

NAVSEA  
STANDARD ITEM

FY-19 CH-4

ITEM NO: 009-71  
DATE: 31 AUG 2018  
CATEGORY: II

1. SCOPE:

1.1 Title: Piping System; test

2. REFERENCES:

- 2.1 S9086-RK-STM-010/CH-505, Shipboard 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 each new and disturbed piping systems in accordance with 2.1.

3.1.1 Each master and backup test **gauge** shall conform to **gauge** range and graduation shown on Table 504-6-1 of 2.2. The backup **gauge** shall be cross-checked to the master hydrostatic test **gauge** up to the maximum test pressure just prior to start of testing. Master and backup **gauges** shall track within 2 percent of each other.

3.1.1.1 Each master and backup test **gauge** used for vacuum testing shall consist of 2 compound **gauges** 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 in systems which exceed the reduced energy criteria of operating conditions of 200 degrees Fahrenheit or 500 PSIG. The accept or reject criteria shall be in accordance with Class One of 2.5. (See 4.2)

**(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 the requirements of 2.3 and 2.4 in systems which exceed the reduced energy criteria of operating conditions of 200 degrees Fahrenheit or 500 PSIG. The accept or reject criteria shall be in accordance with Class One of 2.5. (See 4.2)

**(I)** "LIQUID PENETRANT INSPECTION" |

3.1.4 Accomplish liquid penetrant tests on final layer of all Class P-2 welds in accordance with Paragraph 505-11.1.2.6.a(2) of 2.1 and the requirements of 2.3 and 2.4 in systems which operate above 200 degrees Fahrenheit. The accept or reject criteria shall be in accordance with Class 2 of 2.5. (See 4.2)

**(I) (G)** "VISUAL INSPECTION - SHOP TEST" (See 4.3) |

3.1.5 Accomplish a shop hydrostatic test of replacement piping, fittings, and components that can be tested in the shop or cannot be tested and inspected IAW paragraph 3.1.6 after installing in to the ship's system for evidence of external leakage and/or deformation. Allowable external leakage and/or deformation: None.

**(I) (G)** "VISUAL INSPECTION - HYDROSTATIC, LOW PRESSURE AIR, VACUUM, OR OPERATING PRESSURE TEST" (See 4.3) |

3.1.6 Visually inspect the pressurized system or system under vacuum for evidence of external leakage and/or deformation. Allowable external leakage and/or deformation: None.

3.1.6.1 Each joint requiring inspection shall remain uninsulated and unpainted until completion of successful inspection. Each joint tested and inspected under 3.1.5 would not require re-inspection unless the joint was disturbed during installation. These joints can be insulated and painted.

3.1.6.2 Provide a sketch of that portion of the system to be tested, showing the location of blanks, isolation valves, test connection, joints previously tested/inspected under 3.1.5 and the location of air vents to vent air. Sketch shall be on the test site during the accomplishment of the test.

(V) "STATIC TEST"

3.2 Accomplish a static head pressure test of each 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 each new and disturbed gravity drain piping for proper operation and unobstructed flow.

(V) (G) "OPERATIONAL TEST"

3.4 Accomplish an operational test of each 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 Nondestructive testing requirements in 3.1.2, 3.1.3, and 3.1.4 apply only when the operating pressure test option has been selected.

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4.3 Test pressure and test medium will be specified in invoking Work Item.