

GP 18-03-04	Pressure Casting Quality and Inspection	December 2004
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Pressure Casting Quality and Inspection

GP 18-03-04

Scope

- 1) * [I] This Global Practice (GP) covers the minimum quality and inspection level for iron, steel (carbon, alloy or stainless), and nickel-based alloy pressure-retaining castings used for pumps, steam turbines, compressors, valves and pipe fittings or other equipment, when specified by the Owner's Engineer.
 - 2) [I] An asterisk (*) indicates that a decision by Purchaser is required or that additional information is furnished by Purchaser.
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1. Required References

This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 18-10-01	Additional Requirements for Materials
GP 20-01-01	Inspection of Equipment and Materials

1.2. API–American Petroleum Institute

API RP 941	Steels for Hydrogen Service at Elevated Temperatures and Pressures in Petroleum Refineries and Petrochemical Plants
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1.3. ASME–American Society of Mechanical Engineers

ASME B16.34	Valves - Flanged, Threaded, and Welding End
ASME B31.3	Process Piping
ASME SEC VIII D1 C PT UCS	Part UCS Requirements for Pressure Vessels Constructed of Carbon and Low Alloy Steels
ASME SEC VIII D1 MA APP 7	Appendix 7 Examination of Steel Castings

1.4. ASTM–American Society for Testing and Materials

ASTM A 395/A 395M	Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A 703/A 703M	Standard Specification for Steel Castings, General Requirements, for Pressure-Containing Parts

1.5. MSS–Manufacturers Standardization Society of the Valve and Fittings Industry

MSS SP-53	Quality Standard for Steel Castings and Forgings for Valves, Flanges and Fittings and Other Piping Components Magnetic Particle Examination Method
MSS SP-54	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components Radiographic Examination Method

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MSS SP-55	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components Visual Method for Evaluation of Surface Irregularities
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2. General

The Owner's Engineer shall specify inspection requirements for non-ferrous castings other than nickel-based castings.

[GP 18-03-02](#) and [GP 18-03-03](#) cover static cast furnace components and centrifugal cast high alloy furnace tubes, respectively.

3. Definitions

- 1) [I] The term Inspector, as used in this Practice, refers to the Owner's Representative.
- 2) * [I] Casting Quality Levels—a quality level shall be assigned to the casting as defined in Table 1 or by the Owner's Engineer.

Table 1: Casting Quality Levels

Quality Level	Casting Type
I	1. All alloy steel and stainless steel castings in continuous cyclic hot hydrogen service where the design temperature exceeds the CS curve in API RP 941. 2. All castings in hydrofluoric (HF) acid service. 3. Castings in other services or applications as specified by the Owner's engineer.
II	1. All castings in non-cyclic hot hydrogen service where the design temperature exceeds the CS curve in API RP 941. 2. All castings in high-pressure steam and hydrocarbon (Class 1500 and higher) service. 3. Pump castings in: a. Hydrocarbon or boiler feedwater service where the design pressure is ≥ 750 psig or design temperature is $\geq 750^{\circ}\text{F}$ b. Chemical service (e.g. sulfuric acid, phenol, peroxide) c. Low temperature or cryogenic hydrocarbon and petrochemical service where the design temperature is $\leq -20^{\circ}\text{F}$ d. Service where Cr-Mo steels, CA-15, CA6NM, CN7M, stainless steel, alloy 20, and all nickel based alloys, except those covered by Quality Level I or III are specified

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