

**SPECIFICATION
FOR
COMPRESSORS, AIR STATIONARY**

(This specification is released for procurement purposes until revised, or rescinded.)

SCOPE

This specification covers stationary, electric-motor-driven, reciprocating compressors and their associated components.

I. CLASSIFICATION

Compressors shall be of the following types:

- Type I - reciprocating, single acting
- Type II - reciprocating, double acting
- Type III - rotary screw
- Type IV - rotary centrifugal

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Invitation for Bid shall form a part of this specification:

Boiler and Pressure Vessel Code, Section VIII, Pressure Vessels
American Society of Mechanical Engineers (ASME)
345 East 47th Street
New York, NY 10017

Occupational Safety and Health Act Standards
U.S. Department of Labor and/or
200 Constitutional Ave., NW
Washington, DC 20210

N.C. Department of (OSHA)
4 West Edenton Street
Raleigh, NC 27611

National Electric Code (NEC)
60 Batterymarch Street
Boston, MA 02210

National Electrical Manufacturers' Association (NEMA)
155 East 44th Street
New York, NY 10017

National Fire Protection Assn. (NFPA)
470 Atlantic Avenue
Boston, MA 02210

III. REQUIREMENTS

A. DESCRIPTION

When specified, the compressor and its associated components shall be assembled into a packaged unit. The packaged unit shall contain the necessary components to complete the self-contained package as specified herein, and if required by bid specification, shall be base mounted for stationary service with sufficient mounting holes to provide firm anchorage to a foundation. The compressor and its associated components shall be standard products of the manufacturer or his suppliers and specific requirements shall be included in the Invitation for Bids and as listed under ORDERING DATE herein. The basic components of the air compressor shall be completely built, tested and shipped by a recognized manufacturer with adequate and qualified parts and service facilities available.

B. PERFORMANCE

The compressor shall be capable of compressing and delivering not less than the volume rate of flow of air, compressed and delivered at the specified pressure under standard atmospheric conditions of 14.7 psi pressure, 68°F temperature, and 30% relative humidity.

C. COMPRESSOR

The compressor shall be of the reciprocating or rotary type, single-or two-stage, capable of operating unattended for a period of eight hours at rated speed and capacity. All parts subject to wear or service shall be field serviceable, and the compressor shall require only minimum maintenance. Cover plates for access openings shall be oil-and dust-tight. The cylinder cooling area shall be adequate to prevent excessive heating. Air passages shall be unrestricted. The crankcase or oil pump shall be provided with means for filling and draining oil and for checking the level of the oil except when sealed anti-friction bearings are used.

TYPE I

The Type I compressor shall be a single acting reciprocating unit. The compressor shall be air cooled or liquid cooled as specified in the Invitation for Bids. The compressor and the motor shall be mounted on a substantial, single, unified frame assembly. Cylinder arrangement shall be vertical or radial. Pistons shall be of the automotive type, equipped with piston rings of which at least one shall be an oil ring.

TYPE II

The Type II compressor shall be a reciprocating unit with double acting compressor elements. The compressor shall be liquid-cooled and of crosshead design. The cylinder arrangement may either be horizontal vertical, V-type, L-type, radial, or semi-radial. When oil-free air delivery is specified in the Invitation for Bids, no part of the piston rod in contact with oil shall enter the cylinder and the piston rings shall be self-lubricated.

TYPE III

The Type III compressor shall be a rotary screw type with male and female rotors. The compressor shall be of the type that is lubricated and cooled by the injection of filtered lubricating oil into the compression chamber. When the compressor is operated continuously at rated capacity, the temperature of the discharge air shall be not more than 100°F above the ambient temperature. When specified in the Invitation for Bids, the rotary compressor shall delivery oil-free air. When oil is injected into the compression chamber, the compressor shall be equipped with an oil separator and a receiver.

TYPE IV

The Type IV compressor shall be a centrifugal type with single or multi-stages as specified. When the discharge pressure is 15 p.s.i. or less for single stage and 28 p.s.i. or less for two-stage compressors, the heat of compression need not be removed.

D. COMPRESSOR REGULATION

Regulation of the compressor shall be accomplished by one of the following two methods of control:

1. Constant Speed Control

The compressor shall operate continuously at constant speed. Means shall be provided to automatically load and unload the compressor at preset minimum and maximum pressure settings respectively. Means shall be provided for the automatic release of pressure within the cylinders when the unit is operating without load. Means shall also be provided for the manual or automatic unloading of the cylinders during the starting of the unit.

2. Dual Control

The dual system shall consist of a combination of constant speed control and an automatic start-and-stop control by automatic or manual selector switch. When set for start-and-stop control, the motor shall stop automatically when the discharge pressure reaches the maximum pressure setting and start automatically when the discharge pressure falls to the minimum setting.

When specified in the Invitation for Bids, the compressor shall be equipped with a timed control to stop the compressor after a 10-minute unloaded period if air is not used.

E. AIR FILTER

The compressor air intake shall be fitted with an air filter in accordance with the manufacturer's latest standard practice. The filter shall be of the dry type, with replaceable element and inlet filter silencer when specified. The air filter shall be readily removable for cleaning.

F. GAUGES AND SAFETY CONTROLS

Location of gauges and lights shall be in manufacturer's standard location. Low-lubrication oil pressure shutdown and high discharge air temperature shutdown are required when specified in the Invitation for Bids. Other safety controls may be required as specified in the Invitation for Bids.

G. AFTERCOOLERS

After-coolers shall be of the water-cooled, shell-and-tube type or air-cooled, tube-and-fin type as specified in the Invitation for Bids. Water-cooled after-coolers shall be of sufficient capacity to cool the compressed air to within 15°F of the temperature of the water entering the cooler. Air-cooled after-coolers shall have sufficient capacity to cool the discharge air within 20°F of ambient temperature. For visual observation of water entering the cooler, a slight-flow indicator or funnel shall be provided counter to the air flow. The after-cooler shall be provided with a moisture separator and automatic dump trap at the air outlet to trap and drain off the condensed moisture and oil from air leaving the cooler.

H. AIR RECEIVER

The air receiver shall be constructed in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Pressure Vessels, and shall carry the official ASME code symbol stamp. Unless otherwise specified, the volume of the receiver, in cubic feet, or gallons shall be manufacturer's standard size for compressor requested. The receiver shall be equipped with a spring loaded safety valve, stamped with the ASME code symbol. The receiver shall be equipped with a drain valve and pressure gauge. When specified in the Invitation for Bids, a stand for mounting the receiver in a vertical or a horizontal position shall be furnished.

I. MOTORS

The motor shall be designed for operation with electrical power supply having characteristics as specified in the Invitation for Bids. The motor shall have a horsepower nameplate rating at least equal to the horsepower required for continuous operation of the compressor at full load. Unless otherwise specified, starter shall be furnished with capacity and electrical characteristics suitable for the motor according to NFPA No. 70.

J. DRIVE

The compressor shall be driven by a multi-V-belt or a direct drive as specified in the Invitation for Bids. Belt guards shall be OSHA approved.

K. MOUNTING

When specified in the Invitation for Bids, Type II and Type III compressors shall be mounted on a steel skid base. The base shall consist of two steel skid runners with an integrally formed, welded, or bolted base plate for mounting components of the unit.

L. LUBRICATION SYSTEM

The lubrication system shall be the manufacturer's standard method of lubrication.

M. LABELING

The air compressor unit shall be labeled as follows:

1. The name of the manufacturer, model number and serial number shall be shown in a conspicuous place on the unit.
2. Air receiver tank, separator and after-cooler shall have an ASME label denoting approval.
3. Electrical motor shall have a label or nameplate showing name of the manufacturer, model number and the electrical characteristics (volts, cycle, and phase) of the motor.

IV. WARRANTY

The contractor warrants to the owner that all equipment furnished under this specification will be new, of good material and workmanship, and agrees to replace promptly any part or parts, which by reason of defective material or workmanship shall fail under normal use, free of negligence of accident, for a minimum period of 12 months from date of acceptance. Such replacement shall be free of any charge to the owner or his representative.

V. SERVICE, PARTS, AND MANUALS

The contractor shall furnish complete written instructions for installation, an operation and maintenance manual, and a complete list of replacement parts or assemblies.

VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

This section is not applicable.

VII. DELIVERY AND PAYMENT

Delivery of and payment for equipment under this specification shall be in accordance with the terms and conditions stated in the Invitation for Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

VIII. ORDERING DATA

Purchasers should exercise any desired option offered herein and should specify the following in the Requisition and Invitation for Bids:

1. Title, number, and date of this specification.
2. Compressor type, capacity, discharge working pressure, and number of stages.
3. Packaged unit requirement with steel base or separate components.
4. If water cooled or air cooled oil cooler and after-cooler are required.
5. Size (cu.ft. or gals.) and type (horizontal or vertical) air receiver required.
6. Motor horsepower.
7. Type starter required.
8. Air compressor accessories or other requirements.
9. Electrical requirements.
10. If oil-free air is required.
11. Type controls required and if special time control is required.
12. Special safety controls required.