

NAVSEA
STANDARD ITEM

FY-28

ITEM NO: 009-031

DATE: 01 OCT 2024

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 must 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 must 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 must 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 must be in direct visual contact with control gun operator stationed outside of boiler. Control gun operator must 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 must 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 must meet minimum requirements listed herein:

3.2.1 Supply hose from the pump to the control gun must be 1/2-inch inside diameter (I.D.) with 30,000 PSI minimum burst pressure and must not exceed 400 feet in length. A 15-foot length of supply hose must 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 must be non-rotating. Orifices in the nozzles must be angled back 30 degrees. Nozzles must have a minimum of 18 orifices evenly spaced around the circumference. Each orifice must 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 must be 25,500 PSI minimum. Lance must be 0.229 inch or larger I.D. and must have a smooth Teflon core, and must not exceed 25 feet in length.

3.2.6 Waterjet cleaning solution must 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 must traverse the entire length of every tube cleaned.

3.5.1.1 Downcomer, riser, and support tubes must be traversed twice.

3.5.2 The lance and nozzle must traverse the tubes at a maximum rate of one foot per second.

3.5.3 A fan nozzle must 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 must 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 must 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.

3.6.3 Accomplish a fresh water flush of all internal surfaces cleaned in 3.5.

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.

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3.8 Inspect surfaces to ensure the following requirements are met:

3.8.1 Surfaces must be dry.

3.8.2 There must be no evidence of flash rusting.

3.8.3 There must be a streaking effect seen when looking into the tubes. The streaking effect must 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 must be removed.

3.8.5 Residual sodium nitrite deposits remaining after the surfaces are dried is acceptable.

4. NOTES:

4.1 None.