALL BE BRASS.
- 1.11 INSPECT KNIFE-EDGE. KNIFE-EDGE SHALL BE SMOOTH AND ROUND. ENSURE KNIFE-EDGE IS NOT SQUARE OR HAS SHARP EDGES THAT COULD CUT GASKET.
- Ⓐ 1.12 INSPECT GASKET. GASKET MATERIAL IS REQUIRED TO BE SILICON RUBBER AND MEET FEDERAL SPECIFICATION ZZ-R-765, CLASS 3B, GRADE 30. GASKET SHALL BE HELD SECURELY IN PLACE BY THE DOOR GASKET CHANNEL RETAINER LIPS. GASKET SHALL HAVE ONLY ONE BUTT JOINT AND IT SHALL BE CENTERED ON TOP OF THE DOOR.
- 1.13 INSPECT DOOR HANDLE AND DOG BUSHING SETSCREW. SETSCREW SHALL BE BRASS IF DOOR HAS OILITE BRONZE BUSHINGS, AND SHALL BE STAINLESS STEEL IF DOOR HAS STAINLESS STEEL OR ALUMINUM BUSHINGS.
- 1.14 INSPECT DOG AND OPERATING HANDLE BUSHINGS FOR CORRECT MATERIAL. OILITE BRONZE IS INSTALLED IN STEEL, STAINLESS STEEL AND ALUMINUM SLEEVES. TEFLON LINED CRES IS INSTALLED IN STEEL AND STAINLESS STEEL SLEEVES ONLY. TEFLON LINED ANODIZED ALUMINUM IS INSTALLED IN ALUMINUM SLEEVES ONLY. OILITE BRONZE BUSHINGS ARE DISTINGUISHABLE BY THEIR BRASS COLOR, TEFLON LINED ANODIZED ALUMINUM BUSHINGS ARE DISTINGUISHABLE BY THEIR GREEN COLOR, AND TEFLON LINED STAINLESS STEEL BUSHINGS ARE DISTINGUISHABLE BY THEIR SILVER COLOR.
- 1.15 INSPECT FOR PHYSICAL DAMAGE TO PANEL, FRAME, OPERATING MECHANISM, DOG ASSEMBLIES, AND PAINT.
- 1.16 INSPECT OPERATING MECHANISM, OPERATING DOOR THROUGH ONE COMPLETE UN-DOG/OPEN/CLOSE/DOG CYCLE. DOOR SHALL OPERATE SMOOTHLY.

**NOTE:** THE DOOR MANUFACTURER SHALL CORRECT RELATED DEFICIENCIES. ALL DISCREPANCIES FOUND SHALL BE REPORTED IN WRITING TO THE PORT ENGINEER PRIOR TO INSTALLATION OF THE DOOR.

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A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 6 OF 12	

GENERAL NOTES CONTINUED:**2. INSPECTION OF BULKHEAD:**

- 2.1 INSPECT BULKHEAD CUTS FOR CORRECT LOCATION AND PROPER SIZE. BULKHEAD SHALL OVERLAP DOOR FRAME BY AT LEAST 1-1/4 INCH AROUND ENTIRE PERIMETER.
- 2.2 PREPARE ALL AREAS TO BE WELDED, ALL AREAS SHALL BE CLEAN AND FREE OF PAINT, SCALE, RUST, CORROSION (ALUMINUM OXIDE), DIRT, GREASE AND OIL.
- 2.3 THE BULKHEAD PANEL AT THE DOORFRAME SHALL BE STRAIGHT TO WITHIN 1/16 INCH, PARTICULARLY ON BULKHEADS GREATER THAN 1/4 INCH THICKNESS. BEFORE FITTING THE DOOR THE BULKHEAD SHALL BE CHECKED WITH A STRAIGHT EDGE OR STRING, SEE FIGURE 5-A. DIAGONAL CORNERS SHOULD BE CHECKED TO DETECT TWIST.

**3. DOOR INSTALLATION:**

**NOTE:** IT MIGHT BE NECESSARY TO REMOVE DOOR HANDLE CLIP FOR DOOR INSTALLATION.

- 3.1 LAYOUT AND MARK POSITION OF DOORFRAME ON BULKHEAD. ENSURE DOORFRAME OVERLAPS BULKHEAD AT LEAST 1-1/4 INCH AROUND ENTIRE PERIMETER.
- 3.2 AREAS OF THE DOOR, AS WELL AS ADJACENT DECK AND BULKHEAD AREAS EXPOSED TO WELD SPATTER SHALL BE SHIELDED BY WRAPPING OR DRAPING WELDERS CLOTH AROUND THESE AREAS. THIS INCLUDES DOOR PANELS, GASKET, KNIFE-EDGE, LINKAGES, DOG SPINDLES, AND BUSHINGS.

**NOTE:** SOME DOORS MAY HAVE TEFLON LINED STAINLESS STEEL OR ANODIZED ALUMINUM BUSHINGS WITH A TEMPERATURE SENSITIVE SEAL VICE BRONZE BUSHINGS. SPECIAL CARE MUST BE TAKEN WHEN ANY TYPE OF HOT WORK IS BEING PERFORMED NOT TO MELT OR DISTORT SEAL.

- Ⓐ 3.3 WITH DOOR CLOSED AND DOGGED, POSITION DOOR ASSEMBLY ON BULKHEAD AND ALIGN WITH MARKS. CLAMP DOOR ASSEMBLY TO BULKHEAD WITH ONE OR 2 CLAMPS HOLDING DOOR FRAME TO BULKHEAD, VERIFY THERE IS NO MORE THAN A 1/16 INCH OPENING BETWEEN DOOR FRAME AND BULKHEAD. IF GAPS GREATER THAN 1/16 INCH EXIST, REMOVE DOOR AND STRAIGHTEN BULKHEAD. TACK WELD FRAME TO BULKHEAD TO ADEQUATELY SUPPORT THE DOOR. PLACE ONE (1) INCH TACK WELDS AROUND PERIMETER ABOUT EVERY 12 INCHES. TACK WELDS SHALL BE PLACED NEAR EACH DOG SLEEVE TO HELP PREVENT THE SLEEVE FROM TURNING DURING THE PRODUCTION WELDING PROCESS. OPEN THE DOOR AND TACK WELD OTHER SIDE OF DOOR IN THE SAME MANNER.

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 7 OF 12	

GENERAL NOTES CONTINUED:

3.4 CHOCKS MAY BE TACKED IN PLACE AT ANY TIME DURING THE INSTALLATION PROCESS. CHOCKS SHOULD NOT BE COMPLETELY WELDED UNTIL AFTER THE DOOR IS WELDED AND THE BULKHEAD PANEL AND DOORFRAME HAVE BEEN STRAIGHTENED TO WITHIN THE SPECIFIED FLATNESS.

**NOTE:** THE DOOR SHOULD BE CLOSED AND DOGGED THROUGH AT LEAST HALF OF THE WELDING SEQUENCE AND PREFERABLY CLOSED AND DOGGED THROUGH THE ENTIRE WELDING SEQUENCE (DEPENDING ON ACCESSIBILITY TO THE OPPOSITE SIDE OF DOOR).

3.5 WELD FRAME TO BULKHEAD USING PROPER WELDING PROCEDURES AND THE SEQUENCE SHOWN IN FIGURES 9-A AND 10-A, SHEET 9 AND 10, TO MINIMIZE WARPING OF THE DOORFRAME AND BULKHEAD. SINCE EVERY DOOR INSTALLATION IS UNIQUE, THE WELDING SEQUENCE MAY REQUIRE TAILORING TO SUIT LOCAL CONDITIONS. KEY FEATURES OF THIS TO NOTE ARE:

- o WELDING BEGINS IN THE CENTER OF THE DOOR, ALLOWING THE TOP AND BOTTOM OF THE DOOR TO FLOAT ON THE BULKHEAD.
- o WELDING IS DONE ON THE RADIUS CORNERS LAST BECAUSE CURVED SECTIONS WILL DISTRIBUTE HIDDEN STRESS BETTER THAN STRAIGHT SECTIONS.
- o WELD INCREMENTS (BLOCKS) SHALL BE NO LONGER THAN 12 INCHES TO PREVENT WARPING.
- o WELD INCREMENT SEQUENCE FEATURES SKIP WELDING TO PREVENT LOCALIZED HEAT BUILD UP.
- o NUMBER OF WELD INCREMENTS (BLOCKS) WILL CHANGE WITH DIFFERENT SIZE DOORS.

3.6 INSPECT FOR EXCESS DISTORTION BY:

- o OPENING AND CLOSING THE DOOR AND INSPECTING FOR SMOOTH OPERATION, NO BINDING.
- o INSURE THERE IS NO METAL TO METAL CONTACT BETWEEN THE DOOR PANEL AND KNIFE EDGE OR DOGS.
- o WHILE HOLDING THE DOOR PANEL LIGHTLY CLOSED BUT NOT DOGGED, ENSURE THERE IS NO MORE THAN 1/8 INCH GAP BETWEEN THE KNIFE-EDGE AND GASKET.

**NOTE:** IF ANY EXCESS DISTORTION EXIST, IT SHOULD BE CORRECTED AT THIS TIME BEFORE INSTALLING THE CHOCKS.

3.7 INSTALL CHOCKS AND BRACKETS IAW REFERENCE "NAVSEA DRAWING 805-1362325; REINFORCEMENT FOR WT AND AT DOOR OPENINGS". CHECK FOR METAL TO METAL CONTACT AS DOOR SWINGS CLOSED.

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 8 OF 12	

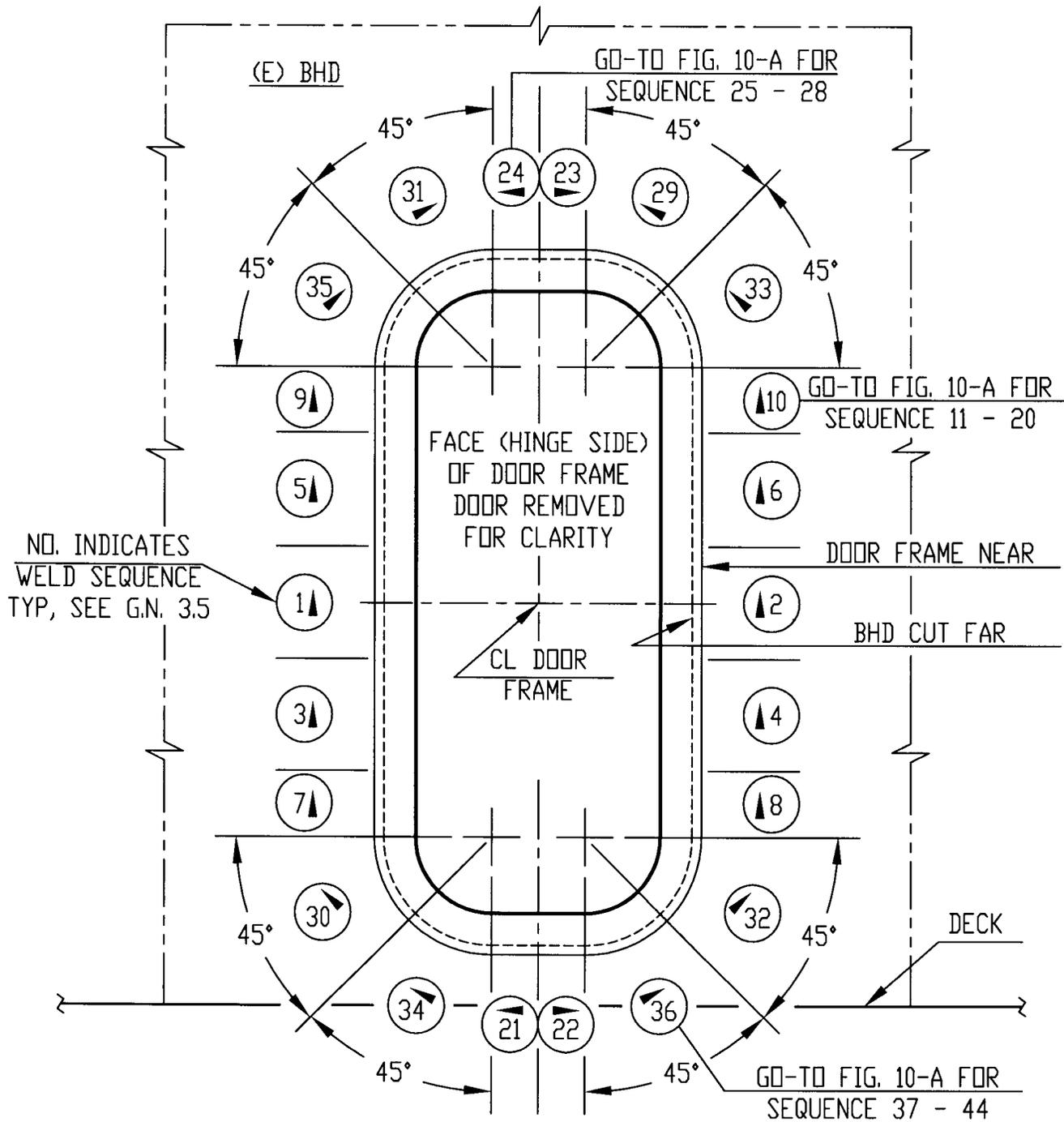


FIGURE 9-A  
 INSTALLATION WELDING SEQUENCE FOR  
 FACE (HINGE SIDE) OF DOORFRAME, SHOWING 50% OF WELDING REQUIREMENTS  
 SEE FIGURE 10-A FOR REMAINDER OF WELDING PATTERN AND G.N. 3.5  
 TYPICAL 26' X 66' DOOR FRAME SHOWN  
 SCALE: 3/4" = 1'- 0"

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 9 OF 12	



GENERAL NOTES CONTINUED:

3.8 ADJUST DOGS FOR 1/8 INCH GASKET COMPRESSION AND CHALK TEST FINISHED DOOR. 1-1/8 TURNS OF THE DOG NUT ACHIEVES A 1/8 INCH GASKET COMPRESSION.

3.9 INSTALL HASPS, LOCKS, HOOKS, HANDLE RETAINING CLIPS, AND STOPS AS REQUIRED.

3.10 PAINT CLOSURE IN ACCORDANCE WITH NSTM 631, VOLUME 3.

## 4. FINAL INSPECTION:

4.1 INSPECT WELDING. WELDING SHALL BE COMPLETE AND FREE FROM DEFECTS.

4.2 INSPECT GASKET AND KNIFE-EDGE ALIGNMENT. IN THE UNDOGGED POSITION WITH DOOR HELD SLIGHTLY CLOSED BY HAND, THE GAP (IF ANY) BETWEEN THE GASKET AND KNIFE-EDGE SHALL NOT EXCEED 1/8 INCH.

4.3 INSPECT DOOR ALIGNMENT AND WATERTIGHT/AIRTIGHT INTEGRITY. CHALK TEST DOOR AND ENSURE THERE IS PROPER SEALING AROUND ENTIRE PERIPHERY AND THAT KNIFE-EDGE CONTACTS THE MIDDLE 3/5ths PORTION OF THE GASKET.

4.4 INSPECT DOOR OPERATION. OPERATE DOOR THROUGH ONE COMPLETE UN-DOG/OPEN/CLOSE/DOG CYCLE AND ENSURE THAT DOOR OPERATES SMOOTHLY.

4.5 INSPECT HASPS, STAPLES, HOOKS AND STOPS LOCATIONS. LOCATIONS SHALL BE IN ACCORDANCE WITH THE DRAWINGS.

4.6 INSPECT FOR PROPERLY INSTALLED DEAD LIGHT AND FIXED LIGHTS IF REQUIRED.

4.7 INSPECT DOG HANDLE RETAINING CLIPS. DOGGING PIPE CLIPS SHALL BE WELDED TO BULKHEAD IN CLOSE PROXIMITY TO DOOR (INDIVIDUALLY DOGGED DOORS ONLY).

4.8 INSPECT GASKET. GASKET SHOULD BE HELD SECURELY IN PLACE BY GASKET CHANNEL RETAINING LIPS AND THERE SHALL BE ONLY ONE GASKET BUTT JOINT LOCATED AT THE TOP OF THE DOOR.

4.9 INSPECT THE KNIFE-EDGE. KNIFE-EDGE SHALL BE SMOOTH WITHOUT NICKS, CRACKS, BURRS, OR SHARP EDGES. STAINLESS STEEL KNIFE-EDGES SHALL BE SMOOTHED WITH ALUMINUM OXIDE ABRASIVE CLOTH, GRIT 320.

4.10 INSPECT ANODIZED ALUMINUM BUSHINGS AND STAINLESS STEEL BUSHINGS. DISASSEMBLE ONE DOG ASSEMBLY AND ENSURE FLANGE BUSHING SEALS ARE NOT DAMAGED DUE TO WELDING. ENSURE SILICON IS PRESENT, IF SILICON IS NOT PRESENT, DISASSEMBLE ALL DOGS AND DOOR HANDLES AND INSTALL SILICON.

4.11 INSPECT FOR STRING AND STICK PACKING. ON DOORS WITH OILITE BRONZE BUSHINGS, ENSURE THAT STRING AND STICK PACKING HAS BEEN INSTALLED. IF STRING AND STICK PACKING IS NOT PRESENT, DISASSEMBLE ALL DOGS AND DOOR HANDLES AND INSTALL STICK PACKING AND STRING PACKING.

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 11 OF 12	

GENERAL NOTES CONTINUED:

- 4.12 INSPECT DOOR DOG CONTACT WITH DOG WEDGES. DOGS SHALL CLEAR SHOULDER OF WEDGE WHEN DOGGING AND SHALL REST ON THE FLAT SURFACE OF THE WEDGE WHEN DOGGED. DOG NUTS SHALL BE ADJUSTED AS NECESSARY TO ENSURE PROPER DOG CONTACT.
- 4.13 INSPECT CLOSURE OPENING. ENSURE THE OPERATING LINKAGE ON QUICK ACTING DOORS AND THAT DOGS ON INDIVIDUALLY ACTING DOORS DO NOT PROTRUDE INTO THE CLOSURE OPENING WHEN DOOR IS IN THE OPEN POSITION.
- 4.14 INSPECT DOOR FINISH. PAINT SHALL BE COMPLETE AND FREE FROM DAMAGE.
- 4.15 INSPECT FOR PAINT OVERSPRAY. GASKETS, KNIFE-EDGES, SEALING SURFACES, DOG WEDGES, BUSHINGS, LABEL PLATES, SPINDLES, JAM NUTS AND ALL OTHER SURFACES NOT REQUIRED TO BE PAINTED SHALL BE FREE OF PAINT AND OVERSPRAY.

SIZE	FSCM NO.	WT GRP	NAVSEA DWG NO.	REV
A	53711	167	7379842	A
SCALE: AS NOTED		CODE: 243	SHEET 12 OF 12	

**WELDED INSTALLATION OF WATERTIGHT/AIRTIGHT DOOR PROCESS**

Description of Duty	Paragraph No.	Accountable Shop/Code	Work Packaging	Trouble Desk/EPD
START		○		
1. Job Planning.	6.2	□ → □		
2. Receive closure in shop. Inspect for missing or damaged parts.	6.3.1	□ ← □		
3. Accomplish inspections of ship structure.	6.3.2	□		
4. V-out and weld splits, cracks and broken welds.	6.3.3	□		
5. Straighten adjacent bulkhead panel as necessary.	6.3.4	□		
6. Install new door assembly.	6.3.5	□		
7. Follow weld sequence of enclosure (1).	6.3.5.1	□		
8. Accomplish final inspection of door assembly.	6.3.6	□		
9. Inspect door assembly and adjacent areas for PCM special coating material.	6.3.7	□		
10. Fabricate or install new damage control label plate.	6.3.8	□		
11. Closure Quality Assurance Tests	6.4	□ → □		
END			○	

