

PPE CASE



Personal Protective Equipment Conformity Assessment Studies and Evaluations

Evaluation of a Self-Contained Breathing Apparatus Involved in a Fatality and a Near Miss While Operating at a Structure Fire

**NIOSH Division of Safety Research DSR Clinton Fire
Department Request for two MSA Model G1**

The National Institute for Occupational Safety and Health (NIOSH) conducts a Fire Fighter Fatality Investigation and Prevention Program, which is executed by its Division of Safety Research. In support of this Program, NIOSH's National Personal Protective Technology Laboratory (NPPTL) inspects and evaluates the Self-Contained Breathing Apparatus (SCBA) that was being used by the fire fighter during a fatality.

This report provides a summary of NPPTL's inspection and evaluation methods, as well as findings, for two SCBAs that were being used by two fire fighters while operating at a silo fire. The SCBAs used were both MSA Model G1, 4500 psi, 45-minute units. The NIOSH Division of Safety Research (NIOSH/DSR) and the Clinton Fire Department were advised that NIOSH NPPTL would provide a written report of the investigation and any applicable test results.

NIOSH evaluated two SCBAs involved in a fatality and near miss while the fire fighters operated at a structure fire. The SCBAs were not found to contribute to the fatality or near miss.

A qualified service technician must inspect, repair, test, clean, and replace damaged components of any SCBA involved in an incident before it may be returned to service.

What NIOSH Did to Protect the Worker

Upon receipt of the SCBAs, NPPTL managed the custody of evidence throughout the entire inspection and evaluation process at its Morgantown, West Virginia facility. NPPTL staff inspected all SCBA components and documented their findings with written and photographic evidence. NIOSH assigned Task Number TN-22941 to identify the units. NPPTL also tested the SCBAs to determine conformance to the NIOSH approval requirements as outlined in Title 42, Code of Federal Regulations, Part 84 (42 CFR 84). Further testing was conducted to provide an indication of the conformance of the SCBA to the National Fire Protection Association (NFPA) Airflow Performance requirements of NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service, 2013 Edition. If the inspection or evaluation data suggested that the SCBA units may have contributed to the fatality and near miss event, NPPTL would have engaged in corrective action to ensure that

no other users of the product would experience a fatal event. In this case, no such corrective action was necessary. NPPTL then managed the disposition of the SCBA.

Chain of Custody

The SCBA units were delivered to NIOSH NPPTL investigators, from the NIOSH Division of Safety Research (DSR), who were assigned to investigate the Clinton Fire Department fatality and near miss event. They delivered the units to Lab H1513 for secure storage at the NIOSH facility in Morgantown, West Virginia on February 14, 2019. The SCBA units remained in secure storage in Lab H1513 throughout the inspection and testing process.

SCBA Inspection

On February 18, 2019, NPPTL employees Jay Tarley and Angie Andrews inspected the SCBA units. The units were identified as Clinton Fire Department SCBAs and visually examined the devices, component by component, in the condition received to determine the conformance of the units to the NIOSH-approved configuration. The units were MSA Model G1, 4500 psi, 45-minute units, with NIOSH Approval Number TC-13F-0787CBRN.

As received (pictured below) SCBA unit 1

- SCBA unit 1 was hand delivered to Lab H1513 by NIOSH DSR investigators
- Cylinder was received empty, closed, and completely threaded to the cylinder attachment
- Bypass was partially open
- Facepiece was included



Figure 1: SCBA unit 1 as received



Figure 2: SCBA unit 1 as received

Components and Observations for SCBA unit 1 (Figure 2) (“Right” or “left” are from the user’s perspective) (see Figures in Appendix)

Facepiece (Figures 5-9)

- Facepiece seal P/N: 10161810; M/N: 7-2771-1: CE 0158; EN 136:1998 CL3+
- Medium size
- Nosecup; M/N: 7-2774-1
- Other markings in nosecup: 10144170 vmq<
- Nosecup valve: 10144193
- Lens scratched and dirty
- MMR housing was dirty but in good condition
- HUD present
- Hairnet was in good condition with dirt present
- All straps and buckles functioned properly

Mask Mounted Regulator (MMR) (Figures 10-11)

- MMR label on front: MSA; M/N: 7-2779-1
- Overall condition was dirty with signs of physical damage
- Cracked and missing housing next to bypass
- MMR was secured to low pressure line
- Bypass partially open
- Inside flange had normal wear and in good condition
- Sealing area was fair and dirty
- Regulator could be attached and removed
- Outer rubber casing dirty with minor scratches

Low Pressure Regulator Hose (Figure 12)

- Secured at all attachment points
- Line was in good condition
- Line passed through the shoulder strap to the reducer

Pressure Reducer Assembly (Figures 13-14)

- Overall condition was good
- All airline connections were secure
- All lines going to the pressure reducer were in good condition
- 4500 Psi; 2615321

PASS Control Module (Figures 15-16)

- Lines to control module looked good
- Gauge lens was readable
- Protective casing was good and in place
- Protective casing mfr date medallion 3/2015
- P/N: 10144966; M/N: 7-2816-1

High Pressure Hose and Cylinder Attachment (Figures 17-19)

- High pressure reducer S/N: 7-2843-1 JS
- High pressure line scratches, dirty
- High pressure hose marking FW1128-04-329
- Cylinder quick connect attachments were dirty
- Pressure relief valve P/N: 10036292

- Hose going into power module is damaged

ExtendAire II EBSS (Emergency Breathing Support System) (Figures 20-21)

- Quick Connect snap tite 9847-22; 3215
- P/N: 10157416; M/N: 7-2941-1
- Other markings: C162-1; 1534; FD 17-1082-10-04
- Fair condition; covered with soot
- Rubber cover; P/N: 10149646
- Sleeve was frayed

PASS Power Module (Figures 22-24)

- SEI label:07-2015; 10148687 4500 psi; RFID
- PASS met requirements of NFPA 1982: Standard on Personal Alert Safety Systems (PASS) 2013 edition
- FCC ID: P9R-10154953, RPN 10069330, QQQWT32AE
- SCBA containing power module; M/N: 7-2810-1
- Overall condition was good, but dirty with debris
- Not held securely to backframe; backframe broken
- Power module battery was not in box

Backframe Assembly (Figures 25-27)

- SEI label 1981-2013 edition
- NIOSH Approval Number label: TC-13F-0787CBRN
- Extensive physical damage, broken in multiple places
- Cylinder retaining strap damaged/bent
- Dirt and debris were found everywhere
- Shoulder straps were attached to the frame; frame broken

Straps and Buckles (Figure 28)

- Overall condition of straps was good, but dirty
- Hose lines passed through shoulder straps
- All adjustable buckles moved and held in place
- Waist area buckle latched but was not attached to backframe

Compressed Air Cylinder and Cylinder Valve Assembly (Figures 29-31)

- DOT-SP 10915-4500; TC-SU 5134-310
- Luxfer P/N: L66b-7
- AJK 20806; REE 127
- MSA; M/N: 7-1348-1
- Mfr hydrostatic date: 9/15; 45 minute, 4500 PSI
- Gauge was readable; Received empty
- Overall condition was poor with deep gouges
- Threads were good
- O-ring was present and in good condition
- Rubber bumper at base of cylinder valve was in good condition

As received (pictured below) SCBA unit 2

- SCBA unit 2 was hand delivered to Lab H1513 by NIOSH DSR investigators
- Cylinder was received empty, closed, and completely threaded to the cylinder attachment
- Bypass was partially open
- Facepiece was not included



Figure 3: SCBA unit 2 as received



Figure 4: SCBA unit 2 as received

Components and Observations for SCBA unit 2 (Figure 4) (“Right” or “left” are from the user’s perspective) (see Figures in Appendix)

Facepiece was not provided

Mask Mounted Regulator (MMR) (Figures 32-33)

- MMR label on front: MSA; M/N: 7-2779-1
- Overall condition was fair but dirty
- MMR was secured to low pressure line
- Bypass partially open
- Inside flange had normal wear and in good condition
- O-ring and seal ring area were fair and dirty
- Outer rubber casing dirty with minor scratches

Low Pressure Regulator Hose (Figure 34)

- Secured at all attachment points
- Line was in good condition
- Line passed through the shoulder strap to the reducer

Pressure Reducer Assembly (Figures 35-38)

- Overall condition was good; backframe broken in area
- All lines to pressure reducer were secure; in good condition
- 4500 Psig; 7-2785-1; 2717098
- Universal Air Connection (UAC) found with cap off; in good condition

PASS Control Module (Figures 39-40)

- Lines to PASS control module looked good
- Gauge lens was readable
- Protective casing was good and in place
- Protective casing mfr date medallion 1/2015
- P/N: 10144966 4500/5500 psi
- M/N: 7-2816-1

High Pressure Hose and Cylinder Attachment (Figures 41-42)

- High pressure S/N: 7-2789-1
- High pressure hose P/N: FW1123-04-329
- High pressure line scratched, dirty; dislodged from backframe
- Cylinder quick connect attachments were dirty
- Pressure relief valve P/N: 10036292

ExtendAire II EBSS (Emergency Breathing Support System) (Figures 43-44)

- Overall condition was good
- Quick Connect snap tite 9847-22; 3415
- P/N: 10157416; M/N: 7-2941-1
- Other markings: C162-1; 1534; FD 17-1082-10-04
- Rubber cover: P/N 10149646

PASS Power Module (Figures 45-47)

- SEI label: 07-2015; 10148687 4500 psi; RFID
- PASS met requirements of NFPA 1982: Standard on Personal Alert Safety Systems (PASS) 2013 edition
- FCC ID P9R-10154953, RPN 10069330, QQQWT32AE

- SCBA containing power module M/N 7-2810-1
- Electrical lines to the HUD and speaker were both broken away from module
- Overall condition looked fair, but dirty
- Not held securely to backframe, backframe broken
- Power module battery was not in box

Backframe Assembly (Figures 47-48)

- S/N: 7-N/A
- SEI label 1981-2013 edition
- NIOSH Approval Number label: TC-13F-0787CBRN
- Other marking: 10158404; FD label with E 101C
- Extensive physical damage
- Cylinder retaining strap broken
- Dirt and debris were found everywhere
- Right shoulder strap was broken from the frame at the bottom

Straps and Buckles (Figure 49)

- Overall condition of straps was good, but dirty
- Hose lines passed through shoulder straps
- All adjustable buckles moved and held in place
- Waist area buckle latched but was not attached to backframe

Compressed Air Cylinder and Cylinder Valve Assembly (Figures 50-54)

- DOT-SP 10915-4500; TC-SU 5134-310
- Luxfer P/N L66B-7
- AJK 20846; REE 127
- MSA M/N 7-1348-1
- Mfr hydrostatic date: 9/15; 45 minute, 4500 PSI
- Overall condition was fair, with gouges
- Gauge was readable; received empty
- Threads were good
- O-ring was present and in good condition
- Rubber bumper at base of cylinder valve was in fair condition

SCBA Testing

The SCBA unit 1 was tested using the six NIOSH test methods and one NFPA test method as described in **Table 1**.

**A replacement cylinder was used for testing due to damaged cylinders and a replacement facepiece was used on the Positive Pressure and Rated Service Time Test.*

Table 1. Summary of results from testing SCBA unit against established NIOSH SCBA certification tests.

NIOSH Tests	Description of Results	PASS/ FAIL
<p>Positive Pressure Test - NIOSH Standard Test Procedure Number 120, 42 CFR Part 84 Reference: Subpart H, § 84.70 (a)(2)(ii) Requirement: <i>The pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.</i> Procedure: A breathing machine with a 622 kg.-m./min cam operating at 24 RPM with a 40 liters per minute flow rate (115 liters per minute peak flow) is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece.</p>	<p>The unit met the test requirements. The inhalation breathing resistance did not become negative during the test. The PASS, digital remote and HUD were not functional (battery was not included in shipping container).</p> <p>Inhalation Breathing Resistance: (inches of water column) = 0.1</p>	<p>PASS</p>
<p>Rated Service Time Test - NIOSH Standard Test Procedure Number 121, 42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b) Requirement: <i>Service time will be measured while the apparatus is operated by a breathing machine as described in § 84.88. The open-circuit apparatus will be classified according to the length of time it supplies air or oxygen to the breathing machine. Classifications are listed in § 84.53.</i> Procedure: A breathing machine with a 622 kg.-m./min cam operating at 24 RPM with a 40 liters per minute flow rate is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece. The breathing machine is run until the inhalation portion of the breathing curve falls below the minimum requirement.</p>	<p>The unit met the test requirements. The measured service time (adjusted to correspond with the recorded breathing cycles) was more than the rated service time of 45 minutes. The SCBA did not go negative on inhalation therefore, maintained positive pressure in the facepiece. The PASS did not function (battery was not included in shipping container).</p> <p>Measured Service Time: 49 Minutes 32 Seconds</p>	<p>PASS</p>

<p>Static Pressure Test - NIOSH Standard Test Procedure Number 122, 42 CFR Part 84 Reference: Subpart H, § 84.91 (d) Requirement: <i>The static pressure (at zero flow) in the facepiece shall not exceed 38 mm (1.5 inches) water column height.</i> Procedure: The facepiece is fitted to an anthropometric head for testing. A pressure tap in the head is connected to a calibrated manometer. Full cylinder pressure is applied to the unit at zero flow and a reading from the manometer is recorded.</p>	<p>The SCBA met the test requirement.</p> <p>Facepiece Static Pressure: (inches of water column) = 0.90</p>	<p>PASS</p>						
<p>Gas Flow Test - NIOSH Standard Test Procedure Number 123, 42 CFR Part 84 Reference: Subpart H, § 84.93 (b) and (c) Requirement: <i>The flow from the apparatus shall be greater than 200 liters per minute when the pressure in the facepiece of demand apparatus is lowered by 51 mm (2 inches) water column height when full container pressure is applied. Where pressure-demand apparatus are tested, the flow will be measured at zero gauge pressure in the facepiece.</i> Procedure: A pressure tap in the anthropometric head is connected to a manometer for determining when the pressure inside the facepiece is at zero. A mass flow meter is connected in line between the anthropometric head and an adjustable vacuum source to measure flow. The SCBA cylinder is replaced by a test stand which is adjusted initially to full cylinder pressure. The vacuum source is adjusted during the test to maintain the desired pressure inside the facepiece. Once the proper facepiece pressure has stabilized, a flow reading is recorded. The procedure is then repeated with the test stand adjusted to 500 psig.</p>	<p>The SCBA met the test requirement.</p> <table border="0"> <tr> <td>Applied Pressure</td> <td>Airflow (liters per minute)</td> </tr> <tr> <td>4500 psig</td> <td>453.1</td> </tr> <tr> <td>500 psig</td> <td>438.9</td> </tr> </table>	Applied Pressure	Airflow (liters per minute)	4500 psig	453.1	500 psig	438.9	<p>PASS PASS</p>
Applied Pressure	Airflow (liters per minute)							
4500 psig	453.1							
500 psig	438.9							
<p>Exhalation Resistance Test - NIOSH Standard Test Procedure Number 122, 42 CFR Part 84 Reference: Subpart H, § 84.91 (c) Requirement: <i>The exhalation resistance of pressure-demand apparatus shall not exceed the static pressure in the facepiece by more than 51 mm (2 inches) water column height.</i> Procedure: The facepiece is mounted on an anthropometric head form. A probe in the head form is connected to a slant manometer for measuring exhalation breathing resistance. The airflow through the apparatus is adjusted to a rate of 85 liters per minute and the exhalation resistance is recorded.</p>	<p>The SCBA met the test requirement.</p> <p>Exhalation Breathing Resistance: (inches of water column) = 2.21 Static Pressure: (inches of water column) = 0.90 Difference: (inches of water column) = 1.31</p>	<p>PASS</p>						

<p>Remaining Service Life Indicator Test - NIOSH Standard Test Procedure Number 124, 42 CFR Part 84 Reference: Subpart H, § 84.83 (f) Requirement: <i>Each remaining service life indicator or warning device must give an alarm when the remaining service life is reduced to a minimum of 25 percent of its rated service time or any higher minimum percent value or values as specified in the approval. Open-circuit demand and pressure-demand respirators must alarm continuously until depletion of the breathing air supply. The percent value set for indicator activation must be identified by labels and/or markings on each respirator unit.</i></p> <p>Procedure: A calibrated gauge is connected in line between the air supply and the first stage regulator. The unit is then allowed to gradually bleed down. When the low air alarm is activated, the pressure on the gauge is recorded. This procedure is repeated six times. The average of the six readings is calculated and recorded.</p>	<p>The test requirement was identified on the label as 33% - 37% of its remaining rated service time.</p> <table border="1" data-bbox="1312 284 1911 609"> <thead> <tr> <th></th> <th>Electrical</th> <th>Bell</th> </tr> <tr> <th>Run #</th> <th>Alarm Point (psi)</th> <th>Alarm Point (psi)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NA</td> <td>1620</td> </tr> <tr> <td>2</td> <td>NA</td> <td>1620</td> </tr> <tr> <td>3</td> <td>NA</td> <td>1620</td> </tr> <tr> <td>4</td> <td>NA</td> <td>1630</td> </tr> <tr> <td>5</td> <td>NA</td> <td>1620</td> </tr> <tr> <td>6</td> <td>NA</td> <td>1620</td> </tr> <tr> <td>Average</td> <td>NA</td> <td>1622</td> </tr> </tbody> </table>		Electrical	Bell	Run #	Alarm Point (psi)	Alarm Point (psi)	1	NA	1620	2	NA	1620	3	NA	1620	4	NA	1630	5	NA	1620	6	NA	1620	Average	NA	1622	<p>NA PASS</p>
	Electrical	Bell																											
Run #	Alarm Point (psi)	Alarm Point (psi)																											
1	NA	1620																											
2	NA	1620																											
3	NA	1620																											
4	NA	1630																											
5	NA	1620																											
6	NA	1620																											
Average	NA	1622																											

National Fire Protection Association (NFPA) Test (in accordance with NFPA 1981, 2013 Edition):

NFPA Test	Description of Results	PASS/ FAIL
<p><i>NFPA Air Flow Performance Test—NFPA 1981 (2013 Edition) Reference: Chapter 8, Performance Requirements, Section 8-1.1</i> Requirement: <i>SCBA shall be tested for air flow performance as specified in Section 8.1, Air flow Performance Test, and the SCBA facepiece pressure shall not be less than 0.0 in. (0.0 mm) water column and not greater than 3½ in. (89 mm) water column above ambient pressure from the time the test begins until the time the test is concluded.</i></p> <p>Procedure: The required equipment specified in the NFPA standards were used to conduct the tests on this unit. A pressure tap in the head is connected to a transducer which in turn is connected to a flatbed chart recorder for determining the pressure in the facepiece.</p>	<p>The SCBA passed this test. PASS unit, HUD, and alarm system were not functional (battery was not included in shipment).</p> <p>Maximum Facepiece Pressure: (inches of water column) = 2.8 Minimum Facepiece Pressure: (inches of water column) = 0.4</p>	<p>PASS PASS</p>

Disposition of SCBA

Following testing on February 26, 2019, the SCBA unit was returned to secure storage in Lab H1513 at the NIOSH facility in Morgantown, West Virginia.

Synopsis of Findings

The SCBA unit 1 inspected and evaluated by NPPTL was an MSA Model G1, 45-minute, 4500 psi unit with NIOSH Approval Number TC-13F-0787CBRN. The corresponding facepiece and cylinder were provided with the unit. A cylinder, not involved in the incident, was provided by the fire department for testing. Overall, the SCBA was in fair condition with soot and debris found on the unit. The NFPA approval label was present and readable. The PASS, HUD, and alarm systems did not function due to battery not being included with the unit.

The SCBA unit 1 met the test requirements of the NIOSH Positive Pressure Test, as the SCBA maintained a positive pressure for the 45 minute minimum duration of the test. The unit passed all of the other NIOSH tests, as well as meeting the requirements of the NFPA “Airflow Performance” test.

The SCBA unit 2 inspected and evaluated by NPPTL was an MSA Model G1, 45-minute, 4500 psi unit with NIOSH Approval Number TC-13F-0787CBRN. The corresponding cylinder was provided with the unit. Overall, the SCBA was in poor condition. The NFPA approval label was present and readable. It was determined unit 2 was not safe to test due to the high pressure hose not being attached to backframe.

In light of the information obtained during this investigation, NIOSH NPPTL has proposed no further action on its part at this time. The SCBAs were returned to the shipping containers to be shipped back to the Clinton Fire Department.

CASE Conclusion

No evidence was identified to suggest that the SCBA units inspected and evaluated contributed to the fatality or near miss. NIOSH determined that there was no need for corrective action with regards to the approval holder or users of SCBAs manufactured under the approval numbers granted to these products.

Actions to be Taken by the Fire Departments With SCBAs Involved in an Incident

- Any SCBA unit involved in an incident may not be placed back in service until the SCBA has been repaired, tested, cleaned, and any damaged components replaced and inspected by a qualified service technician, including such testing and other maintenance activities as prescribed by the schedule from the SCBA manufacturer
- All SCBA units, even those not involved in an incident, must undergo a flow test on at least an annual basis

Actions the PPE Users, Selectors, and Purchasers May Take to Further Protect Themselves and Others from Hazards

- Sign up for NPPTL’s Listserv at <https://www.cdc.gov/niosh/npptl/sub-NPPTL> to receive email notifications relevant to PPE

To request additional information about this report, contact NPPTL at ppeconcerns@cdc.gov, and reference NIOSH Task Number 22491 in your request.

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Appendix Photographs to Support Inspection Findings for SCBA

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Figure 5: Top view of facepiece



Figure 6: Facepiece hairnet and straps



Figure 7: Inside view of facepiece and nosecup



Figure 8: Inside view nosecup and identifying markings



Figure 9: Facepiece seal identifying markings



Figure 10: Mask mounted regulator (MMR)



Figure 11: MMR with identifying markings



Figure 12: MMR and low pressure hose



Figure 13: Pressure reducer, UAC with primary low pressure warning device (bell)



Figure 14: Back view of pressure reducer assembly and identifying markings

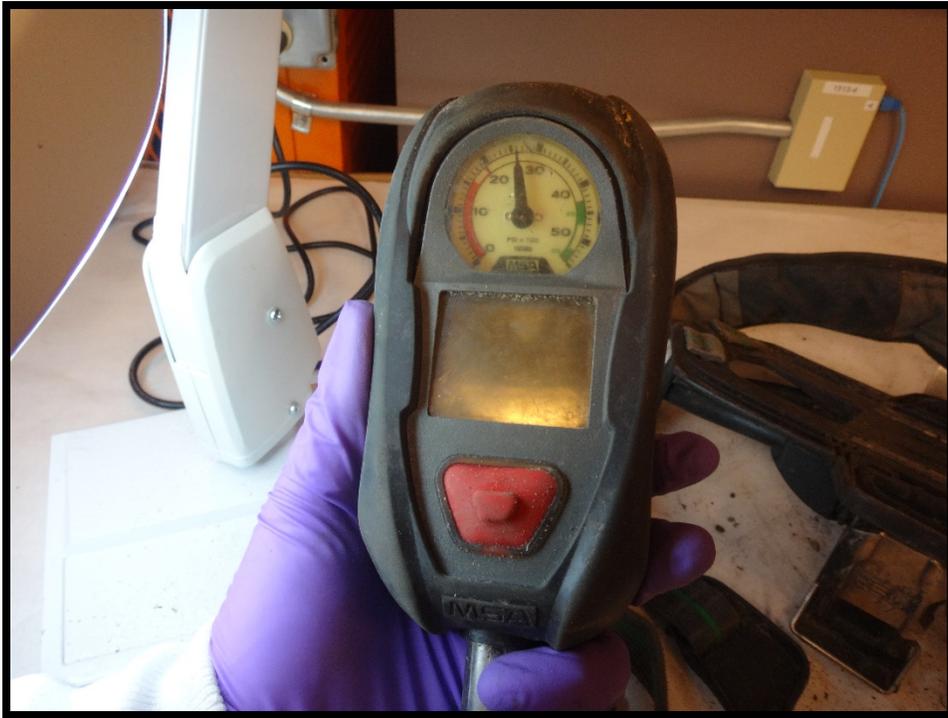


Figure 15: Front view of PASS control module



Figure 16: Back view of PASS control module with labels



Figure 17: High pressure hose and cylinder attachment



Figure 18: High pressure hose connection bent



Figure 19: Cylinder attachment threads



Figure 20: ExtendAire II EBSS hose with male and female Quick Connect



Figure 21: Male and female Quick Connect



Figure 22: PASS power module



Figure 23: PASS power module SEI label



Figure 24: Power module MSA label



Figure 25: Back view of backframe with labels



Figure 26: Broken sections of backframe



Figure 27: Front view of backframe



Figure 28: Overview of straps and broken waist belt connection



Figure 29: Cylinder gauge and cylinder threads



Figure 30: Cylinder with gouges

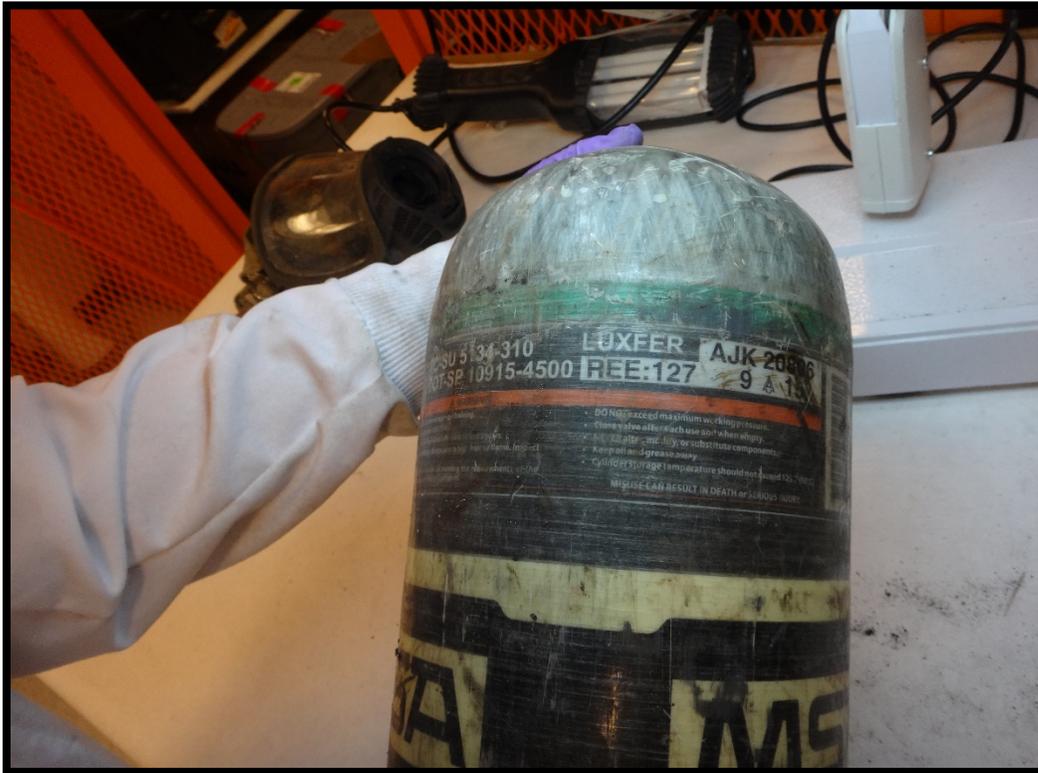


Figure 31: Cylinder labels



Figure 32: Mask mounted regulator (MMR)



Figure 33: MMR identifying marking

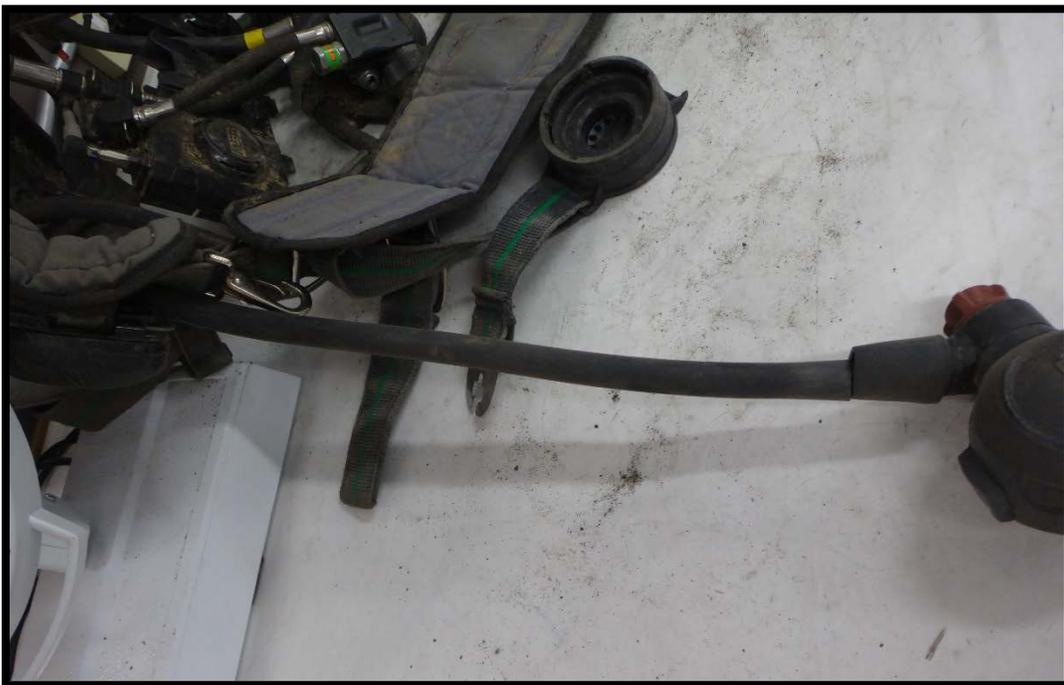


Figure 34: Low pressure hose and MMR



Figure 35: Pressure reducer assembly, UAC with primary low pressure warning device (bell)



Figure 36: Bottom view of pressure reducer with identifying markings



Figure 37: UAC as found with cap off



Figure 38: UAC with cap on



Figure 39: Back view of PASS control module with labels



Figure 40: Front view of PASS control module



Figure 41: High pressure hose



Figure 42: Cylinder attachment threads



Figure 43: ExtendAire II EBSS and identifying markings



Figure 44: ExtendAire II EBSS male and female Quick Connect



Figure 45: PASS power module with plastic housing broke off



Figure 46: PASS power module with cracked plastic housing



Figure 47: Backframe with broken cylinder retaining strap



Figure 48: Backframe with labeling



Figure 49: Overview of straps and buckles



Figure 50: Cylinder gauge

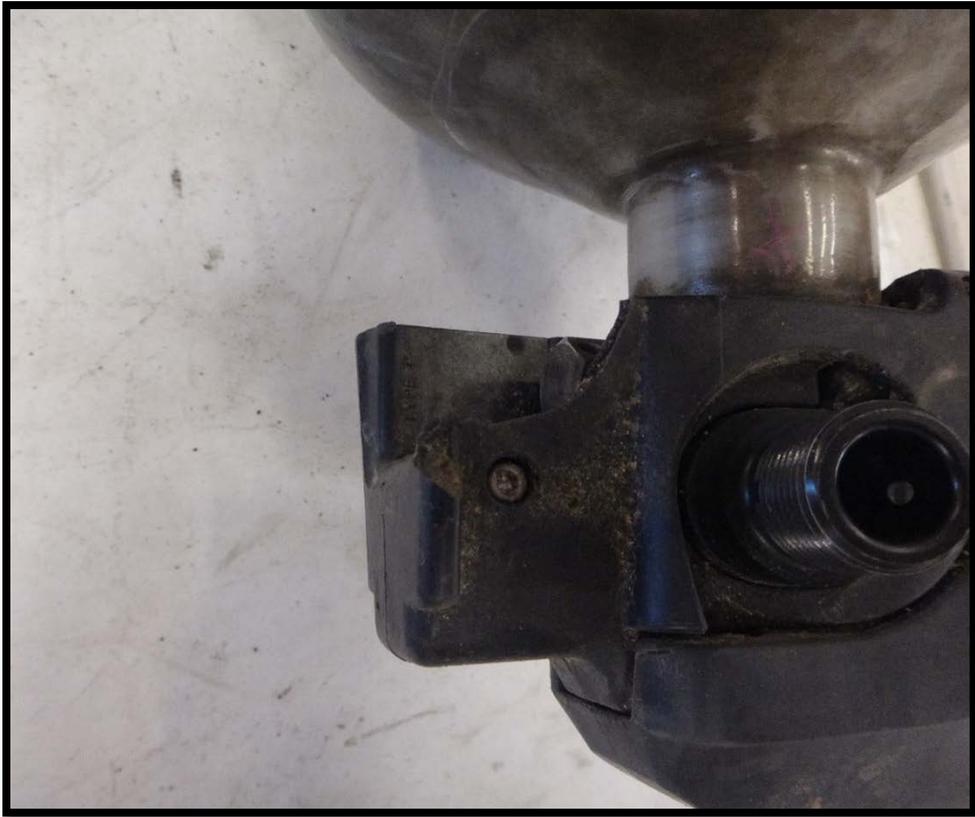


Figure 51: Cylinder attachment threads



Figure 52: Cylinder labels

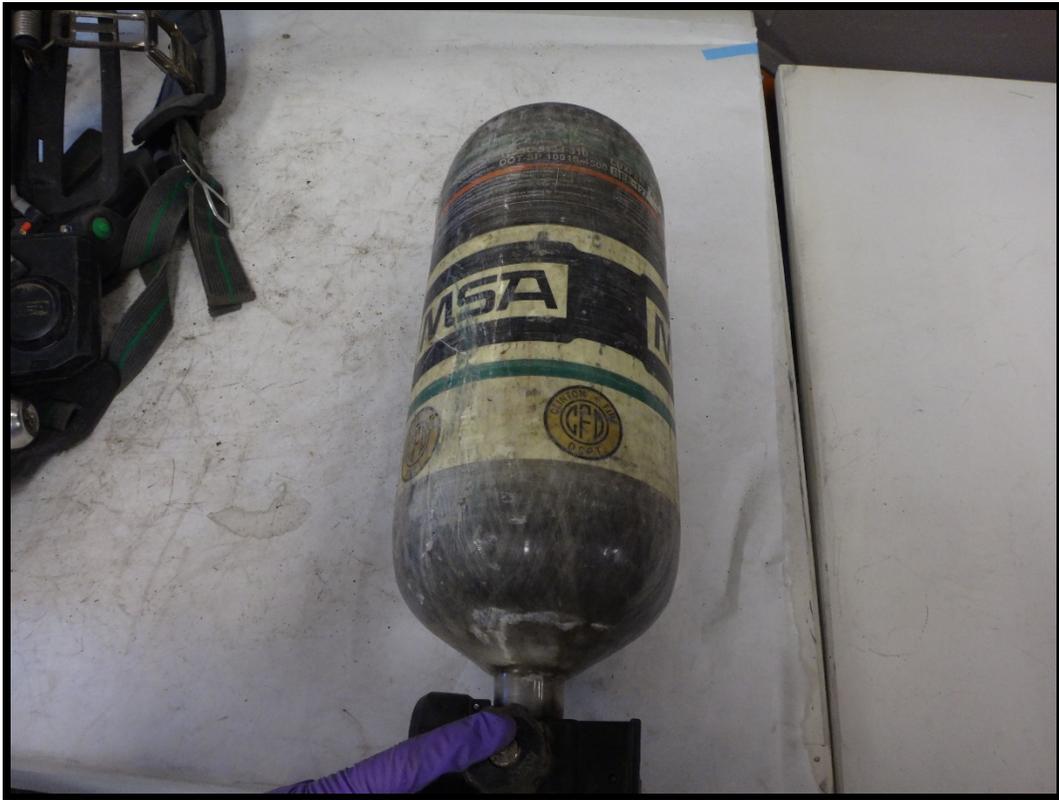


Figure 53: Overview of cylinder



Figure 54: Cylinder with exposed fibers

Disclaimer

The purpose of this effort was to determine the conformance of a respirator to the NIOSH approval requirements found in Title 42, *Code of Federal Regulations*, Part 84. A number of performance tests are selected from the complete list of Part 84 requirements and each respirator is tested in its “**As received**” condition to determine its conformance to those performance requirements. Each respirator is also inspected to determine its conformance to the quality assurance documentation on file at NIOSH.

In order to gain additional information about its overall performance, each respirator may also be subjected to other recognized test parameters, such as National Fire Protection Association (NFPA) consensus standards. While the test results give an indication of the respirator’s conformance to the NFPA approval requirements, NIOSH does not actively correlate the test results from its NFPA test equipment with those of certification organizations which list NFPA-compliant products. Thus, the NFPA test results are provided for information purposes only.

Selected tests are conducted only after it has been determined that each respirator is in a condition that is safe to be pressurized, handled, and tested. Respirators whose condition has deteriorated to the point where the health and safety of NIOSH personnel and/or property is at risk will not be tested.

