

INCH-POUND

MIL-S-17849E(SH)
AMENDMENT 2
22 June 1995
SUPERSEDING
AMENDMENT 1
28 February 1994

MILITARY SPECIFICATION

STRAINERS, SEDIMENT, PIPELINE, DUPLEX
(WITH AND WITHOUT MAGNET)

This amendment forms a part of MIL-S-17849E(SH), dated 19 March 1992, and 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.

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* 2.1.1, SPECIFICATION, MILITARY: Add:

- "MIL-M-46888 - Magnet Materials, Permanent.
- MIL-R-83248/1 - Rubber Fluorocarbon Elastomer, High Temperature Fluid, and Compression Set Resistant (O-Rings, Class 1, 75 Hardness).
- MIL-R-83248/2 - Rubber Fluorocarbon Elastomer, High Pressure Fluid, (O-Rings, Class 2, 60 Hardness)."

Add to Standard, Military:

"MIL-STD-100 - Engineering Drawing Practices."

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2.2: Add, after ANSI:

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

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

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Add, under ASTM:

- "A 36 - Standard Specification for Structural Steel.
- A 105 - Standard Specification for Forgings, Carbon Steel, for Piping Components.
- A 106 - Standard Specification for Seamless Carbon Steel Pipe High Temperature Service.
- A 285 - Standard Specification for Pressure Vessel Plates, Carbon Steel Low and Intermediate Tensile Strength.
- A 513 - Standard Specification for Electric Resistance Welded Carbon and Alloy Steel Mechanical Tubing.
- A 516 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate and Lower-Temperature Service.
- A 519 - Specification for Seamless Carbon and Alloy Steel Mechanical Tubing.
- E 437 - Standard Specification for Industrial Wire Cloth and Screens (Square Opening Series)."

* 2.2 Add after ASTM:

"SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

J 1926 - Specification for Straight Thread O-Ring Boss Port.

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)"

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3.3.1.1.2: Delete "Shifting for all strainers" and substitute "Unless otherwise specified (see 6.2), shifting for all strainers".

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* 3.3.1.1.5: Delete and substitute:

"3.3.1.1.5 Changeover valve leakage. Strainers tested in accordance with 4.7.2, leakage shall be zero except those strainers tested in accordance with 4.7.12. Strainers who completed 4.7.12 testing shall be tested in accordance with 4.7.2 but the reject criteria shall be as follows. Strainers whose leakage rate fills the off-duty basket compartment in less than one hour shall be rejected."

3.3.2: Delete "Unless otherwise specified (see 6.2)," and after "housing" add ", as specified (see 6.2)".

* 3.3.2: Delete second sentence and substitute:

"Straight threaded unions, or boss connections shall be in accordance with ANSI J 1926."

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3.3.2.1: Add after last sentence "Flange face finish shall be as specified (see 6.2)."

3.3.2.3: Add as last sentence "Equalizing valves which are integral to the strainer housing shall be soft seated."

3.3.2.4: After "drain" add "(globe)". Add after last sentence "Valves which are integral to the strainer housing shall be soft seated."

3.3.4: Add after last sentence "Hinged type cover shall be equipped with a latch to prevent accidental closing under dynamic shipboard conditions."

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3.3.4.1: Delete first two sentences and substitute:

"Compartment cover (except for type II, class 2 strainer) shall, in the event of gasket/O-ring failure, deflect fluid spray downward away from the operator."

3.3.5(f): Delete "size" and substitute "size/filtration rating".

3.3.5(h): After "(NSN)" add "(see 6.2)".

* Add new paragraph 3.3.5.1:

"3.3.5.1 Part numbering of interchangeable parts. The manufacturer's part number and drawing number shall be the same. All fasteners shall be identified by an industry part number which identifies both size and material."

PAGES 9 and 11

* TABLES II and III: Delete "Magnets . . . (see 6.2" and substitute:

Magnets (see 6.2)	Alnico VIII A	MIL-M-46888	B10
	Alnico VIII s		B11

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3.3.6.4.1 and 3.3.6.4.2: Add to last sentence: "with flange face finish requirements as specified (see 6.2)."

3.3.6.5: After "Basket" add "assembly".

3.3.6.5.1: Add after first sentence: "Wire mesh edges and seams shall be folded back upon themselves and welded or brazed to preclude fraying. Wire mesh shall be attached to the interior as opposed to the exterior of the support basket."

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Add after "...by-passing of contaminants." "The seal shall be retained by the element (for example, by a groove) so as to preclude gasket/O-ring loss during strainer changeover and element removal."

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3.3.6.5.2.2: Add after last sentence: "Plate outer element sides and bottom shall have perforated 0.250 inch diameter holes spaced at a minimum 0.325 inch center-to-center. All welds shall be continuous."

3.3.6.6: After "Basket" add "assembly".

3.3.6.6.1: Add after third sentence: "Wire mesh edges and seams shall be folded back upon themselves and welded or brazed to preclude fraying."

Add after "... by-passing of contaminants." "The seal shall be retained by the element (for example, by a groove) so as to preclude gasket/O-ring loss during stainer changeover and element removal."

Add new paragraph 3.3.6.6.1.1:

"3.3.6.6.1.1 Multistraining elements. Each straining element shall be equipped with a separate seal between the straining element lands. Each straining element shall be individually secured, top and bottom, in the basket support frame."

Add new paragraph 3.3.6.6.1.2:

"3.3.6.6.1.2 Disposable straining elements. Disposable straining elements shall be in accordance with 3.3.6.6 except for 3.3.6.6.3. Basket compartment shall accommodate muslin/nylon bag in a basket support frame. If the basket support frame design cannot support either a muslin/nylon or a polypropylene bag, then a separate basket shall be provided. Muslin or nylon bags shall be fabricated from cloth having at least 70 yarns/in in warp and fill direction. Unless otherwise specified, muslin/nylon bag particle removal shall be equivalent to strainer. Basket support frame shall be in accordance with 3.3.6.5.1 except that a wire mesh screening medium is not required."

3.3.6.6.2: Delete and substitute:

"3.3.6.6.2 "Strainer basket assemblies shall retain one gram of test dust in accordance with 4.7.8.3.1 per gpm of rated flow without exceeding a differential pressure of 10 psi or as specified (see 6.2) through the strainer when tested in accordance with 4.7.8.3."

Add new paragraph 3.3.6.6.4:

"3.3.6.6.4 Filtration ratio (beta ratio, B_r). The filter element when tested as specified in 4.7.8.2 shall have a minimum beta ratio of 75."

3.3.6.7: Add after "... inlet flow path" "unless otherwise specified (see 6.2)".

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Table IV: Delete and substitute:

"TABLE IV. Materials for type II, class 2 strainers.

PART	MATERIAL	APPLICABLE DOCUMENT	REMARKS
Bodies, bonnets, covers, glands and changeover valves (parts in contact with sea water)	Copper-nickel alloy Bronze	ASTM B 369 MIL-B-24480	Alloy C96400 C95800
Clamps, yokes, valve operators, (parts not in contact with sea water)	Cast bronze Nickel-copper CRES CRES casting	QQ-C-390 MIL-C-24723 ASTM A 276 MIL-C-24707/3	Alloy C90300 or C92200
Vent, drain, gauge and equalizing valves	Bronze, globe	803-4384536	Note 1
Threaded fasteners	Nickel-copper	MS17828 MS35311	
Gaskets	O-ring Synthetic rubber	MIL-R-83248/1 MIL-R-83248/2 MIL-G-1149	For all except threaded bosses for threaded bosses
Packing for valve stems and rods	O-ring	MIL-P-24396 MIL-R-83248/1	
Basket	CuNi plate NiCu plate	MIL-C-15726 QQ-N-281	Alloy C71500 N04400 or N04405
Threaded plugs	NiCu CuNi	QQ-N-281 MIL-C-15726	MS18229

1/ Connections shall be either straight threaded unions or boss connections fitted with O-rings. Open ended valves with a union or boss connection must be secured to prevent accidental rotation of the threaded joint."

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3.3.7.2.3: Add after "... center-to-center." "All welds shall be continuous."

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- 3.4.1: Add "(a) Ensure drain valve is shut."
Renumber (b) through (f): same as previous steps (a) through (e).
Delete and substitute: "(g) Shift flow slowly to off-duty side while watching for leaks. Fluctuations in differential pressure across the strainer may occur during the shift. If leaks occur, shift quickly back to original flow pattern, and repeat step (f). If no leakage occurs during shifting, proceed to step (g)."
Add "(h) Shut equalizing valve."
Renumber (i) through (u): same as previous steps (h) through (t).

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- 3.8 Delete "part" and substitute "internal part".
Add after last sentence: "Parts containing asbestos shall not be used."
3.10: Delete "furnished," and substitute "furnished with each order. Contractor shall identify what special tools are required."

Add new paragraph 3.11:

"3.11 Spares. A list of recommended spare and replacement parts shall be submitted to the procurement activity. O-rings, threaded fasteners, and other parts shall be identified by applicable military or industry standard part number, where available."

Add new paragraph 3.12:

"3.12 Fabricated components. Fabricated components that form the pressure boundary shall conform to the requirements of the ASME Boiler and Pressure Vessel Code: Section VIII, Division 1."

Add new paragraph 3.13:

"3.13 Special lifting equipment. Strainer components requiring lifting equipment shall be kept at a minimum. When lifting equipment is required the contractor shall identify the weight of the component and the method of lifting used. This information shall be incorporated into the technical manual and the weight of the component shall be listed in the drawings."

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* TABLE VI; Delete and substitute:

Examination and Tests	First article	Quality Conformance
POST-FOUNDRY PRODUCTION: Pilot Pressure Boundary Casting	4.7.11	---
PRODUCTION:		
Examination	4.6	4.6
Shock	4.7.5	---
Hydrostatic	4.7.1	4.7.1
Tightness (leakage)	4.7.2	4.7.2
Torque	4.7.2.1	4.7.2.1
Operating Capacity	4.7.3	---
Pressure Drop	4.7.4	---
Spray Deflector	4.7.7	---
Safety Interlock	4.7.9	4.7.9
Equalizing Flow Rate	4.7.13	4.7.13
Operational Cycling	4.7.12	---
Basket Tests:		
Element Strength	4.7.6	---
Bubble Point	4.7.8.1.1	4.7.8.1.2
Filtration Ratio	4.7.8.2	---
Retention Test	4.7.8.3	---
Cleaning Procedures	4.7.8.4	---
NonDestructive Test	4.7.10	4.7.10
Additional Inspection	4.8	4.8

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TABLE VI: Delete "Maximum particle passed" and substitute "Filtration ratio (Filter element efficiency)".

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4.7.1: Delete and substitute:

"The test shall be an internal pressure test with water or system fluid at a viscosity equivalent to water. Where water is detrimental to the unit being tested, corrosion inhibitors shall be added. Each completely assembled strainer shall be tested to a pressure equal to 150 percent of the design pressure for a duration of 60 minutes. During this test, the changeover valve shall be positioned to allow flow to both basket compartments. Strainers not maintaining zero leakage shall be rejected."

4.7.2: Delete first sentence and substitute: "Each strainer shall be tested for a duration of 30 minutes to verify the seal tightness for each valve seat of the 3-way changeover valve at 100 percent of design pressure using test fluid as specified in 4.7.3."

4.7.3: Add after first sentence: "When specified (see 6.2), a range of pressure drops at specified operating conditions (see 6.2) shall be developed."

Delete "(3.3.3)" and substitute "(3.3.3) and repeated with the highest viscosity specified (see 3.3.3)."

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Add new paragraph 4.3.1:

"4.3.1 Assembly drawing. Assembly drawings shall be furnished with each new filter basket assembly submitted for first article tests. Prior to authorization for first article testing, two sets of assembly drawings, in accordance with MIL-STD-100, shall be furnished with each new model filter basket assembly submitted for first article tests. Assembly drawing shall show a cutaway section of details in their normal assembly positions and shall carry part numbers of details and subassemblies. The following data shall be furnished on or together with, the assembly drawings:

- (a) Outline dimensions of the complete assembly.
- (b) Bill of material, listing specifications grade and condition or other data needed to identify the material proposed.
- (c) General notes stating complete performance data including rated flow capacity, pressure drop data, pressure rating, filtration rating, and dirt holding capacity.
- (d) Unless such information is provided in the first article test report, filter element drawings shall include a cross-sectional view with each individual components identified. Proprietary information, such as number of square inches of media or composition of media is not required.

Dimensioning and tolerance on drawing shall be in accordance with ANSI Y14.5."

4.7.6: Delete two places "basket" and substitute "basket assembly".

After first sentence add: "Differential pressure shall be applied in a rapid manner, one minute or less."

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4.7.6: Add after last sentence "Minor swelling of the pleated filter media after testing does not constitute failure."

PAGES 20 AND 21

- 4.7.8.1.1 and Delete "similar to" and substitute "in accordance with".
 4.7.8.1.2: Delete "baskets" and substitute "basket assemblies".
 Delete "basket" and substitute "basket assembly".

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4.7.8.2: Delete and substitute:

"4.7.8.2 Filtration ratio (Filter element efficiency). After completion of 4.7.8.1.1, the elements shall be subjected to a filter element efficiency test using the specified test dust (see 6.2) and the test procedure specified in ANSI B93.31."

4.7.8.3: Delete and substitute:

"The strainer basket assembly and its straining elements shall be tested for effectiveness of filtration using clean oil of the viscosity specified in 4.7.3(a). Oil shall be pumped through the strainer at rated flow. At the rate of 10 grams per 4 minutes, 1 gram per gpm of specified in 4.7.8.3.1 shall be added. After all dust has circulated, the pressure differential through the strainer and total weight of test dust retained by the basket assembly shall comply with 3.3.6.6.2."

Add new paragraph 4.7.8.3.1:

"4.7.8.3.1 Test contaminant. Unless otherwise specified (see 6.2) the test dust contaminant shall be of the proposed ISO test dust test grade identified below. The dust is available from Powder Technology Inc., (PTI), P.O. Box 1464, Burnsville, MN 55337.

Micrometers size	Volume percent content of test dust larger than	
	Coarse	Medium
5	88-89	79-82
10	77-79	54-58
20	61-64	29-33
40	38-41	11-13
80	10-12	0-1
Filter rating (micrometers)	Test dust grade	
10-30	Medium	
25-80	Coarse	

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- 4.7.8.4: Delete two places "basket" and substitute "basket assembly".
 First and last sentences, Delete "3.3.6.7.3" and substitute "3.3.6.6.3".

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- * 4.7.12: Delete: ", and with the requirements of 4.3 shall be demonstrated." and substitute: ". Upon satisfactory completion of this test the unit shall be refurbished to new condition before being offered for delivery."

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- 6.2: (f) Delete "Alternate".
 (g) Delete and substitute: "Inlet and outlet connection type, size and flange face finish (see 3.3.2.1, 3.3.6.4.1 and 3.3.6.4.2)."
 (p) Delete "(1)" and substitute "(a)".
 (q) Delete "(2)" and substitute "(b)".
 (x) Delete "(see 6.6.1)" and substitute "(see 6.6.1 and 5.3.1.1)".
 Add (y) Alternate magnet characteristics (see table II).
 (z) Alternate shifting mechanisms (see 3.3.1.1.2).
 (aa) Test dust (see 4.7.8.3.1).
 (bb) Terminal differential pressure drop (see 3.3.6.6.2 and 4.7.8.3).
 (cc) Whether a range of differential pressure drops shall be reported for various operating conditions (see 4.7.3).
 (dd) Alternate filtration ratio (filter element efficiency) (see 4.7.8.2)."

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- 6.3: Delete "DI-T-5315A" and substitute "DI-NDTI-81307" under "DID Number".

- 6.6: Delete "quality assurance" and substitute "first article inspection".

- 6.6.1: Delete "5.2.1.1.4" and substitute "5.3.1.1".

- * 6.7, Line 1: Delete "Depreservation" and substitute "Preinstallation".
 Line : Delete "depreservation" and substitute "preinstallation".
 Line : Delete "depreservation for" and substitute "to return the unit to active status".

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- * 6.8: Delete and substitute:

- * "6.8 Definitive military specification part number. The military specification part number is a definitive part number which corresponds to the type, class and size of strainers covered by this specification.

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* 6.8.1 Cataloging data. For cataloging purposes, part numbers for the strainers are assigned as follows:

MS17849 - X - XX.XX

Military specification number _____

Type and class code letter _____

Size (NPS of inlet/outlet piping) _____

* 6.8.1.1 Type and class. The type and class of strainer are identified by a single letter (see table IX).

* **TABLE IX. Code letter to type and class.**

Type	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
I	A	B	C	D	E	F	G	H
II	I	J	K	L	M	N	O	P

* 6.8.1.2 Size. The size of strainer are identified by NPS of inlet/outlet piping as specified (see 6.2)."

* 6.9: Renumber to 6.10 and substitute as new 6.9:

"6.9 Subject term (key word) listing.

Basket
 Duplex
 Filtration
 Fuel
 Lube oil
 Sea water
 Valves"

Preparing activity:
 Navy - SH
 (Project 4730-N115)