

Specific Procedures for Use of Self-Contained Breathing Apparatus

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This appendix is meant to supplement the Respiratory Protection Program and is specific to the use of Self-Contained Breathing apparatus (SCBA) for emergency response. This appendix should be used in conjunction with the SCBA manufacturer’s operation manual.

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It should be noted that SCBAs will provide the highest level of respiratory protection and it is important to use the appropriate protective clothing to complete the ensemble. In particular, full body protection is needed in emergency situations where gas or vapor is present that can be absorbed through the skin or cause deterioration of the SCBA components.

Selection and Use

SCBAs will be used during certain maintenance activities or operations where other respirator protection is not adequate based on the toxicity and warning properties of the hazardous materials (such as Isocyanates), or when responding to emergencies where:

- The atmosphere presents an oxygen deficiency (less than 19.5% oxygen);
- There is a concentration of a hazardous chemical that is immediately dangerous to life or health (IDLH);
- Where the hazardous substance, in certain atmospheres, lacks an adequate warning property (odor or taste), or the identity or quantity of the substance is unknown and in the professional judgment of the emergency responder, air concentrations may exceed that which could be adequately protected from use of *negative pressure respirators*; and
- It is deemed necessary by the emergency response personnel.

Normally the determination to use SCBA in an emergency shall be made by key facility personnel who have attended EHS Emergency Response Training or trained EHS staff.

When such an emergency arises, authorized University personnel to affect rescue or mitigate the release of a hazardous material will wear SCBAs. All SCBA units used for emergency purposes will be NIOSH approved, open circuit/pressure demand, with a full-facepiece.

Authorized Users of SCBA

All potential users of SCBA must register with EHS by calling 7-1142 and complying with all provisions of the Respiratory Protection Program and this attachment. Authorized users must meet the following specific criteria in addition to the criteria set forth in the Respiratory Protection Program:

- Medical Surveillance
 - The annual medical surveillance must determine that the user is physically able to wear an SCBA and perform the work;
 - The individual must be fit tested by EHS with a full-facepiece of the same make, model, and size as the SCBA unit which may potentially be used;
 - The user must have attended the EHS Emergency Response Training course and attend annual refresher training in the use and wearing of SCBA; and
 - Sight-impaired users can be fitted with prescription glass inserts for the use inside the full-facepiece. Employees will be provided with safety prescription eyewear through the University Prescription Eyewear Program. (Refer to EHS's [Procedures for Obtaining Prescription Safety Glasses](#).) In lieu of glass inserts, contact lenses may be worn with full-facepiece respirators if they are rigid gas permeable or soft (hydrophilic) lenses, *except in atmospheres containing acrylonitrile, methylene chloride, 1,2-dibromo-3-chloropropane, ethylene oxide, and methylene dianiline.*

Hard, nonpermeable lenses shall not be worn with full-facepiece respirators

- Current authorized users of SCBAs include:
 - Emergency Responders and other supporting units or people that can provide specialized knowledge during an emergency within departments around campus.

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- SCBAs for emergency use are located at the North Campus Transfer Facility (NCTF) and at the Lurie Nanofabrication Facility (LNF) in the Electrical Engineering and Computer Science (EECS) Building.

Location and Storage

The location and storage of SCBA units must be thought out carefully in order to afford adequate protection of staff and emergency responders and at the same time provide effective and timely response to the emergency at hand. Each university building that has a potential for using SCBAs during an emergency need not be equipped with SCBAs. Instead, SCBA units may be placed in a strategic location, so that responders can access them quickly and safely and respond to emergencies in several different buildings in the area. Under no circumstances will SCBAs be placed in or just outside of the area where an oxygen deficient or IDLH atmosphere is possible. The area where responders pick up and/or don this equipment must be free from potential hazards. EHS can assist departments in determining a suitable storage location.

When a suitable location has been determined, SCBAs should be stored in a compartment built for this purpose. The compartment must be secured or locked to prevent unauthorized use of SCBAs. Planning must be such that all authorized users have the ability to access the units quickly, 24-hours a day. They should also be stored in a manner to protect them from weathering, contamination, and deterioration. The storage area should be clearly marked as containing emergency respirators.

Standard Operating Procedures

- Employees who have received EHS Emergency Response Training will assess the emergency. If key facility staff determines that SCBAs are needed due to the potential presence of an atmosphere that is IDLH, the following procedures will be followed:
- Contact Department of Public Safety and Security (DPSS) at 9-1-1 (with a campus phone) and inform them of the exact nature of the emergency and need for SCBA use. Also, report the number of SCBA units, breathing air cylinders on hand, and the number of authorized users on hand;
- DPSS will contact EHS to respond to the emergency and provide technical assistance. The procedures described below will be followed by University departments in using SCBAs during emergencies:
 - Conduct an inspection of the SCBA units to assure proper working order of all components. Check the service life of the cylinder and estimate the amount of time needed to complete the emergency tasks. If necessary, have additional cylinders on hand so as to facilitate change-out of cylinders to complete the emergency tasks. Consider the time to and from the emergency work area and decontamination (if necessary) when estimating the time to complete the task;
 - No attempt will be made to don a SCBA and respond to the emergency until there are four SCBA units and four authorized users present. A buddy system will be used, whereby two authorized employees don SCBA and enter the emergency work area. As a backup, the other two authorized employees will stay in a safe area with SCBA donned (except for mask and use of breathing air) ready to enter the emergency work area if necessary. There must be two backup authorized employees with SCBA at all times, therefore, two additional authorized employees and SCBAs must be on the scene before backup personnel take any action to enter the

emergency work area. EHS and other designated emergency responders will provide backup in emergency situations;

- Assure there is a means for continuous communication between both authorized employees who will be entering the emergency work area and the backup personnel. Communications can be accomplished by radio, visual signs, a signal line, etc.;
- When appropriate, authorized employees entering the hazardous area with SCBA should be equipped with retrieval equipment or lifeline to aid in rescue, should it become necessary. If this is not feasible, there must be some equivalent provisions for rescue; and
- When all of the above provisions are in place, the authorized employees (including the backup personnel) may don the SCBAs in accordance with the manufacturer's specifications and enter the emergency work area.
- NOTE: There may be some situations where responders decide to use SCBAs when there is not an IDLH atmosphere present. In these cases, a SCBA may be used in the same manner as a negative pressure respirator, without outside assistance or a buddy system.

Cleaning

SCBAs shall be cleaned and disinfected after each use in accordance with the manufacturer's operation manual.

Inspections

All SCBAs shall be inspected at least monthly and checked for proper function before and after each use using the inspection sheet and inspection tables developed by EHS (see attached table, below). The inspection sheet will serve as a written certification of the monthly inspection and shall be maintained for each SCBA.

The inspection sheet must be kept in an area where it is available for inspection by authorized users, emergency responders, and state/federal inspectors. It is recommended that the sheet be kept in a three-ring binder located in an area separate from the SCBAs. A tagging system should be used for the SCBA itself to indicate the units have been inspected and passed. Inspection tags should indicate the SCBA number, inspection date, and inspector's initials.

The following is general guidance that can be referenced during the inspection of SCBAs using the SCBA Inspection Table ([Table 1](#)) and the [SCBA Logs](#) attached:

1. Visually inspect the complete respirator for worn or aging rubber parts, worn or frayed harness webbing or damaged components;
2. Check the latest cylinder hydrostatic test date to ensure it is current. All cylinders must be visually inspected monthly and hydrostatically tested by a licensed cylinder retester in accordance with the appropriate US Department of Transportation (US DOT) specification or the applicable US DOT exemption;
 - a. University cylinders are made of composite construction which must be hydrostatically tested every three years and carbon fiber wrapped cylinders which are required on a five-year cycle. If during the inspection it is noted that hydrostatic testing is necessary again, note it on the inspection sheet and report it to EHS-HMM.

3. Visually inspect cylinder and valve assembly for physical damage such as dents or gouges in metal. Cylinders that show physical damage or exposure to high heat or flame, such as paint turned brown or black, decals charred or missing, pressure gauge lens melted or elastomeric bumper distorted, and cylinders that show evidence of exposure to chemicals such as discoloration, cracks in the cylinder, or bulging of the cylinder wall shall be removed from service and emptied of compressed air;
4. Check cylinder pressure gauge for “FULL” indication. If cylinder pressure is less than “FULL”, replace with a fully charged cylinder;
5. Check to ensure reducer hose coupling is hand tightened to the cylinder valve outlet;
6. Check that the breathing regulator purge valve is closed;
7. Don the facepiece or hold the facepiece to the face to affect a good seal. Inhale sharply to automatically start the flow of air. Breathe normally from the facepiece to ensure proper operation;
8. Clean and sanitize mask when done; and
9. File the inspection form in a binder with the SCBAs and retain them at least for one year after inspection.

Table 1

COMPONENT	LOOK FOR
Facepiece Lens	<ul style="list-style-type: none"> • Nicks, scratches, or abrasions that could impair vision; • Deep gouges or cracks that could reduce impact resistance; and • Anti-fog coating in need of replacement.
Facepiece Rims/Skirt/Head Strap	<ul style="list-style-type: none"> • Deformed, cracked or broken rims; • Loose rim screws (do not over tighten). • Cuts, gouges, abrasions, nicks or punctures including in the sealing area. • Deterioration from age, heat, or contamination.
Facepiece Buckles	<ul style="list-style-type: none"> • Crushed, bent, or corroded; and damaged or loose rivets.
Facepiece Inlet Nozzle	<ul style="list-style-type: none"> • Loose nozzle cover screws; • Heat damage to the nozzle body and cover; • AIR KLIK not seated and locking pawl not engaged; • Dirt and debris in the exhalation module; Sticking exhalation valve; and • Damaged exhalation valve set.
Second Stage Regulator & Hose	<ul style="list-style-type: none"> • Cracks or heat damage to housing or cover; • Faulty operation of bypass valve, first breath-on, AIR KLIK /override buttons; • Dirt and debris in the outlet port; screen and grill cracked; • Hose or fittings corroded, cracked or leaking; and • Sticking release and shutoff buttons.
Gauge/Alarm Assembly	<ul style="list-style-type: none"> • Gauge lens scratched; pointer deformed or stuck; • Hose or fittings corroded, cracked or leaking; • Debris in whistle outlet; and • Loose back plate screws.
First Stage Regulator & Hose	<ul style="list-style-type: none"> • Hose and fittings corroded, cracked or leaking; • Loose retaining rings on hose connectors. Loose inlet nipple; • Abrasion of hose; • Damaged female threads on C.G.A. hand wheel; • Damaged or missing O-ring or groove on C.G.A. nipple;

COMPONENT	LOOK FOR
	<ul style="list-style-type: none"> • Loose inlet nipple; • Dents or heat damage to housing; and • Loose pressure port screws.
Harness Frame	<ul style="list-style-type: none"> • Cylinder band and latch not working properly; • Cylinder not secured in frame and band; • Bent or broken frame; • Webbing color change; excessive wear or fraying; cuts, nicks, nicks or broken stitching; • Buckles damaged or corroded; and Loose Hardware.
Air Cylinder & Valve	<ul style="list-style-type: none"> • Dents, gouges, blisters, or cuts; and external damage to cylinder valve; • Smooth operation of valve hand wheel and ratchet collar; • Loose screws securing rubber guard on cylinder valve; • Condition of threads on valve outlet; • Cylinder pressure gauge lens scratched; pointer deformed or stuck; • Gauge reading incorrectly; and • Hydrostatic test date within 3 years or 5 for carbon-fiber wrapped.

Maintenance and Repair

For SCBA units that fail inspection, the unit must be immediately taken out of service and red-tagged. The deficiency must be noted in the inspection log and an authorized service facility with factory-trained technicians should be contacted for repair. Suggested authorized service facilities are the manufacturer or:

Argus Group (Argus-HAZCO)

46400 Continental Drive
 Chesterfield, MI 48047
 Phone: 1-800-873-0456

Spears Fire and Safety Services, Inc.

287 Jackson Plaza
 Ann Arbor, MI 48103
 Phone: 1-734-663-4133

<http://www.spearsfiresafety.com/>

Refilling Air Cylinders

Refilling of high-pressure cylinders (4,500 psi) is arranged through EHS-HMM (3-4568). EHS-HMM has purchased a breathing air system for refilling cylinders and it is located at the North Campus Transfer Facility. The unit is designed to deliver Grade E air that is purer than Grade D breathing air, which is the minimum allowed by law. HMM maintains a tag and logbook system for purification cartridge change-out as well as having semi-annual testing and certification of the air by outside laboratory.

New Equipment Purchases

The purchase of new SCBA units should be consistent with the equipment used by EHS and the Ann Arbor Fire Department. By utilizing identical equipment, EHS and the Fire Department can more effectively assist departments in refilling cylinders, having backup cylinders available, repair work, and training. Identical equipment also provides authorized users with the ability to use buddy system breathing, should the need arise.

EHS Equipment Specifications

- SURVIVAIR® Panther® *CBRN* certified SCBA (EHS-HMM):
 - Capacity/Service Time: 45-minutes,
 - NFPA-compliant,
 - NIOSH-certified for chemical, biological, radiological, and nuclear (CBRN) agents,
 - Cylinder Pressure: High Pressure (4,500 psi),
 - Carbon-fiber wrapped air cylinder,
 - Heads-Up-Display (HUD) facepiece,
 - Low-profile second stage regulator, and Carrying case and accessory kit, five strap head harness and skirt.
- Scott Air-Pak® 75™ CBRN certified SCBA (EHS-ER On-Call Team):
 - Capacity/Service Time: 60-minutes,
 - NFPA-compliant,
 - NIOSH-certified for chemical, biological, radiological, and nuclear (CBRN) agents,
 - Cylinder Pressure: High Pressure (4,500 psi / 300 Bar),
 - Full carbon-fiber wrapped, epoxy resin air cylinder,
 - Visualert Heads-Up-Display (HUD) AV-3000 facepiece with redundant low-pressure alarm,
 - Streamlined backframe,
 - Improved hose management for reduced snag hazard,
 - Dual path pressure reducer ensures constant flow of air,
 - Six-point quad adjustment head harness,
 - EPIC Voice Amplifier device transmits strong, clear, crisp voice communications,
 - Rugged, glove-friendly designed regulator, and
 - Carrying case and accessory kit

SCBA INSPECTION LOG

Year: _____ SCBA #: _____ Serial #: _____ Mask #: _____

COMPONENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COMMENTS
Air Cylinder No. & Hydrostatic Date													
Facepiece Lens & Rims													
Facepiece Head Straps													
Facepiece Skirt													
Facepiece Buckles													
Facepiece Inlet Nozzle													
HUD / Alarm													
Battery													
1st Stage Reg. & Hose													
2nd Stage Reg. & Hose													
Harness/Frame													
Location													
Date													
Initials													

NOTE: A check mark “✓” indicates that each component was inspected as per guidelines and that the component passed inspection. An “X” indicates the component failed inspection.

Scott Air-Pak 75 SCBA INSPECTION LOG

Scott AIR-PAK 75 4.5

Inspection Form



Date: ___ / ___ / ___ Name of Person Inspecting: _____

Location (circle): EHS Vehicle 1446 LNF

INSPECTION OF THE BREATHING AIR CYLINDER U-M EHS # (CIRCLE): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	PASS	FAIL
✓ Visually inspect breathing air cylinder and valve assembly for physical damage such as dents or gouges in metal or in composite wrapping. Cylinders which show physical damage or exposure to high heat or flame, such as paint turned brown or black, decals charred or missing, pressure gauge lens melted or elastomeric bumper distorted, and cylinders which show evidence of exposure to chemicals such as discoloration, cracks in the cylinder or the composite wrapping, peeling of the outer layers of the composite wrapping and/or bulging of the cylinder wall, shall be removed from service and emptied of compressed air.)	_____	_____
✓ Hydrostatic test date is current (within 5 years)	_____	_____
✓ Check for damage of the cylinder valve hand wheel and the threads on the cylinder valve outlet.	_____	_____
✓ Check the relief valve (burst disc) for damage or dirt.	_____	_____
✓ Check the cylinder pressure gauge for "FULL" indication. If cylinder pressure is less than "FULL," replace with a fully charged cylinder.	_____	_____

- ✓ Complete one form for each breathing air cylinder.
- ✓ This form shall be completed monthly and after every use.
- ✓ Any checked "fail" shall result in the SCBA being bled of all air, taken out of service, tagged, and the Office of Emergency Preparedness (OEP) notified.