

POLARIS AIR  
COMPRESSOR SPECIFICATIONS

The following requirements should be considered as the minimum major requirements necessary for packaged centrifugal air compressors to meet a minimum standard for operation and reliability.

1.0 Basic Design/Construction

- 1.1) The compressor shall include a horizontally split gear case to ease in the maintenance and inspection of the bearing and seals. Such that only the gear case top half needs to be removed for bearing and seal inspection without having to disturb air piping, water piping, instrument control lines, etc.
- 1.2) The baseplate shall be designed as one continuous baseplate for the mounting of the compressor/gear case and main driver. The entire baseplate structure shall be steel. Cast iron baseplates or portions made of cast iron are not acceptable.

The baseplate should be designed to minimize compressor or driver vibration from being transmitted to the foundation and be designed to not require or minimize any grouting or fixed hold down bolts.

- 1.3) The gearing shall be designed per AGMA standards and include a service factor of 1.5 minimum.
- 1.4) The pinion and bull gear quality level shall be rated as per the AGMA standard, where the minimum quality level acceptable is level 13.
- 1.5) The impellers shall be designed to incorporate the features of backward leaning blades giving a suitable pressure rise to surge, minimum of 5%, however, a higher pressure rise to surge is preferred.
- 1.6) The impellers shall be of high quality material and be 17-4 PH stainless steel.
- 1.7) The bearings shall be suitable for the high speed such that the pinion journal bearings be designed as the tilting pad (multi-pad segments) type and the thrust bearings be designed to absorb thrust in both directions (double acting). All bearings to be horizontally split. Transfer of thrust from one rotating element to another is not acceptable.
- 1.8) The seals shall be a multi-carbon ring type to insure oil free air and be horizontally split for ease in their removal for replacement or inspection.

## 2.0 Intercoolers

- 2.1) Intercoolers shall be of the water in tube type to allow cleaning by rodding and tubes must be straight NO U-bends allowed.
- 2.2) Intercoolers shall be designed in such a way that they have an overall life expectancy at least equal to the compressor, provided the makers maintenance procedures are followed. This requirement shall mean intercoolers are not to be designed as a normal replacement part.
- 2.3) The actual job intercoolers shall be used during any factory compressor test.
- 2.4) A moisture removal system shall be included and shall incorporate the v-notch type drain valves. Moisture traps are not acceptable.

## 3.0) Lubrication System

- 3.1) The lubrication system shall include a main oil pump and auxiliary oil pump.
- 3.2) Lubrication system should be low pressure (less than 35 psig) in order to attempt to avoid contamination of the process air.
- 3.3) The main oil pump shall be shaft driven and the auxiliary oil pump shall be electric motor driven.
- 3.4) The main oil pump and auxiliary oil pump shall be of the same capacity and pressure rating such that the auxiliary oil pump will allow continuous running of the compressor should the main oil pump be inoperable.
- 3.5) The oil reservoir shall include a minimum of 4.0 minutes retention time. Also a large/generous clean out opening is required on the reservoir to provide access for field cleaning of the reservoir as required. A separate drain is also required.
- 3.6) The oil reservoir shall include a visual sight glass to determine the safe oil level in the tank. The sight glass shall be a minimum of 2-3 inches in continuous length. Bull's eye sight indicators are not acceptable.
- 3.7) The overall lubrication design shall be such that easy access exists for filter and cooler maintenance.
- 3.8) The job lubrication system shall be used for any factory compressor testing.

3.9 A steam or electric heater shall be supplied and must be connected to the oil reservoir level switch or transmitter such that the oil heater is prevented from operating when the oil level falls to a low low level condition.

#### 4.0 Drivers

- 4.1) The compressor is to be designed to accept either an electric motor or steam turbine driver.
- 4.2) The driver shall be mounted and rough aligned at the compressor manufacturers shop prior to final shipment.
- 4.3) Where voltage and power limits are not exceeded the job driver shall be used when testing the compressor at the manufacturer's shop.
- 4.4) The drivers shall be rated such that they are sized to allow continuous compressor operation. The drivers shall include a minimum of 1.15 service factor. A 1.25 service factor is NOT allowed.
- 4.5) Driver overload protection is required to be included in the overall compressor control system.
- 4.6) Ring oiled/self-lubrication motors and/or steam turbines are acceptable, however, a forced feed lubricated driver option shall be offered separately for consideration.

#### 5.0 Controls

- 5.1) The compressor controls shall be state of the art PLC based type controls and must have "trending" capabilities.
- 5.2) The PLC should have a color touchscreen HMI.
- 5.3) The PLC shall receive signals from local instrument transmitters. Transducers are not acceptable.
- 5.4) The control system shall be designed to detect a compressor surge condition and safely unload the compressor should this condition exist.
- 5.5) The control system shall be designed to allow for suction throttling at constant pressure. Throttle range to be in the approximate range of 70 percent, i.e., turndown of 30% of design flow at design discharge pressure.

5.6) The control panel shall be a NEMA 4 enclosure and be baseplate mounted, wired and piped by the compressor manufacturer at the manufacturer's shop and shall be used during the final compressor test.

6.0 Testing

6.1) Compressor aerodynamic test must be conducted in accordance with ASME PTC-10.

7.0 Warranty

7.1) The entire package shall include a minimum of 12/18 month warranty, i.e., 12 months from initial start-up or 18 months from shipment whichever period occurs first.

7.2) Air end warranty shall include a minimum of 24/30 month warranty, i.e., 24 months from initial start-up or 18 months from shipment whichever period occurs first.