

NAVSEA  
STANDARD ITEM

FY-23

ITEM NO: 009-13  
DATE: *01 OCT 2021*  
CATEGORY: II

1. SCOPE:

1.1 Title: Meter, Gauge, Switch, and Thermometer; repair

2. REFERENCES:

- 2.1 Calibration Requirements List (CRL) for Shipboard Installed Instrumentation
- 2.2 NAVSEA OD 45845, Metrology Requirements List
- 2.3 S9300-A6-GYD-010, Electrical Workmanship Inspection Guide for Surface Ships and Submarines
- 2.4 ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, First Edition
- 2.5 ANSI/NCSL Z540-3, Requirements for the Calibration of Measuring and Test Equipment
- 2.6 NAVSEA 04-04734, Naval and Marine Corps Calibration Laboratory Audit/Certification Manual
- 2.7 NAVAIR 17-35TR-8, Technical Requirements for Calibration Labels and Tags

3. REQUIREMENTS:

3.1 Prior to the installation verify instrument calibration requirements in applicable NAVSEA documentation to determine if the instrument requires calibration. Permanently installed instruments, are addressed by 2.1; all other non-installed instruments are addressed by 2.2.

3.1.1 If installing a calibrated instrument, the instrument must have at least two-thirds of its calibration life remaining. If it does not, the instrument must be calibrated in accordance with 3.7.

3.1.2 If the instrument is designated as No Calibration Required (NCR), perform a functional check to ensure proper functioning of the instrument if it is not required for system acceptance testing. Instrument identified as requiring calibration for system/acceptance testing/trials but designated as NCR in the ship's CRL, must be calibrated in accordance with 3.7 and must be labeled with a special calibration label NAVSEA 4734/6, and an NCR label NAVSEA 4734/26. For meters the special calibration label must be annotated to read, "CALIBRATION PERFORMED TO SUPPORT TESTING"; for gauges, switches and thermometers the calibration label must be annotated to read, "CALIBRATION PERFORMED TO SUPPORT TESTING. THIS LABEL MUST BE REMOVED UPON COMPLETION OF TESTING/TRIALS TO REFLECT THE CRL CAL-N (NCR) DESIGNATION OF THE

INSTRUMENT". All such special calibration labels must be removed and the instrument must have NCR labels affixed upon completion of testing/trials.

3.1.3 System or chain calibrations (designated as Level 2 in the ship's CRL) are not to be performed by commercial activities. For system calibration, contact the SUPERVISOR. Level 2 calibrated meters installed in systems must be subject to system or chain calibrations at the next available period. (See 4.5)

3.2 Disconnect and remove each meter and associated impeters, 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 must be cut back to remove damaged/questionable portions of the wire and new terminal ends installed in accordance with 2.3.

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

3.3 Disconnect and remove each gauge, switch, and thermometer.

3.3.1 Remove sealed gauges as a complete unit.

3.3.2 Clear gauge 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 gauge unit.

3.5 Repair each instrument and associated equipment to manufacturer's specifications.

3.5.1 Remove existing and install new components in place of those identified to be defective. Install new components where missing.

3.5.2 Free-up and adjust moving parts.

3.5.3 Restore unit cases to original finish.

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

3.7 Calibrate and adjust each instrument, including associated accessories, to manufacturer's specifications, using appropriate calibration procedures and test equipment in accordance with 2.1 for permanently installed-instruments, or 2.2 for other/non-installed instruments.

3.7.1 Calibration laboratories must be accredited to either 2.4 or 2.5 by a Commercial Accreditation Activity, or certified by a Navy Certification Activity to 2.6. The

calibration laboratory's scope must include the parameters required to execute the calibration at the appropriate ranges and tolerances. Calibration must meet a minimum Test Accuracy Ratio (TAR) of 4:1, or a Test Uncertainty Ratio (TUR) equal to or greater than 4:1, or a Probability of False Accept (PFA) not to exceed 2 percent.

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

3.7.3 Affix a calibration label to the face of each instrument, 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 calibration activities and Test, Measurement, and Diagnostic Equipment (TMDE) custodians must use calibration labels and tags in accordance with 2.7.

3.7.4 The calibration interval assigned for shipboard installed instrumentation must be in accordance with 2.1. All other meters must have a calibration interval assigned in accordance with 2.2.

3.7.5 Submit one legible copy, in hard copy and approved transferrable media (in Excel format), of a calibration events data file in accordance with Attachment A for each contractor and subcontractor-performed calibration event to the ship's Field Calibration Activity (FCA), Engineering/Maintenance Officer and AIMD Officer (if assigned) via the SUPERVISOR on a bi-weekly basis.

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

3.9 Install and connect each gauge, switch or thermometer, installing new seals, gaskets and fasteners.

#### 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 NAVSEA 04RM3 Approved list of Accrediting Bodies (AB).

- . ANSI-ASQ National Accreditation Board (ANAB), <http://anab.org/>
- . Laboratory Accreditation Bureau (L-A-B), <http://l-a-b.com/>
- . Perry Johnson Registrars (PJLA), <http://www.pjr.com/>
- . The American Association for Laboratory Accreditation (A2LA), <https://www.a2la.org/>
- . National Voluntary Laboratory Accreditation Program (NVLAP), <https://www.nist.gov/nvlap>
- . International Accreditation Service (IAS), <http://www.iasonline.org>

Contact NAVSEA 04RM3 for information on commercial accreditation in accordance with 2.4 and 2.5 by NAVSEA approved commercial Accrediting Bodies (AB).

4.4 This item does not apply to Oxygen gauges.

4.5 Point of contact for Level 2 system or chain calibrations is NAVSEA 04RM.

4.6 Contact one of the following Navy Certification Activities for certification requirements in accordance with 2.6:

Mid-Atlantic Regional Maintenance Center  
Laboratory Certification Branch  
(Code 212)  
Phone: (757)400-0735  
FAX: (757)400-3160

Southwest Regional Maintenance Center  
Laboratory Certification Branch  
(Code 240C)  
Phone: (619)556-6699/(619)556-1346  
FAX: (619)556-4877

4.7 Scope: The official and detailed statement of the calibration services for which the laboratory is accredited. Alternative terms include scope of accreditation, scope of competency, and scope of calibration.

***4.8 For boats and craft 65 feet or less in length gages and meters do not require calibration unless boat or class of boats has been issued a Calibration Requirement List (CRL) or required by 3-M or 3-M like system used as the Preventative Maintenance System (PMS) for the boat.***

## ATTACHMENT A

- Entries in the calibration events file shall not be abbreviated.
- The event data for NOFORN/Reactor/Steam plant instruments shall be handled in accordance with the applicable SEA 08 directives.
- For existing, permanently installed instruments, the calibration events file data set shall include the nomenclature, CRL reference number, condition received (i.e., In Tolerance (IT) or Out of Tolerance (OOT)), date calibrated, date due, procedure used, calibration standard used, servicing lab code and service label applied (i.e., calibrated, special calibration, rejected, etc.) in accordance with 2.7.
- For existing, non-installed instruments, the calibration events file data set shall include the nomenclature, National Stock Number, Sub-Category (SCAT) Code, instrument serial number, manufacturer's Commercial and government Entity (CAGE), procedure used, calibration standard used, sub-custodian, work center. Manufacture's model number, condition received, Metrology Requirements List (METRL) cycle, servicing laboratory code (if applicable), date serviced, due date, and servicing label attached.
- For newly added instruments, the minimum data set includes manufacturer, model, serial number, nomenclature, manufacturer's CAGE, range, procedure used, calibration standard used, date calibrated, date due, servicing lab code, service label attached, location, part-of (System), function within the system (if permanently installed), National Stock Number and SCAT Code.