



Standard Specification for Fabricated or Cast Automatic Self-Cleaning, Fuel Oil and Lubricating Oil Strainers¹

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1. Scope

1.1 This specification covers automatic or continuously self-cleaning automatic strainers, or both, for use in fuel and lubrication oil systems. The strainer is designed to operate under positive pressure (discharge side of the pump). Strainers manufactured to this specification are suitable for use in any marine environment.

1.2 It is not the intent of this document to redefine existing filtration standards. The intent is to provide sound guidelines for purchasers and designers of lube oil and fuel oil systems. Nominal micron requirements and filter efficiencies shall be as agreed upon by the purchaser and manufacturer and stated in the purchase order document.

2. Referenced Documents

2.1 ASTM Standards:²

[D3951 Practice for Commercial Packaging](#)

[F795 Practice for Determining the Performance of a Filter Medium Employing a Single-Pass, Constant-Rate, Liquid Test \(Withdrawn 2002\)](#)³

[F1199 Specification for Cast \(All Temperatures and Pressures\) and Welded Pipe Line Strainers \(150 psig and 150°F Maximum\)](#)

[F1200 Specification for Fabricated \(Welded\) Pipe Line Strainers \(Above 150 psig and 150°F\)](#)

2.2 ASME/ANSI Standards:⁴

[ASME Boiler and Pressure Vessel Code: Section VIII Division 1, Pressure Vessels](#)

[ASME Boiler and Pressure Vessel Code: Section IX, Welding and Brazing Procedures](#)

[B16.5 Steel Pipe Flanges and Flanged Fittings \(Including Ratings for Class 150, 300, 400, 600, 900, 1500, and 2500\)](#)

[B16.42 Ductile Iron Pipe Flanges and Flanged Fittings Class 150 and 300](#)

[Y14.5 Dimensioning and Tolerancing](#)

2.3 [American Welding Society Standard](#):⁵

[AWS D1.3 Structural Welding Code](#)

2.4 [MSS Standards](#):⁶

[SP25 Standard Marking Systems for Valves and Fittings](#)

[SP55 Quality Standards for Valve, Flanges and Fittings and Other Piping Components \(Visual Method\)](#)

2.5 [Federal Specification](#):⁷

[PPP-F-320 Fiberboard: Corrugate and Solid Sheet Stock \(Container Grade\) and Cut Shapes](#)

2.6 [Military Specifications](#):⁸

[MIL-P-116 Preservation, Methods of](#)

[MIL-B-121 Barrier Material, Greaseproofed, Water Proofed, Flexible](#)

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

[MIL-P-15024 Plates, Tags and Bands for Identification of Equipment](#)

[MIL-P-15024/5 Plates, Identification](#)

2.7 [Military Standards](#):⁸

[MIL-STD-167-1 Mechanical Vibrations of Shipboard Equipment \(Type I—Environmental and Type II Internally Induced\)](#)

[MIL-STD-740 Airborne and Structureborne Noise Measurement and Acceptance Criteria of Shipboard Equipment](#)

[MIL-STD-2073-1 Material Procedures for Development and Application of Packaging Requirements](#)

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

⁵ Available from American Welding Society (AWS), 550 NW LeJeune Rd., Miami, FL 33126, <http://www.aws.org>.

⁶ Available from Manufacturers Standardization Society of the Valve and Fittings Industry (MSS), 127 Park St., NE, Vienna, VA 22180-4602, <http://www.mss-hq.com>.

⁷ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

⁸ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *filter, or straining element*—the replaceable component in a strainer that performs the barrier separation of solid particles from flowing fluid. It shall be removable for cleaning and servicing.

3.1.2 *maximum allowable working pressure (MAWP)*—the highest internal pressure that the strainer can be subjected to in service. The maximum non-shock working pressure for which a strainer is rated by the manufacturer on its nameplate.

3.1.3 *maximum design temperature*—the maximum temperature for which a strainer is rated by the manufacturer.

3.1.4 *strainer*—a device which, when installed in a pipeline, provides a mechanical means of removing suspended solids from flowing liquid.

3.1.5 *straining element open area*—the net effective open area of the clean element through which the fluid can pass.

4. Classification

4.1 Strainers shall be furnished as Type I fuel oil or Type II lubricating oil. The strainers may be either hydraulic, electric, or pneumatic operated.

5. Ordering Information

5.1 Orders for strainers under this specification shall include the following:

5.1.1 This specification number,

5.1.2 Operating and design requirements for flow rate, pressure, temperature, nominal micron rating, fluid type, and viscosity. ASME Section VIII Division 1 Code Stamp requirements.

5.1.3 Flanged end connections class and type drilling, that is, ANSI, DIN, and so forth.

5.1.4 Orientation of inlet and outlet connections (see 6.2.9).

5.1.5 Repair spare parts package (see 14.1).

5.1.6 Quality criteria and test plan requirements.

5.1.7 Additional test or supplementary requirements (that is, ship motions and attitude constraints, see 7.3 and S1).

5.1.8 Strainer element open area if greater than requirements in 6.2.6.

5.1.9 Any special seal requirements.

5.1.10 Any special control requirements, that is, differential pressure gauges, valves, control panels, motors and so forth.

5.1.11 Certified drawing requirements showing maintenance envelope and mounting details.

6. Materials and Manufacture

6.1 The strainer shall be designed to remove contaminating or unwanted solid particles, or both, from fuel oil and lube oil. The self-cleaning action shall be automatic, and shall have the ability to backwash, when required, the filtered fluid through the filter element in segments such that the contaminating particles are flushed free of the filter element. The self-cleaning action of each unit shall be driven by a motor (electric, pneumatic, or hydraulic.)

6.2 *Components*—Each strainer assembly shall consist of a housing with a removable cover, inlet and outlet connections,

filter/straining element(s), self-cleaning mechanism(s), controls, and a differential pressure gauge. The strainer unit shall have suitable supports. The cross-sectional flow area throughout the unit shall be equal to or greater than that of the piping to which the strainer is connected.

6.2.1 *Housing*—The strainer housing, cover, flanges, and other items which form the pressure boundary shall conform to the requirements of the ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, Pressure Vessels. Cast grey iron pressure retaining components shall not be used. Units requiring ASME stamp shall have it specified in the purchase agreement. The dirty oil inlet shall be located at the lower part of the body and arranged to help prevent contamination of the clean outlet side of the strainer during disassembly.

6.2.2 *Cover*—The removable cover shall be secured to the housing by threaded fasteners. Removal of the cover shall provide access to all internal components and shall not require unbolting the inlet and outlet strainer piping connections. Cover lifting devices with integral supports or lifting eyes shall be required for covers weighing more than 30 lb.

6.2.2.1 *Antispray feature*—The strainer cover shall contain a device to deflect fluid spray downward in the event of gasket failure. The spray deflector shall remain in position at all times when the cover is connected to the housing.

6.2.3 *Gasket*—The gasket or o-ring shall be capable of providing a positive seal under service and test conditions. The gasket shall be installed between the cover and strainer housing. This gasket shall be in place during the hydrostatic pressure test.

6.2.4 *Pipe and Flange Dimensions*—The inlet and outlet flanges shall be sized and drilled to conform with ANSI B16.5, Class 150 or 300, or as specified in the ordering data (see 5.1.3 and ANSI B 16.42).

6.2.5 *Element Support*—The filter element support shall not permanently deform when the assembly of the filter element and element support is subjected to the strength of internals test (see 9.3.3). The element support shall be designed to facilitate easy removal of the filter element and element support as one assembly. The element support must satisfy the flow area requirements of 6.2.6.

6.2.6 *Filter Element*—The filter element may be furnished in any corrosion resistant material compatible with the fluid in service. The filter element shall be attached to the element support in such a manner that it can be easily removed and replaced from the element support. The straining element open area shall be at least two to four times larger than the area of the strainer discharge connection.

6.2.7 *Motor*—The self-cleaning action of each unit shall be operated by a motor included as a part of the strainer. This motor can be hydraulic, electric or pneumatic.

6.2.7.1 *Hydraulic motor*—A motor exhaust connection sized to meet the strainer hydraulic motor shall be provided. This motor exhaust connection shall also be suitable for venting air during the initial fill and pressurization.

6.2.7.2 *Electric motor*—Electric motors shall be fractional horsepower, TEFC, NEMA design B, with a continuous rated 1.15 service factor or equivalent. Voltage, phase and cycle rating shall be stated in the purchase document.

6.2.7.3 *Pneumatic motor*—Design type shall be agreed upon between the purchaser and manufacturer.

6.2.8 *Backflush Structure*—The backflush structure shall periodically or continuously clean all of the filter element by backflushing system fluid through the element. The structure shall clean the filter element in segments so as not to disrupt the system flow through the strainer at any time. All impurities separated shall be isolated from the filtered liquid and discharged. All shaft penetrations shall require seals suitable for oil service.

6.2.9 *Connections*—The inlet and outlet connections shall be flanged. The inlet and outlet shall be permanently marked and identified.

6.2.9.1 Drain connections shall be provided. These connections shall be furnished with caps or plugs.

6.2.9.2 The unit shall have a suitable means of removing sludge from the strainer when it is isolated from service or during normal operation.

6.2.10 *Lifting Attachments*—Each housing and the cover shall be provided with suitable sling attachment areas for lifting in a normal position. If lifting eyes are used, each eye shall have the capability to carry the total weight.

6.2.11 *Mounting*—Free standing strainers shall be mounted by feet attached to the housing. Each foot must be provided with a suitable hole to accommodate one hold-down bolt.

6.3 *Welding*—Welding for nonpressure-boundary components shall be in accordance with the AWS Structural Welding Code. Welding for pressure boundary components shall be in accordance with the ASME Boiler and Pressure Vessel Code.

6.4 *Treatment and Painting*—The exterior of the strainer shall be treated and painted in accordance with standard commercial practice.

6.5 *Material*—Ductile iron, bronze, carbon steel, and stainless steel materials used in the fabrication of the automatic self-cleaning strainer shall not affect nor be affected by petroleum products. Materials shall be in accordance with ASTM or ASME specifications. Dissimilar metal connections shall be designed to provide optimum corrosion protection.

6.6 *Seals*—Strainer seals shall be elastomers suitable for this service.

7. Operating Requirements

7.1 *Pressure*—The strainer shall be suitable for operation in the range of 0.21 to 1.03 MPa (30 to 150 psi).

7.2 *Temperature*—The strainer shall be suitable for operation between 15 to 120°C (60 to 250°F) unless otherwise specified in the ordering data (see 5.1.2).

7.3 *Shipboard Performance*—Strainers shall be capable of operating in accordance with all requirements of this specification when subjected to the purchase agreement specified ship motion and attitude constraints (see 5.1.7).

7.4 *Self-Cleaning Rate*—The pressure drop through the strainer assembly shall not exceed the manufacturer’s maximum rated pressure drop during operation. Specifically, the self-cleaning mechanism shall be capable of maintaining the

pressure drop below this value when contaminated fluid is being pumped through the strainer at the design flow specified in 5.1.2.

8. Workmanship

8.1 *Workmanship*—The strainer and its components shall be free from blow holes, porosity, hard spots, shrinkage defects and cracks. All surfaces shall be smooth and clean (reference MSS SP55). Where dimensions and tolerances affect interchangeability, operation, or performance or any combination thereof, they shall be held.

8.2 *Cleaning*—The strainer shall be cleaned of all extraneous material and dried.

9. Tests

9.1 Each strainer will have standard hydrostatic tests performed in accordance with Specifications F1199 or F1200 whichever is applicable. When specified as part of the purchase agreement, a detailed test plan may be submitted for approval. The performance, prototype and operational tests listed herein, shall be performed to prove the design. All strainers produced under this specification will meet these minimum requirements. Proof of test qualification shall be provided when specified in the purchase agreement.

9.2 *Test Extensions*—When the following conditions are satisfied, extension of a product test of one size to qualify another size is permitted (see Table 1):

- 9.2.1 Similar geometry and design characteristics.
- 9.2.2 Similar or stronger material than the tested unit.
- 9.2.3 Same pressure rating.
- 9.2.4 Similar or stronger end connections.
- 9.2.5 Similar sealing configurations.
- 9.2.6 Same mode of operation and operator attachment.

9.3 *Operational Tests:*

9.3.1 *Flow Capacity Test*—The test shall be performed in general accordance with Practice F795. The pressure drop at the rated flow shall not exceed 0.07 MPa (10 psi) with a fluid viscosity of 250 SSU.

9.3.2 *Inclined Flow Capacity Test*—The flow capacity test in 9.3.1 will be performed at a list and trim angle of 30°.

9.3.3 *Strength of Internals Test* : The filter elements shall be proven to withstand a minimum pressure differential of ten times the rated clean pressure differential or 1/3 of the maximum allowable working pressure (MAWP) of the housing, whichever is greater. The increased differential pressure shall

TABLE 1 Test Extensions^A

Strainer/Filter Pipeline Size Tested, mm (in.)	Other Sizes Approved By This Test, mm (in.)
19 (¾)	¾ and smaller
50 (2)	25 (1), 32 (1¼), 40 (1½), 50 (2)
150 (6)	65 (2½), 80 (3), 100 (4), 150 (6)
200 (8)	200 (8)
250 (10)	250 (10)

^AAbove 250 mm (10 in.), test extensions methods shall be agreed upon between the purchaser and the manufacturer and should be specified in the purchase agreement.

be held or maintained for 30 min. The strainer assembly will then be disassembled and inspected. Any permanent deformation or signs of damage shall constitute failure of the test. When testing methods are not practical, calculations or finite element analysis methods may be used as objective evidence that the strength of internals meet the requirements. The acceptance of these methods is to be a matter of contract and will be specified in the purchase agreement.

9.4 Self-Cleaning and Filtration Efficiency Test—The test fluid shall be an SAE 40 weight lubricating oil. The liquids viscosity should be either 250 or 500 SSU. This shall be clearly stated on the test report. The test report contaminants shall be silica sand with a known granular size and distribution.

Micron Size Contaminants	Weight % of Total Less Than Micron Sizes
4–25	25 %
25–40	50 %
40–75	80 %
75–100	90 %
100–165	95 %
228	100 %

The solids loading during the test shall be increased in intervals until a maximum value of 300 PPM is reached. Test data shall be recorded for a minimum of ½ h at each PPM loading.

PPM	Run Time in min
20 PPM (MG/L)	30
40 PPM (MG/L)	30
60 PPM (MG/L)	30
80 PPM (MG/L)	30
100 PPM (MG/L)	30
200 PPM (MG/L)	30
300 PPM (MG/L)	30

Practice **F795** shall be used as a guide to performance testing and the reporting of test results.

10. Inspection

10.1 Responsibility for Inspection— The contractor is responsible for the performance of all inspection requirements. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements.

10.1.1 Responsibility for Compliance— Items must meet the requirements of Sections **6**, **7**, and **8**, and, if so ordered, those of the Supplementary Requirements (see **5.1.7**). The inspections set forth in this specification shall become a part of the contractor’s inspection system or quality program. The absence of inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that products or supplies submitted for acceptance shall comply with requirements of the contract. Quality conformance sampling does not authorize submission of defective material, nor does it commit the purchaser to accept defective material.

10.1.2 Quality Conformance Inspection— Quality conformance inspection shall consist of the visual and dimensional inspections specified in **10.1.3**. Quality conformance inspection shall be accomplished on 100 % of the assemblies offered. Only those assemblies which pass all inspections shall be delivered to the purchaser.

10.1.3 Visual and Dimensional Inspection— The visual and dimensional inspection shall consist of the inspection listed in **Table 2**.

10.1.4 Design Data Inspection—The contractor shall provide the purchaser with documentation to show that the requirements of **Table 2** have been satisfied. This documentation may include drawings, engineering analyses, or test data, or any combination thereof. The inspections listed in **Table 3** shall be verified by engineering review of the documentation provided.

11. Product Marking

11.1 Consult MSS SP25.

11.2 Identification—Identification plates, if required in the contract, shall be provided and shall include the following information:

11.2.1 The nominal pipe size of the inlet and outlet connections.

11.2.2 Design pressure, flow capacity.

11.2.3 The necessary operating instructions.

11.2.4 Weight when wet (operational weight).

12. Packaging

12.1 Protection—Strainer assemblies and their associated parts shall be individually preserved and packaged to afford adequate protection against corrosion, deterioration and physical damage from shipment between the supply source and the first receiving activity.

13. Supporting Documentation

13.1 Technical and Logistics Documentation—The contractor shall furnish the following publications applicable to the assemblies supplied under this specification:

13.1.1 Spare parts listing.

13.1.2 Maintenance, service, and repair manual.

13.1.3 Graph of expected pressure drop across the strainer assembly as a function of flow at various fluid viscosities. The maximum pressure drop allowed shall be indicated.

TABLE 2 Visual and Dimensional Inspection

Inspection	Requirement Paragraph
Number of replaceable units	6.1, 5.1.5
Presence of ASME stamp (if part of purchase agreement)	6.2.1
Presence and type of cover fasteners	6.2.2
Access to internals without breaking inlet and outlet connections	6.2.2
Presence of cover lifting device, if required	6.2.2
Presence of antispray feature integral with cover	6.2.2.1
Presence, sizes, and locations of connections	6.2.9
Presence of required caps and plugs	6.2.9
Presence of lifting eyes	6.2.10
Presence and type of mounting feet	6.2.11
Presence and color of paint	6.4
Presence, completeness, legibility, and correctness of identification	11.1
Quality of workmanship	8.1
Presence and contents of technical publications	13



TABLE 3 Design Data Inspection

Inspection	Requirement Paragraph
Quality of materials	6.5
Proper selection of materials	6.5
Provisions for dissimilar metal contact, if applicable	6.5
Self-cleaning entirely automatic	6, 7
Method of self-cleaning	6.2.7, 6.2.8
Presence and volume of contaminant sump	6.2.8
Hydraulic motor(s) driven by strained system fluid exclusively	6, 6.2.7
Flow area throughout strainer unit	6.2.6
Full flow maintained during self-cleaning	7, 6.2.8
Suitability of strainer assembly for pressure and temperature	7.1, 7.2
Ability of strainer assembly to withstand motions induced by shipboard use	7.3
Self-cleaning rate	7.4
Ease of access to internals	6.2.2
Cover removable without breaking inlet and outlet connections	6.2.2
Weight of cover, if lifting device not provided	6.2.2
Adequacy of antispray device	6.2.2.1
Gasket material	6.2.3
Certification that gasket was used during hydrostatic pressure test	6.2.3
Flange dimensions	6.2.4, 5.1.3
Ease of removal of assembly of filter element and element support	6.2.5, 6.2.6
Ease of removal of filter element	6.2.5, 6.2.6
Flow area through assembly of filter element and element support	6.2.6
Selection of pressure gauge	6.2.9
Material of seals	6.6
Connection sizes	6.2.9
Strength of lifting eyes	6.2.10
Welding procedures	6.3
Exterior painting	6.4

13.2 *Test Report*—Upon completion of the tests, a test report shall be prepared. The report shall be certified and signed by the contractor’s quality control representative.

14. Repair Parts

14.1 *Repairs Parts Kit*—When specified (see 5.1.5) a repair/spare parts kit shall be furnished and delivered with each assembly. The kit shall contain the parts and quantities specified in the contract.

15. Keywords

15.1 automatic self-cleaning strainers; fuel oil strainers; lubrication oil strainers; simplex strainers

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements apply only when specified by the purchaser in an order (see 5.1.7).

S1. Referenced Documents

S1.1 *Government Specifications, Standards, and Handbooks*—The following documents, of the issue in effect on the date of invitation for bids, form a part of this specification to the extent specified herein.

S2. Preparation for Delivery

S2.1 *Preservation*—Preservation shall be Level A or industrial, as specified.

S2.1.2 *Level A*—Cleaning, drying and preservatives shall be in accordance with MIL-P-116. Strainer unit shall be protected by Method I of MIL-P-116.

S2.1.2.1 *Strainer assembly*—All internal bare metal surfaces subject to corrosion shall be preserved using a preservative compatible to the system requirements. Unless otherwise specified. See S2.1, Type P2 of MIL-P-116 shall apply.

S2.1.2.2 *External bare metal surfaces*—Machined surfaces and unpainted corrodible metal surfaces shall be coated with MIL-P-116 P-2 preservative and wrapped with greaseproof barrier material conforming to Type I, Grade A of MIL-B-121.

S2.1.2.3 *Preservative protection*—All equipment surfaces which are preserved shall be protected from direct contact with any blocking, dunnage, and shrouding by inserting one or more layers of barrier material conforming to Type I, Grade A of MIL-B-121 at points of contact.

S2.1.2.4 *Openings*—The open ends of all flanges and fittings shall be coated with MIL-P-116 Type P-2 preservative and sealed with similarly preserved blind flanges or plastic plugs/caps. The ends of the flanges and fittings shall be wrapped with greaseproof barrier material conforming to Type I, Grade A of MIL-B-121.

S2.1.2.5 *Technical Publications*—Technical publications, which accompany shipment prepared for Level A, shall be preserved in accordance with Submethod 1C-1 or MIL-P-116 and secured to the hardware package. Technical publications shall not be placed within the sealed barrier material used to enclose the strainer assembly. Technical publications, when shipped in bulk quantities shall be preserved to MIL-P-116 Submethod 1C-1 and packed in fiberboard containers in accordance with PPP-F-320.

S2.2 *Packing*—Strainers preserved as specified (see S3.1), shall be packed in exterior shipping containers for the level of packing specified in accordance with Table VII, exterior shipping container requirements, of MIL-STD-2073-1, and herein.

S2.3 *Caseliners, Closure, and Gross Weight:*

S2.3.1 *Caseliners* —Unless otherwise specified, shipping containers containing strainers preserved commercial shall be provided with waterproof caseliners in accordance with MIL-STD-2073-1.

S2.3.2 *Closure*—Container closure, reinforcing, or banding shall be in accordance with the applicable container specification or appendix thereto except that class-weather-resistant/fire-retardant fiberboard boxes shall be closed in accordance with Method V and reinforced with nonmetallic or tape banding and class-domestic/fire-retardant fiberboard boxes shall be closed in accordance with Method I using pressure-sensitive tape.

S2.3.3 *Weight*—Wood, plywood, and cleated type containers exceeding 200-lb gross weight (91-kg gross mass) shall be modified by the addition of skids in accordance with MIL-STD-2073-1 and the applicable container specification or appendix thereto.

S2.4 *Industrial*—Items prepared for shipment shall be packaged in accordance with Practice D3951 (see 12.1).

S2.4.1 *Container Modification* —Shipping containers exceeding 200-lb gross weight shall be provided with a minimum of two 3- by 4-in. nominal (75- by 100-mm) wood skids laid flat, or skid- or all-type base which will support the material and facilitate handling by mechanical handling equipment during shipment, stowage, and storage.

S2.5 *Marking*—In addition to any special marking required, interior (unit and intermediate) packs and shipping containers shall be marked including bar coding and structural for shipment, stowage, and storage in accordance with MIL-STD-2073-1.

S3. Data Requirements

S3.1 *Data Requirements*—When this specification is used in acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provision of DOD FAR Supplement, Part 27, Sub-Part 27.471-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs.

Paragraph No.	Data Requirement Title	Applicable DID No.
S3.4	Product Drawings and Associated Lists	DI-DRPR-81000
S4.4	Plan, Inspection and Test	UDI-R-21375A
10.1.2	Procedures, Test	NDI-T-23732B
13.2	Test/Inspection Reports	NDTI-80809
S4.2	First Article Qualification Test Plan	DI-T-5313-A

S3.1.1 Data item descriptions related to this specification, and identified in 5 and the Supplement will be approved and listed as such in DOD 5010.12-L., AMSDL. Copies of data item description required by contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.

S3.2 *Data Requirements Waiver Instructions*—The data requirements of this specification may be waived by the contracting/acquisition activity upon certification by the officer that identical data were submitted by the officer and accepted by the Government under a previous contract for an identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports). When specified in the contract or order, a certificate of compliance shall be prepared.

S3.3 *Technical Manuals*—The requirement for technical manuals and technical repair standards should be considered when this specification is applied to a contract. If technical manuals are required, military specifications and standards which have been cleared and listed in DOD 5010.12-L (AMSDL) must be listed on a separate CDRL (DD Form 1423), included as an exhibit to the contract. The technical manuals must be acquired under separate contract line item in the contract.

S3.4 *Drawings* —Drawings shall be prepared in accordance with S3.1. One set of reproducible (or microfilm) drawings shall be furnished to the contracting agency after first article inspection approval.

S3.5 *Identification*—Identification plates shall be provided in accordance with MIL-P-15024 and MIL-P-15024/5, and shall include the following information:

S3.5.1 The nominal pipe size of the inlet and outlet connections.

S3.5.2 Design pressure, flow capacity.

S3.5.3 The necessary operating instructions.

S3.5.4 National Stock Number (NSN).

S3.5.5 Weight when wet (operating weight).

S3.6 *Technical, Logistics Documentation*—The contractor shall furnish the following publications applicable to the assemblies supplied under this specification:

S3.6.1 Spare parts listing.

S3.6.2 Maintenance, service, and repair manual.

S3.6.3 Graph of expected pressure drop across the strainer assembly as a function of flow at various fluid viscosities. The maximum pressure drop allowed shall be indicated.

S4. Inspection

S4.1 *Classification of Inspections*—The inspection requirements specified herein are classified as follows:

S4.1.1 First article inspection (see S4.2).

S4.1.2 Quality conformance inspection (see 10.1.2).

S4.2 *First Article Inspection* —First article inspection shall consist of the visual and dimensional inspections and the design data inspections specified in Section 10, and the tests specified in 9.1, in that order. The strainer assembly must pass all inspections and tests specified to be considered acceptable.

S4.3 *First Article*—The contractor shall furnish a sample strainer for first article inspection and test (see S4.5).

S4.4 *Inspection System*—An inspection system program plan shall be prepared (see S4.1).

S4.5 *First Article*—When a first article inspection is required, the items shall be a first article sample. The first article shall consist of the units specified. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles.

S4.5.1 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 and 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.

S4.6 *Reliability*—The contractor shall provide, with the first article, an engineering calculation of the mean time between failure for the strainer operating under the conditions specified herein.

S5. Shock, Vibration, and Acoustic Requirements

S5.1 *Mechanical Shock*—The strainer assembly, including the differential pressure gauges, shall meet the high impact shock requirements of MIL-S-901 for Grade A, Class 1 equipment.

S5.1.1 *Mechanical Shock Test*—This test shall be conducted in accordance with MIL-S-901. All functions of the strainer assembly shall be unaffected by this test. Any unit not meeting MIL-S-901 shall be rejected.

S5.2 *Vibration*—The self-cleaning simplex strainers shall be designed and tested to function satisfactorily under the requirements of MIL-STD-167-1 Type 1 environmental vibration.

S5.2.1 *Vibration Test*—This test shall be conducted in accordance with MIL-STD-167-1. All functions of the strainer assembly shall be unaffected by this test. Any unit not meeting MIL-STD-167-1 shall be rejected.

S5.3 *Acoustic Requirement*—When operating, the strainer assembly shall conform to the airborne noise requirements of MIL-STD-740 for Grade C equipment.

S5.3.1 *Acoustic Requirement Test*—This test shall be conducted in accordance with MIL-STD-740. The sound energy limits imposed by MIL-STD-740 for Grade C equipment shall not be exceeded.

S5.4 *Tests*—Table S5.1 lists required tests; a test plan shall be submitted for approval before testing.

S6. Other Requirements

S6.1 *Subcontracted Material and Parts*—The packaging requirements of referenced documents listed in Section S1 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.

S6.2 *Repair Parts*—A repair parts kit shall be furnished and delivered with each assembly. The kit shall contain the parts and quantities specified in the contract.

S6.3 *Depreservation Instructions*—A set of instructions covering the depreservation of the equipment shall be furnished. Instructions shall show all information necessary for depreservation, such as, but not limited to: the addition of lubricants prior to operation, flushing of lines, removal of greaseproof barrier and the location of detached components. Instructions shall be packaged in a transparent waterproof plastic bag, minimum 4 mil (100 μm) thick. Closure shall be by heat sealing. The shipping container in which the instructions are packed shall be marked to so indicate.

TABLE S5.1 Tests

Test	Requirement Paragraph(s)	Method Paragraph(s)
Mechanical shock	S5.1	S5.1.1
Vibration	S5.2	S5.2.1
Acoustic requirement	S5.3	S5.3.1

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