



## **SCBA 1**

**Identification, familiarization, donning, and inspection of the Scott Fifty SCBA.  
Using a cascade system to refill Scott Fifty SCBA cylinders**

**NFPA 1001, Standard for Firefighter Professional Qualifications 2008 Edition**  
FFI 5.3.1, 5.3.5, 5.3.9, & 5.5.1

### **Equipment needed:**

Cascade System  
Scott Fifty Air-Pak SCBA  
Full protective clothing  
Spray bottle of SCBA disinfectant solution  
Spray bottle of clean water  
Clean towels  
Bucket of mild soapy water  
Bucket of clean water  
Facepiece

### **Student Performance Objectives:**

The student shall identify all parts of the Scott Fifty Air-Pak SCBA and ensure that the apparatus is ready for use by demonstrating how to complete a function check.

The student must perform practical skills to a practical test accuracy of 100%.

The student shall demonstrate how to properly don and doff the Scott Fifty Air-Pak SCBA while wearing full protective clothing. Donning must be performed in 60 seconds or less per.

The student must perform practical skills to a practical test accuracy of 100%.

The student shall demonstrate how to change a compressed air cylinder on the Scott Fifty Air-Pak SCBA, follow steps to clean their breathing apparatus, and discuss how to properly complete any documentation required. The student must perform practical skills to a practical test accuracy of 100%.

## I. Construction, Parts and Definitions of the Scott Fifty Air-Pak SCBA

**The student shall identify parts of the Scott Fifty Air-Pak SCBA.**

### A. Introduction

The Scott Air Pak self contained breathing apparatus is designed to provide greater mobility with approximately 30 to 60 minutes of breathable air when filled to 4500 psi. The unit provides the user with respiratory protection while performing work in environments that is dangerous to life or health. The breathing regulator is equipped with a Vibralert alarm, which warns the user of a diminishing air supply or system malfunction, thus allowing time for egress from the hazardous environment. The unit is NIOSH and MOSHA certified.

**The unit weight depends on the cylinder capacity:**

30 minute cylinder (45 cubic feet) weighs 23 pounds

45 minute cylinder (68 cubic feet) weighs 35 pounds

60 minute cylinder (90 cubic feet) weighs     pounds



## B. Facepiece

The facepiece is a conical shaped, clear polycarbonate lens. It directs available light rays into the eye, affording the wearer maximum visibility. The lens has a molded locking groove, and serves as a receptacle for the pressure demand regulator. The facepiece is equipped with nylon net and a strap assembly.

**The facepiece comes in three sizes: Small, Medium, and Large.**

# AV 3000 FACE PIECE



**Sleek Low Profile Improves Downward And Peripheral Vision  
Six-point Quad Adjustment Head Harness  
Dual Voicemitters For Clearer Communications**

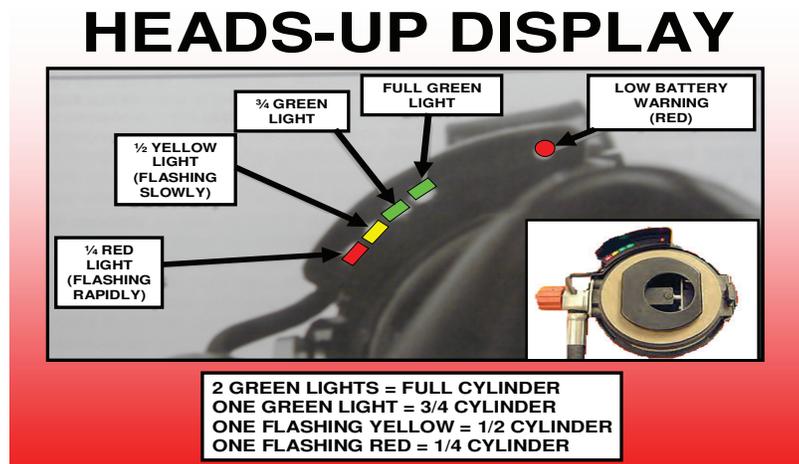
## C. Pressure Demand Regulator

The pressure reducer reduces the pressure received from the cylinder to working pressure of 100 psi. The regulator is designed to be inserted into the opening of the facepiece and reduces the pressure to 14.736psi. The gasket on the regulator must be in position for the system to operate safely. It is necessary to provide a seal between the facepiece and the regulator. A spring loaded snap lock assembly is located on the side of the regulator. Its purpose is to line up and lock the regulator to the facepiece in the proper operating position. The regulator also includes the low pressure vibralert alarm. This alarm will activate at approximately 1,100 psi (25% of capacity) and warns the user of low air by audible and vibrating alarm. An exhalation valve is incorporated into the mounted regulator.

1. The secondary pressure demand reducer should activate when the cylinder is turned on and as pressure is bled down when unit is checked for readiness.
2. The manual purge valve is a manually operated bypass, to be used if the regulator should fail.

**To use the manual purge valve:**

1. Open the valve by turning counterclockwise enough to provide adequate air supply.
2. Attach the regulator to the facepiece by inserting with purge valve at 12 o'clock position and turning counterclockwise 1/4 turn until locked in place.  
*(viewed from inside of facepiece)*
3. Separate from the low pressure hose. There is also a quick disconnect coupling for emergency (buddy) breathing.



**D. Frame & Harness**

# HARNESSES

- **Constructed of a lightweight aircraft aluminum alloy, the back frame follows the shape of the user's back.**
- **The back frame places the bulk of the SCBA's weight on the user's hips, where wrap-around wings provide comfortable hip support.**
- **Results in a design intended to minimize shoulder fatigue and give the user maximum freedom of movement.**



A wire frame is the rigid base to which the harness straps and pressure reducer assembly is attached. Its main purpose is to hold the air cylinder. A multi-position, adjustable band coupled with a toggle clamp that holds a 30, 45, or 60 ft<sup>3</sup> air cylinder. The harness assembly consists of two adjustable shoulder straps and an adjustable waist strap with a quick release buckle. The straps are constructed of Nomex/Kevlar which will not melt. The shoulder straps have pockets which house the low pressure line, Pass control console/remote gauge, and the EBSS line. The harness also houses the Pass sensor module assembly.

## **E. The specific Features of the Cylinder Are:**

1. Carbon Fiber/Kevlar Wrapped Aluminum Cylinder
2. Pressurized to 4500 psi
3. Capacity 45, 68 or 90 cubic feet respectively (30 min, 45 min or 60 min cylinder)
4. Absolute life of fifteen years or 15 x 365 fillings (5,475)



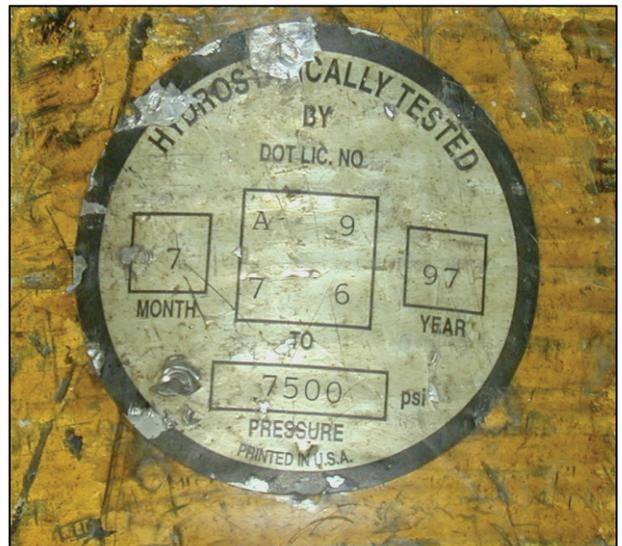
**High Pressure Connection**

**Cylinder Gauge**

**Cylinder Valve Knob**

**F. To test the cylinder by doing the following:**

1. Check cylinder for high heat or flame contact. (Discoloration, melted, or blisters)
2. Open cylinder fully to prevent leakage.
3. Perform a hydrostatic test every five years.
4. The hydrostatic test date is stamped on the cylinder.



**Hydrostatic Test Date**

## **G. High Pressure Hose**

1. Runs from cylinder to pressure reducing regulator.
2. Hand tighten and place O.O.S. if the Teflon o-ring is leaking or missing.

## **H. Pressure Reducing (1<sup>st</sup> Stage) Regulator**

1. Mounted on left side of the sliding frame.
2. Reduces pressure from 4500 psi to working pressure.
3. Has dual path primary and secondary pressure reducing section.

**Primary:** Normal pressure reduction to **100 psi**

**Secondary:** Transfers from primary when cylinder pressure drops to 1100 psi (25% full) and increases the working pressure to **150 psi**.

4. If primary section fails in closed position, air will be transferred to the secondary section and vibralert will sound.

**The secondary stage can be tested by:**

- Opening cylinder
- Opening purge valve

## **I. Hose from pressure reducer to regulator (facepiece) and the Emergency Breathing Support System connection.**

### **J. Donning Switch**

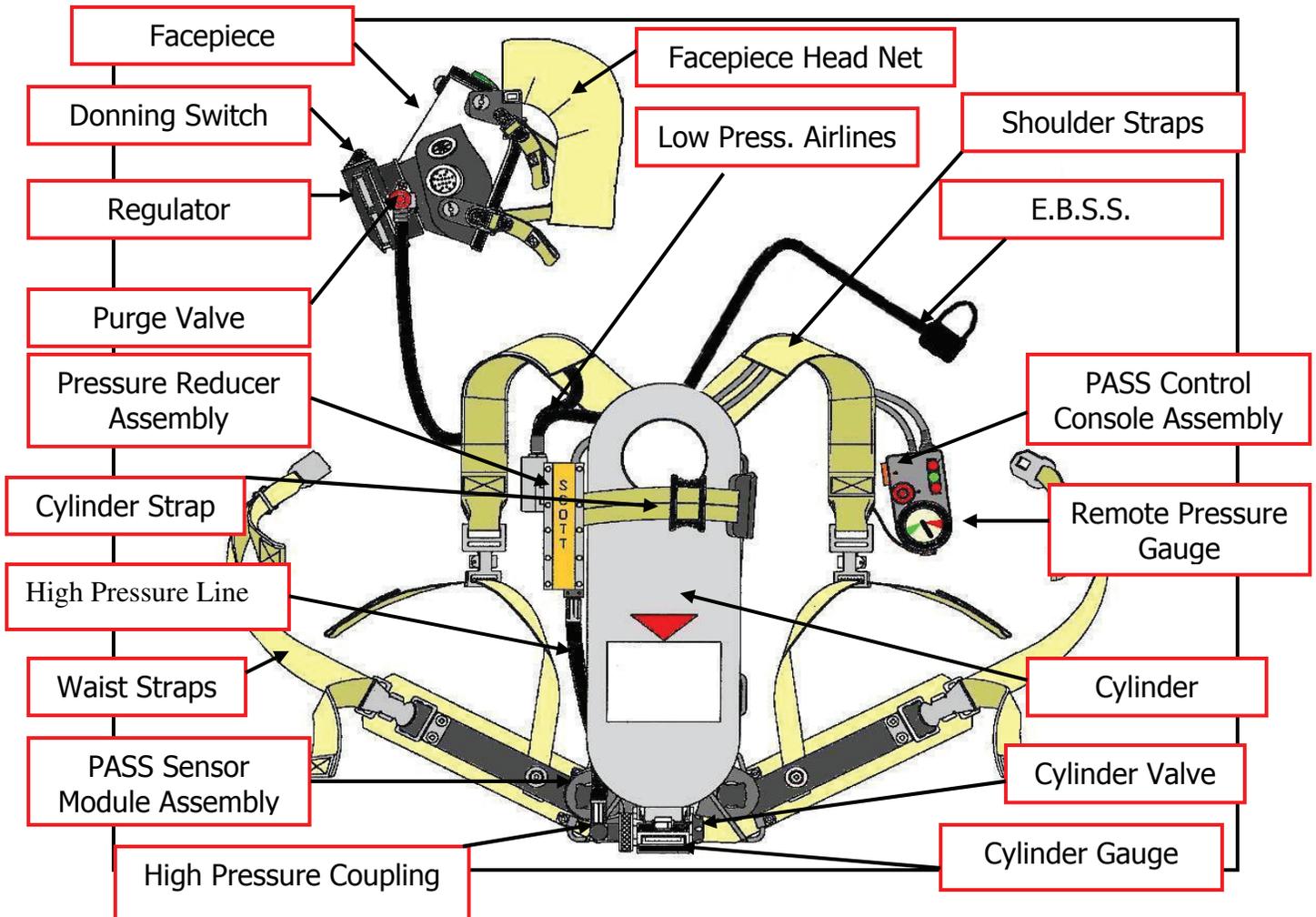
The donning switch is located on the regulator and can be activated to prevent rapid loss of air supply if the system is turned on prior to donning the facepiece or if the facepiece is removed while in service. If the switch is pressed down or you feel no resistance, it is in the off position and you need only to breathe into the facepiece to activate the air.

When you discontinue the use of the regulator, depress the donning switch to stop air flow, pull back on the locking tab, hold your breath, and turn the regulator 1/4 turn clockwise (viewed from inside the facepiece) to stop the air flow and remove the regulator. With the donning switch activated, the purge valve and vibralert will function normally. If the purge valve has been adjusted to produce a flow or if the vibralert is in operation, the air supply will continue to be depleted.

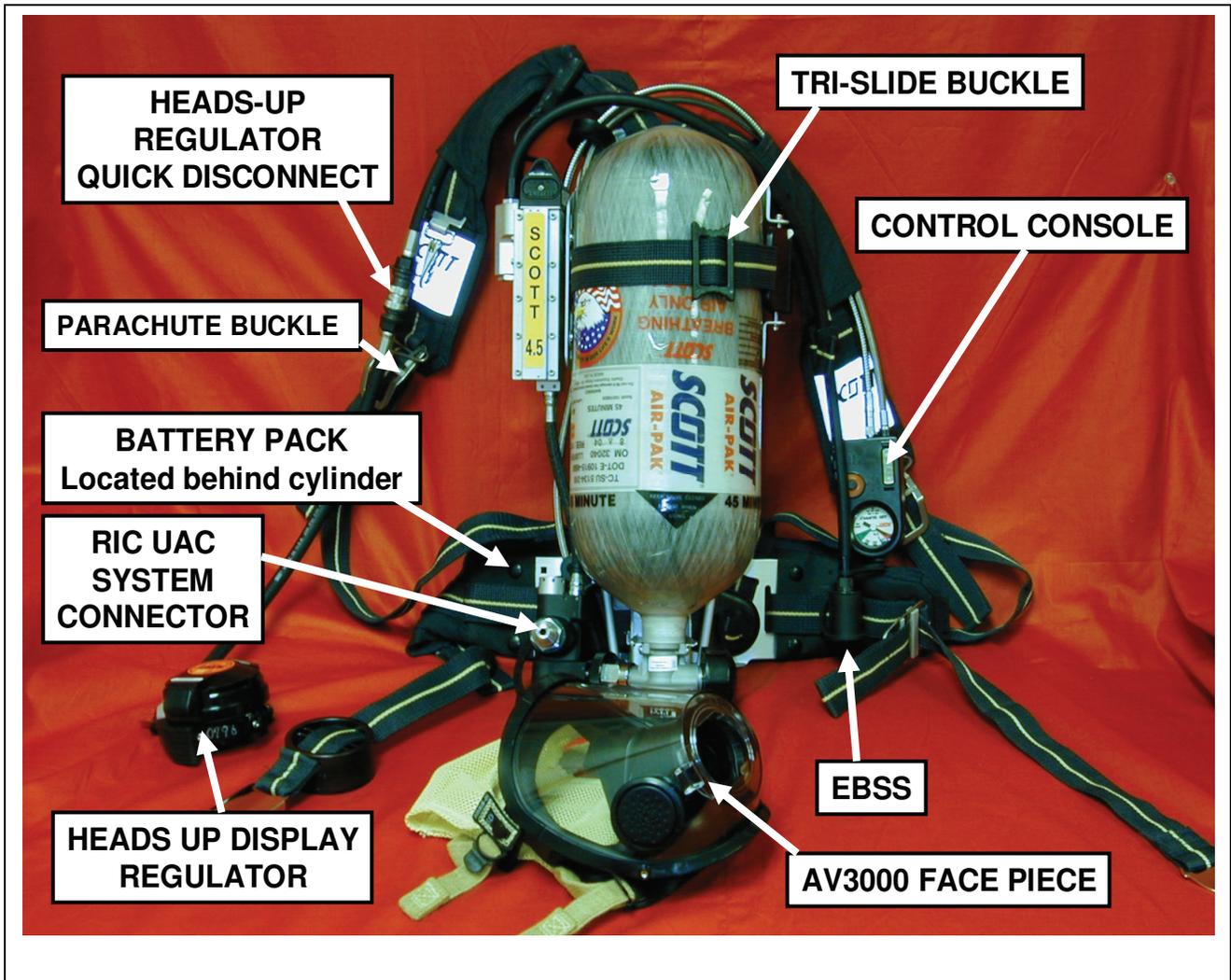
## K. Emergency Breathing Support System Connection

1. Located near remote pressure gauge.
2. Connection in the open position with dust cover on.

Scott Fifty Air-Pak SCBA Parts Illustration



### THE SCOTT FIFTY AIR-PAK:



**HEADS UP  
REGULATOR  
QUICK  
DISCONNECT**



## II. Inspecting the Scott Fifty Air-Pak SCBA

### A. The student shall ensure that the apparatus is ready for use by completing a function check..

1. Check cylinder air pressure on the cylinder pressure gauge.
2. Slowly open the cylinder valve and charge the high pressure hose to the regulator. The vibralert should sound briefly.
3. Ensure that the Quick Disconnect coupling is connected to the low pressure line. Ensure HUD lights are functioning.
4. Check for the presence and condition of the regulator gasket
5. Close the cylinder valve, listen for air leaks, and watch the remote gauge assembly for pressure loss. Compare the remote gauge reading with the cylinder gauge reading. If the indicated cylinder pressure reading is below full, replace with a fully charged cylinder.
6. Ensure that EBSS system is functioning.
7. Check the low pressure (vibralert) alarm by “breathing down” the system after shutting off the cylinder valve.
8. Check all harness straps for defects. Ensure that they are tangle free and extended.
9. Ensure cylinder is secured to harness.
10. Check the facepiece for cracks, tears, and other damage.

***Note: All air must be removed from the system or damage to the pressure reducing assembly may result from extended pressure on the system.***

### III. Donning the Scott Fifty Air-Pak SCBA

#### A. The student shall don breathing apparatus while wearing full protective clothing.

1. Start with turn out pants pulled up, turn out coat on and buckled, collar up, and Nomex hood on. Gloves and helmet shall be laid within reach.
2. Inspect the apparatus and lay it out on the harness with the top of cylinder facing the student.
3. On the start signal from the instructor, turn the air cylinder fully on.
4. Grasp the left shoulder strap at the top of the frame while protecting the demand regulator.
5. Swing the SCBA over your left shoulder allowing both arms to slip through the loops, as if putting on a jacket.
6. Fasten and pull waist strap snug while bending at a 45 degree angle
7. Straighten up as you pull down on the shoulder straps to adjust the harness to fit the body.
8. Re-adjust waist and shoulder straps to ensure that the weight is carried on the hips.
9. Grasp facepiece with one hand, place chin into the chin cup, and press facepiece to the face.
10. Hold this position with one hand; pull the net over your head with your free hand, and smooth the net out.
11. Pull chin straps 1<sup>st</sup>, and then temple straps 2<sup>nd</sup>, straight back to tighten.
12. Adjust facepiece for proper seal and comfort.
13. Place hands on top of head and smooth out the net, and re-adjust straps if necessary for a proper seal.
14. Place bare hand over the opening of the facepiece and inhale to check for seal.  
Advise that you have a “seal” once a proper seal has been obtained. Re-adjust straps if needed.
15. Place Nomex hood and helmet with earflaps down over the head and securely fasten chinstrap.
16. Put gloves on.

17. Grasp the regulator with the purge valve at the 12 o'clock position, insert into the opening of the facepiece, and rotate the regulator 1/4 turn counterclockwise, (as you look through the facepiece), to lock into the facepiece.
18. Inhale and breathe normally  
(slight resistance while exhaling is normal due to positive pressure).
19. Place 1 hand on helmet and maintain control of the PASS with the console.



## Donning the Face piece



**B. The student shall doff the breathing apparatus, following the proper procedure.**

**1. Removing facepiece:**

- a. Push the donning switch on the regulator for termination of air, hold your breath, release the locking tab, and remove the regulator using 1/4 turn.
- b. Remove the helmet and Nomex hood.
- c. Pull forward on both thumb releases and/or temple straps located on the facepiece, extending the straps fully.
- d. Using index fingers pull facepiece up and away from face.
- e. Do not place net over front of lens.

***Note: DO NOT RIP THE FACEPIECE OFF!***

**2. Removing Harness**

- a. Press release button in the waist buckle.
- b. Extend shoulder straps fully.
- c. Swing unit off the right shoulder then left while controlling demand regulator.
- d. Turn off cylinder, purge system of air, reset PASS.
- e. If needed, replace the cylinder.

**3. Regulator Protection**

- a. Place regulator in pocket holder provided on waist strap.
- b. Place on the ground with the opening facing up.

#### **IV. Changing an Air Cylinder in the Scott Fifty Air-Pak SCBA**

##### **A. The student shall change a compressed air cylinder on a self contained breathing apparatus assembly.**

1. Place the apparatus on the floor with the backpack harness assembly down and the cylinder valve pointing toward the student.
2. Make sure the cylinder valve is shut off and the system is purged.
3. Uncouple the high pressure hose coupling. (DO NOT USE WRENCHES)
4. Release the cylinder band toggle lever by pulling upward on the tab, which will loosen the band.
5. Grasp the cylinder at the neck, depress the locking tab and lift the cylinder free from the cylinder hook. Remove the cylinder by sliding out over the hook.
6. Slide a full cylinder in, pushing it the opposite direction from the one which was removed.
7. Engage and lock the cylinder hanger in the hook at the bottom of the wire frame.
8. Adjust the cylinder retaining band to accommodate the appropriate size cylinder (30, 45, or 60 minutes).
9. Push the toggle lever to secure the cylinder board. Do not force the toggle lever. Adjust the band for a snug fit by sliding it along the side rails.
10. Re-secure the high pressure hose after checking for presence, condition and tightness of the small Teflon "O" ring, located at the tip of the nipple of the high pressure coupling.  
(THE HIGH PRESSURE COUPLING SHOULD ONLY BE HAND TIGHT)
11. Open cylinder fully.
12. Perform service check.



**Changing a Cylinder**

## V. Cleaning the Scott Fifty Air-Pak SCBA

### A. The student must use the follow steps to clean their breathing apparatus:

1. Place the breathing apparatus on the floor. Disconnect the regulator and the facepiece.
2. Wipe down the entire apparatus with a cloth dampened with disinfectant.
3. Dip the facepiece in a bucket filled with soap solution, then rinse with clean water.
  - a. Wash in warm water mixed with mild detergent solution.
  - b. Rinse in cold water.
  - c. Air dry the net.
4. Clean the backpack frame and harness assembly.
  - a. Clean backpack assembly with mild soap and water.

### **DO NOT SUBMERGE PRESSURE REDUCING ASSEMBLY**

- b. A soft brush may be used.
  - c. **Do not use a hose to rinse the backpack assembly.**
5. Return the SCBA to the proper storage rack with the face piece clipped to harness and regulator secured to unit.

## **VI. Cleaning & Disinfecting the Scott Fifty Air-Pak SCBA Regulators**

### **A. The student shall clean and sanitize regulators**

1. Wear eye protection.
2. Use 6 sprays of multi-wash solution (3 in, 3 out of regulator).
3. Swirl around, shake out excess.
4. Let stand 10 minutes (opening down).
5. Rinse with 6 sprays from water spray bottle.
6. Place on towel opening down.
7. Document in SCBA log book completion of cleaning.

**DO NOT SUBMERGE REGULATOR IN WATER.**

## VII. Filling an SCBA Cylinder from a Cascade System

### A. The student shall demonstrate filling a SCBA cylinder.

**Note: This skill sheet is for sample purposes only. The procedures outlined here may not be applicable to your cascade system. Always check the manufacturer's instructions before attempting to fill any cylinders.**

1. Check the hydrostatic test date of the cylinder.
2. Inspect the SCBA cylinder for damage such as deep nicks, cuts, gouges, or discoloration from heat.

**Note: If the cylinder is damaged or is out of hydrostatic test date, remove the cylinder from service and tag it for further inspection and hydrostatic testing.**

**CAUTION: NEVER ATTEMPT TO FILL A CYLINDER THAT IS DAMAGED OR THAT IS OUT OF HYDROSTATIC TEST DATE!!!**

3. Place the SCBA cylinder in a fragment-proof station.
4. Connect the fill hose to the cylinder.

**Note: If the fill hose has a bleed valve, make sure that it is closed.**

5. Open the SCBA cylinder valve.
6. Open the valve at the fill hose, the valve at the cascade system manifold, or the valves at both locations if the system is so equipped.

**Note: Some cascade systems may have a valve at the fill hose, at the manifold, or at both places.**

7. Open the valve of the cascade cylinder that has the least pressure but that has more pressure than the SCBA cylinder.

**Note: The airflow from the cascade cylinder must be slow enough to avoid "chatter" or excessive heating of the cylinder being filled.**

8. Watch to see that the cylinder gauge needle rises slowly by about 300 to 600 psi (2 100 kPa to 4 200 kPa) per minute.

**Note: Your hand should be able to rest on the SCBA cylinder without undue discomfort from the heating of the cylinder.**

9. Close the cascade cylinder valve when the pressures of the SCBA and the cascade cylinder equalize.

**Note: If the SCBA cylinder is not yet completely full, open the valve on the cascade cylinder with the next highest pressure.**

10. Repeat step 9 until the SCBA cylinder is completely full.

11. Close the valve or valves at the cascade system manifold and/or fill line if the system is so equipped.

12. Close the SCBA cylinder valve.

13. Open the hose bleed valve to bleed off excess pressure between the cylinder valve and the valve on the fill hose.

**CAUTION: FAILURE TO DO SO COULD RESULT IN O-RING DAMAGE!**

14. Disconnect the fill hose from the SCBA cylinder.

15. Remove the SCBA cylinder from the fill station.

16. Return the cylinder to proper storage.



## **SCBA 2**

### **Emergency Procedures of the Scott Fifty SCBA**

**NFPA 1001, Standard for Firefighter Professional Qualifications 2008 Edition**  
5.3.1, 5.3.5, & 5.3.9

#### **Equipment needed:**

Scott Fifty Air-Pak SCBA  
Protective clothing

#### **Student Performance Objective:**

The student shall demonstrate the emergency actions for various failures of the Scott Fifty Air-Pak SCBA. The student must perform practical skills to a practical test accuracy of 100%.

## **I. Demand Regulator Malfunction Emergency**

**The student shall demonstrate the emergency action for failure of pressure demand regulator while using SCBA.**

**When experiencing restricted breathing or no air from the regulator:**

1. Check remote gauge.
2. Turn the red manual purge valve counterclockwise only enough to receive the required air.
3. Control the breathing rate by operating the purge valve in an open and close manner.
4. Notify your partner.
5. Exit the building immediately with partner.

## **II. Facepiece Failure**

**The student shall demonstrate the emergency action for failure to the facepiece while utilizing SCBA.**

1. Attempt to cover the damaged portion of the facepiece with a gloved hand.
2. Notify partner and exit the building immediately.

### III. FAILURE OF PRESSURE REDUCING STAGE ASSEMBLY

#### A. The student shall demonstrate the emergency action for failure of the pressure reducer assembly while using SCBA.

1. Secondary path of pressure reducer assembly will automatically activate, sounding quarter service life alarm regardless of the availability of the air supply in the cylinder.
2. Check remote gauge.
3. Notify your partner.
4. Exit the building immediately.

*Note: In any emergency situation, always notify someone and, if possible, have someone accompany you to the exit.*

### IV. Total Depletion of Air

#### The student shall demonstrate the emergency action for depletion of air while using SCBA.

1. Check remote gauge.
2. Notify partner of emergency and the need to use the emergency breathing support system.
3. Firefighter giving support will be in charge of the operation.
4. Firefighter giving support will check their remote gauge, remove their own dust cover and prepare the connection.

*Do not remove the EBSS strap yet. In a vision obscured environment, the EBSS line could be easily lost. Wait until the EBSS connection is complete.*

5. Firefighter needing support will hold his/her breath when advised by the support firefighter.
6. The support firefighter will disconnect the low pressure quick disconnect coupling of firefighter needing air, connect to the support firefighter EBSS, and the support firefighter will now disconnect the EBSS strap on their own SCBA and pass the supply line over their shoulder.

7. While positioned behind the supporter, the supported firefighter will place a hand

over coupling on EBSS line and a hand on the ground.

With the support firefighter in charge, exit the building in a coordinated manner.

*Preferably the firefighter needing air should be on the support firefighter's right side with left hand supporting the connection and the right hand on the ground because the EBSS line comes off the support firefighter's right shoulder.*



**Note:**

1. Vibralert will activate in both firefighter's facepiece when the support unit reaches 1000–1100 psi.
2. Duration of the supply unit will be reduced to  $\frac{1}{2}$  with two firefighter's breathing from the same unit.
3. Joining two units is not permitted when the support unit low pressure alarm (vibralert) has already activated.
4. It is not recommended to perform this action if the support firefighter's supply is less than <1/2 full and they are less than <100' from a means of egress.
5. Do not give support to an unconscious firefighter.
6. The HUD display will not work in the facepiece of the firefighter being supported.