



Standard Specification for Sealless Lube Oil Pump with Oil Through Motor for Marine Applications¹

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1. Scope

1.1 This specification defines the requirements applicable to design, construction and testing of sealless, rotary positive displacement pumps with oil-through motors for ship lubricating oil service. The complete pump and motor assembly is referred to as canned lube oil pump (CLP). This specification applies to CLPs pumping oil with a SAE rating of 20–50.

1.2 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- A27/A27M Specification for Steel Castings, Carbon, for General Application
- A159 Specification for Automotive Gray Iron Castings
- A193/A193M Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

- A194/A194M Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
- A216/A216M Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
- A395/A395M Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
- A449 Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
- A536 Specification for Ductile Iron Castings
- A563 Specification for Carbon and Alloy Steel Nuts (Metric) A0563_A0563M
- A564/A564M Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
- A574 Specification for Alloy Steel Socket-Head Cap Screws
- A582/A582M Specification for Free-Machining Stainless Steel Bars
- B23 Specification for White Metal Bearing Alloys (Known Commercially as “Babbitt Metal”)
- B148 Specification for Aluminum-Bronze Sand Castings
- B152/B152M Specification for Copper Sheet, Strip, Plate, and Rolled Bar
- B187M Specification for Copper Bar, Bus Bar, Rod and Shapes [Metric] (Withdrawn 2002)³
- B271 Specification for Copper-Base Alloy Centrifugal Castings
- B505/B505M Specification for Copper Alloy Continuous Castings
- B584 Specification for Copper Alloy Sand Castings for General Applications
- D2000 Classification System for Rubber Products in Automotive Applications
- D3951 Practice for Commercial Packaging
- F912 Specification for Alloy Steel Socket Set Screws
- F1510 Specification for Rotary Positive Displacement Pumps, Ships Use

¹ This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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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.

2.2 ASME/ANSI Standards:⁴

ASME/ANSI B16.5 Pipe Flanges and Flanged Fittings

2.3 Hydraulic Institute Standards:⁵

ANSI/HI 3.6 Rotary Pump Tests

2.4 AISI Standards:⁶

1018 Carbon Steel

1045 Carbon Steel

1141 Carbon Steel

1144 Carbon Steel

4140 Chromium-Molybdenum Steel

4150 Chromium-Molybdenum Steel

4340 Nickel-Chromium-Molybdenum Steel

2.5 AIA Standards:⁷

NASM 17829

2.6 API Standards:⁸

API Standard 676 Positive Displacement Pumps—Rotary

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *canned lube oil pump unit*—a unit, which when assembled as a pump and motor, is completely sealed from leakage to the environment. Lubrication and cooling of motor bearings and primary cooling of motor windings and insulation are achieved by circulating a portion of the fluid being pumped (oil) through the motor.

3.1.2 *capacity*—the quantity of fluid actually delivered per unit of time at the rated speed, including both the liquid and dissolved or entrained gases, under stated operating conditions. In the absence of any gas or vapor entering or forming within the pump, the capacity is equal to the volume displaced per unit of time, less slip, motor bearing lubrication and motor cooling flows.

3.1.3 *displacement*—the volume of fluid displaced per revolution of the rotor(s).

3.1.4 *rated condition point*—the required capacity at speed, pressure, viscosity and power as specified by the purchaser.

3.1.5 *slip*—the quantity of fluid that leaks through internal clearances of a pump per unit of time.

4. Classification

4.1 Pumps will be classified as follows:

4.1.1 *Type II*—Screws with timing gears.

4.1.2 *Type III*—Screws without timing gears.

4.1.3 *Type X*—Vane (sliding).

4.1.4 *Type XI*—Sliding shoe.

4.2 *Motor Types*—Oil-through type that uses the oil to cool the motor and lubricate the bearings.

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

⁵ Available from Hydraulic Institute, 6 Campus Drive, First Floor North, Parsippany, NJ 07054, <http://www.pumps.org>.

⁶ Available from American Iron and Steel Institute (AISI), 25 Massachusetts Ave., NW, Suite 800, Washington, DC 20001, <http://www.steel.org>.

⁷ Available from Aerospace Industries Association (AIA), 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209, <http://www.aia-aerospace.org>.

⁸ Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, <http://www.api.org>.

5. Ordering Information

5.1 The ordering activity shall provide manufacturers with the following information:

5.1.1 Title, name, and date of specification.

5.1.2 Type and size (see Section 4).

5.1.3 Oil to be pumped (for example, 2190 TEP SAE 40).

5.1.4 *Operating Conditions*—Single speed, two-speed, or variable speed. (See 9.1.)

5.1.5 Capacity in gallons per minute or litres per minute at rated discharge pressure at specified operating condition.

5.1.6 Discharge pressure in pound-force per square inch gauge (psig) or kilopascal (kPa) gauge at specified operating condition.

5.1.7 Inlet pressure conditions (NPIPA).

5.1.8 Oil Viscosity and temperature for minimum and maximum operating conditions.

5.1.9 External motor cooling oil supply, if required. (See 9.4.)

5.1.10 Mounting configuration (vertical, horizontal).

5.1.11 Relief valve cracking pressure. (See 9.1.)

5.1.12 Airborne noise level (if different than 7.4).

5.1.13 Packaging and boxing requirements (immediate use, domestic; storage, domestic; or overseas).

5.1.14 Quantity of pumps.

5.1.15 Quantity of drawings.

5.1.16 Quantity of technical manuals.

5.1.17 Quantity of test reports, if required. (See Section 10.)

5.1.18 Certified test data, if required. (See 10.3.)

5.1.19 IACS (International Association of Classification Societies) classification with applicable notions, if required.

5.1.20 *Motor Characteristics*:

5.1.20.1 *Voltage/Phase/Frequency*:

(1) *Duty*—Continuous.

(2) *Ambient Temperature*—50°C.

(3) *Enclosure*—Totally enclosed, oil through.

(4) *Insulation*—Class F, (vacuum pressure impregnation (VPI)).

(5) *Conduit Box Orientation*—See 7.6.

6. Material

6.1 Materials of principal pump components shall be in accordance with Table 1.

6.1.1 Materials other than shown in Table 1 are considered exceptions and are subject to approval by the purchaser before usage.

6.2 Materials of principal motor components shall be in accordance with Table 2.

6.2.1 Materials other than shown in Table 2 are considered exceptions and are subject to approval by the purchaser before usage.

7. General Requirements

7.1 CLPs shall be capable of sustained operation during inclinations up to 45° in any direction.

7.2 CLPs shall be capable of withstanding external vibration in the frequency range of 4 to 25 Hz.