MIL-S-2953C
4 February 1980
SUPERSEDING
MIL-S-2953B
24 July 1978
(See 6.5 and 6.6)

MILITARY SPECIFICATION

STRAINERS, STEAM (SIZES 3 INCHES AND BELOW)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers basket-type steam strainers in sizes 3 inches and below.

1.2 Classification.

1.2.1 Strainer designation. Strainers covered by this specification shall be designated in the following form (see 6.2.1 and 6.3):

M2953 - X XX X XX

Military specification code number
Composition code letter (see 1.2.1.1)
Rating code number (see 1.2.1.2)
End style code letter (see 1.2.1.3)
Size code number (see 1.2.1.4)

1.2.1.1 Composition code letter. The material of the strainer is identified as follows (see 3.1):

Composition code letter	Composition
A	Composition A
B	Composition B
D	Composition D

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 3112, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 4730

* 1.2.1.2 Rating code number. The pressure rating of the strainer is identified as follows:

Rating code number	ANSI B16.5 rating
06	Class 600 pound
15	Class 1500 pound

* 1.2.1.3 End style code letter. The type of strainer end connections is identified as follows (see 3.2.5):

End style code letter	End connection type
F	Flanged
B	Butt-Weld
S	Socket-Weld

* 1.2.1.4 Size code number. The strainer size is identified as follows (see 3.2.1):

Size code number	Nominal pipe size
08	1/2
12	3/4
16	1
20	1-1/4
24	1-1/2
32	2
40	2-1/2
48	3

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment and Systems, Requirements for.

MIL-P-17286 - Propulsion and Auxiliary Steam Turbines and Gears (Including Repair Parts, Tools, Accessories and Instruments): Packaging of.

MIL-G-21032 - Gaskets, Metallic-Asbestos, Spiral Wound.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-278 - Fabrication Welding and Inspection; and Casting Inspection and Repair for Machinery, Piping and Pressure Vessels in Ships of the United States Navy.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

A193 - Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

A194 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.

A216 - Carbon-Steel Castings Suitable for Fusion Welding for High-Temperature Service.

A217 - Martensitic Stainless Steel and Alloy Steel Castings for Pressure-Containing Parts Suitable for High-Temperature Service.

A240 - Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Fusion-Welded Unfired Pressure Vessels.

A696 - Steel Bars, Carbon, Hot-Rolled and Cold-Components and Other Pressure-Containing Parts.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B1.12 - Class 5 Interference - Fit Thread.

B16.5 - Steel Pipe Flanges and Fittings.

B16.11 - Forged Steel Fittings, Socket-Welding and Threaded.

B16.25 - Buttwelding Ends.

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Boiler and Pressure Vessel Code - Section VIII, Division 1, Appendix II.

(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Strect, New York, NY 10017.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Materials. Materials shall be as specified in table I.

TABLE I. Materials.

Name of part	Materials form	Composition A	Composition B	Composition D
Body	Casting	ASTM A217, grade WC9	ASTM A217, grade WC6	ASTM A216, grade WCB
Cover	Casting			
	Bar stock	------	------	ASTM A696
Basket screen	----	ASTM A167, type 316 ASTM A240		
Gaskets	Spiral wound	MIL-G-21032, type I		
Studs for covers	Alloy steel for high temperature bolting	ASTM A193, grade B16	ASTM A193, grade B16	ASTM A193, grades B7 and B16
Nuts for covers	Heavy semi-finished hexagon carbon and alloy steel for high temperature bolting	ASTM A194, grade 4	ASTM A194, grade 4	ASTM A194, grades 2, 2H and 4

* 3.1.1 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.2 Design and construction.

3.2.1 Sizes. Strainers shall be furnished in nominal pipe sizes of 1/2, 3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, or 3, as specified (see 1.2.1.4 and 6.2.1).

* 3.2.2 End connections. Strainers shall have flanged ends in accordance with ANSI B16.5 and table II, butt-weld ends in accordance with ANSI B16.25, or socket weld ends in accordance with ANSI B16.11 as specified (see 1.2.1.3 and 6.2.1). The design of the strainer nozzle cross-section, the area between the end connection and the strainer body, shall be such that the connecting piping (considering maximum size and schedule to be used) will reach yield stress prior to the strainer nozzle cross-section.

TABLE II. Flange face-to-face dimensions.

Rating ANSI B16.5	Strainer size (inches)							
	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
Class 600 Class 1500	5-5/8 11	6-3/8 11-1/4	7-3/8 11-1/2	8-3/8 13	9-7/8 14-1/4	11-7/8 17-1/4	13-3/8 20	14-3/8 23

* 3.2.3 Covers. Covers shall be flanged and bolted. Covers shall not be fitted with any connection for a blow valve. Wye type strainer covers shall be provided with a boss to facilitate attachment of a blow down or drain connection. The following features shall be incorporated:

(a) Cover alinement shall be obtained by body guiding, that is, a close tolerance fit between the cover and strainer body. The cover shall not be alined by means of the cover fasteners.
(b) Flange joint design shall assure proper compression of type I gaskets, in accordance with MIL-G-21032, when body and cover flanges are drawn up metal-to-metal.

(c) Cover flanges shall be secured by any of the following:
  (1) Through bolts threaded the entire length and fitted with a nut on each end. Threads on the bolts and nuts shall be class 2 fit.
  (2) Tap end studs with interference class 5 fit at tap end and a class 2 fit at nut end. Interference shall be in accordance with ANSI B1.12.
  (3) Cap screws in accordance with B-7, class 2 fit of ASTM A193. Allen head type cap screws shall not be used.

(d) Threaded fasteners, quantity and size, shall comply with ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Appendix II.

3.2.4 Basket screen. The free area through the basket screen shall be at least 2-1/2 times the area of the inlet. Holes shall be either punched or drilled with all burrs removed. Holes shall be 0.020 inch in diameter and equally spaced over the basket. Spacing of holes on centers shall be approximately twice the diameter of the hole or greater. Metal thickness of basket shall be 0.015 inch minimum. Wire mesh will not be acceptable.

3.2.5 Strainer body. The design of all strainers shall provide that steam shall pass through the basket and shall be directed axially into the inside of the basket so that any foreign material intercepted by the strainer may be withdrawn by removal of the cover. The basket shall be installed in such a manner as to provide for easy removal. Each strainer shall have distinctly cast or stamped on one side of the body the size, the trademark of the manufacturer, and the pressure rating of the strainer. The walls of the bodies shall be curved surfaces; no flat surfaces will be permitted. They shall be ribbed as necessary to provide strength. The low point of the strainer body shall be provided with a boss to facilitate installation of a drain connection by welding. In wye type strainers the boss on the strainer cover is considered to fulfill this requirement.

3.3 Pressure temperature. Pressure temperature rating shall be in accordance with ANSI B16.5, class 600 and class 1500.

3.4 Shock. Strainers furnished in accordance with this specification, shall meet the requirements of MIL-S-901 when tested in accordance with 4.5.2.

3.5 Nondestructive testing. Nondestructive testing requirements shall be in accordance with MIL-STD-278.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Sampling for quality conformance inspection.

4.2.1 Lot. All strainers of the same composition, pressure rating, size, and construction offered for delivery at the same time shall be considered a lot for purposes of sampling.

4.2.2 Sampling for examination of end item. Sampling for the examination specified in 4.3.1 and 4.3.2 shall be conducted in accordance with MIL-STD-105. The acceptance quality levels (AQL), expressed in defects per hundred units (DHU) and the inspection levels shall be as shown in table III.

TABLE III. Inspection level.

Examination	Inspection levels	AQL'S	
		Major	Total
Visual examination (see 4.3.1)	II	2.5	6.5
Dimensional examination (see 4.3.2)	I	1.5	4.0

4.3 Examination.

4.3.1 Visual examination. Sample strainers shall be visually examined in accordance with table IV.

TABLE IV. Classification of defects.

Examination	Defect	Major	Minor
Design and construction	Not design specified	X	---
	Not material specified	X	---
	Component missing or damaged	X	---
	Not assembled correctly	X	---
Workmanship	Poor assembly	X	---
	Cover not properly alined	X	---
	Welding not properly fused or inadequate	X	---
	Poor finish on machining	X	---
Identification and marking	Improper, missing or illegible	---	X

4.3.2 Dimensional examination. Sample strainers shall be examined to determine conformance with the dimensional requirements specified herein. Any deviation from the specified tolerances shall constitute a defect. Any dimensional defect for pressure containing parts shall constitute a major defect.

4.4 Parts.

4.4.1 Pressure containing parts. Pressure containing parts shall be examined to determine conformance with applicable specifications.

4.4.2 Nonpressure containing parts. The DCASMA may accept certification that nonpressure containing parts conform to their applicable material specification providing that such certification contains the actual test, examination, or other verifiable data.

4.5 Tests.

4.5.1 Shell tests. Each of the strainers shall be subjected to the pressures specified in table V for the duration of 1 minute. The water temperature shall not exceed 100°F. Any weeping, leakage, or permanent deformation shall be cause for rejection.

TABLE V. Test pressures for strength and porosity.

ANSI B16.5 rating	Pressure (gage)	
Pounds	lb/in^2	
	Composition A and B	Composition D
Class 600	2250	2225
Class 1500	5625	5575

4.5.2 Shock. Equipment and test classification shall be grade A, hull/bulkhead mounted, class III, type A. Method of mounting shall comply with figure 1.

4.5.2.1 Strainer shall be hydrostatically pressurized with water to the cold rating specified in ANSI B16.5. Any external leakage of the strainer or strainer/piping or visible damage to the strainer basket shall constitute failure.

4.5.3 Nondestructive tests. Strainers 2-1/2 and 3 inches in size shall be tested in accordance with MIL-STD-278.

4.6 Inspection of packaging. The preservation-packaging, packing, and marking shall be inspected for compliance with section 5 of this document.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisitions. For the extent of applicability of the packaging requirements of referenced documents listed in section 2, see 6.4.)

5.1 Preservation-packaging, packing, and marking. Steam strainers shall be preserved-packaged level A or C and packed level A, B, or C as specified (see 6.2.1), and marked in accordance with MIL-P-17286.

6. NOTES

6.1 Intended use. Strainers covered by this specification are intended for steam and steam drain use only and have pressure-temperature ratings in accordance with ANSI B16.5 except for maximum allowable temperatures. The maximum temperature limitations will be 1050°F for composition A strainers, 1000°F for composition B strainers, and 775°F for composition D strainers.

* 6.2 Ordering data. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Definitive military specification part number required (see 1.2.1).
(c) Quantity required.
(d) Level of preservation-packaging and packing required (see 5.1).

* 6.3 Definitive military specification part number. The military specification part number is a definitive part number which corresponds to the composition, rating, end style, and size of the strainers covered by this specification and defines the requirements of the options presented under this specification. The military specification number, composition code letter, rating code number, end style code letter, and size code number are combined to form the definitive military specification part number.

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 Supersession data. MIL-S-2953, dated 3 October 1951 has been superseded as follows:

MIL-S-2953	Superseding document
Class a	NAVSHIPS Drawing 810-841499
Class b	M2953-D06 XXX
Class c	M2953-B06 XXX

6.6 Changes from previous issue. The margins of this specification are marked with an asterisk (*) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army - ME
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Review activities:
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DLA - CS

Preparing activity:
Navy - SH

Agent:
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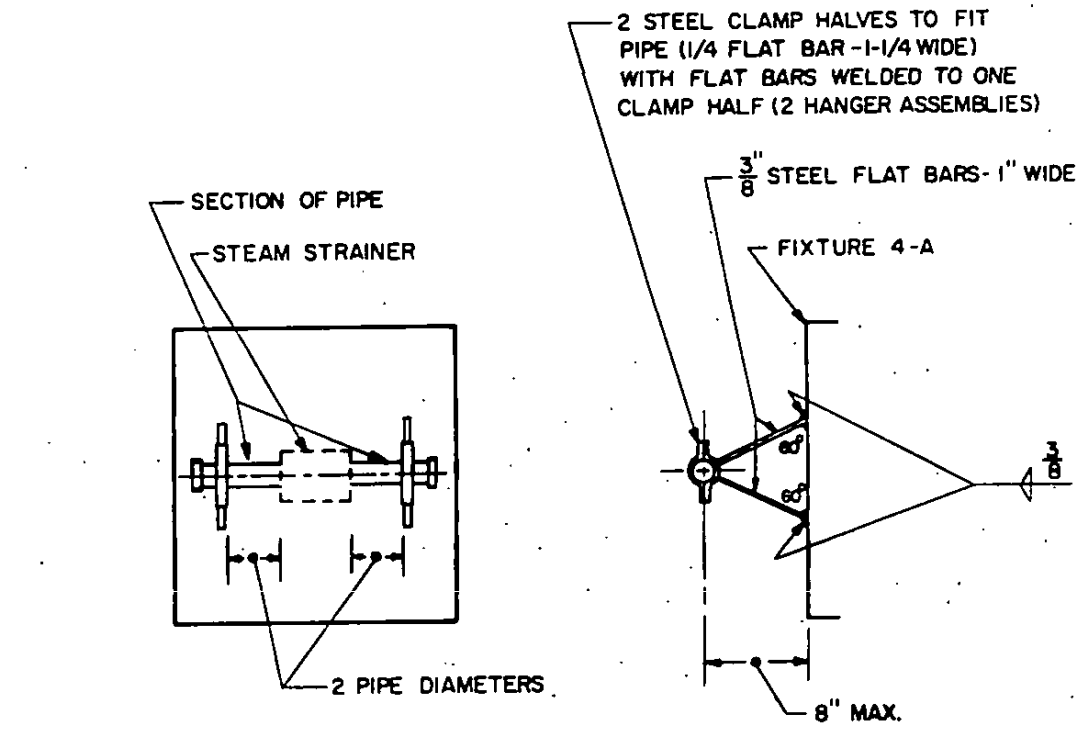
(Project 4730-0902)



SH 10682

FIGURE 1. Method of mounting strainer for shock test.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
	☐ USER
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ MANUFACTURER
	☐ OTHER *(Specify)*:

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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