



## **The Charter Township of Flint Fire Department is seeking Bids for: 6000 PSI Stationary Breathing Air Compressor, Mobile Fill Station and 6-Bottles**

### **Approvals:**

Apparatus shall be compliant with all requirements of the National Fire Protection Association's 2016 Edition of NFPA-1901 Automotive fire Apparatus, Chapter 24 Air Systems.

### **Specific Requirements:**

#### **10 HP 6000 PSI Stationary Breathing Air Compressor Station (Qty 1)**

- Compressor shall be a four stage, 6,000 psi designed for continuous duty.
- Compressor shall be equipped with a 10 hp. motor to produce 13cfm @ 1420 rpm, 240V, 60Hz Single Phase.
- The compressor shall be lubricated by a combination splash and low pressure lubrication system. A pressurized lubrication circuit shall lubricate the final stage of compression. The other stages and the driving gear shall be splash lubricated. The pressure lubrication circuit shall include a positive displacement oil pump, gear driven by the crankshaft, and a non-adjustable oil pressure regulator. A highly visible sight glass shall be included to check the oil level. The oil drain for the compressor shall be piped to the outside of the frame.
- The cylinders shall be arranged in a dynamically balanced, diametrically opposed "X" configuration with each cylinder located directly in the cooling fan's blast.
- The connecting rods shall be of single piece design and constructed of a high strength aluminum alloy
- Compressor crankcase shall be constructed from top grade Aluminum Alloy eliminating excessive weight.
- Crankshaft shall be of a single piece forged steel construction and supported in the crankcase by three long-life roller bearings. Compressor shall be constructed with cast iron cylinders with deep cooling fins on the external surface for optimum heat dissipation.
- Cylinders shall have finned aluminum heads for heat dissipation.
- Piston rings on the first through third stage are of cast iron; fourth stage rings shall be of a high strength polymide. The final stage shall incorporate a ringed, free-floating, aluminum piston, which is driven by a guide piston and third stage discharge pressure.
- Compressor shall have stage pressure gauges, intercoolers, relief valves, and condensate traps after each stage of compression.
- Compressor and electric motor shall be mounted with an automatic "V" belt adjusting system.
- Compressor assembly shall be open frame.

### **PURIFICATION SYSTEM**

Purification chambers shall be constructed of Anodized aluminum.  
Purification system shall process a minimum of **67,000 cu.ft** of air per cartridge set.  
System shall be monitored by electronic purification monitor  
The purification system shall have the following minimum ratings:  
1. 6000 PSI working pressure.  
2. 4 to 1 safety factor.



## Electrical Control and Instrumentation

The compressor control panel (CCP) shall include an across-the-line magnetic motor starter, fused transformer and PLC controller. The CCP shall be built in accordance with UL 508A, the standard for Industrial Control Panels and shall be affixed with a UL label.

The PLC compressor control system consists of a programmable logic controller for the monitoring, protection and control of the compressor systems.

Standard features of the CCP include:

- A NEMA type 4 electrical enclosure
- UL electrical panel
- Human Machine Interface (HMI) with 4-Line Back Lit Text Display and Emergency Stop (Optional redundant remote HMI display available)
- Home screen customizable with distributor contact information
- Real Time Clock (time and date)
- Compressor on / off
- Digital Display of Compressor Final Pressure
- Digital Display of Compressor Oil Pressure
- Digital Display of current Compressor Run Time
- Digital Display of Final Separator Cycle Count
- Compressor High Temperature Shutdown and Alarm
- Full support of the optional Automatic Condensate Drain system (interval and duration set points adjustable thru the HMI - password protected)
  - Digital Display of time to next ACD Cycle
  - Condensate Drain Reservoir full alarm
- Full support of CO monitor alarm functions (optional)
- Full support of SECURUS purification system moisture monitor warning and alarm functions (optional)
- Built in overtime timer set at 5 hours - optional times available
- Maintenance Timer (selectable between real time or compressor run time) to give Digital Display of all needed Preventative Maintenance Evolutions
- Motor overload alarm
- Non-resettable hour meter
- Recoverable Run History (last 5 run periods)
- Recoverable Alarm History (last 5 fault shutdowns)
- Support of up to 5 Languages (to be specified at time of order; includes English, French, Spanish & Portuguese)
- Operator choice of display in BAR or PSI

For ease of Maintenance and Repair:

- PLC has removable Terminal Blocks for all functions
- Diagnostic EEPROM (Electrically Erasable Programmable Read-Only Memory) Capability
- Support of Two (2) Communication Protocols (optional)
  - o Ethernet Connection
  - o Analog Phone Modem
- Wiring shall be encapsulated within a split corrugated type loom. Each wire end connection shall be machine crimped and numbered.



The HMI shall have 22 adjustable system parameters secured by password protection. The HMI will provide display of all safety / fault shutdowns with a scrolling text of up to three potential causes for the fault / shutdown.

The compressor oil pressure shall be monitored by a pressure transmitter and digitally displayed on the HMI. The compressor shall shut down and a fault will be indicated on the HMI should the compressor's oil pressure drop below the factory preset value during operation. The oil pressure transmitter shall be bypassed during start-up to permit the oil pump to achieve the normal operating pressure.

The low oil pressure and final air pressure transmitters shall be equipped with sealed electrical connectors. The analog pressure sensors for oil pressure and final pressure shall have adjustable set point and dead-band thru the HMI (password protected).

A temperature switch shall be supplied on the head of the final stage of compression. The compressor shall shutdown and a fault will be indicated on the HMI should the final stage temperature exceed the tamper-proof set point during operation.

### **CO Monitor**

System includes an electric CO monitor, which shall incorporate an electric-chemical sensor that puts out a digitized signal (analog signal is not acceptable as these are prone to drifting). The numerical display and the flowmeter shall be backlit. The monitor shall incorporate one-touch calibration. No tools shall be required, except to remove the cover. One cylinder of calibration gas shall be provided with the unit.

### **MOBILE CONTAINMENT FILL STATION (Qty 1)**

1. The front-loading, two position containment fill station shall totally enclose the SCBA or SCUBA<sup>1</sup> cylinders during the refilling process.

2. The fill station's outer enclosure and door assemblies shall be constructed of formed ¼ inch thick plate steel. Venting shall be provided in the bottom of the fill station to allow the rapidly expanding air from a ruptured cylinder to escape from the fill station.

3. The fill station shall be ergonomically designed for maximum operator convenience and safety for refilling cylinders. The fill station door and cylinder holder assembly shall tilt out towards the operator 45 degrees, providing unobstructed access to the cylinder holder to load and unload the cylinders. A handle and heavy-duty gas spring shall be incorporated into the design of the fill station to assist the operator in opening and closing the fill station door. It shall take no more than approximately eighteen pounds of effort to open or close the fill station door thereby eliminating operator fatigue.

4. For complete operator protection, the fill station shall include a safety interlock system that will prevent refilling SCBA cylinders unless the fill station door is closed and secured in the locked position. The automatic interlock will require no actuation of secondary latching mechanism on the outside of the fill station.

5. Two fill hoses shall be located within the fill station. Each fill hose shall be equipped with a bleed valve and SCBA fill adapter of choice. Fill hose retainers shall be provided to anchor the fill hoses when not in use.

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6. Safety relief valve shall be incorporated to prevent over charging high pressure SCBA/SCUBA.
7. Fill station shall be equipped with one (1) compressor inlet bulkhead fitting, four (4) bank valves (cascade controls) and four (4) bank pressure gauges. This inlet shall be on the face of the cascade panel.
8. The cascade panel shall be designed to be mounted on top of the fill station.
9. The cascade control panel (cascade control and gages) shall be flush gage/control panel with the front.
10. Fill station shall fit a compartment opening of 58 H X 33.5W

**UN/ISO CYLINDER 6000 PSI (Qty. 6)**

ISO/UN cylinders shall be manufactured in accordance with DOT and TC codes and specifications. Each shall be equipped with a burst disc and CGA 702 type isolation valve. ISO/UN cylinder type shall be rated for 509 standard cubic feet @ 6000 PSIG. Each cylinder has a 10 year retest requirement.