



# Compressor Specification

Single-Stage, Water-Cooled  
Oil-Lubricated Rotary Screw

## 1. Scope

- 1.1. This specification is for a gear driven, oil-lubricated, single-stage air cooled rotary screw air compressor. The compressor shall be a 45 kW Atlas Copco model GA45+ or pre-approved equivalent.
- 1.1. The compressor shall deliver 144.2 l/s at 8.5 bar in accordance with ISO 1217, Annex C. L/s is FAD litres per second at inlet conditions.
- 1.2. The units shall be manufactured in accordance with this specification. The construction as described in this specification is considered essential and critical to the application. The vendor shall state in his quotation any and all exceptions to the specification.

## 2. General

- 2.1. The rotary screw air compressor shall be capable of producing and delivering 100% of the required air demand as specified at standard operating conditions.
- 2.2. The compressor shall be designed and supplied as a complete package with all necessary equipment, including but not limited to the following components: inlet filter, air compression element, drive motor, aftercooler with integral moisture separator, oil cooler, cooling fan, motor starter, microprocessor regulation and control system. All components shall be mounted on a common solid base frame and fully enclosed with a sound attenuating enclosure.
- 2.3. The compressor package shall be rated to operate in ambient conditions from 0°C to 46°C.
- 2.4. The units shall be manufactured by a qualified manufacturer who has been manufacturing air compressors for at least ten (10) years.
- 2.5. The compressor manufacturer shall be certified under ISO 9001 / 9002 quality standards and ISO 14001 environmental standards.
- 2.6. The manufacturer must participate in the Compressed Air & Gas Institute (CAGI) Performance Verification program.

## 3. Compressor Enclosure

- 3.1. The compressor shall be enclosed in a steel sound attenuating canopy with removable panels.
- 3.2. The sound attenuating material shall be flame retardant polyurethane foam.

## 4. Noise Levels

- 4.1. The compressor package shall not exceed 66 dB(A) when measured in the free field conditions at one meter in accordance with the CAGI-Pneurop Test Code.

## 5. Compressor Element

- 5.1. The compression profile shall be of the asymmetric profile design with four lobes on the male rotor and six lobes on the female rotor.
- 5.2. The male and female rotors shall have the same diameter.
- 5.3. The element housing shall be of cast iron construction.



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## 6. Drive Motor

- 6.1. The drive motor must be a Totally Enclosed Fan Cooled (TEFC) type.
- 6.2. The full-load efficiency rating must meet or exceed NEMA premium standards.
- 6.3. The motor shall conform with NEMA MG 1 for 60Hz applications and IEC 34-1, EN60034-1 for 50 Hz applications.
- 6.4. The inboard motor bearing shall be lubricated by the compressor lubricant and the rear motor bearings shall be greased for the life of the motor.
- 6.5. The complete motor shall be 100% maintenance-free.
- 6.6. Approved manufacturers include:
  - A. Siemens
  - B. WEG
  - C. ABB
  - D. TECO Westinghouse
  - E. Reliance
  - F. Leroy Somer
  - G. Toshiba
  - H. Baldor

## 7. Drive Arrangement

- 7.1. The drive arrangement shall be a gear-driven design.
- 7.2. The drive system shall be fully enclosed to protect against dirt and dust intrusion.
- 7.3. The drive gear shall be directly mounted on the end of the motor shaft eliminating the need for a coupling.
- 7.4. The driven gear shall be helically cut to exert compensating thrust on the rotors to offset axial loads generated during compression.

## 8. Cooling System

- 8.1. The compressor package shall be fitted with a water-cooled, stainless steel, plate and frame oil cooler and aftercooler.
- 8.2. The plates must be brazed together with copper.

## 9. Moisture Separator

- 9.1. The compressor shall be equipped with a labyrinth style moisture separator integrated in the discharge side of the after-cooler.

## 10. Electronic Water Drain

- 10.1. The compressor will have a zero loss electronic water drain plumbed to the aftercooler.
- 10.2. These drains shall discharge no compressed air during removal of the condensate.
- 10.3. The zero loss drains shall be monitored by the microprocessor controller.



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10.4. A manual condensate drain shall also be included.

## 11. Inlet Air Filter

11.1. The filter shall be a paper cartridge type and be factory installed inside the compressor enclosure.

11.2. The filter shall have the following SAE fine efficiency ratings:

|            |       |
|------------|-------|
| 1 micron:  | 98.0% |
| 2 microns: | 99.5% |
| 3 microns: | 99.9% |

11.3. The filter shall be equipped with a differential pressure indicator for monitoring by the control system.

11.4. The service interval of the filter must be at least 4,000 hours.

## 12. Oil System

12.1. The oil system shall include an ASME approved air/oil separator with oil level indicator. The service interval of the separator element must be at least 8,000 hours.

12.2. The oil filter shall be a spin-on type with an integrated bypass valve. The oil filter element will have a 12 micron beta 75 rating and the service interval must be at least 8,000 hours.

12.3. The oil temperature shall be regulated by means of a thermostatic bypass valve. Oil circulation is achieved through differential pressure.

12.4. The oil must be synthetic and rated for a change interval of 8,000 hours.

12.5. The oil system must use o-rings to provide a positive seal. No gaskets can be used.

## 13. Electric Cubicle

13.1. The control cubicle must be designed to NEMA 3R or IP 54 standards.

13.2. The cubicle must include a cooling fan and vent to force ambient air through the cubicle.

13.3. A wye-delta starter must be used to start the main drive motor.

## 14. Regulating and Control System

14.1. The compressor shall have a regulating system which is of the full load / no load design, controlled by an air compressor discharge pressure sensor which senses the pressure variations at the compressor discharge and maintains it within a pre-set adjustable range.

14.2. The full load / no load regulation shall be combined with a start / stop regulation to automatically stop the compressor as required.

14.3. The compressor shall be equipped with an onboard microprocessor controller which will control, monitor and protect the operation and condition of the air compressor.

14.4. The controller shall have a 3.5" color display.

14.5. The controller shall allow programming of two pressure bands for loading and unloading.

14.6. Time based start / stop and changeover for net pressure band shall be programmable.



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- 14.7. The control algorithm shall include a function to proactively stop the compressor during periods of low demand without having to wait for the stop timer to time out.
- 14.8. The controller must be capable of automatically restarting the compressor in the event of a voltage failure.
- 14.9. The controller must be capable of graphing any of the measured temperature or pressure inputs on the display. The time frame of the graph shall be adjustable from 4 minutes to 10 days.
- 14.10. The compressor shall be able to be controlled locally, remotely or via a local area network.
- 14.11. The controller must be equipped with auxiliary contacts for external indication of automatic or manual load control, general warning and general shutdown conditions.
- 14.12. The controller must be capable of providing remote monitoring by a PC through the local Ethernet system via an Ethernet port on the controller.
- 14.13. The controller must be capable of providing remote monitoring via a iPhone, iPad, or Android phone or tablet.
- 14.14. The controller shall monitor the hours of operation and output a message on the display to notify the operator to provide preventative maintenance in accordance with the factory approved service plan.
- 14.15. The control system shall have the capability to monitor the following functions:
  - Discharge air pressure
  - Element outlet temperature
  - Ambient temperature
  - Compressor status
  - Motor overload status
  - Running hours
  - Loaded hours
  - Regulator hours
- 14.16. Compressor protective functions shall include:
  - Emergency stop
  - Element outlet temperature
  - Drive and cooling fan motor overload
  - Service warnings

## 15. Shipment and Delivery Preparation

- 15.1. The compressor must be packaged on a wooden skid and fully enclosed with a wooden enclosure.

## 16. General Installation Requirements

- 16.1. Upon placement on a level surface and connection to essential utilities, the unit shall be provided available for immediate operation.
- 16.2. The compressor must not require bolting to the floor.