



Standard Specification for Fabricated (Welded) Pipe Line Strainers (Above 150 psig and 150°F)¹

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1. Scope

1.1 This specification covers welded strainers in services above 150 psig or 150°F (1 MPa and 65°C). For welded strainers in services at or below these ratings and cast strainers, see Specification F 1199.

1.2 This specification provides the minimum requirements for the design fabrication, rating, marking, and testing of welded pipe line strainers for services above 0°F (–18°C).

1.3 Strainers manufactured to this specification are acceptable for use in the marine environment.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 The following safety hazards caveat pertains only to the test methods portion, Section 8, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester²

F 722 Specification for Welded Joints for Shipboard Piping Systems³

F 1199 Specification for Cast (all Temperatures and Pressures) and Welded Pipe Line Strainers (150 psig and 150°F Maximum)³

2.2 ANSI Standards:⁴

B2.1 Pipe Threads

B16.1 Cast Iron Pipe Flanges and Flanged Fittings

B16.3 Malleable Iron Threaded Fittings

B16.4 Cast Iron Threaded Fittings

B16.5 Steel Pipe Flanges and Flanged Fittings

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

B16.15 Cast Bronze Threaded Fittings

B16.24 Bronze Pipe Flanges and Flanged Fittings

B16.25 Butt-welding Ends

B31.1 Power Piping

2.3 MSS Standards:⁵

SP-51 150 lb Corrosion Resistant Cast Flanges and Flanged Fittings

SP-63 High Strength Wrought Welding Fittings

2.4 ASME Standard:⁶

ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, Pressure Vessels

ASME Boiler and Pressure Vessel Code: Section IX, Welding and Brazing Qualifications

3. Terminology

3.1 Definitions:

3.1.1 *basket or element*—the replaceable part in a strainer that performs the barrier separation of solid particles from flowing fluid. It is normally removable for cleaning and servicing and can be furnished in a wide variety of materials, particle size removal capability, straining area, and types of construction. Interchangeable baskets or elements are normally available for a given make, model, and size strainer.

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

3.1.3 *maximum design temperature*—the maximum temperature (MAT) for which the strainer is rated by the manufacturer.

3.1.4 *strainer*—a device which, when installed in a pipe line, provides a mechanical means of removing solids from a flowing liquid or gas by using a barrier element.

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

4. Classification

4.1 Strainers may be classified into three general construction categories, simplex, duplex (or multiplex), and automatic

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 01.07.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁵ Available from American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.

⁶ Available from Manufacturers Standardization Society of the Valve and Fitting Industry, 1815 N. Fort Myer Dr., Arlington, VA 22209.

(self-cleaning), as follows:

4.1.1 *Simplex*—A strainer consisting of a single basket or element chamber that normally requires the flow through the unit to be shut down before cleaning.

4.1.1.1 Classifications of simplex strainers based on port alignment relative to basket or element chamber are *Y*, *T*, *Z*, and others.

4.1.2 *Duplex* (or *Multiplex*)—A strainer usually consisting of at least two basket or element chambers separated by a valve (or valving) that permits continuous flow of fluid through one chamber while the other is accessible for cleaning.

4.1.3 *Automatic* (Self-Cleaning)—A strainer providing some means for back-flushing or cleaning of the straining element while the unit is in service. It can have one or more elements and may require periodic shutdown for maintenance and inspection.

4.2 Strainers may be further classified by pressure ratings and types of port connections, port alignments relative to unit center lines, cover closures, valve types (in duplex), types of baskets or elements, materials of construction, and other features of design.

5. Ordering Information

5.1 Orders for products under this specification shall include the following information as applicable. If a manufacturer's standardized product is being ordered, include all data needed by the manufacturer to define the product.

- 5.1.1 Make.
- 5.1.2 Model (simplex or duplex).
- 5.1.3 Port size.
- 5.1.4 Port connections.
- 5.1.5 Maximum allowable working pressure/temperature rating.
- 5.1.6 Body and cover material.
- 5.1.7 Type of cover closure.
- 5.1.8 Basket (element) material.
- 5.1.9 Basket hole size.
- 5.1.10 Optional design features.
- 5.1.11 Certification (see 6.4, 8.1.2.1, and Section 9).
- 5.1.12 Nondestructive examination requirements (see 8.2).
- 5.1.13 This ASTM standard designation number.
- 5.1.14 Additional requirements or testing as contracted by the manufacturer and purchaser.

5.2 If a product is to be specified by performance criteria rather than model description, then the following should be specified:

- 5.2.1 Maximum allowable clean pressure loss at a given flow capacity of a given liquid at a given viscosity.
- 5.2.2 Temperature and pressure.
- 5.2.3 Straining area.
- 5.2.4 Minimum basket rupture differential pressure (see 7.9).
- 5.2.5 Maximum valve seepage rates (see 7.8).
- 5.2.6 Certification (see 6.4, 8.1.2.1, and Section 9).
- 5.2.7 For self-cleaning strainers, specify basket cleaning effectiveness and endurance testing.

5.3 In general, the standard product description should not be mixed with the performance criteria because conflicting specifications can result (for example, maximum allowable

pressure loss inconsistent with product size).

6. Materials and Manufacture

6.1 Strainer housings, as well as any pressure-retaining parts, including bolting used for pressure retention, shall be constructed of materials listed in Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code (hereafter called ASME Code) or ANSI/ASME B3.1. Bolts, screws, and fasteners in contact with interior fluid shall be of appropriate corrosion-resistant material.

6.2 The pressure ratings established under this specification are based on materials of high quality produced under regular control of chemical and mechanical properties by a recognized process. The manufacturer shall be prepared to submit a certificate of compliance verifying that his product has been manufactured from material whose chemical and mechanical properties are at least equal to the requirements of an acceptable standard or specification.

6.3 For materials not having values of allowable stress tabulated in Section VIII, Division 1 of the ASME Code, allowable stresses shall be determined in accordance with the procedures outlined in Subsection C and Appendix P of that section. Where it can be shown that the values of allowable stress listed for a particular material in one product form (because of similar chemistry, mechanical properties, heat treatment, and so forth) are applicable to the same material in an unlisted product form, the listed values of allowable stress may be used.

6.4 Seals and parts, other than pressure-retaining parts and bolting used for pressure retention, shall be of materials suitable for the service.

6.5 Users are cautioned against applications with fluids which may react chemically with any materials used in these products in contact with the fluid.

7. Other Requirements

7.1 The maximum allowable working pressure (MAWP) and maximum design temperature rating of strainers covered under this specification shall be established by at least one of the following methods:

7.1.1 Proof test in accordance with the requirements prescribed in paragraph UG-101 of Section VIII of the ASME Code. If burst-type tests as outlined in paragraph UG-101(m) are used, it is not necessary to rupture the component. In this case, the value of *B* to be used in determining the MAWP shall be the maximum pressure to which the component was subjected without rupture. Safety of personnel shall be given serious consideration when conducting proof tests. Components that have been subjected to a proof test shall not be offered for sale.

7.1.2 Design calculations in accordance with the requirements prescribed in Section VIII, Division 1 of the ASME Code.

7.1.3 Extensive and successful performance experience under comparable service conditions with similar materials may be used as a basis for rating provided all other provisions of this specification are met.

7.2 Strainers may be cast, forged, or fabricated of plates, tubes, or pipes. Welding on pressure-retaining components