

PPE CASE



Personal Protective Equipment Conformity Assessment Studies and Evaluations

Evaluation of a Self-Contained Breathing Apparatus for Potential Contribution to a Fatal Event in the Fire Service

Hamilton, Ohio Fire Department Request for Survivair Panther 30 minute, 4500 psig unit with NIOSH Approval Number TC-SU-5134-310 (August 3, 2016)

As part of the **National Institute for Occupational Safety and Health (NIOSH), Fire Fighter Fatality Investigation and Prevention Program (FFFIPP)**, the National Personal Protective Technology Laboratory (NPPTL) agreed to examine and evaluate a self-contained breathing apparatus (SCBA) unit identified as Survivair Panther 30 minute, 4500 psig, SCBA.

This SCBA status investigation was assigned NIOSH Task Number 20731. The NIOSH Division of Safety Research (NIOSH/DSR) and the Hamilton Fire Department were advised that NIOSH/NPPTL would provide a written report of the inspections and any applicable test results.

The SCBA unit was contained in a cardboard shipping box and delivered to the NIOSH facility in Morgantown, West Virginia on January 13, 2016. Once the cardboard box containing the unit arrived, it was taken to the H building and locked in the evidence cage located in room 1513. The inspection was conducted on March 3, 2016 and placed back into the locked evidence cage until the testing evaluations.

NIOSH evaluated one SCBA unit used by a fire fighter involved in a fatal event. The SCBA was not found to contribute to the fatality. A qualified service technician should always inspect, repair, test, clean, and replace damaged components of any SCBA involved in an incident before it may be returned to service.

Disclaimer

The purpose of Respirator Status Investigations is to determine the conformance of each 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.

Investigator Information

The self-contained breathing apparatus (SCBA) performance tests were conducted by Jeremy Gouzd (Fellow), Karis Kline (Contractor), and Jay Tarley (Physical Scientist). The SCBA inspections for this report were performed and written by Jeremy Gouzd and Karis Kline. The investigators are part of the Evaluation and Testing Branch, National Personal Protective Technology Laboratory, National Institute for Occupational Safety and Health, located in Morgantown, West Virginia.

NIOSH Task Number 20731

SCBA Inspection

The unit was removed from the packaging in the Testing Lab, Room 1513 and inspected on March 3, 2016 by Jay Tarley (Physical Scientist), Karis Kline (Contractor), and Jeremy Gouzd (Fellow). The SCBA was identified as the Hamilton Fire Department SCBA. The SCBA unit was extensively examined, component by component, in the condition received to determine how well the SCBA conformed to the NIOSH-approved configuration. The unit was identified as a Survivair Panther 30 minute, 4500 psig SCBA with the NIOSH approval number TC-SU-5134-310. The visual inspection process was documented photographically. Once all the inspections were completed, the SCBA unit was repackaged and placed back in the evidence cage in room 1513.

The complete SCBA inspection is summarized in **Appendix I**. The condition of each major component of the SCBA that was photographed with a digital camera is contained in **Appendix III**.

SCBA Testing

The purpose of the testing was to determine how well the SCBA conformed to the approval performance requirements of Title 42, *Code of Federal Regulations*, Part 84 (42 CFR 84). Further testing was conducted to provide an indication of the SCBA's conformance to the National Fire Protection Association (NFPA) Air Flow Performance requirements of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service*, 2013 Edition.

NIOSH SCBA Certification Tests (in accordance with the performance requirements of 42 CFR 84):

1. Positive Pressure Test [§ 84.70(a)(2)(ii)]
2. Rated Service Time Test (duration) [§ 84.95]
3. Static Pressure Test [§ 84.91(d)]
4. Gas Flow Test [§ 84.93]
5. Exhalation Resistance Test [§ 84.91(c)]
6. Remaining Service Life Indicator Test (low-air alarm) [§ 84.83(f)]

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

7. Air Flow Performance Test [Chapter 7, 7-1.1]

Appendix II contains the complete NIOSH test report for the SCBA units. **Tables ONE and TWO** summarize the NIOSH and NFPA test results.

Summary and Conclusions

One SCBA unit was submitted to NIOSH/NPPTL by NIOSH/DSR for the Hamilton Fire Department for evaluation. The SCBA unit was delivered to NIOSH in one shipment on January 13, 2016 and extensively inspected on March 3, 2016. The unit was identified as a Survivair Panther model, 4500 psig 30 minute SCBA with the NIOSH approval number TC-SU-5134-310. After inspection, the unit was deemed testable, only suffering slight damage from the incident it was involved in.

The unit was provided with a corresponding cylinder which was found to also be in testable condition, however it was missing a date for hydrostatic testing. Under the applicable Department of Transportation (DOT) exemption, the air cylinder is required to be hydro tested every five years. For the air cylinder on this unit, the hydro date was not found, therefore, a retest would need to take place before it would be deemed safe to test this unit.

The unit did come with a corresponding facepiece. The overall condition of the unit and facepiece was fair to good with some dirt and debris. There was visible heat damage to the unit's straps. The cylinder

with the unit had some scratches and dirt present. The cylinder was opened and it was empty. This unit passed the NIOSH tests and NFPA air flow test.

In light of the information obtained during this investigation, NIOSH has proposed no further action on its part at this time. The SCBA unit remains locked in the evidence cage until ordered to return to Hamilton Fire Department.

If these units are to be placed back in service, the SCBAs must be 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. Typically, a flow test is required on at least an annual basis.

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, should undergo a flow test on an annual basis at a minimum.

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

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

For more information related to personal protective equipment, visit the NIOSH website www.cdc.gov/niosh/npptl

To receive documents or other information about occupational safety and health topics, contact NIOSH:

Telephone: 1-800-CDC-INFO (1-800-232-4636)

TTY: 1-888-232-6348

CDC INFO: www.cdc.gov/info

or visit the NIOSH website at www.cdc.gov/niosh

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Appendix I

SCBA Inspection Report



National Personal Protective Technology Laboratory, Evaluation and Testing Branch

Respirator Field Problem Incoming Inspection Report Summary

Task Number:	TN-20731	Requestor:	NIOSH/DSR for the Hamilton Fire Department
Date Received:	January 13, 2016		
Date Inspected:	March 3, 2016	Description:	Fatality
Manufacturer:	Survivair	Inspected by:	Jeremy Gouzd, Karis Kline
Approval Number:	TC-SU-5134-310	SCBA Type:	Open Circuit, Pressure-Demand

The SCBA was received in a cardboard box (refer to **Figures 1-2** in **Appendix III**)

Contact Agency: NIOSH/DSR for the Hamilton Fire Department

As received:

- Cylinder included and empty, open
- Bypass closed
- Mask mounted regulator (MMR) not locked in to facepiece
- Facepiece included and detached in separate paper bag

Components and Observations

NOTE: All references to “right” or “left” are from the user’s perspective.

1. Facepiece: (refer to **Figures 3-8** in **Appendix III**)

Facepiece assembly; Survivair, Medium

Other Markings: Label “___lterman” on MMR port housing

Part Number 252022 Lot Number 280050

Medallion Left- 962167 Medallion Right 03

- Overall condition is dirty, covered in drywall dust
- Lens and rings are dirty, covered in debris
- Lens appears to be covered in debris

- Lens retaining ring marking 962837
- Hairnet dirty, but in good shape
- Cheek tension straps twisted

2. MMR with HUD: (refer to **Figures 9-11** in **Appendix III**)

MMR markings: 968801 040 3120067

- HUD INCLUDED
- Secured to low pressure line
- Bypass is closed, covered in debris
- Inside flange has no scratches and appears in good condition
- Sealing area is dirty; Patent #5097826
- Regulator can be attached and removed
- Locking assembly does function
- Quick disconnect not present

3. Low Pressure Line: (refer to **Figure 12** in **Appendix III**)

Number: Obscured by line cover

- Secured at all attachments points
- Quick disconnect not present
- Line runs through the shoulder strap to the reducer
- Tear in protective cover

4. 4.5 Pressure Reducer Assembly: (refer to **Figures 13-15** in **Appendix III**)

Markings/numbers: Part Number 268888 Lot Number 283553

- Barcode marking is present- BA-010638 05104
- Overall condition is fair to good, but dirty with scratches
- All airline connections are secure
- Disconnected from belt

5. High Pressure Line & Cylinder Attachment: (refer to **Figures 16-18** in **Appendix III**)

- Overall condition is good with slight scratches
- Cylinder attachments thread corroded, threads on and off, “O” ring in place, but dirty
- Relief valve SVA 45K
- Eaton FD17-1002-10-04
- Three lines:
 - One goes to first stage regulator
 - Two low pressure lines go to auxiliary with male and female attachment points
 - One line goes to stand alone gauge

- High pressure hose assembly other markings:
 - 0407230349
 - 968831

6. Console Compass Personal Alert Safety System (PASS) Version: (refer to **Figure 19** in **Appendix III**)

Model#: 962600

- Overall condition is good
- Lines are in good shape—pressure/electrical
- Protective casing slightly dirty; normal wear and tear
- SEI Label attached NFPA 1992, 1998 ed.
- PASS did turn on
- Additional port on PASS device has steel plug

7. Backframe Assembly: (refer to **Figures 20-22** in **Appendix III**)

Other markings: 27A City of Hamilton Sticker Partial #: 001561

Model #: Unreadable

Lot #: 286186

NIOSH label: TG-13F-284

NFPA 1981, 2002 ed.

- Overall condition is good, but dirty
- Shoulder straps were attached to the frame
- Cylinder strap intact

8. Straps & Buckles: (refer to **Figures 23** in **Appendix III**)

- Overall strap condition is dirty with some dye sublimation
- Shoulder strap attachment connected both sides
- Hose lines and wires pass through shoulder straps
- All adjustable buckles move and hold in place
- Waist area buckle latches and releases
- Heat damage to plastic latch on cylinder strap

9. Cylinder & Valve Assembly: (refer to **Figures 24-27** in **Appendix III**)

Some DOT and other information:

DOT- E-10915-4500

Survivair PN: 917135

TC-SU-5134-310

IO 25030

Cylinder M/N: 7-947-1

Luxfer PN: L45J-1 REE 78

Manufacture date: 7/04

30 Minute, 4500 PSIG

Valve stem assembly PN: 920322

LN: Unreadable, begins with 2

- Overall condition is fair to good as there are some surface scratches and dirt present
- Gauge is readable
- Threads are dirty and corroded
- As received cylinder valve open and empty
- Rubber bumper at base on cylinder valve is in OK condition
- Rehydro/inspection date: Not found

10. Auxiliary Hose: (refer to **Figures 28** in **Appendix III**)

- Female and male attachment points
- Cover in place, but off
- Quick disconnect on female port is stuck
- AISI303 on male port R1.4305
- On quick disconnect RECIUS type 25 NW 7.4

11. Standalone Gauge: (refer to **Figure 29** in **Appendix III**)

- Lens is scratched and dirty, but readable
- 9806-41

Appendix II

SCBA Test Results



National Personal Protective Technology Laboratory, Evaluation and Testing Branch

SCBA Test Report

Task Number: TN-20731
Manufacturer: Survivair Panther 4500 psig 30 min
NIOSH Approval Number: 20731
Tests Performed by: Karis Kline, Jeremy Gouz, and Jay Tarley
Report written by: Karis Kline
Date of Report: August 3, 2016

I. Background

The SCBA unit was delivered to the NIOSH facility in Morgantown, West Virginia on January 13, 2016. It was taken to the lower floor of lab room 1513 for secured storage. The inspection for this unit was conducted on March 3, 2016.

The unit was stored under lock until the time of the performance test.

The unit was removed from the packaging in the Testing Lab, Room 1513 and inspected on March 3, 2016 by Jay Tarley (Physical Scientist,) Karis Kline (Contractor), and Jeremy Gouz, (Fellow). The SCBA was identified as the Hamilton Fire Department SCBA. The SCBA unit was extensively examined, component by component, in the condition received to determine how well the SCBA conformed to the NIOSH-approved configuration. The unit was identified as a Survivair Panther 30 minute, 4500 psig SCBA with the NIOSH approval number TC-SU-5134-310. The visual inspection process was documented photographically. Once all the inspections were completed, the SCBA unit was repackaged and placed back in the evidence cage in room 1513.

A series of performance tests were conducted on May 3, 2016

II. Test Outlines

- 1. POSITIVE PRESSURE TEST – NIOSH Test Procedure No. 120**
42 CFR Part 84 Reference: Subpart H, § 84.70 (a)(2)(ii)

Requirement:

The pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.

Procedure:

A breathing machine with a 622 kg.-m./min. cam operating at 24 RPM with a 40-liter 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.

Results: The unit met all of the test requirements.

Inhalation Breathing Resistance:	0.25
(inches of water column)	
Pass / Fail	PASS

2. RATED SERVICE TIME TEST – NIOSH Test Procedure No. 121

42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b)

Requirement:

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.

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 runs until the inhalation portion of the breathing curve falls below the minimum requirement.

Results: The unit passed Rated Service Time Test.

Test Notes: The measured service times for the unit (adjusted to correspond with the recorded breathing cycles) were more than the rated service times of 30 minutes. The PASS functioned during the test. The SCBA did not go negative on inhalation, but maintained positive pressure in the facepiece at the same level.

Measured Service Time:	Minutes	Seconds	33	34
Pass / Fail	PASS			

3. STATIC PRESSURE TEST – NIOSH Test Procedure No. 122
42 CFR Part 84 Reference: Subpart H, § 84.91 (d)

Requirement:

The static pressure (at zero flow) in the facepiece shall not exceed 38 mm. (1.5 inches) water-column height.

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.

Results: The unit met the test requirement.

Facepiece Static Pressure:(inches of water	1.15
Pass / Fail	Pass

4. GAS FLOW TEST – NIOSH Test Procedure No. 123
42 CFR Part 84 Reference: Subpart H, § 84.93 (b) and (c)

Requirement:

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 gage pressure in the facepiece.

Procedure:

A pressure tap in the anthropometric head is connected to a manometer for determining when the pressure inside the facepiece is 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.

Results: The unit passed the Gas Flow test.

Unit 1		
Applied Pressure	Air Flow(liters per minute)	Pass/Fail
4500 psig	232	Pass
500 psig	228	Pass

5. EXHALATION RESISTANCE TEST – NIOSH Test Procedure No. 122

42 CFR Part 84 Reference: Subpart H, § 84.91 (c)

Requirement:

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.

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 air flow through the apparatus is adjusted to a rate of 85 liters per minute and the exhalation resistance is recorded.

Results: The unit passed the Exhalation Resistance Test.

Exhalation Breathing Resistance: (inches of water column)	2.25
Static Pressure: (inches of water column)	1.15
Difference: (inches of water column)	1.1
Pass / Fail	Pass

6. REMAINING SERVICE LIFE INDICATOR TEST – NIOSH Test Procedure No. 124

42 CFR Part 84 Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c)

Requirement:

Each remaining service life indicator or warning device shall give an alarm when the remaining service life of the apparatus is reduced within a range of 20 to 25 percent of its rated service time or pressure.

This requirement is modified under § 84.63(c) as follows: *For apparatus which do not have a method of manually turning off remote gage in the event of a gage or gage line failure the remaining service life indicator is required to be set at 25% ± 2% of the rated service time or pressure.*

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.

Results: The unit passed the Remaining Service Life Indicator test. The test requirement is 25% ± 2%.

Testing Notes:

The SCBA unit contained two alarms—a mechanical “bell” alarm and the electric light indicator on the PASS Console that changes from green to red when activated. The mechanical and electric alarms worked for all four testable units. Required range is between 1035 and 1215 psig.

Run #	Mechanical Alarm Point (psig)	Electronic Alarm Point (psig)
1.	1200	1050
2.	1200	1050
3.	1200	1025
4.	1200	1050
5.	1200	1025
6.	1200	1025
Avg.	1200	1038
Pass /	Pass	Pass

7. NFPA AIR FLOW PERFORMANCE TEST

NFPA 1981 (1997 Edition) Reference: Chapter 5, Performance Requirements, Sec. 5-1.1

Requirement:

SCBA shall be tested for air flow performance as specified in Section 6-1, Air Flow Performance Test, and the SCBA facepiece pressure shall not be less than 0.0 in. (0.0 mm) water column and nor greater than 3½ in. (89 mm) water column above ambient pressure from the time the test begins until the time the test is concluded.

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.

Results: The SCBA passed this test.

Maximum Facepiece Pressure: (inches of water column)	3.2
Minimum Facepiece Pressure: (inches of water column)	0.1
Pass / Fail	PASS

III. Disposition:

Following testing, the SCBA unit was returned to the package in which the unit was shipped to NIOSH and placed in secured storage. The unit was placed back into secured storage until it was shipped back to the fire department.

The results of all tests are summarized in Tables One and Two which follow.

TABLE ONE – Summary of NIOSH Test Results

Task Number: 20731
Manufacturer: Survivair
NIOSH Approval Number: TC-SU-5134-310
Tests Performed By: Jay Tarley, Jeremy Gouz, Karis Kline
Dates of Tests: May 3, 2016

TEST / 42 CFR PART 84 REFERENCE	STANDARD	RESULT	PASS	FAIL
1. POSITIVE PRESSURE TEST Reference: Subpart H, § 84.70 (a)(2)(ii) ≥ 0.00 INWC		0.25 INWC	X	
2. RATED SERVICE TIME TEST Reference: Subpart F, § 84.53 (a), Subpart H, § 84.95 (a) and (b) ≥ 30 min.		33 min 34 s	X	
3. STATIC PRESSURE TEST Reference: Subpart H, § 84.91 (d) ≤ 1.50 INWC		1.15 INWC	X	
4. GAS FLOW TEST (at Full Cylinder Pressure) Reference: Subpart H, § 84.93 (b) and (c) ≥ 200 lpm		232.0 LPM	X	
4. GAS FLOW TEST (at 500 psig) Reference: Subpart H, § 84.93 (b) and (c) ≥ 200 lpm		228.0 LPM	X	
5. EXHALATION RESISTANCE TEST Reference: Subpart H, § 84.91 (c) Difference ≤ 2.00 INWC		1.1 INWC	X	

6. REMAINING SERVICE LIFE INDICATOR TEST (Mechanical alarm) Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c) Between 1035 and 1215 psig	1200 PSIG	X	
6. REMAINING SERVICE LIFE INDICATOR TEST (Electronic alarm) Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c) Between 1035 and 1215 psig	1038 PSIG	X	

NOTE: The Positive Pressure Test and Rated Service Life Test run simultaneously.

TABLE TWO – Summary of NFPA Test Results

TEST / REFERENCE	STANDARD	RESULT	PASS	FAIL
7. NFPA AIR FLOW PERFORMANCE Reference: NFPA 1981 (1997 Edition), Section 5-1.1	≤ 3.50 INWC Exhalation Resistance	3.2 INWC	X	
7. NFPA AIR FLOW PERFORMANCE Reference: NFPA 1981 (1997 Edition), Section 5-1.1	≥ 0.00 INWC Inhalation Resistance	0.1 INWC	X	

Appendix III

SCBA Inspection Report

Figure 1: Sealed paper bag containing SCBA
Figure 2: Facepiece unit in bag with evidence description
Figure 3: Facepiece and SCBA unit out of bag
Figure 4: Overview of facepiece, covered in debris
Figure 5: View of inside of facepiece, covered in debris
Figure 6: Bottom view of facepiece, debris inside
Figure 7: Identifying markings on facepiece frame
Figure 8: Identifying markings on facepiece
Figure 9: Mask mounted regulator
Figure 10: Inside flange, mask mounted regulator
Figure 11: Heat damage to air supply valve
Figure 12: Tear in protective cover of low pressure hose
Figure 13: Pressure reducer assembly with markings
Figure 14: Identifying markings on pressure reducer
Figure 15: Side view of pressure reducer with identifying markings
Figure 16: High pressure hose and cylinder attachment
Figure 17: Cylinder attachment overview with bell assembly and markings
Figure 18: Quick fill port on cylinder attachment
Figure 19: PASS console
Figure 20: Overview of pack assembly (backside)
Figure 21: Overview of pack assembly (inside)
Figure 22: Back frame labels
Figure 23: Overview of buckles and straps
Figure 24: Overview of cylinder
Figure 25: Overview of cylinder label
Figure 26: Markings on cylinder
Figure 27: Cylinder threads with readable cylinder gauge
Figure 28: Auxiliary hose, female and male attachments
Figure 29: Standalone gauge, lens scratched but readable



Figure 1: Sealed Paper bag containing SCBA

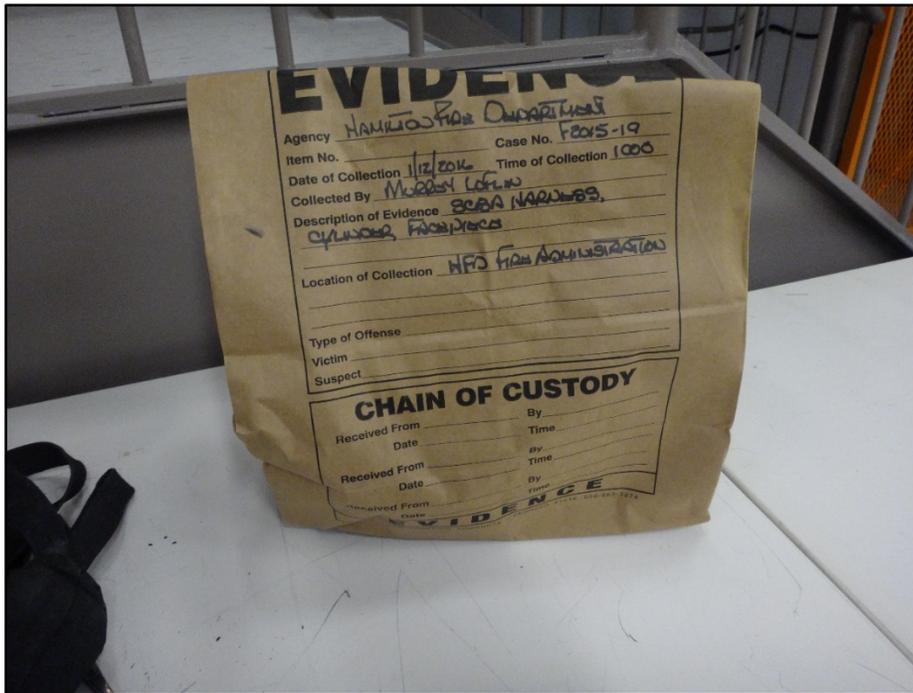


Figure 2: Facepiece unit in bag with evidence description



Figure 3: Facepiece and SCBA unit out of bag



Figure 4: Overview of facepiece, covered in debris



Figure 5: View of inside of facepiece, covered in debris



Figure 6: Bottom view of facepiece, debris inside



Figure 7: Identifying markings on facepiece frame



Figure 8: Identifying markings on facepiece



Figure 9: Mask mounted regulator



Figure 10: Inside flange, mask mounted regulator



Figure 11: Heat damage to air supply valve



Figure 12: Tear in protective cover of low pressure hose

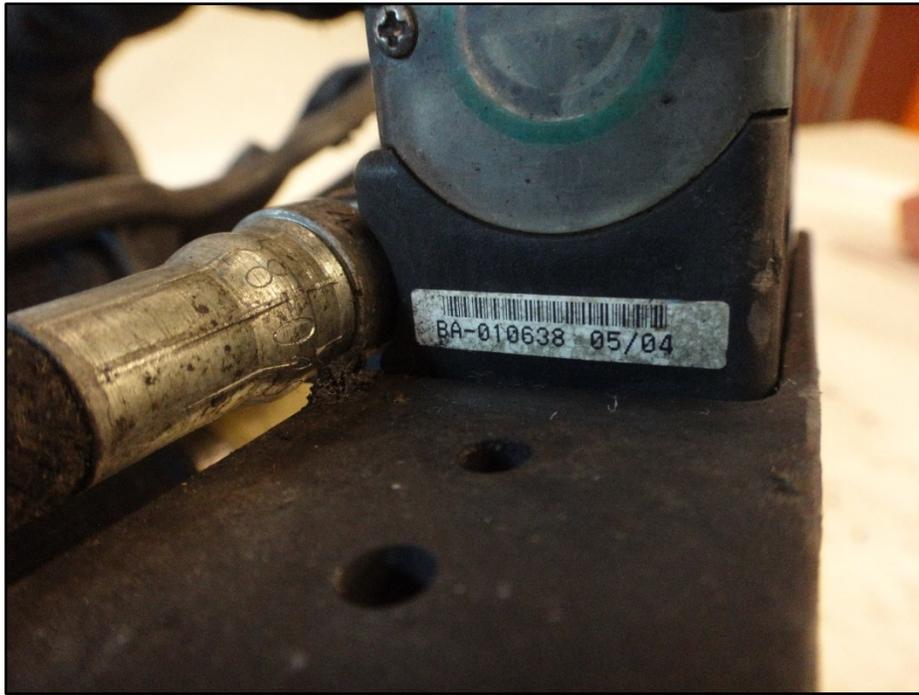


Figure 13: Pressure reducer assembly with markings



Figure 14: Identifying markings on pressure reducer



Figure 15: Side view of pressure reducer with identifying markings



Figure 16: High pressure hose and cylinder attachment

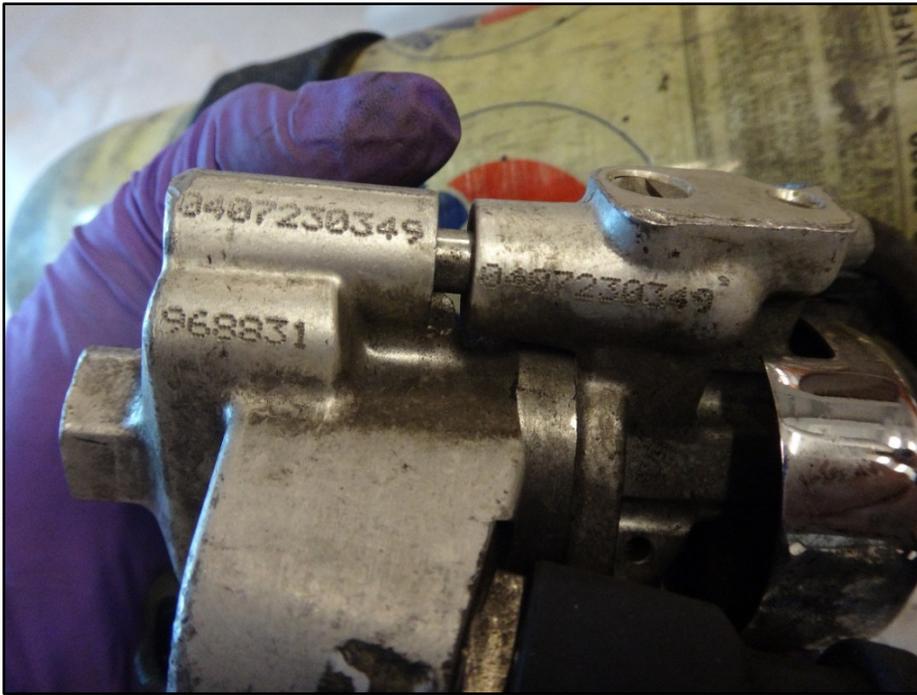


Figure 17: Cylinder attachment overview with bell assembly and markings



Figure 18: Quick fill port on cylinder attachment



Figure 19: PASS console



Figure 20: Overview of pack assembly (backside)



Figure 21: Overview of pack assembly (inside)



Figure 22: Back frame labels



Figure 23: Overview of buckles and straps



Figure 24: Overview of cylinder

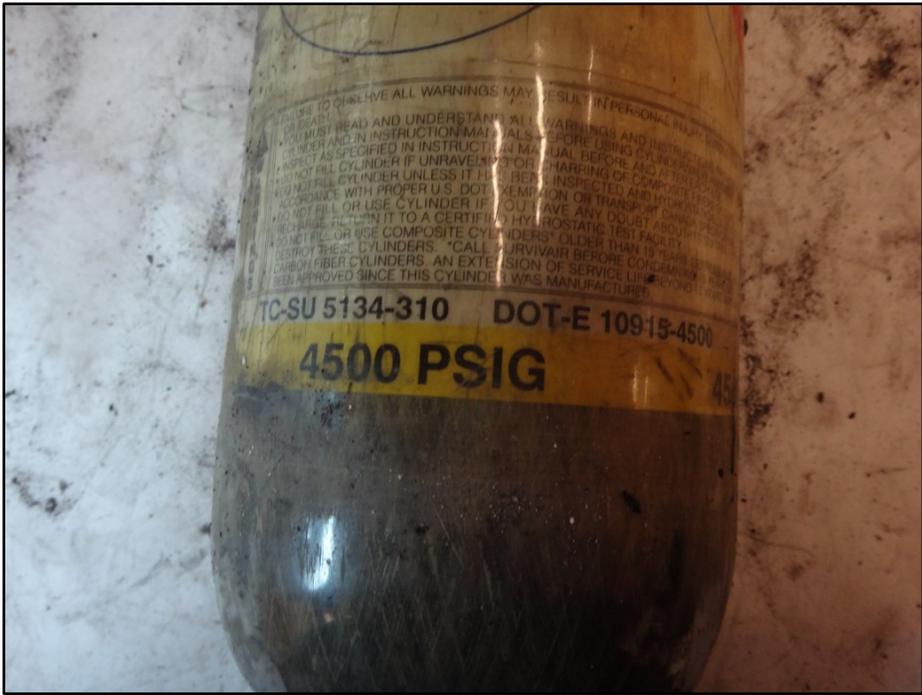


Figure 25: Overview of cylinder label

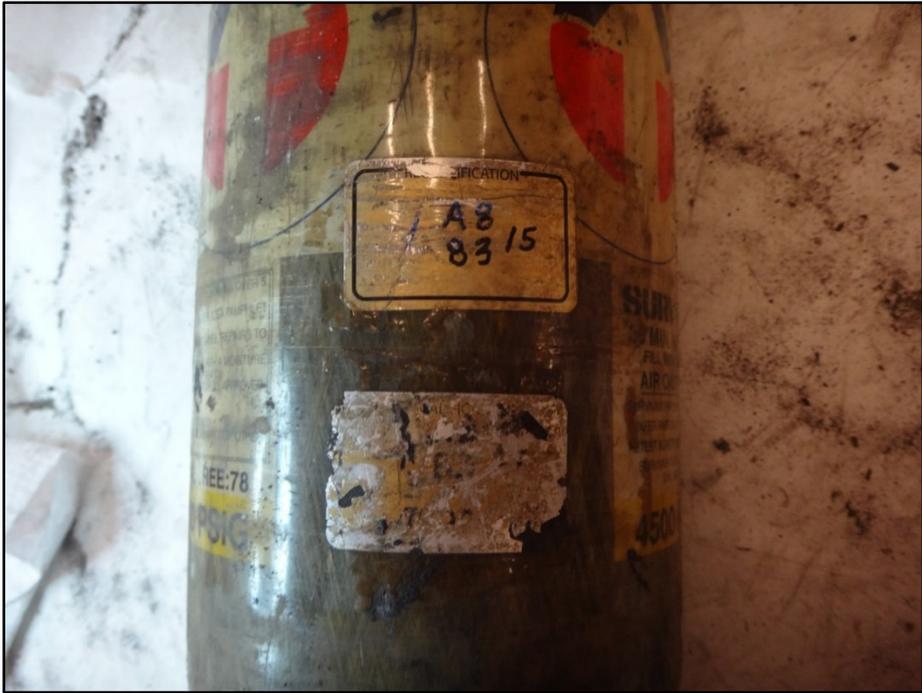


Figure 26: Markings on cylinder



Figure 27: Cylinder threads with readable cylinder gauge



Figure 28: Auxiliary hose, female and male attachments



Figure 29: Standalone gauge, lens scratched but readable