SPECIFICATIONS
FOR

BREATHING AIR CASCADE SYSTEM

FOR THE

FIRE DEPARTMENT

CITY OF GREENVILLE, OHIO

2019
NOTICE TO BIDDERS

Sealed bids for a Breathing Air Cascade System for the City of Greenville Fire Department shall be received by the Board of Control, c/o Janelle Cross at the Municipal Building, 100 Public Square, Greenville, Ohio 45331, until 10:00 a.m., July 11, 2019, at which time they will be opened and read aloud in the Municipal Council Room.

The bids shall be received in accordance with the Invitation to Bidders, Instructions to Bidders, Specifications and Proposal Forms, all of which may be obtained from the City website, cityofgreenville.org.

Curt Garrison
Safety/Service Director

PUBLISH:  June 21, 2019
            June 28, 2019
INVITATION TO BIDDERS

Sealed Proposals properly endorsed BREATHING AIR CASCADE SYSTEM shall be received by the Board of Control, c/o Janelle Cross in the Municipal Building, 100 Public Square, Greenville, Ohio 45331, until 10:00 a.m., July 11, 2019, at which time they will be opened and read aloud in the Municipal Council Room.

Each bid shall contain the full name of every person or company interested in bidding and shall be accompanied by a Bid Bond for the full amount (100%) of the bid OR a Certified Check, Cashier's Check, or Letter of Credit on some solvent bank made payable to the City of Greenville, Ohio in the amount of ten percent (10%) of the total bid, as evidence of good faith by the bidder that a contract shall be entered into and its performance secured. The deposits of all bidders shall be returned when the successful bidders have entered into a contract and have furnished the necessary Performance Bonds or when all bids have been rejected. The bid guaranty filed pursuant to the foregoing shall be governed by the provisions of Section 153.54 of the Ohio Revised Code and all relevant divisions thereof.

The bids shall be received in accordance to the Invitation to Bidders, Instructions to Bidders, Specifications and Proposal Form, all of which may be obtained from the City Planning & Zoning office.

Curt Garrison
Safety/Service Director
INSTRUCTIONS TO BIDDERS

PROPOSAL FORM
The proposal must be submitted on the Proposal Form furnished by the City of Greenville in a sealed envelope plainly marked Breathing Air Cascade System.

SPECIFICATIONS
Greenville Fire Department has specified a breathing air station to refill self-contained breathing apparatus (SCBA) cylinders with purified air that meets or exceeds the requirements of CGA Pamphlet G-7, Compressed Air for Human Respiration, the requirements of ANSI/CGA G-7.1, Commodity Specification for Air, Grade E, and all other recognized standards for respirable air. The Manufacturer shall operate under a Quality Management System which complies with the requirements of ISO 9001:2015 for the design, manufacture, inspection, test, and service of air & gas compressors and associated spare parts for commercial and military applications. All equipment shall be new and of current design and manufacture. Used or refurbished equipment is unacceptable.

The equipment must meet, at minimum, the technical specifications for Bauer Model UN4/13H UNICUS 4 6000 PSI Service, attached.

EXCEPTIONS/ADDITIONS TO BID CONDITIONS AND SPECIFICATIONS
The bidder shall be required to complete the "Exceptions to Specifications" and "Additions to Specifications" forms that are enclosed in the bid documents and attach them to the "Proposal" form so that a fair evaluation of the unit offered to the City may be made by the Board of Control prior to the awarding of the Contract. Specific details must be listed on these forms.

BID BOND
Each bid shall contain the full name of every person or company interested in bidding and shall be accompanied by a Bid Bond for the full amount (100%) of the bid OR a Certified Check, Cashier's Check or Letter of Credit on some solvent bank in the sum of ten percent (10%) of the total bid made payable to the City of Greenville, Ohio as evidence of good faith by the bidder that a contract shall be entered into and its performance secured. The deposits of all bidders shall be returned when the successful bidders have entered into a contract and have furnished the necessary Performance Bonds or when all bids have been rejected. The Bid Guaranty filed pursuant to the foregoing shall be governed by the provisions of Section 153.54 of the Ohio Revised Code and all relevant divisions thereof.

NON-COLLUSION AFFIDAVIT
Bidders are required to file on forms furnished by the City and shall submit a completed Non-Collusion Affidavit at the time their bid is filed.
CAT / CORPORATE TAXES
The person or company will at the time of bid supply a statement affirmed under oath that the person/business with whom the contract is to be made was not charged at the time the bid was submitted with any CAT Taxes / Corporate Tax OR that such person was charged with delinquent CAT Taxes / Corporate Taxes, in which case the statement shall also set forth the amount of such due and unpaid delinquent taxes and any due and unpaid penalties and interest thereon. A copy of such statement shall be incorporated into the contract by and between the bidder and the City, pursuant to Section 5719.052 of the Ohio Revised Code. The statements required are found with the bidding documents.

BID WITHDRAWAL
No bidder shall withdraw his bid for a period of 90 days.

REJECTION OF BIDS
The City of Greenville reserves the right to reject any and all bids and waive informalities.

BEST BID
The City shall in its opinion accept the bid for the advertised and shall enter into such contracts that will maintain the safety, health, and welfare of its citizens. The quality of the equipment to be supplied, its conformity to the specifications, its suitability to do the work required, the availability of parts and service, and delivery terms shall all be taken into consideration in said award.

OHIO TAX EXEMPTION
An Ohio Tax Exemption Certificate is available at the Greenville City Auditor's Office.

DISCRIMINATION AND INTIMIDATION
The prohibition against discrimination and intimidation on account of race, creed or color is stated in Sections 153.59, 153.591, and 153.60 of the Ohio Revised Code, these sections shall be made a part of these specifications the same as if written if full within. The City of Greenville is an equal opportunity employer M/F.

DELIVERY
The Unit Price bid shall include all dealer service / preparation charges and all transportation charges to Greenville, Ohio. Date of delivery must be designated on the proposal page.

PAYMENT
Payment shall be made to the Contractor within thirty (30) days after the contractors invoice has been approved by the Director of Public Safety/Service and delivery of the equipment has been made.
BREATHEING AIR CASCADE SYSTEM
PROPOSAL FOR THE CITY OF GREENVILLE, OHIO
FIRE DEPARTMENT

I, or we, ______________________________ hereby propose to furnish to the City of Greenville Fire Department the following Breathing Air Cascade System, complete, as advertised, for the Price set forth below:

TOTAL BID..................................$____________________
TOTAL BID IN WORDS ____________________________________________

_______________________________________________________________
MANUFACTURER: ___________________________________________
MODEL NUMBER: ___________________________ (specifications attached)
DATE OF DELIVERY __________________________
WARRANTY PERIOD ___________________________ (warranty attached)
ANNUAL ON-SITE MAINTENANCE AGREEMENT OVER NEXT SIX (6) YEARS
Year 1 $____________ Year 2 $____________ Year 3 $____________
Year 4 $____________ Year 5 $____________ Year 6 $____________

________________________________________
SIGNED: __________________________
NAME: __________________________
TITLE: __________________________
COMPANY: ______________________
________________________________________
ADDRESS: _________________________
________________________________________
PHONE: __________________________
E-Mail: __________________________
Federal ID No.: ____________________

DATE: ____________________________

___ ATTACH COMPANY SPECIFICATIONS & WARRANTY
___ ATTACH EXCLUSIONS & ADDITIONS SHEETS
___ ATTACH COMPANY MAINTENANCE AGREEMENT
___ 100% BID BOND
___ 10% LETTER OF CREDIT OR CERTIFIED CHECK
ADDITIONS TO SPECIFICATIONS

I, or we, having read and understand the Specifications for the Breathing Air Cascade System, do hereby propose to offer to the City of Greenville, Ohio equipment that meets the minimum specifications of the City, but has the following listed additional items. (Each item and its cost shall be listed.)

If there are no additional items, state "NONE" on this sheet and attach it to the "Proposal" page.


Company Name ___________________________________________


EXCEPTIONS TO SPECIFICATIONS

I, or we, having read and understand the Specifications for the Breathing Air Cascade System, do hereby propose to offer to the City of Greenville, Ohio a system that meets the specifications with the following exceptions.

If there are no exceptions to the Specifications, state "NONE" on the sheet and attach it to the "Proposal" sheet.

Company Name ________________________________
STATEMENT OF BIDDER
Concerning CAT Taxes / Corporate Tax (Delinquency)

STATE OF __________________ )  SS
COUNTY OF ____________ )

________________________________________, being the _______________________________,
(Name of person making statement) (Title/Position)

________________________________________, being first duly cautioned
(Name of bidding company)

and sworn according to law does hereby swear or affirm as follows:

AMOUNT OF UNPAID DELINQUENT TAX/PENALTY & INTEREST/TOTAL DUE

a. __________________________________________

b. __________________________________________

c. __________________________________________

d. __________________________________________

That I understand that a copy of this Statement shall be incorporated into the contract to be entered between the City of Greenville and

________________________________________
(name of bidder)

Further Affiant sayeth naught.

________________________________________
(Signature of person making statement)

________________________________________, being the _______________________________,
(Name of person making statement)

title or position ____________________________
(name of bidder)

appeared before me and did swear that the foregoing statements are true as he believes.

SWORN to and subscribed in my presence this _________ day of ______________, 20____,
at ______________________, Ohio.

________________________________________
Notary Public
STATEMENT OF BIDDER
Concerning CAT Taxes / Corporate Tax (No Delinquency)

STATE OF ___________________)    ) SS.
COUNTY OF ____________________

__________________________________________, being the
(Name of person making statement)

__________________________________________, being
(title/position held) _________________________, (name of bidder)
first duly cautioned and sworn according to law does hereby swear or affirm as follows:

1. That as of July 11, 2019, ____________________________ (name of bidder) was not charged
with any delinquent CAT taxes / Corporate Tax on the general
tax list of personal property taxes of Darke County, Ohio.

2. That I understand that a copy of this Statement shall be incorporated into the
contract to be entered between ____________________________
and the City of Greenville, Ohio.

Further Affiant sayeth naught.

__________________________________________
(Signature of person making statement)

__________________________________________, being the
(Name of person making statement) ____________________________, (title)
of ____________________________ (bidder) appeared before me and did swear that the
foregoing statements are true as he verily believes.

Sworn to and subscribed in my presence this __________ day of ___________________,
20____, at _________________________, Ohio.

__________________________________________
Notary Public
NON-COLLUSION AFFIDAVIT

STATE OF ________________________
COUNTY OF ________________________

_______________________________, being first duly sworn, deposes and says that he is ______________________ (sole owner, partner, president, secretary, etc.) of ________________________________, the party making the foregoing proposal or bid; that such bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived, or agreed, directly or indirectly with any bidder or person, to put in a sham bid, or that such person shall refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of affiant or any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the City of Greenville, Ohio or any person or persons interested in the proposed contract; and that all statements contained in said proposal or bid are true; and further, that such bidder has not, directly or indirectly, submitted this bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

_______________________________
Affiant

SWORN to and subscribed before me this _____ day of ______________________
20_____.

_______________________________
Notary Public in and for
______________________________
County, ________________________
My Commission Expires ____________
SUPERSEDES: ALL PRIOR

Specification for a breathing air station to refill self-contained breathing apparatus (SCBA) cylinders with purified air that meets or exceeds the requirements of CGA Pamphlet G-7, Compressed Air for Human Respiration, the requirements of ANSI/CGA G-7.1, Commodity Specification for Air, Grade E, and all other recognized standards for respirable air. The Manufacturer shall operate under a Quality Management System which complies with the requirements of ISO 9001:2015 for the design, manufacture, inspection, test, and service of air & gas compressors and associated spare parts for commercial and military applications. All equipment shall be new and of current design and manufacture. Used or refurbished equipment is unacceptable. Specifications are subject to change without notice.

BAUER MODEL

UN4/13H
UNICUS 4

6000 PSI SERVICE

The breathing air station shall be supplied on a steel base frame of welded construction. The frame shall be designed for both the static and dynamic loads of the system and of sufficient size to adequately accommodate all of the station’s components. The compressor, purification system, fill station and all tubing shall be incorporated into an appliance-like enclosure complete with sound attenuation. The enclosure panels shall be equipped with a slam-action latches and lift-off hinges making it simple to facilitate inspection and maintenance. The UN4 enclosure and base frame shall be finished with a baked on polyester powder coat paint for the ultimate in durability, corrosion resistance, and long life.

The station shall be designed for against-the-wall installation, operation and maintenance and single-point operator control from the front of the station. The design of the station shall permit unrestricted cooling air flow to the compressor and motor when installed against a wall. All system instrumentation, controls and access to the containment fill station shall be located at the front of the station. The depth of the fill station portion of the Unicus 4 is adjustable thereby allowing the Unicus 4 to fit through a standard 36" doorway. The station shall be designed for continuous duty operation indoors with room temperatures ranging between 40°F and 115°F\(^1\). Installation shall not require a special foundation; however, it is the responsibility of the purchaser to ensure the installation site has a solid and level foundation that can support the weight of the station, the availability of a qualified source of air for the intake of the compressor and adequate ventilation.

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

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\(^1\) Please consult the Bauer factory for applications outside of this temperature range.
orderly arrangement, adapting to the contours of the station. All instrument tubing shall be 300 series stainless steel.

The station shall be warranted free from defects in material and workmanship for a period of twenty four [24] months from date of shipment or twelve months from date of start-up, whichever expires first. The warranty shall not impose limitations on the station's accumulated operating hours during the warranty period.

**Performance Table**

<table>
<thead>
<tr>
<th>Model</th>
<th>FAD(^2) SCFM</th>
<th>Charging Rate(^3) SCFM</th>
<th>HP</th>
<th>RPM</th>
<th>Compressor Model</th>
<th>Purification System</th>
<th>Air Processing Capability(^4) (cu ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN4/13H</td>
<td>10.8</td>
<td>13.0</td>
<td>10.0</td>
<td>1420</td>
<td>K12.14 II</td>
<td>P2 Securus</td>
<td>67,000</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>Model</th>
<th>SCBA Fills in 1st Hour</th>
<th>From 2 ASME</th>
<th>From 4 ASME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2216 PSI</td>
<td>2216 PSI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 cu ft</td>
<td>45 cu ft</td>
</tr>
<tr>
<td>UN4/13H</td>
<td>38</td>
<td>25</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 cu ft</td>
<td>45 cu ft</td>
</tr>
</tbody>
</table>

The number of SCBA fills in 1st hour is calculated by using the following formula:

\[
\frac{\text{FAD} \times 60 \text{ min/hr}}{+ \text{SCBA fills from storage}^5} - (\text{SCBA volume at fill pressure}) - (\text{SCBA volume at 500 PSIG})
\]

**Compressor**

The compressor shall be an air-cooled, oil lubricated, four stage, three cylinder, reciprocating compressor. The crankcase shall be cast of a high strength, aluminum alloy. The crankshaft shall be of a single piece forged steel construction, and supported in the crankcase by three long-life roller bearings. The connecting rods shall be of single piece design with stages 1, 2 & 3 being of high strength aluminum alloy construction and the 4th stage being of forged steel construction. Each connecting rod shall incorporate a roller bearing at the crank end and needle bearing at the pin end. The pistons shall be constructed of an aluminum alloy. Piston rings on

\(^2\) Based on standard inlet conditions.
\(^3\) Based on recharging an 80 cu ft cylinder from 500 to 3000 PSIG.
\(^4\) Based on an inlet temperature of 68°F.
\(^5\) Reference the Bauer Fillagraph for number of fills from storage.
the second and third stage are of cast iron; first and fourth stage rings shall be of a high strength polyimide. The final stage shall incorporate a ringed, free-floating, aluminum piston, which is driven by a guide piston and the previous stage’s discharge pressure. The cylinders shall be of cast iron construction with deep cooling fins on the external surface for optimum heat dissipation. The cylinders shall be arranged in a “W” configuration with the first and second stage sharing one common stepped cylinder. Each cylinder shall be located directly in the cooling fan’s blast. The cylinders shall be removable from the crankcase. The compressor’s flywheel shall be of cast iron construction. A multi-wing, high velocity cooling fan shall be integral to the flywheel.

An intercooler shall be provided after each stage of compression and an aftercooler shall be provided after the final stage of compression. The coolers shall be individually detachable from the compressor, located directly in the cooling fan’s blast and made of a stainless steel. The aftercooler shall be designed to cool the discharge air to within 18°F of ambient temperature. A cool-down cycle shall not be required prior to stopping the compressor.

A separator shall be supplied after the second and third stages of compression, and a coalescing separator shall be supplied at the discharge of the compressor. A unique “zero loss” automatic condensate drain (ACD) system shall be supplied for all of the separators. The system shall purge the separators on a timed event, approximately every fifteen minutes yet significantly decrease the interstage and final separator pressure drop as found on other brands. The reduction in pressure loss shall allow the compressor to reach maximum operating pressure quicker. Additionally during the blow down cycle, radiant noise levels shall be significantly reduced and tubing to the A.C.D. manifold and collection reservoir are significantly reduced. The ACD system shall unload the compressor on shutdown for unloaded restart. An exhaust muffler and condensate reservoir shall be supplied. Manually operated valves shall be supplied to override the automatic operation of the ACD system for test and maintenance purposes.

The compressor shall be lubricated by a combination splash/mist and low pressure lubrication system. The final stage of compression shall be lubricated by a pressurized lubrication circuit. The other stages and the driving gear shall be splash/mist lubricated. The low-pressure lubrication circuit shall include a positive displacement oil pump, gear driven by the crankshaft, a non-adjustable oil pressure regulator, and a full-flow oil filter with replaceable element. 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 compressor shall be equipped with an inlet filter with replaceable particulate element.

**Prime Mover and V-Belt Drive**

The single or three-phase electric motor shall be of the open drip-proof (ODP) design. The motor voltage and frequency shall be specified by the purchaser. The compressor and motor shall be mounted on a common base that is vibration isolated from the station’s main frame. The compressor and motor shall be arranged in a vertical design. Power from the motor shall be
transmitted to the compressor by a v-belt drive. The v-belt drive shall be designed to tension the drive belts automatically. Rotation arrows shall be affixed in a conspicuous place on the compressor.

**Electrical Control & Instrumentation**

The compressor control panel (CCP) shall include an across-the-line magnetic motor starter, industrial power supply 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 **Multi-Color Touch Screen Display** incorporating vivid TFT (Thin Film Transistor) Technology and NOT limited by touch cells (Optional mounting configurations available-up to 25 ft remote)
- Emergency Stop Palm Button
- 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 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
- 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
- Nonresettable hourmeter
- 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)
  - Ethernet Connection
  - 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 text read-out 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 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 by-passed 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.

Fault shut downs shall not affect the ability to fill SCBA cylinders from the storage system as long as there is sufficient pressure in the storage to fill them.

**Purification System**

The purification system shall purify high pressure air to a quality that meets or exceeds the requirements of CGA Pamphlet G-7, Compressed Air for Human Respiration, ANSI/CGA G-7.1, Commodity Specification for Air, Grade E, and all other recognized standards for breathing air. Purification shall be achieved by mechanical separation of condensed oil and water droplets, adsorption of vaporous water by a desiccant, adsorption of oil vapor and elimination of noxious odors by activated carbon and conversion of carbon monoxide to respirable levels of carbon dioxide by catalyst.

UN4/13H

May 2018
The high pressure purification chamber shall have a working pressure of 6000 PSIG. The purification system shall utilize a replaceable cartridge. The purification system shall be designed so that the replacement of the cartridge can be accomplished without disconnecting system piping. The design of the chamber shall preclude the possibility of operating the system without the cartridge installed or with an improperly installed cartridge. A bleed valve shall be provided to vent the purification system to facilitate replacing the cartridge. A pressure maintaining valve and a check valve shall be supplied downstream of the purification system to increase the efficiency of the purification system by maintaining a positive back pressure. A check valve shall be supplied between the coalescing separator on the compressor's discharge line and the purification system to maintain the positive pressure in the purification system when the compressor shuts down.

The purification system shall include Bauer's patented Securus Electronic Moisture Monitor System<sup>6</sup>. A sensor shall be located in the Securus purifier cartridge for direct monitoring of moisture levels. The Touch Screen Display shall indicate the status of the Securus cartridge. The Securus system shall warn the operator, in advance, of the impending expiration of the Securus cartridge via a scrolling text display message on the panel mounted operator / compressor interface. The compressor shall shut down automatically and the operator notified via audible alarm and scrolling text display message on the panel mounted operator / compressor interface should the operator fail to change the Securus cartridge within the warning period. The compressor shall not be capable of restarting until the used cartridge is replaced with a new one<sup>7</sup>. The moisture monitoring system shall be of a fail-safe design. Should the electrical contact between the display module and sensor be disconnected, an immediate fault shut down shall be effected. For absolute safety and highest quality breathing air, no manual override shall be supplied for the moisture monitor.

**Cascade Fill Control / Instrument Panel**

A steel instrument panel affixed with a non-glare Lexan overlay shall be installed on the front of the station. The overlay shall contain an embedded airflow schematic. The cascade fill control / instrument panel shall be hinged for easy maintenance and accessibility.

The cascade control panel shall be factory piped for four storage banks and designed to fill three SCBA cylinders either independently or simultaneously. The control panel shall include, at a minimum, a manual control valve and pressure gauge for each storage bank, an adjustable regulator for SCBA cylinder fill pressure complete with a pressure gauge for inlet and regulated pressure and a relief valve to protect the SCBA cylinders from overfilling, a manual control valve and pressure gauge for each fill position, a manual direction valve to allow the operator to select SCBA filling from either air storage or the compressor, provisions for factory or field modification to allow a different fill pressure at each fill position. The cascade system shall allow the simultaneous tasks of filling one storage bank while drawing down another during the

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<sup>6</sup> U. S. Patent Number 4,828,589  
<sup>7</sup> Replace all cartridges at the same time.
SCBA fill process. Strategically placed tees and check valves preclude the need for individual “To” and “From” valves. Systems requiring individual “To” and “From” valves shall not be deemed acceptable, as they require more efforts to operate.

All control panel mounted pressure gauges shall have a 2 ½” diameter and be liquid filled. A fluorescent light shall be factory installed above the panel to provide a glare-free illumination of the control panel. An on/off switch shall be integrated into the operator / compressor interface for the light.

**Air Storage**

The air storage system shall include two receivers fabricated, tested and stamped in accordance to Section VIII of the ASME Boiler and Pressure Vessel Code. The receivers shall have a 3:1 safety factor at 6000 PSIG (7000 PSIG MAWP at 200°F). The receivers shall have a capacity of 491 cu ft at 6000 PSIG. The receivers shall be mounted in a vertical configuration in a rack that is integral to the breathing air station’s frame. The rack shall be designed to accommodate four identical receivers. The receivers shall be installed in accordance with 29 CFR 1910.169. The rack shall be designed to support the receivers in a secure manner and permit visual inspection of the receivers’ external surface. Each receiver shall be supplied with a manual drain valve, an isolation valve and safety relief valve. For ease of maintenance and periodic inspection all the drain valves shall be piped to one convenient location within the Unicus III enclosure. Each receiver, or bank of receivers if additional storage is required, shall be piped to the cascade fill control panel to facilitate cascade filling.

**Containment Fill Station**

The front-loading, three position; containment fill station shall totally enclose the SCBA or SCUBA 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 chrome plated 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 force to open or close the fill station door thereby eliminating operator fatigue.

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8 UN storage systems available.
9 Capacity referenced to 70°F.
10 SCUBA to 31” maximum overall length including valve, boot and fill yoke.

UN4/13H

May 2018
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.

Three 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.

**Testing and Preparation for Shipment**

The breathing air station shall be tested by the manufacturer prior to shipment.

A manufacturer’s nameplate shall be placed on the interior of the electric panel. The nameplate shall include, at a minimum, manufacturer’s name, model number, serial number, compressor block number, and date of manufacture. Voltage, phase/frequency, and amperage are located on another label inside the electrical panel.

The station shall be suitably prepared for motor freight transport. The station shall be bolted to a wooden pallet, wrapped in sheet plastic, and fully protected by a wooden crate. The compressor intake and similar openings shall be suitably covered. Component parts, loose parts or associated spare parts shall be packaged separately and shipped on the same pallet if feasible.

**Documentation**

A documentation package shall be supplied with the station. The documentation package shall include, at a minimum, an operation manual on CD, recommended spare parts list, warranty information and a start-up/warranty registration form.

The Operator’s Instruction and Maintenance Manual for the breathing air station shall be as detailed as possible, outlining all operation and maintenance instructions. The manual shall include detailed illustrated drawings for the compressor block and all system components along with a complete parts listing for all illustrated components. Warnings and safety precautions shall be identified clearly in the manual.

**Available Accessories**

The following shall be offered by the manufacturer as accessories to the breathing air station:

- leveling feet and securing brackets (no charge option)
- Two additional ASME receivers
- UN4 Auto Fill Option
- Carbon monoxide monitor with calibration kit

UN4/13H

May 2018
Remote Fill with bulkhead fitting, regulator, pressure gauge, line valve, and quick connect coupling
- Dual pressure cylinder refill system
- Tri pressure cylinder refill system
- Remote Fill with regulator, pressure gauge, line valve, and cabinet enclosed hose reel with 100 ft of high-pressure 6000 psi hose

Reference outline dimension drawing: ASY-2151