

**THE FOLLOWING PARAGRAPH NUMBERS REFER TO API-619, THIRD EDITION, JUNE 1997
WHICH IS A PART OF THIS PRACTICE**

1 - SCOPE

I 1.0 SCOPE

- a. (Exception) This practice covers rotary screw compressors and silencers.
- b. All specifications in this practice are additions to those of **API-619** unless specifically noted as exceptions. Paragraph numbers in this practice which do not appear in **API-619** are new paragraphs.
- c. **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-619** indicating that a Purchaser's decision is required.

- d. **Vendor Qualification.** Compressor systems 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 speed, power rating, and discharge pressure for a gas of comparable characteristics. These compressors must have been in service for at least one year and be performing satisfactorily.

Alternatively, the vendor may satisfy this **experience requirement on an individual component and service condition basis.** Experience need not be concentrated in a single compressor, but may be spread through several operating compressors. To qualify, each of these compressors must have been in service for at least one year and be performing satisfactorily.

The critical areas relative to service conditions which must be demonstrated to the satisfaction of the Owner's Engineer include, but are not limited to the following:

- | | |
|------------------------|-----------------|
| 1) Pressure | 4) Power rating |
| 2) Molecular weight | 5) Speed |
| 3) Volumetric capacity | 6) Temperature |

The critical areas relative to mechanical design which must be demonstrated to the satisfaction of the Owner's Engineer include, but are not limited to the following:

- 1) Sealing system
- 2) Bearing design and loading
- 3) Number of stages and staging arrangement
- 4) Casing size and design
- 5) Casing joint design
- 6) Rotor dynamics
- 7) Rotors structural design and performance
- 8) Material selection
- 9) Power Transmission components - design and arrangement
- e. In the area of component mechanical design, the vendor must show that each component has operated under the same conditions as those of the proposed compressor.
- f. Compressors manufactured under a license agreement shall carry the **licensor's written guarantee.**
- g. Where the vendor qualification requirement of **Par. 1.0d** 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.

2 - REFERENCES

2.1 STANDARDS

- I
- a. **Table 1** lists the practices and standard 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 10-14-1	Lube and Seal Oil Systems for Machinery
IP 10-11-1	Sizing of Drivers and Transmissions for Compressors, Fans, and Pumps	IP 18-10-1	Additional Requirements for Materials
IP 10-12-1	Vibration, Axial Position, and Bearing-Temperature Monitoring Systems for Compressors and Drivers	IP 18-12-1	Positive Material Identification
		IP 20-1-1	Inspection of Equipment and Materials
STANDARD			
API Standard			
619	Rotary-Type Positive Displacement Compressors for Petroleum, Chemical, and Gas Industry Services		

TABLE 2

PRACTICES			
IP 3-16-1	Flanged Joints, Gaskets, and Bolting	IP 15-7-1	Electric Power Branch Circuit Design for Instrumentation
IP 3-18-1	Piping Fabrication Shop or Field	IP 15-7-2	Protective Systems
IP 6-1-1	TEMA Type Shell and Tube Heat Exchangers	IP 15-11-1	Instrument Control Panels
IP 6-4-1	Air-Cooled Heat Exchangers	IP 16-9-1	Low Voltage A-C Motors Up to 200 HP (150 kW)
IP 10-7-2	Special Purpose Steam Turbines	IP 16-9-2	A-C Motors: Medium Voltage and Low Voltage Over 200 HP (150 kW)
IP 10-10-1	Special Purpose Gear Units		
IP 15-1-2	Instrumentation for Compressors and Drivers		
STANDARDS			
ASME Codes		ASTM Standards (Cont.)	
Section VIII	Pressure Vessels - Division 1	B 111 / B 111M	Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
Section IX	Welding and Brazing Qualifications	B 169 / B 169M	Aluminum Bronze Plate, Sheet, Strip, and Rolled Bar
B31.3	Process Piping	B 171 / B 171M	Copper-Alloy Condenser Tube Plates
ASTM Standards		B 584	Copper Alloy Sand Castings for General Applications
A 488 / A 488M	Steel Castings, Welding, Qualifications of Procedures and Personnel		

4 - BASIC DESIGN

4.1 GENERAL

- O,R
- * 4.1.4 **Compressors** shall also be suitable for the specified **maximum differential pressure** resulting from the combination of minimum suction pressure and discharge pressure equal to the pressure relief valve setting.
 - E 4.1.13 **Noise.** Compressor vendors shall submit noise emission data for the quoted machine, including silencers, with their proposal per **IP 2-1-1**.
 - R,O * 4.1.15
 - a. Compressors and auxiliaries shall be suitable for outdoor installation.
 - b. Compressors and auxiliaries shall be winterized for the climatic zone specified.
 - O,R 4.1.16 A **spare compressor** shall be provided. If two or more machines should be duplicates, a single spare will suffice.

	Rotary Screw Compressors		IP 10-3-3	
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	(This practice is appropriate for attachment to Inquiry or Purchase Document)		Rev. 1	June 1999

R,O	4.1.17	Compressors shall be run-in on air. Vendor shall provide air performance curves, operating guidelines, and any additional features required for this "run-in." Vendor shall also advise the efficiency penalty, if any, of meeting this requirement.
	4.3	CASING CONNECTIONS
O,R	4.3.4	a. Flanged casing drain connections are required.
		b. Thermowell to mount a casing temperature alarm thermocouple shall be provided in the discharge nozzle or in the discharge pipe near the compressor flange.
	4.6	SEALS
	4.6.1	GENERAL
S	* 4.6.1.1	a. Shaft seals and seal oil systems shall be suitable for exposure to casing maximum allowable working pressure and temperature, unless otherwise specified.
O		b. Compressor design shall maintain a positive internal gas pressure at the seals under all startup and operating conditions, including negative suction pressure during air "run in" operation.
O,R	4.6.7	BUFFER GAS
		Piping for continuous buffer gas injection shall include dual 100 mesh (150 micrometers) strainers, automatic differential pressure controller and low pressure alarm and buffer gas pressure gage. If buffer gas is used for "run-in" only, a hand control valve without pressure alarm is acceptable. Piping downstream of strainer shall be stainless steel. Vendor shall specify buffer gas flow rates at new and at 2 times new labyrinth clearances.
	4.7	DYNAMICS
O,R	4.7.1	CRITICAL SPEED
	♦ * 4.7.1.6	Data demonstrating that the machine is a stiff shaft design shall be submitted to the purchaser for approval by the Owner's Engineer.
	4.7.2	TORSIONAL ANALYSIS
I	♦ * 4.7.2.5	Unless otherwise specified, the vendor shall perform a torsional analysis of the complete coupled train and shall be responsible for directing the necessary modifications.
I	4.2.7.6	The vendor shall perform a transient torsional vibration analysis for synchronous and/ or variable speed motor driven units. The acceptance criteria for the analysis shall be mutually agreed upon by the purchaser and the vendor.
	4.8	BEARINGS
R	♦ * 4.8.1	GENERAL
		Unless otherwise specified, hydrodynamic radial and thrust bearings are required.
	4.9	BEARING HOUSINGS
I	4.9.3	Radial and thrust bearings shall be fitted with bearing metal temperature sensors and monitors per IP 10-12-1 .
	4.10	LUBE OIL AND SEAL OIL SYSTEMS
I	4.10.3	(Exception) Lube and seal oil systems for dry screw compressors shall be per IP 10-14-1 .
	4.11	MATERIALS
	4.11.1	GENERAL
R	* 4.11.1.5	The Purchaser shall specify if compressor is in wet H ₂ S service.
	4.11.4	WELDING
R	4.11.4.5.1	The following examinations are required:
		a. Butt welded joints of pressure casings shall be 100% radiographed. Inspection procedures for other pressure casing welds shall be approved by the Inspector. Examination methods and acceptance criteria shall be per ASME Code Section VIII , Par. UW 51, except that fluorescent intensifying screens, such as calcium tungstate, shall not be used.
		b. Welded joints on rotors shall be radiographed. Acceptance standards shall be the same as for butt welded joints .
		c. Silencer welds shall be 100% radiographed.
		d. Support leg attachment welds shall be examined by the magnetic particle method. Non-magnetic materials may be inspected by the dye penetrant method.