

GP 10-01-01	Centrifugal Pumps	January 2005
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Centrifugal Pumps

GP 10-01-01

Scope

- 1) [I] This Global Practice (GP) covers centrifugal pumps.
 - 2) [I] All requirements specified in this GP are additions to those of API STD 610-8, Eighth Edition, August 1995, unless specifically noted as exceptions. Paragraph numbers in this GP which do not appear in API STD 610-8 are new paragraphs.
 - 3) [I] An asterisk (*) indicates that a decision by Purchaser is required or that additional information is furnished by Purchaser.
 - 4) [I] A bullet (•) is shown in API STD 610-8, indicating that a Purchaser decision is required.
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1. Required References

[I] The Tables below list the Practices and Standards that shall be used with this Practice.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 02-01-01	Plant Noise Design Criteria
GP 03-12-09	General Requirements for Valves
GP 10-01-03	Shaft Sealing Systems for Centrifugal and Rotary Pumps
GP 10-11-01	Sizing of Drivers and Transmissions for Compressors, Fans, and Pumps
GP 18-03-04	Pressure Casting Quality and Inspection
GP 18-07-01	Welding Procedures
GP 18-12-01	Positive Material Identification
GP 20-01-01	Inspection of Equipment and Materials

1.2. ExxonMobil Data Sheets

ExxonMobil Data Sheets	ExxonMobil Data Sheet Homepage
D100101C01	Centrifugal Pumps - Documentation Requirements Sheet
I100101C01	Centrifugal Pumps - Inspection and Testing Requirements Sheet
T100101C01	Centrifugal Pumps (API 610) - Customary Units
T100101M01	Centrifugal Pumps (API 610) - Metric Units

1.3. API–American Petroleum Institute

API STD 610-8	Centrifugal Pumps for Petroleum, Heavy Duty Chemical, and Gas Industry Services Eighth Edition
API STD 682	Shaft Sealing Systems for Centrifugal and Rotary Pumps

1.4. ASME–American Society of Mechanical Engineers

ASME B16.11	Forged Fittings, Socket-Welding and Threaded
ASME B31.3	Process Piping

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1.5. ASTM–American Society for Testing and Measurement

ASTM A 395/A 395M	Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A 487/A 487M	Standard Specification for Steel Castings Suitable for Pressure Service
ASTM A 494/A 494M	Standard Specification for Castings, Nickel and Nickel Alloy
ASTM B 111	Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
ASTM B 111M	Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock (Metric)
ASTM B 584	Standard Specification for Copper Alloy Sand Castings for General Applications

2. Additional Requirements

* [I] The following Practices and Standards shall be used with this GP as specified by the Owner's Engineer.

2.1. Global Practices–ExxonMobil Engineering Practices

GP 03-03-12	Oil Mist Lubrication Systems
GP 03-12-09	General Requirements for Valves
GP 03-16-01	Flanged Joints, Gaskets, and Bolting
GP 10-07-01	General Purpose Steam Turbines
GP 10-10-02	General Purpose Gear Units
GP 16-09-01	Low Voltage AC Motors Up to 200 HP (150 kW)
GP 16-09-02	AC Motors: Medium Voltage and Low Voltage Over 200 HP (150 kW)
GP 18-04-01	Postweld Heat Treatment of Equipment Handling Alkaline Solutions
GP 18-10-01	Additional Requirements for Materials

2.2. ASME–American Society of Mechanical Engineers

ASME SEC VIII D1	BPVC Section VIII - Rules for Construction of Pressure Vessels - Division 1
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2.3. ASTM–American Society for Testing and Measurement

ASTM B 169/B 169M	Standard Specification for Aluminum Bronze Sheet, Strip, and Rolled Bar
ASTM B 171/B 171M	Standard Specification for Copper-Alloy Plate and Sheet for Pressure Vessels, Condensers, and Heat Exchangers

3. Revisions to API Standard 610

[I] All headings contained herein correspond to paragraph numbering within API STD 610-8. All requirements specified in this GP are additions to those of API STD 610-8 unless specifically noted as exceptions. Paragraph numbers in this GP which do not appear in API STD 610-8 are new paragraphs.

Modifications to Section 1: General Specifications

1.1.1. Addition: Scope

[R], [O] Vendor Qualification: Pumps rated over 500 hp (375 kW), pumps handling liquids at -50°F (-45°C) or lower, and pumps with a discharge pressure above 500 psig (35 barg) shall be supplied by vendors qualified by experience to manufacture the units proposed. To qualify, Vendor must have manufactured (at the proposed point of manufacture) at least two units of comparable power, speed, pressure, temperature, pumped fluid, and impeller design(s) (including number of vanes and diameter) which have been operating satisfactorily for at least one year each.

1.1.3. Addition: Scope

* [I] Proposals to provide any of the pump types listed in Table 1.1 of API STD 610-8 shall be submitted to Purchaser for approval by the Owner's Engineer.

1.1.3. Exception: Scope

□ [R] Proposals for vertical in-line pumps for services greater than 1000 gpm (110 m³/hr), 500 ft (150 m), or 300°F (150°C) or requiring drivers over 150 BHP (112 kW) shall be submitted to Purchaser for approval of the Owner's Engineer.

1.1.4. Exception: Scope

* [C] Proposals to furnish pumps or mechanical seals that do not meet all requirements of this GP (based on specific non flammable, non-hazardous service conditions) shall be submitted to Purchaser for approval by the Owner's Engineer.

Modifications to Section 2: Basic Design

2.1.8. Addition: General

* [R] Inducers shall not be used without approval of the Owner's Engineer.

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2.1.9. Addition: General

[R] Pump Suction Specific Speed (N_{ss}) shall not exceed 12000 (calculated using rotative speed in rpm, flow in GPM, and NPSH in feet). See API STD 610-8, Paragraph 1.4.49.

2.1.11. Addition: General

- a) [O], [C] The head curve for the pump shall be continuously rising from the rated capacity point to the shutoff point. The pump head at shutoff shall be at least 110 percent of the head at the rated capacity point.
- b) * [S] The pump head at shutoff shall not exceed 120 percent of the head at the rated capacity point without approval of the Owner's Engineer.
- a) Pumps for parallel operation shall have equal head rise (within 1 percent, as measured on the performance test) to shutoff.
- b) * Low capacity, high head pumps may be exempt from the requirements of Section 2.1.11, Items a and b of this GP, with approval of the Owner's Engineer.

2.1.11. Exception: General

□ [O] Proposals to use orifices as a means of providing a continuous rise to shutoff shall be submitted to Purchaser for approval by the Owner's Engineer.

2.1.14. Exception: General

[E], [I] Pump Vendors shall furnish noise emission data for the quoted equipment with their proposal according to [GP 02-01-01](#).

2.1.17. Additions: General

[R], [C] Application of pump cooling water shall be as follows:

- a) Pumps with non-pressurized bearing lubrication, and pumping temperatures under 400°F or 200°C shall be designed to operate continuously without use of cooling. Bearing oil temperatures shall not exceed those of API STD 610-8, Paragraph 2.9.2.3, and shall assume no credit for motor cooling air. Cooling water may be used for cooling seal flush liquid to assure proper mechanical seal operation.
- b) Pumps with pressurized lubrication or pumping temperatures over 400°F or 200°C may utilize cooling water only where required for cooling of bearing oil, seal chambers, or seal flush liquid. Pumps with non-pressurized lubrication and pumping temperatures over 400°F or 200°C shall be furnished with bearing housing water jackets. Water jacket connections shall be plugged unless cooling is required.

2.1.29. Addition: General

* [I] Pump and auxiliaries shall be suitable for outdoor installation in the climatic zone specified.

2.2.3. Addition: Pressure Casings

* [I] If more than $\frac{1}{8}$ in. (3 mm) corrosion allowance is required in cast iron and carbon steel casings, it will be specified.

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