

Bid Specifications for NFPA 1981, 2013 Edition

Self-Contained Breathing Apparatus

General Requirements

One (or more) open circuit, self-contained breathing apparatus consisting of the following major sub-assemblies:

- 1) Cylinder and valve assembly for storing breathing air under pressure;
- 2) Full face piece assembly;
- 3) An automatic dual path redundant pressure reducing regulator;
- 4) A removable, facepiece-mounted, positive pressure breathing regulator with air-saver switch, low-pressure alarm and purge valve;
- 5) A harness and back frame assembly for supporting the equipment on the body of the wearer;
- 6) A shoulder strap mounted, remote gauge indicating cylinder pressure;
- 7) A heads-up display (HUD) redundant low-pressure alarm;
- 8) A rapid intervention crew/universal air connection (RIC/UAC); and
- 9) Certified to the NIOSH Chemical, Biological, Radiological and Nuclear (CBRN) standard.

The unit shall be covered by a warranty providing protection against defects in materials or workmanship. This warranty shall be for a period of 10 years on the SCBA, except for the pressure reducer, which shall be covered for 15 years. Electronic components shall be warranted for ten years. The SCBA shall be certified by NIOSH/MSHA as conforming to the Code of Federal Regulations, 42 CFR 84. This apparatus, without modification, shall be NIOSH/MSHA certified. The apparatus shall meet all requirements of NFPA-1981 Standard on Open-Circuit Self-Contained Breathing Apparatus, 2013 Edition.

Successful bidder agrees to provide, at his own expense, a factory-trained instructor for such time as the department head shall require for complete instruction in the operation and maintenance of the apparatus. The department will require a minimum of one (1) training session on the new equipment to insure all firefighters are versed in the proper operation and maintenance procedures. Any exceptions to these specifications must be detailed in a separate attachment, and failure to do so will automatically disqualify the bidder. Successful bidder must be a factory-authorized distributor and service center to sell the equipment specified herein.

Cylinder & Valve Assembly Type and Requirements

The cylinder threads shall be straight with an O-ring or quad-ring gasket type seal. The cylinder valve shall be a "fail open" type, constructed of forged aluminum and designed such that no stem packing or packing gland nuts are required. It shall contain an upper and lower seat such that the pressure will seal the stem on the upper seat, thus preventing leakage past the stem. No adjustment shall be necessary during the life of the valve. The cylinder valve outlet shall be a modification of the Compressed Gas Association (CGA) standard threaded connection number 346 for breathing air (Proposed CGA connection No. 347) with a tri-lobe ergonomically designed hand-wheel.

The valve shall be constructed such that damage will not occur if the coupling is over-torqued by hand. Each cylinder valve shall consist of the following:

- 1) A hand activated valve mechanism with a spring-loaded, positive action, ratchet type safety lock and lock-out release for selecting "lock open service" or "non-lock open service";
- 2) An upstream connected frangible disc safety relief device;
- 3) A dual reading pressure gauge indicating cylinder pressure at all times;
- 4) An elastomeric bumper;
- 5) An angled outlet. Each cylinder and valve assembly shall be equipped with a hanger bracket for positive locking attachment of the assembly to the wire back frame.

The SCBA shall maintain all NIOSH and NFPA standards with any of the following types of cylinders listed as provided by the SCBA manufacturer.

Carbon cylinders

The cylinder shall be manufactured in accordance with DOT specifications and have a working pressure of 4500 psig. The cylinder shall be lightweight, composite type cylinder consisting of an aluminum alloy inner shell, with a total overwrap of carbon fiber, fiberglass and an epoxy resin.

Type: Carbon

Pressure (psig): 4500

Duration (minutes): 45

H2O Capacity (in3): 418

Free Gas Capacity (SCF): 66

Face piece Assembly

AV-3000 HT Face piece (4 Strap Design)

The full facepiece assembly shall fit persons of varying facial shapes and sizes with minimal visual interference. It shall be available in three color-coded sizes and maintain NIOSH/MSHA certification of the respirator regardless of the size used. The face seal shall be constructed of a blend of proprietary material and be secured to the lens by a U-shaped channel frame that is retained to the lens using two fasteners. A detachable bayonet-style mounting adapter for the voice amplifier shall be installed at the factory.

The lens shall be a single, replaceable, modified cone configuration constructed of a non-shatter type polycarbonate material and shall meet the impact and penetration requirements of a face shield as specified in ANSI Z87.1 paragraphs 5.2.8.1 and 5.2.8.2, it shall have a silica based coating to resist abrasion and chemical attack and meet the requirements of NFPA-1981, for lens abrasion. The lens shall have an anti-fog coating to reduce fogging of the lens. The face piece shall have a large diameter inlet serving as the female half of a quarter (1/4) turn coupling which mates with the positive pressure breathing regulator. Multi-directional voicemitters shall be lens mounted on both sides of the facepiece lens and ducted directly to an integral silicone nosecup to enhance voice transmission. The voicemitters, ducts, and nosecup shall be easily removable without the use of tools. The face piece shall have a minimum of three sizes of nosecups. The head

harness shall be a six-point quad suspension made in the fashion of a net hood to minimize interference between securing of the face piece and the wearing of head protection and be constructed of a para-aramid material. Two flame resistant elastic straps, attached to the seal in four locations, shall provide adjustment for proper face sealing.

Pressure Reducer

The pressure-reducing regulator shall be mounted on the back frame and be coupled to the cylinder valve through a short length of internally armored high-pressure hose with a hand coupling for engagement and sealing within the cylinder valve outlet. In lieu of a manual by-pass, the pressure-reducing regulator shall include a back-up pressure-reducing valve connected in parallel with the primary pressure reducing valve and an automatic transfer valve for redundant control. The back-up pressure reducing valve shall also be the means of activating the low-pressure alarm devices in the face piece-mounted breathing regulator. This warning shall denote a switch from the primary reducing valve to the back-up reducing valve whether from a malfunction of the primary reducing valve or from low cylinder supply pressure. A press-to-test valve shall be included to allow bench testing of the back-up reducing valve. The pressure-reducing regulator shall have extended temperature range dynamic O-ring seals composed of fluoro-silicone elastomer. The pressure reducing regulator shall have incorporated a reseatable over-pressurization relief valve which shall prevent the attached low pressure hose and face piece-mounted breathing regulator from being subjected to high pressure. A standard dual-outlet manifold shall also have provision for connection of an optional airline supply for extended duration use while reserving the cylinder supply for egress. The airline supply hose length shall be up to 300 feet and require an inlet pressure range of 60 to 115 psig, depending on the length of supply hose used. A check valve within the outlet manifold shall prevent the external release of cylinder air in the event the airline supply is either not used or disconnected. Switching from airline supply to cylinder supply shall be accomplished manually by the user, by opening the cylinder valve to prevent inadvertent use of the cylinder supply without the user's knowledge. The outlet manifold shall also contain a second outlet port capable of being fitted with an auxiliary supply hose to support a second breathing regulator for the purpose of rescue only. The auxiliary hose shall be located on the primary wearer's right shoulder and be terminated with a female quick connect fitting which can be easily connected and disconnected by trained individuals with a gloved hand and/or in low light conditions. The coupling shall also be guarded against inadvertent disconnect during use of the equipment. When operated in this mode, supplying two breathing regulators, the primary wearer's pressure reducer shall be capable of simultaneously supplying each regulator with a flow of at least 200 liters per minute while maintaining positive pressure in the respective face pieces.

Rapid Intervention Crew/Universal Air Connection (RIC/UAC)

The SCBA shall incorporate a RIC/UAC fitting to be compliant with the 2013 edition of the NFPA 1981 Self-Contained Breathing Apparatus standard. The RIC/UAC shall be an integral part of the high-pressure hose that attaches the cylinder valve to the first stage pressure reducer. The RIC/UAC inlet connection shall be within 4" (4-inches) of the tip of the CGA threads of the cylinder valve. The RIC/UAC shall consist of a connection for attaching a high-pressure air source and a self-resetting relief valve allowing a higher pressure than that of the SCBA to be attached to the SCBA. The RIC/UAC shall have a check valve to prevent the loss of air when the high-pressure air source has been disconnected.

Face piece-Mounted Positive Pressure Regulator

The facepiece-mounted positive pressure-breathing regulator shall supply and maintain air to the facepiece to satisfy the needs of the user at a pressure greater than atmospheric by no more than 1.5 inches of water pressure static. The breathing regulator shall maintain this positive pressure during flows of up to 500 standard liters per minute. The regulator shall also meet or exceed a dynamic flow requirement of remaining positive while supplying a minute volume of 160 liters. The breathing regulator shall have attached a low pressure hose which shall be threaded through the left shoulder strap to couple to the pressure reducing

regulator mounted on the back frame. An optional regulator shall be available with a quick connect coupling in line for use with the optional outlet manifold and accessory hose to allow the breathing regulator to be disconnected from the unit and reconnected to the auxiliary hose of a second unit in the event rescue is required. The quick connect coupling shall be easily connected and disconnected by trained individuals with a gloved hand and/or in low light conditions. The coupling shall also be guarded against inadvertent disconnect during use of the equipment. The low-pressure hose shall be equipped with swivel attachments at both ends. The breathing regulator outlet port shall be configured as the male half of a quarter (1/4) turn coupling which mates with the facepiece and shall be equipped with a doughnut-shaped gasket which provides the seal against the mating surface of the face piece. The regulator cover shall be fabricated of a flame resistant, high impact plastic. The breathing regulator shall also have an integral low-pressure alarm device that shall combine an audible alarm with simultaneous vibration of the face piece. This alarm device shall indicate either low cylinder pressure or primary first stage regulator failure. The breathing regulator shall have a demand valve to deliver air to the user, activated by a diaphragm responsive to respiration. The demand valve shall use an extended temperature range dynamic O-ring seal composed of a fluoro-silicone elastomer. This diaphragm shall include the system exhalation valve and shall be constructed from a high strength silicone elastomer. A purge valve shall be situated at the inlet of the breathing regulator and shall be capable of delivering airflow of between 125 and 175 standard liters per minute. The breathing regulator shall be arranged to direct the incoming air over the inner surface of the face piece for defogging purposes. The components of the breathing regulator shall be constructed of materials that are not vulnerable to corrosion. The flame resistant cover shall contain an air saver switch and pressure demand bias mechanism. It shall reactivate and supply air only in the positive pressure mode when the wearer affects a face seal and inhales. This device shall not affect the breathing flow through the system while in operation.

End-Of-Service Indicators

The SCBA shall have two end-of-service (EOS) indicators. The primary EOS shall be the integral low-pressure alarm device that shall combine an audible alarm with simultaneous vibration of the facepiece. The primary EOS shall be located in the Face piece-Mounted Positive Pressure Regulator. The HUD shall serve as the secondary EOS indicator. It shall be mounted in the user's field of vision on the second stage regulator. It shall display one-quarter bottle increments including full bottle pressure and continuing to 33% of maximum bottle pressure. The display shall not have a numerical representation of bottle pressure. At one-half bottle pressure, one "yellow" LED shall be illuminated and flash at a rate not to exceed one (1x) time per second. At one-quarter bottle pressure, one "red" LED shall be illuminated and flash at a rate not to exceed ten (10x) times per second. The HUD shall have a low battery indication that is distinct and distinguishable from the bottle pressure indications.

Harness and Back Frame Assembly

Heavy Duty Wire Frame Version (No Exception)

A lightweight, adjustable, lumbar support style harness and back frame assembly shall be used to carry the cylinder and valve assembly and the pressure reducing regulator assembly. The back frame shall be a corrosion resistant wire form structure. The back frame shall include an over-the-center, adjustable fixture, a para-aramid strap and a double-locking toggle/snap latch assembly (F.D.N.Y. Style) to secure 45 minute cylinders. The cylinder and valve assembly shall be positioned on the back frame by the combination of a guarded hook on the back frame and a hanger bracket on the cylinder and valve assembly. The harness assembly shall be arranged so the majority of the weight is carried on the hips and be attached to the back frame by use of threaded fasteners for ease of replacement. All load-carrying portions of the harness shall be constructed of para-aramid fiber. It shall have a flexible, waist belt and two shoulder straps. The waist belt shall have a quick release metal structural buckle for easy connection and separation and two web adjusters, one on each side. Adjustment of the waist belt shall be accomplished by simultaneously pulling forward on the free end of the web at each hip-located adjuster. Each shoulder strap shall connect to the rear section of the waist belt at one end and to the rigid section of the back frame at the other end. Each shoulder strap shall

have a web adjuster for quick adjustment and release of the shoulder straps. The back frame shall include accommodation and mounting spaces suitable for installation of a distress alarm integrated with the SCBA. These mounting spaces shall permit installation of an alarm sensor module in an area between the cylinder hanger locking mechanism and the back frame. A stainless steel heavy-duty bracket shall protect all electronic wires between frame and electronic consoles.

Distress Alarm Integrated with SCBA (Pak-Tracker Device)

General Specifications

The distress alarm shall be capable of integration with a NIOSH certified self-contained breathing apparatus, and this integrated SCBA and distress alarm system shall retain NIOSH certification. The system shall meet all requirements of NFPA-1982 Standard on Personal Alert Safety Systems (PASS), 2013 Edition. Operation of this distress alarm shall be initiated with the opening of the valve of an SCBA cylinder charged to a minimum pressure of 30 to 80 psig. A visual indication of automatic mode activation shall consist of a green flashing LED on the system's control module.

Pak-Tracker Firefighter Locator (SCBA Integrated)

The Pak-Tracker Firefighter Locator shall consist of two components; one that is a transmitter integrated into the SCBA and the other that is a hand-held receiver. The integrated component shall be capable of incorporation into a NIOSH certified self-contained breathing apparatus. The SCBA shall retain NIOSH certification and NFPA compliance when the transmitter is installed. The integrated component shall meet all requirements of NFPA-1982 Standard on Personal Alert Safety Systems (PASS), 2013 Edition.

Integrated Component

Operation of integrated portion of the Pak-Tracker Firefighter Locator shall be initiated by either opening of the valve of an SCBA cylinder charged to a minimum pressure of 125 psig or by pressing the "firefighter-down" button and then double clicking the "reset" button. A visual indication of activation shall consist of a green flashing LED on the system's control module.

Dual Alarms

The system shall incorporate dual visual and audible alarms, which shall be activated in a pre-alarm mode when the system remains motionless for approximately 20 seconds. A full alarm shall be activated in the event the system remains motionless for approximately 30 seconds along with a 500 Hz audible signal. Visual signals shall consist of a green flashing LED when the system is in operation and red flashing LEDs to indicate pre-alarm mode, full alarm mode and a low battery condition. The system's LED signals shall be situated on a control console assembly mounted on the user's right shoulder strap. The system shall have a visual LED indicator to check the battery condition while the system is not in use. The Alarm signal shall be in a frequency range of 1 kHz to 4 kHz and consist of three primary frequencies. Sound pressure level shall be >95 dBA. The Pre-alarm signal shall be in a frequency range of 1 kHz to 2 kHz and consist of two primary frequencies, the sound pressure level shall ramp up in two distinct steps from 60 to >100 dBA. The "Firefighter-Down" alarm signal shall be generated in a frequency range of 1 kHz to 4 kHz and consist of three primary frequencies. Sound pressure level shall be >95 dBA. The Pre-alarm signal shall be in a frequency range of 1 kHz to 2 kHz and consist of two primary frequencies, the sound pressure level shall increase in two distinct steps from 60 to >100 dBA.

Control Module

The pressure gauge shall become an integral part of the control module assembly. The control module assembly shall contain push buttons for manual operation of the integrated component. A yellow color-coded push button shall permit system reset; a red color-coded push button shall permit manual activation of the full alarm mode. Both push buttons shall be recessed to minimize accidental activation. The integrated component shall feature a "hands-free" reset capability that may be activated by means of a slight

movement of the SCBA when the system is in a pre-alert mode. Cables connecting the control console assembly and sensor module assembly shall be capable of withstanding approximately 150 pounds of tension.

Sensor Module

The system shall include a sensor module mounted to the SCBA back frame and located in an area between the cylinder and back frame in a manner designed to protect the assembly from damage. The sensor module shall contain dual sound emitters for the audible alarm and dual visual “buddy” indicators. The sensor module shall operate on six “AA” batteries that are located in the control console assembly. The battery life of the SCBA with PASS only shall be no less than 200 hours. The visual indicators shall flash as follows; 1) when the device is in pre-alert as defined by NFPA 1982, 2013 Edition; 2) when the device is in full-alert as defined by NFPA 1982, 2013 Edition; and 3) when the SCBA has reached ¼-bottle pressure as defined by 42 CFR. The sensor module shall contain a secondary component that will transmit a signal when the unit is in “Firefighter Down” alarm. This signal shall be capable of being received by a separate hand-held receiver.

Intrinsically Safe

The distress alarm system shall be ETL listed as intrinsically safe in accordance with ANSI/ UL 913 Class I, Groups C and D, Class II, Groups E, F, and G, Hazardous locations.

Hand-Held Receiver

The hand-held device shall contain a receiver and be designed for firefighting applications such as search and rescue of a downed or trapped firefighter. The housing shall be red in color and constructed of a polymer material, suitable for use in high-heat environments and fire ground applications. The housing shall consist of a compartment enclosing the receiver. The head of the housing shall be integrated into an approximately 6-inch long ergonomically designed handle, designed to house a battery pack. The handle shall be designed for gloved-hand operation with an anti-slip grip. The base of the handle shall consist of a threaded and gasketed cover to permit user access to the battery compartment for the purpose of inserting or removing the battery pack. The base of the cover shall include a molded connection point for attachment of a neck/shoulder strap or similar device. The device shall have means to recharge the battery (NiMH) while installed in the hand-held receiver. The complete weight of the hand-held receiver, with battery pack installed, shall be 2.2 pounds (.997g). The overall dimensions of the hand-held device shall be 5 X 5 X 11.25 inches. (12.7 x 12.7 x 28.57 cm).

Display

The hand-held receiver shall include a large 2.38-inch (6.04 cm), two line x 16 digit LCD and two digit LED display. The display shall have an exterior protective cover that is hard coated and designed to reduce glare.

Controls and Icons

The hand-held receiver shall contain two gloved-hand accessible push-type control buttons to operate all functions. These functions shall include on/off, scrolling, and searching. All buttons shall be designed to prevent accidental shut-off. The hand-held receiver shall include an LCD to display integrated transmitters that are transmitting and which specific transmitter is being tracked, and an LED indicating signal strength of the transmitter being tracked. High intensity graphical bars incrementally illuminate when signal strength is greater than 50. Additional LED shall include a “Low Bat” alert, which shall alert the user to a low battery condition when approximately 20% of battery life remains.

Power Source and Battery Pack

The hand-held receiver shall be powered by a single rechargeable nickel-metal hydride battery pack. Use of nickel metal hydride batteries shall provide approximately six hours of continuous operation.

Desktop Charger

The hand-held receiver shall be available with a desktop charger designed for recharging the nickel-metal hydride pack. The design of the charger is such that a battery can only be inserted one way. The charger shall be capable of recharging fully depleted batteries in approximately two hours. The charger shall be capable of being connected to a 110 VAC or 12 VDC power supply.

Carrying Case

The hand-held receiver shall be made available for storage and transportation with a molded plastic carrying case. The case shall include a foam insert for protection and shall be also be capable of carrying accessories, such as a spare battery pack and desktop charger.

Truck Charging System

The hand-held receiver shall be available with a truck charging system (TCS) suitable for mounting in a vertical position inside an apparatus or on a wall. The TCS shall be designed to securely retain the hand-held receiver when not in use and to recharge the battery inside the hand-held device handle. The TCS shall be supplied with connections for either a 110 VAC or 12 VDC power supply, and shall be capable of recharging a depleted battery pack in approximately two hours. The TCS shall be designed in such a way that a user with gloved hands may mount or dismount a hand-held receiver into the fixture. The TCS shall be capable of satisfying the NFPA Standard for Automotive Fire Apparatus specified in NFPA 1901, Current Edition. The system shall be capable of withstanding forces of 9-Gs (longitudinally) and 3-Gs (from other directions), while securely retaining the hand-held receiver.

Maintenance Requirements

Successful bidder shall furnish and supply all labor, materials, equipment, and /or everything and anything further required to comply with provisions of this specification.

CYLINDERS

1. Cylinders shall be inspected and tested according to "Guidelines for Visual Inspection and Re-qualification of Fiber Reinforced High Pressure Cylinder,"(c-6, 6.2) by the Compressed Gas Association Inc., latest revision, Section 4,5,6,7,8,9,10,11 and CGA Pamphlet C-1, Department of Transportation, Code of Federal Regulations, Title 29, Section 173.34.
2. A member of the fire department will have the right to inspect the successful bidder's facility prior in order to ascertain the capability of the contractor to perform the required work as specified. Only Authorized Scott Safety Service Centers are eligible.
3. All work performed will be guaranteed for a period of 90 days. All work be performed in accordance with this specification and comply with all fire department rules and regulations.

S.C.B.A.

1. Scott Safety Self Contained Breathing Apparatus shall be inspected and tested according to manufacturer's recommendation at minimum of every 12 month or 1 year. This shall apply to all NFPA 1981 certified self-contained breathing apparatus. A member of the fire department will have the right to inspect the contractor's facility or mobile testing equipment in order to ascertain the capability of the bidder to perform the required work as specified. Only Authorized Scott Safety Service Centers are eligible.

2. All work performed will be guaranteed for a period of 90 days. All work be performed in accordance with this specification and comply with all fire department rules and regulations.

PRICE SHEET

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|---|---------|
| 1. Part #X3-524022000302 - Scott 4.5 WireFrame H/D Air Paks (NFPA 2013 Ed. Compliant) | \$_____ |
| Integrated PASS Device with batteries (Pak Tracker) | \$_____ |
| Price each: | \$_____ |
| 2. Part #201215-22 – Scott AV-3000 HT (Medium) Face Mask | |
| Price each: | \$_____ |
| 3. Part #804722-01 - Scott 45 minute Carbon Air Cylinder with valve | |
| Price each: | \$_____ |
| 4. Part #200266-02 - Scott HHR Pak Tracker | |
| Price each: | \$_____ |
| 5. Part #200433-01 - Scott HHR Pak Tracker Truck Mount | |
| Price each: | \$_____ |
| 6. End User Training (1 Session) | |
| Price each: | \$_____ |
| 7. Specialist Level (Field Level) Training Class (1 Session) | |
| Price each: | \$_____ |
| Total Combined: | \$_____ |