

THE FOLLOWING PARAGRAPH NUMBERS REFER TO API-618, FOURTH EDITION,
JUNE 1995 WHICH IS A PART OF THIS PRACTICE

SECTION 1 - GENERAL

- I 1.1 SCOPE
- a. (Exception) This practice covers reciprocating compressors for process air or gas services.
 - b. Reciprocating compressors for plant utility and instrument air are not covered by this practice.
 - c. All requirements specified in this practice are additions to those of **API-618** unless specifically noted as exceptions. Paragraph numbers in this practice which do not appear in **API-618** are new paragraphs.
 - d. **An asterisk (*)** indicates that a decision by the Purchaser is required or that additional information is furnished by the Purchaser.
Note: A bullet (•) is shown in **API-618** indicating that a Purchaser's decision is required.
 - e. **Vendor Qualification.** Major compressor and driver equipment shall be supplied by vendors qualified by experience in manufacturing the units proposed. To qualify, the vendor must have manufactured at the proposed point of manufacture at least two compressors of comparable design, power rating, speed, and discharge pressure, for a gas of comparable characteristics; and two drivers of comparable power rating and speed. This machinery must have been in continuous service for at least one year and be performing satisfactorily. The gear vendor must meet the same experience requirements with gears of comparable power rating and speed ratio.
 - f. Where the vendor qualification requirements of **Par. 1.1e** prevents the application of the latest technology, the vendor shall submit a **second alternative proposal** incorporating such features for evaluation by the Owner's Engineer. The proposal shall specifically identify the undemonstrated features and state their advantages.
- 1.5 REFERENCED PUBLICATIONS
- I 1.5.1 a. **Table 1** lists the practices and standards which shall be used with this practice.
- * b. **Table 2** lists the practices and standards which shall be used with this practice **as specified** by the Purchaser.

TABLE 1

PRACTICES			
IP 2-1-1	Plant Noise Design Criteria	IP 10-11-1	Sizing of Drivers and Transmissions for Compressors, Fans and Pumps
IP 3-6-1	Piping for Instruments	IP 15-2-1	Temperature Instruments
IP 3-12-1	Valve Selection	IP 15-3-1	Pressure Instruments
IP 3-12-9	General Requirements for Valves	IP 18-7-1	Welding Procedures
IP 3-16-1	Flanged Joints, Gaskets, and Bolting	IP 18-12-1	Positive Material Identification
IP 3-18-1	Piping Fabrication Shop or Field	IP 20-1-1	Inspection of Equipment and Materials
STANDARD			
API Standard			
618	Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services		
661	Air Cooled Heat Exchangers for General Refinery Services		

TABLE 2

PRACTICES			
IP 3-3-5	Suction, Discharge, and Interstage Piping for Reciprocating Compressors	IP 15-1-2	Instrumentation for Compressors and Drivers
IP 3-3-6	Closed Cooling Water Systems for Internal Combustion Engines and Reciprocating Compressors	IP 15-6-1	Electronic and Pneumatic Instruments
IP 6-1-1	TEMA Type Shell and Tube Heat Exchangers	IP 15-7-1	Electric Power Branch Circuit Design for Instrumentation
IP 6-4-1	Air-Cooled Heat Exchangers	IP 15-7-2	Protective Systems
IP 10-7-1	General Purpose Steam Turbines	IP 15-11-1	Instrument Control Panels
IP 10-7-2	Special Purpose Steam Turbines	IP 16-9-1	Low Voltage A-C Motors up to 200 HP (150 kW)
IP 10-10-1	Special Purpose Gear Units	IP 16-9-2	A-C Motors: Medium Voltage and Low Voltage Over 200 HP (150 kW)
IP 10-10-2	General Purpose Gear Units	IP 18-10-1	Additional Requirements for Materials
STANDARDS			
ASTM Standards			
B 111/B 111M	Copper and Copper Alloy Seamless Condenser Tubes and Ferrule Stock		
B 169/B 169M	Aluminum Bronze Plate, Sheet, Strip, and Rolled Bar		
B 171/B 171M	Copper Alloy Condenser Tube Plates		
B 584	Copper Alloy Sand Castings for General Applications		

SECTION 2 - BASIC DESIGN

	2.1	GENERAL
E	2.1.2	Noise. Compressor vendors shall submit noise emission data for the quoted machine with their proposal per IP 2-1-1 .
O,C	2.1.12	Compressor performance shall be guaranteed by the vendor for the specified normal operating point as shown on the data sheet. No negative tolerance is permitted on the normal capacity.
R,M	2.1.14	a. Compressors and auxiliaries shall be suitable for outdoor installation . b. Compressors and auxiliaries shall be winterized for the climatic zone specified.
R	2.1.19	The following spare parts shall be furnished for and delivered with each compressor unit: a. A set of valves for entire compressor b. A set of bearings for entire compressor c. A cross head assembly - one of each design d. A piston and rod assembly for each size cylinder e. A cylinder liner for each size cylinder f. A packing assembly for each size cylinder g. A connecting rod If two or more compressors are duplicates, a single set of spares will suffice.
	2.2	ALLOWABLE SPEEDS
R	2.2.1	Piston speeds shall not exceed 850 feet per minute (4.3 m/s) for lubricated services.
	2.4	ROD AND GAS LOADINGS
R	2.4.1	Combined piston rod loadings shall be manufacturer's standard up to but not exceeding a maximum of 8000 psi (55.15 MPa) stress at the thread root.
I	2.4.4	If tailrod construction of the cylinder is used to accomplish rod-load reversal , it shall be clearly identified in the proposal.
	2.6	COMPRESSOR CYLINDERS
	2.6.1	GENERAL
I	2.6.1.2	The first stage of air compressors with atmospheric suction is exempt from the requirement for bottom discharge .
R,M	2.6.1.4	(Exception) Step pistons or tandem cylinder arrangements are not acceptable.

	2.6.2	CYLINDER APPURTENANCES						
M	2.6.2.11.2	(Exception) Studs are required.						
	2.6.3	CYLINDER COOLING						
O,R	2.6.3.4	a. Positive prevention of gas leakage shall include atmospheric venting of space between gas and water gasketing.						
		b. Gaskets shall not be used as blinds for cored cooling passages of the head-cylinder joint.						
M	2.6.3.5.4	Water cooled exchangers when specified for vendor's standard closed jacket water cooling system, shall have removable bundles if larger than 5 square feet (0.46 square meters) of surface.						
R	2.6.3.5.5	Materials for water cooled exchangers , where specified for vendor's standard closed jacket cooling system shall be manufacturer's standard for fresh water, and per Table 3 (of this practice) for salt or brackish water. However, cast iron shells are acceptable in either case.						
I,R	2.6.3.5.6	Air-cooled heat exchangers where required for vendor's standard closed jacket cooling system shall be per API-661 . Materials shall be per the following:						
		<table><tr><th>COMPONENT</th><th>MATERIALS</th></tr><tr><td>Headers</td><td>Carbon steel or cast iron</td></tr><tr><td>Tubes</td><td>Carbon steel with aluminum fins</td></tr></table>	COMPONENT	MATERIALS	Headers	Carbon steel or cast iron	Tubes	Carbon steel with aluminum fins
COMPONENT	MATERIALS							
Headers	Carbon steel or cast iron							
Tubes	Carbon steel with aluminum fins							
	2.6.4	CYLINDER CONNECTIONS						
M	2.6.4.2	Studs are required.						
R,M	2.6.4.6	Each end of each compressor cylinder shall be provided with a cylinder indicating tap and plugged per Figure G-2 (API-618) . The tap shall be rated for the maximum working pressure and temperature of the cylinder and for the gas service.						
	2.7	VALVES AND UNLOADERS						
I	2.7.1	(Exception) Gas velocity shall be computed on the basis of each cylinder end .						
R	2.7.9	Vendor shall submit written valve dynamics report to Purchaser.						
R	2.7.11	Valve seats for use with metallic valve plates shall have a minimum finished hardness of Rockwell C32 and shall be either through hardened or induction hardened to a minimum case depth of 1/16 in. (1.6 mm).						
R	2.7.12	Plug type unloaders are preferred.						
	2.8	PISTONS, PISTON RODS, AND PISTON RINGS						
R	2.8.4	Rods shall be treated with high velocity and high impact thermal plating with tungsten-carbide in the packing area.						
S	2.8.6	Tail rods , if used, shall have forged steel enclosures which will contain the rod in the event of rod failure.						
	2.10	DISTANCE PIECES						
S,E	* 2.10.2	Distance pieces or compartments shall be equipped with gasketed, solid covers for toxic or flammable gas service.						
	2.11	PACKING CASE AND PRESSURE PACKING						
R	2.11.5	When cooling of packing is required , inhibited glycol/water filled thermosyphon systems are preferred if applicable. If a circulating system is required, an inhibited glycol/water system common with the cylinder jacket cooling system shall be provided per Figure G-4 (API-618) , with separate temperature control for each service.						
	2.12	COMPRESSOR FRAME LUBRICATION						
R,I	2.12.3	a. Pressure lubrication systems shall be per Figure G-5 (API-618) .						
		b. Permanent 20 mesh (850 micrometers) Y-type suction strainers shall be provided for externally mounted positive displacement lube oil pumps .						
R	2.12.3.2	a. For units having a frame rating less than 200 hp (150 kW) a hand or motor operated oil pump for startup , piped to feed oil to all bearings, shall be provided.						
		b. When the shaft driven oil pump is provided with a discharge check valve, it shall be drilled with a 0.125 in. (3 mm) hole.						
R	2.12.3.6	All pressurized returns to the crankcase shall enter below the oil level .						