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DETAIL SPECIFICATION

COOLERS, FLUID, INDUSTRIAL, NAVAL SHIPBOARD (SAMPLE WATER COOLERS)

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers sample water coolers for Naval shipboard boiler water and feedwater sampling. Only one classification of cooler is covered by this specification.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-S-901	-	Shock Tests, H.I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for
MIL-DTL-1222	-	Studs, Bolts, Screws and Nuts for Applications Where a High Degree of Reliability is Required; General Specification for
MIL-DTL-15024	-	Plates, Tags and Bands for Identification of Equipment, General Specification for
MIL-P-15024/5	-	Plate, Identification
MIL-C-15726	-	Copper-Nickel Alloy, Sheet, Plate, Strip, Bar, Rod, and Wire
MIL-T-16420	-	Tube, Copper-Nickel Alloy Seamless and Welded (Copper Alloy Numbers 715 and 706)
MIL-E-22200/4	-	Electrodes, Welding, Covered, Copper-Nickel Alloy

Comments, suggestions, or questions on this document should be addressed to: Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to CommandStandards@navy.mil, with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

(Copies of these documents are available online at http://quicksearch.dla.mil/ or https://assist.dla.mil.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

NAVAL SEA SYSTEMS COMMAND (NAVSEA) PUBLICATIONS

0900-LP-001-7000	-	Fabrication and Inspection of Brazed Piping Systems
S9074-AR-GIB-010/278	-	Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels

(Copies of these documents are available online at https://nll.ahf.nmci.navy.mil. These publications can be located by searching the Navy Publications Index for the TMIN without the suffix.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASME

ASME B31.1	-	Code for Pressure Piping, Power Piping

(Copies of this document are available from ASME, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900 or online at www.asme.org.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials. The materials for coolers shall conform to the requirements of table 1.

TABLE I. Materials for coolers.

Part	Material	Specification
Shells and shell internals	Copper-nickel alloy 1/	MIL-C-15726 MIL-T-16420
Coils 2/	Copper-nickel alloy, composition 70-30	MIL-T-16420
Threaded fasteners	Nickel alloys	MIL-DTL-1222
Welding electrode	Copper-nickel alloy	MIL-E-22200/4

NOTES:

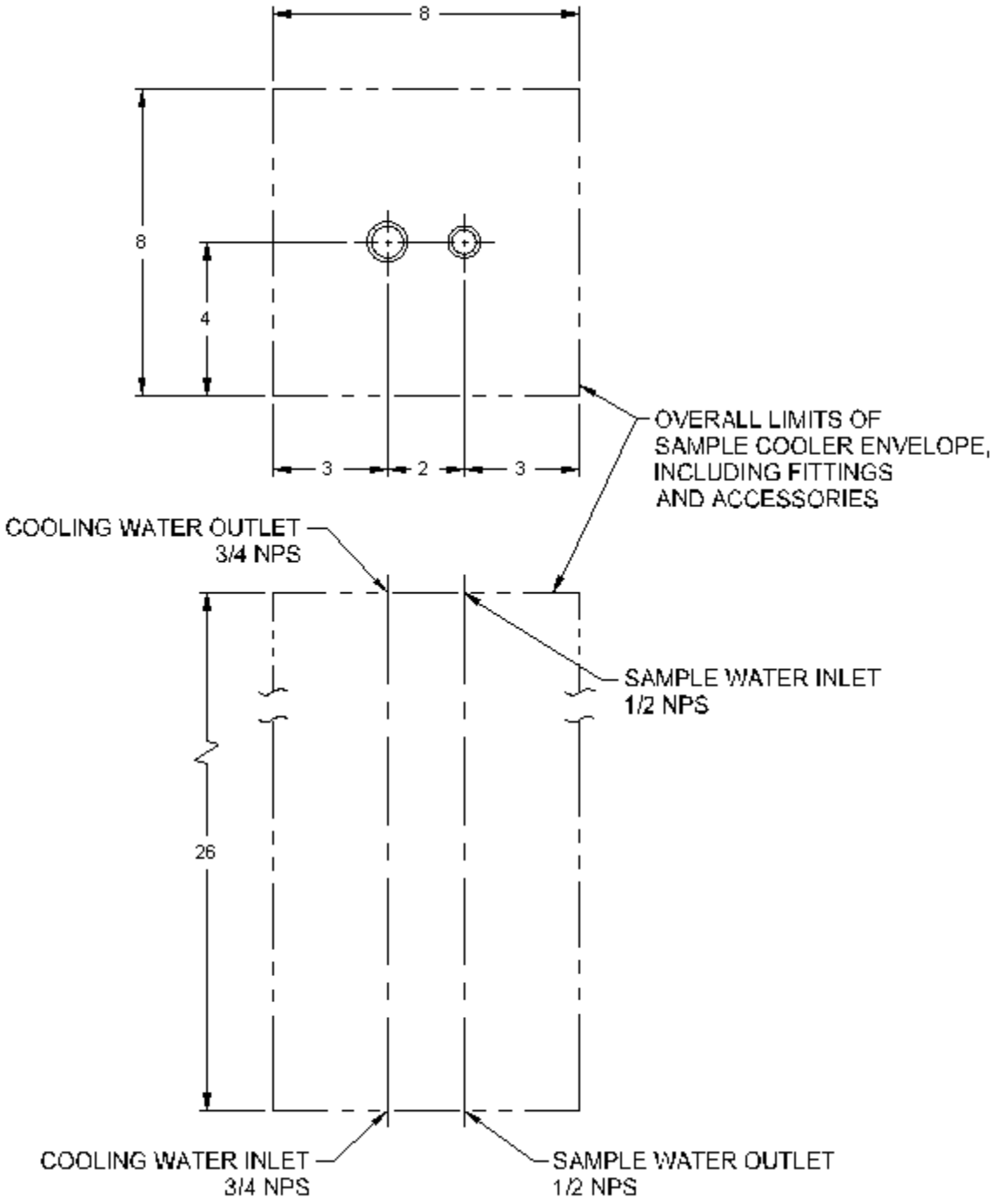
1/ Where cooling will be by a submarine seawater system subject to submergence pressure (see 6.2), copper-nickel alloy shall be composition 70-30.

2/ Chemical and physical properties shall be in accordance with MIL-T-16420. Coil outside diameter and wall thickness may be as required (see 3.4.4).

3.3 Welding and allied processes. Welding shall be in accordance with S9074-AR-GIB-010/278. Brazing shall be in accordance with 0900-LP-001-7000, except that requirements for use of pre-inserted brazing rings are applicable only to pipe fittings. Brazed joints shall be constructed to permit ultrasonic inspection.

3.4 Construction. Sample coolers shall be shell and coil construction, with sample water passed through the coil, and coolant (either seawater or chilled fresh water) passed through the shell (see 6.2).

3.4.1 Space. Unless otherwise specified (see 6.2), sample water coolers (including external fittings) shall fit a space envelope 26 inches in length and 8 inches square in cross-section (see figure 1).



NOTE:

1. Dimensions and pipe sizes are in inches.

FIGURE 1. Sample cooler space envelope.

3.4.2 Shock resistance. The coolers shall withstand the high-impact shock tests as specified (see 4.3.3).

3.4.3 Supports. Each cooler shall have a bracket installed for mounting.

3.4.4 Coil wall thickness. Wall thickness of coils shall be determined by use of the formula specified in ASME B31.1, but shall be not less than 0.065 inch. For the composition 70-30 copper-nickel alloy specified, the allowable fiber stress shall be not more than 9,600 pounds per square inch (lb/in^2).

3.4.5 External connections. Unless otherwise specified (see 6.2), coil external connections shall be ½-inch nominal pipe size (NPS), and shell external connections shall be ¾-inch NPS. External connections shall terminate with 4 inches of straight length (preferred) but not less than 1 inch for attachment by socket weld.

3.4.6 Special provisions. A clearance of not less than ⅛ inch is required between adjacent turns of the coil, between coil and shell, and between coil and baffles (where used) to permit free flow of coolant. Coil supports or spacers, if used, shall be silver brazed to the coil at all points of contact, or where clearance is less than ⅛ inch in order to avoid formation of crevices. Joints in the coil that may be subjected to boiler pressure shall be socket welded.

3.4.7 Capacity. The cooling surface shall be based on a 10-percent fouling factor applied to the overall heat transfer coefficient for clean tube surface. Unless otherwise specified (see 6.2), the cooler shall, at an operating gauge pressure of 1,415 lb/in^2, cool 0.125 gallon of water per minute from 590 to 75 °F, using chilled water as cooling medium at 55 °F and at coolant flow rate not to exceed the upper limit as specified (see 6.2). These parameters shall be separately prescribed if seawater is specified as coolant (see 6.2).

3.4.8 Hydrostatic pressure. The cooler shall withstand, without leakage, rupture, bulge, or flow, the following pressures (see 4.4.1):

Coil: 2,123 lb/in^2, unless otherwise specified (see 6.2).

Shell: 225 lb/in^2, unless otherwise specified (see 6.2), or if seawater cooled and for submarine application, the shell shall meet full submergence pressure and be hydrostatically tested to 1.5 times submergence pressure.

3.5 Painting. Coolers shall be left unpainted.

3.6 Identification plates. Identification plates of sheet or cast brass or bronze shall be prepared in accordance with MIL-DTL-15024 and MIL-P-15024/5 and shall include the following:

a. Name: “Sample Water Cooler” (without quotation marks).
b. Type: Sample Water Cooler.
c. Manufacturer’s service part number.
d. National stock number (allow 20 spaces).
e. Manufacturer’s name.
f. Contract number (contract or purchase order number applying to the cooler purchase).
g. Date manufactured.
h. Serial number.
i. Blank space for Government inspector’s stamp.
j. Maximum test pressure, shell side.
k. Maximum test pressure, coil sides.
l. Blank space for unit number (space reserved for marking by the shipyard at time of installation).
m. The initials “U.S.” (without quotation marks).

3.7 Workmanship. In order for the work to be considered acceptable, conformance to requirements of drawings shall be mandatory.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.3).

b. Conformance inspection (see 4.4).

4.2 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified herein.

4.3 First article inspection. First article inspection shall be performed when a first article sample is required (see 3.1). This inspection shall include the tests of 4.3.2 and 4.3.3.

4.3.1 Laboratory selection. The first article tests shall be conducted at a laboratory acceptable to the acquisition activity.

4.3.2 Performance test. This test shall include accurate measurements of coolant and cooled medium flows, pressure drops, and heat transfer. The cooler shall meet the requirements as specified in 3.4.7 (see 6.2).

4.3.3 Shock test. The first article sample shall be shock tested in accordance with Grade A of MIL-S-901 (see 6.3).

4.4 Conformance inspection. Conformance inspection shall consist of the test of 4.4.1.

4.4.1 Hydrostatic test. A hydrostatic test shall be performed to ensure conformance to 3.4.8 (see 6.2).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The sample water coolers specified herein are normally used for cooling water samples as drawn from shipboard boilers or feedwater systems for chemical testing.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. When first article is required (see 3.1).

c. Whether the normally allowed space envelope may be exceeded (see 3.4.1).

d. Whether NPS external connections differ from those specified (see 3.4.5).

e. Sample water operating pressure, temperature, and flow rate, if other than as specified (see 3.4.7).

f. Whether seawater or chilled fresh water should be used as coolant, and if seawater, alternative parameters to be met (see 3.4.7 and 4.3.2).

g. Temperature and permissible upper limit of flow rate of the coolant (see 3.4.7 and 4.3.2).

h. Coil hydrostatic test pressure, if other than as specified (see 3.4.8 and 4.4.1).

i. Shell side hydrostatic test pressures, if seawater cooled and if other than as specified (see table I, 3.4.8, and 4.4.1).

j. Packaging requirements (see 5.1).

6.3 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see 3.1), and the number of items to be tested as specified in 4.3. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Sub-contracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.5 Subject term (key word) listing.

Brazing

Coil wall

Hydrostatic pressure

Shells

Shock resistance

Welding electrode

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Preparing Activity:
Navy – SH
(Project 4420-2013-004)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.