Equipment Specifications

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High Pressure Breathing Air Compressor/Purification System,

This system shall be specifically designed for this application and be comprised of the following major components:

(A) High pressure compressor
(B) Electric driver motor
(C) Cartridge type purification system (Electronic)
(D) Operation control panel

The compressor, chassis, and purification system are to be all of the same manufacturer's brand. The system shall have been assembled in the U.S.A. and meet the provisions of the "Buy American Act". This system will have a UL approved electrical system be built under ISO 9003 quality management system.

(A) HIGH PRESSURE COMPRESSOR

The compressor block is to be of the 4-stage “W” design. All bearings are to be of the roller or ball design, with no sleeve bearings at any wear point. The crankcase, free-floating piston and rods shall be made of high strength aluminum alloy. The final stage piston must be and of the long life ringed type. The piston will be constructed of an aluminum alloy (with a minimum 3000-hour ring life and 2000 hour valve life).

The final output of the compressor shall be rated at least 13 CFM charging rate and be rated 6000 PSI.

A pressure lubrication system must be provided to supply oil pressure of at least 75 PSI to the compressor’s final stage and to flow oil over the crankshaft bearings. The direct displacement oil pump shall be shaft-driven. With a full flow cartridge type micron filter that is to be used to remove any particles from the oil. This filter shall be a routine replacement item. The crankcase shall have a minimum capacity of 3 quarts of oil.

Air intercooler coils are to be provided between each stage of compression, and an after cooler will provide air temperatures of no more than 15^{o} F above ambient. The intercoolers and after cooler are to be made of stainless steel to provide thermal consistency and a high level of corrosion resistance. Safety valves and moisture accumulators are to be provided. The compressor block must be of a design especially to produce low temperature air easily purified to breathing air quality. No cool down,

(unloaded running) periods are to be required nor are any intermittent duty cycles. The system must be rated for continuous operation.

The compressor is to be rated at 7250 PSI so that at 6000 PSI it will only be working at 85% of its rated capacity with a maximum RPM of (1420) The compressor is to be mounted on vibration/isolating pads on the chassis and vibration pads are also to be provided between the chassis and the floor.

The operation of the compressor shall be automated with the provision of the following:

1. Automatic, adjustable, off/on pressure switch.

2. Final safety relief valve, adjustable but sealed, to preclude operation beyond a preset maximum pressure.

3. Automatic high temperature shutdown switch.

4. Automatic low oil pressure shutdown switch.

5. Power-on indicator light. This shall alert the operator that the switch is in the **ON** position, even if the compressor has shutdown with a satisfied pressure switch.

6. Non-resettable cumulative hour meter.

7. Gauge panel with a gauge for each stage of compression, final output pressure, and oil pressure.

8. Magnetic starter with heat rise protection for the motor.

9. 110- vac solid-state control circuit with transformer.

10. Automatic timed condensate drain system, with reservoir, to drain the accumulated moisture every 15 minutes of operation, and at each shutdown.

11. Test/purge switch for the automatic drain system.

(B) ELECTRIC DRIVER MOTOR

The driver shall be a commonly available brand, such as Baldor, Lincoln, Magnetec, Marathon, etc.

The motor shall be of at least 10 hp, 230 volts, 1 **phase** .

The motor shall be mounted on an automatic tension gravity swivel base and shall drive the compressor with twin vee belts.

(C) CARTRIDGE-TYPE PURIFICATION SYSTEM

A single cartridge-type purification system will be provided, rated to process at least 67,000 cu. ft. of air to the standards of CGA grade E, or better.

A final moisture separator chamber that also includes a 5-micron particulate filter shall precede the purification chamber.

An automatic backpressure-maintaining valve shall be provided to automatically maintain a constant minimum pressure of at least 1200 PSI in the purification system.

The entire purification system shall be mounted on the opposite side of a steel shield from the compressor for cooler and safer operation.

A venting system shall be built into the purification chambers to absolutely preclude improper installation of the cartridges.

The design of the purification chambers shall be such so as to facilitate fast and easy replacement of the cartridges in no more than 10 minutes.

An electronic cartridge monitor system shall be provided which is connected to a sensor built into the final purification cartridge. This system shall provide a warning light 3-5 hours before the cartridge is spent, and shall provide a red light and an automatic system shutdown if the cartridge is allowed to become completely spent. No bypass switch shall be provided which would allow the operator to function the system with spent cartridges, and any malfunction of the monitoring system shall result in a shutdown of the unit.

Replacement purification cartridges are to be stocked at all times by the supplier of the system, and be readily available on short notice.

(D) OPERATION CONTROL PANEL

On the operator's side of the steel protective shield on the front of the unit shall be an hour meter, power switch, interstage and oil gauges, automatic drain system test/purge switch, cartridge monitoring system warning lights, power-on light, high temperature light, low oil pressure shutdown light, and a purification system vent/purge valve.

CONTAINMENT FILL STATION

Specification for containment fill station to refill self-contained breathing apparatus (SCBA). The fill station shall be designed for a maximum working pressure of 6,000 PSIG. All equipment shall be new and of current design and manufacture. Used or

refurbished equipment is unacceptable. Specifications are subject to change without notice.

The fill station shall be built and tested to conform to NFPA 1901, 2009 Edition.

The fill station shall be designed for stationary applications. The fill station shall be constructed of formed plate steel and shall be fully enclosed.

The fill station shall be warranted free from defects in material and workmanship for a period of eighteen months from date of shipment or twelve months from date of start-up, whichever expires first.

Containment Fill Station

The front-loading, two position; containment fill station shall totally enclose the SCBA or SCUBA[1] cylinders during the refilling process.

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. 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.

Each cylinder holder shall be lined to prevent scuffing the outer surface of the SCBA cylinders. 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.

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.

Control Panel

[1] SCUBAs up to 31" maximum overall length including valve, boot and fill yoke.

The fill control panel shall be installed on the front of the fill station. The control panel shall be factory piped and designed to fill two SCBA or SCUBA[2] cylinders either independently or simultaneously.

The control panel shall include the following standard features:

- Inlet pressure gauge
- Adjustable pressure regulator
- Regulated pressure gauge
- Two (2) fill control valves
- Two (2) fill pressure gauges
- One (1) relief valve for regulated fill pressure
- Provisions for factory or field modification to allow a different fill pressure at each fill position
- Regulated remote fill; panel mounted bulkhead fitting, adjustable pressure regulator for up to 6000 PSI with isolation valve and pressure gauge.

All piping and tubing shall be properly supported and protected to prevent damage from vibration during shipment, operation or maintenance. Piping and tubing shall be installed in a neat and orderly arrangement, adapting to the contours of the station. All instrument tubing shall be 300 series stainless steel.

All control panel mounted pressure gauges shall be 2 ½" diameter and be liquid filled. All panel-mounted components shall be labeled with a nameplate.

Installation

The fill station shall be provided on its own freestanding base and shall not exceed the following approximate dimensions: 52-1/4" high, 29-1/2" wide, and 21-1/4" deep. The weight with base and side control panel shall not exceed 830#

Testing and Preparation for Shipment

Prior to shipment, the manufacturer shall test the fill station. A copy of the manufacturer's test report shall be available upon request. An operator's instruction and maintenance manual shall be supplied with the unit. The manual shall be as detailed as possible, outlining all operating and maintenance instructions. The manual shall include detailed illustrated drawings along with a complete parts listing for all illustrated components. Warnings and safety precautions shall be included in the manual.

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[2] SCUBAs up to 31" maximum overall length including valve and boot.

A manufacturer's nameplate shall be securely affixed to station's frame in a conspicuous location.

The fill station shall be suitably prepared for motor freight transport. The unit shall be bolted to a wood pallet, wrapped in sheet plastic and fully protected by a wood crate or cardboard box. All bulkhead fittings and similar openings shall be suitably plugged or covered. Component parts, loose parts or associated spare parts shall be packaged separately and shipped on the same pallet if feasible.

ELECTRONIC CARBON MONOXIDE MONITOR

1. System must be designed to monitor breathing air for Carbon Monoxide. With a range of 0-50 ppm.
2. The monitor should have audible and visual alarm / 95 decibel alarm.
3. Constant digital readout.
4. The monitor shall be capable of accepting pressures up to 6000 psi.
5. The monitor must be compatible with the breathing air and cascade system with necessary power supply connections.

CASCADE SYSTEM

1. The system shall be comprised of four (4) new, 6000 psi, DOT/UN approved, 510 cu. ft. Cylinders.

2. Each tank is to be equipped with a new, soft seat large handled valve, complete with appropriate approved safety relief device. Tanks are to be painted yellow with a 9"x 6" vinyl label stating the cylinders pressure rating and gas the cylinder is being used for. Each tank is to have been internally inspected prior to being valve installation, with a dated sticker attesting to this inspection. A dome-type protective cap is to be supplied with each tank to protect the valve during shipping or transportation.

3. A 6000 psi manifold tee is to be supplied for each tank and a 6000 psi pigtail to connect each tank to the other. For one end of the system is to be provided a nut & nipple, an elbow and a 6000 psi 8-foot flexible hose, to connect from the compressor, and for the other end is to be provided a tee, a 2-1/2 inch10,000 psi line gauge and the filler hose.

4. A 5ft. steel rail section and four ridged clamp sets are to be provided to secure the tanks in place, properly spaced.

5. Any components or fittings necessary for a standard installation, but not mentioned above, will be considered to be included.

6. A 5-year warranty is to be provided on all cascade components, including the tanks, fittings, gauges and valves. If this cascade system is being purchased along with a compressor, the following may be added as specifications #7:

7. The delivery technician will install and hook-up all of the above components at the time of the compressor start-up and test the entire system to full working pressure.

SUPPLIER REQUIREMENTS:

The supplier of this system shall provide, at no extra cost to the buyer,

- A factory-certified technician for a thorough on-site mechanical and operational check of the entire system

- Calibration of the system to the buyer's exact applications

- An air output flow check

- Once the system is calibrated and the purification cartridges are installed, the technician will take a sample of the produced breathing air and have it tested to at least grade E, Grade

- And a thorough training session for the buyer's operation and maintenance personnel. (A certificate of training will be provided to every one trained)

Once the On Site start up and training is completed and accepted as operational by the Buyer, a checklist documenting every function of the system will be provided for the buyer's file.

The supplier of this system must have been a regular dealer in the brand proposed/provided for at least ten years, and must supply a listing of several similar, recent installations with his bid. They must stock all parts and materials at all times, and be capable of providing emergency service within 24 hours.

If the supplier has a maintenance and/or service contract program available, a description shall be included with the bid.

Warranty: [2 YEARS]
YEAR ONE

A warranty of 2 full years is to be provided on both parts and labor, **on-site**. No exceptions to this will be accepted. Compressor block carries a complete 5 year warranty.

Insurance and Liability

It shall be the responsibility of the supplier, [selling and installing vendor], to carry and show proof of having Product Liability Insurance, [PLI], commercial general and automotive liability insurance of at least [1] one million dollars, manufacturers bidding on behalf of the local distributor due to the local **A distributor not having [PLI] is not acceptable as the manufacture will not be providing the LOCAL support or installation. They must further show that they and their workers are covered under workers compensation and in accordance with state laws.**

Delivery, off-loading, electrical installation

The supplier shall pay all delivery charges to the buyer's door.

The buyer will provide for the off-loading, uncrating, placement, and electrical installation of the unit.

General:

The supplier shall provide with their bid, fully descriptive literature on the product proposed.

Any exceptions to any of these specifications must be clearly stated on a separate page and attached to the bid form. Failure to mention exceptions regardless of how insignificant could result in having their bid removed from consideration.

The buyer reserves the right to reject acceptance on any product which does not meet these specifications, if the exceptions have not been agreed to in advance, in writing.

10/8/15