18.01 PURPOSE

Establish guidelines for the general use and maintenance of Self Contained Breathing apparatus (SCBA).

Note: The Respiratory Protection Program information is contained in SOP 2-8-2.

18.02 SCOPE

All paid and volunteer staff shall follow this procedure.

18.03 DEFINITIONS

1. **CALIFORNIA CODE OF REGULATIONS, TITLE 8, SECTION 5144**
   
   SCBA shall be provided and used whenever employees are required to work in a hazardous environment that may be encountered during fire fighting activities, hazardous materials response or during training activities.

2. IDLH – Immediately Dangerous to Life and Health means an atmosphere that poses an immediate threat to life. Would cause irreversible adverse health effects, or would impair an individual’s ability to escape from a dangerous atmosphere.

3. Oxygen deficient atmosphere – An atmosphere where oxygen content below 19.5% by volume.

18.04 POLICY

1. All personnel that may respond or function in areas of possible contamination shall wear an SCBA.

2. County Fire will provide an adequate number of SCBA to each VFC to ensure safe operations and compliance with CCR, Ti 8, Section 5144 (Two in Two Out).

3. All SCBA shall be used, cleaned, disinfected, stored, inspected and repaired as directed by CCR, Ti 8, Section 5144 and this Standard Operating Procedure.

18.05 PROCEDURES FOR USE

1. The SCBA shall be completely donned during the following conditions:
   
a. When entering a building fire, where flammable or toxic gases are suspected to be present.

b. During overhaul and investigation operations at structure fires until SCBA removal is approved by the Incident Commander and Safety Officer.

c. During the extinguishment and overhaul of fires involving vehicle passenger areas.

d. During the extinguishment and overhaul of a rubbish fires

e. During response to hazardous materials incident

f. Any other type of incident where it is reasonable expected to be a respiratory hazard due to products of combustion or hazardous materials
2. The Incident Commander and Safety Officer shall ensure the atmosphere is monitored throughout the incident, and that the SCBA be worn when the atmosphere is likely to become contaminated or oxygen deficient.

3. The SCBA shall not be removed at an incident until the following standards have been met:
   a. Carbon Monoxide reading consistently remain below 25 parts per million (PPM)
   b. Oxygen levels consistently remain above the 19.5% and below 23%.
   c. All other industrial airborne contaminants are within acceptable limits.

   **NOTE:** The above criteria does NOT apply to structure fires and SCBA **SHALL** be worn by all members working in an involved area during overhaul and similar situations in these incidents. There are several carcinogenic materials and compounds, cyanides, phosgene gas, aldihydes and other toxic gases that cannot be sensed with traditional monitors.

4. When the scene is deemed safe either by monitoring the air or by removing personnel from the affected area, only the Incident Commander shall declare the incident environment safe for the purpose of discontinuing the use of SCBA. When the SCBA is no longer utilized the atmosphere must be monitored continuously. If conditions change, or the air monitor alarms, all personnel shall evacuate the building and the SCBA shall be utilized for re-entry.

**18.06 CLEANING and DISINFECTING THE FACE PIECE:**

1. Respiratory shall be cleaned and disinfected by the user after each use.
   a. Wash in warm water with a mild cleaning solution. MSA recommends a germicidal solution to inhibit the growth of bacteria. A mild chlorine solution of 1 milliliter (3 small drops) of laundry bleach to one liter of water.
   b. Do not use alcohol as it may degrade the rubber in the facemask.
      i. Cleaning Procedure
         1. Remove the mask mounted regulator
         2. Unthread the thumb screw of the Heads Up Display (HUD) and slide the receiver from the face piece bracket.
         3. Thoroughly wash the face piece and nose cup in water. A soft brush or sponge may be used
         4. Rinse the face piece and nose cup in warm (110° F) running water.
         5. Clean the pressure – demand exhalation valve by pressing in on the stem and a blunt object and flushing with warm water.
         6. Allow the face piece to air dry. Do not place parts near a heater or in direct sunlight. The rubber will deteriorate.
         7. The face pieces shall be dried thoroughly to prevent water residue from entering the regulator during use.
         8. Operate the exhalation valve by hand to be sure it works properly.
         9. Re-attach the HUD by sliding the receiver onto the face piece bracket the finger tightening the thumb screw.
18.07 STORAGE

1. The SCBA should be stored in a state of readiness for the next emergency call.
2. All SCBA shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals.
3. Face piece shall be stored to prevent deformation of the face piece and exhalation valve.
4. Air cylinders should be filled after use and stored in a state of readiness with a minimum of 4000 psi.
5. Face masks should be stored in the manufacturer’s bag or similar back to prohibit dirt and debris from clogging the valves.

18.08 SCBA INSPECTION:

1. At a minimum, every SCBA shall be inspected after each use (after cleaning) and monthly by each Volunteer Fire Company (VFC).
2. Respirator inspections shall include the following:
   a. A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters.
   b. A check of elastomeric parts for pliability and signs of deterioration.
   c. The regulator and warning devices function properly.
3. Documentation shall be maintained to verify inspection and proper function.
   a. An inspection form is included in Attachment 1.
   b. Inspection procedures are in Attachment 2.
   c. Functional Tests are included in Attachment 3.
4. County Fire Logistics personnel will inspect each SCBA and face piece at least quarterly.
   a. Quarterly inspection reports will be left with the VFC and copies maintained at County Fire headquarters for the life of the apparatus.
5. County Fire Logistics will review monthly maintenance and inspection records managed by the VFC to verify proper function and history.
6. If the SCBA does not function properly during any inspection procedure is shall be removed from service. If a SCBA is removed from service, County Fire Logistics should be notified immediately so repairs may be implemented.
7. County Fire will conduct an annual flow test of the apparatus to ensure proper function.
8. County Fire will arrange for hydrostatic testing of every compressed air cylinder as required.
9. County Fire will conduct annual employee fit testing per SOP 2-8-2.

18.09 REPAIRS

1. An SCBA that is taken out of service or otherwise found defective shall be discarded or repaired or adjusted in accordance with the following procedures:
   a. Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer’s NIOSH-approved parts designed for the respirator.
   b. Any repairs shall be made per manufacturer’s specifications.
2. County Fire Logistics shall be notified of every SCBA needing repairs.
3. Repairs are to be documented and maintained at County Fire headquarters.
4. Replacement of batteries is not considered a repair and may be conducted by the VFC.
18.10 BREATHING AIR

1. Breathing air must be of high quality and purity.
2. Compressed air shall meet the United States Pharmacopoeia requirements for breathing oxygen.
3. Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association (CGA G-7 grade D/L - 2004) Commodity Specification for Air to include:
   a. Oxygen content of 19.5-23.5%
   b. Hydrocarbon content of 5 milligrams per cubic meter of air or less
   c. Carbon monoxide content of 10 ppm or less
   d. Carbon dioxide content of 1,000 ppm or less
   e. Lack of noticeable odor.
4. All compressors shall be tested and certified as specified by CGAG-7 grade D/L.
5. Testing of compressors shall be at least quarterly and documentation maintained on site.

18.11 COMPRESSED CYLINDERS

1. Cylinders are tested and maintained per the Department of Transportation (DOT).
2. Cylinders shall be inspected with the SCBA to ensure integrity of the cylinder.
3. Deep scratches, gouges, or worn exterior coating shall be reported to the County Fire Logistics staff.
4. Cylinders must be compliant with hydrostatic testing requirements or removed from service.
5. County Fire Logistics manages the hydrostatic testing. Carbon cylinders are required to be hydrostatically tested every five years.
6. Do not attempt to repair a compressed air cylinder. County Fire Logistics will arrange for approved servicing and repair.
7. Cylinders are removed from service after fifteen years from the manufacturer date.

18.12 REFERENCE

2. California Code of Regulations (CCR), Title 8, Section 5144
3. MSA Certified Care and Maintenance

Attachment 1: Inspection procedures
Attachment 2: Inspection Functional Tests
Attachment 3: SCBA Inspection form: PDF format s/materials/masterforms/SCBA
Attachment 2

Inspection Procedures

1. Face Piece
   a. Inspect for rubber deterioration, dirt, cracks, tears, holes or tackiness.
   b. Check harness head strap for breaks, loss of elasticity, or missing buckles or straps, for signs of wear.
   c. Inspect the lens for cracks, scratches, and a tight seal with the face piece rubber.
   d. The exhalation valve must move off the seat and return when released.
   e. Inspect the face piece coupling for damage and that the spider gasket and valve disc are present.
   f. Check the Heads up Display (HUD) for cracks or damage.

2. Cylinder Gauges
   a. Ensure you can see both gauge needles and face clearly through the lens.
   b. Ensure the gauge stem is not bent.
   c. Ensure the gauge hose is not damaged.

3. Audible Alarm with URC Heads Up Display (HUD) System / ICM Unit
   a. Check that the alarm rings briefly and the HUD flashes or ICM Unit Gauge tones when the cylinder valve is opened. This test assures that the alarms are operating.
   b. Check that the bell is in proper alignment.
   c. If the bell is loose, remove the unit from service.
   d. Unscrew the Audi-Larm Alarm with URC assembly coupling nut from the cylinder valve. Inspect the coupling nut for thread damage. Be sure the O-ring is not damaged.
   e. Check the Audi-Larm Alarm with URC Assembly and URC Assembly relief valve for damage.
   f. Assure the relief valve label for damage.
   g. Ensure the relief valve ports are showing.

4. High Pressure Hose
   a. Look for cuts or abrasions between the alarm and the first stage regulator.
   b. The hose fitting should be tight.

5. Quick-connect Second Stage Intermediate Hose.
   a. Inspect the rubber washer for deterioration, dirt, cracks, and tackiness.

6. Cylinder
   a. The air cylinder should be refilled as soon as possible after use.
   b. Cylinders should not be stored partially filled for 2 reasons.
      i. If used without recharge, the service life of the cylinder is reduced.
      ii. The cylinder burst disc vents excess pressure if a full cylinder is over exposed to fire or heat. If the cylinder is not full, it may be damaged before the burst disc vents.
   c. Check the cylinder valves for signs of damage.
   d. Inspect for cracks, dents, weakened areas, visible composite fibers.
   e. Check and record the hydrostatic test date during every inspection.

7. Harness
   a. Check for cuts, tears, abrasions, or signs of heat or chemical –related damage.
   b. Check that the tee nuts, washers, and screws, if any, are secure.
8. Carrier
   a. Inspect the cylinder band and latch to be sure it holds the cylinder securely. Operate the latch wing to be sure that it opens and closes properly and that it holds the cylinder securely. If the cylinder band and latch is locked, the latch wing should not turn.
   b. Inspect the back plates for cracks, weakened areas, or signs of heat or chemically related damages.

9. PR 14 First Stage Regulator
   a. Inspect the mounting bracket for cracks, weakened areas, or signs of heat or chemically related damage.
   b. Inspect the mounting bracket screws to verify that they are secure.
   c. Inspect the regulator mounting bracket to verify that it holds the regulator securely.
   d. Inspect the regulator seal ring to verify that it is present and properly seated. Inspect the seal ring for rubber deterioration, dirt, cracks, tears, holes or tackiness.
   e. Inspect the pressure relief valve. Verify that the relief holes are clear and free of debris or other contaminants. Verify that the pressure relief valve is properly secured.
   f. Inspect hose connections. Verify hoses are properly secured.
Attachment 3

Functional Test
(After each Use and Monthly)

1. Check that the regulator and face piece can hold a negative pressure.
   a. Close the cylinder valve.
   b. Don the Face piece or hold the face piece against your face to create an effective seal.
   c. Attach the regulator to the face piece and inhale until the face piece begins to collapse against
      your face.
   d. Hold your breath about 10 seconds. The negative pressure should be maintained and the face
      piece should remain collapsed against your face for the entire 10 seconds.
   e. Do not use the apparatus if negative pressure cannot be maintained in the face piece.

2. Check the second stage regulator operation.
   a. Push the regulator release buttons.
   b. Verify the regulator bypass knob is fully closed (clockwise).
   c. Slowly open the cylinder valve to pressurize the SCBA. Verify that the cylinder valve is
      completely opened.
   d. Check the pressure gauge to verify that the cylinder is full. Regulator functional checks must be
      conducted with a full cylinder.
   e. Open the regulator bypass knob (counter-clockwise). Verify that air flows from the regulator.
      Close the bypass knob (clockwise).
   f. Attach the regulator to the face piece. Verify proper regulator attachment by pulling on the
      regulator.
   g. Don the face piece or hold the face piece against your face to create an effective seal.
   h. Inhale sharply to start air flow. Breathe normally. Verify proper regulator response. The
      regulator should not make any unusual sounds including: whistling, chattering, or popping.
   i. Remove the face piece from the face. Verify that air flows freely. Push the regulator release
      buttons. Verify that air flow stops.
   j. If the regulator fails to meet any of the above checks, remove the apparatus from service.

3. Open the bypass slowly.
   a. Observe the readings on the pressure gauge or ICM Unit gauge.
      i. Note the point the alarm begins to ring.
      ii. Note the point where the receiver begins to flash.
      iii. Approximate pressure gauge reading at which the alarm should start to ring and tone or
           flash are 750 psig for 3000 psig system OR 1175 psig for high pressure systems.
           iv. Watch the drop in pressure on the gauge or ICM Unit. And gauge the point at which the
               Audi-Larm with URC Assembly begins to ring and the HUD begins to flash. 
               Approximate pressure gauge readings at which the alarm should start to ring and tone or
               flash are 750 psig for 3000 psig systems OR 1175 psig for high pressure systems.
              v. The alarms should continue until the air pressure is approximately 200 psig or less. If the
                 Audi-Larm with URC, ICN unit, or the HUD does not function properly, the unit should
                 be removed from service.
4. Audi-Larm with URC Assembly Body:
   a. Check the bell is on tightly and is in the proper alignment
   b. Check the URC Assembly and Relief Valve for damage or leaks.
   c. Close the cylinder valve completely. Be sure that nothing blocks the regulator outlet.
   d. Do not disconnect the Audi-Larm coupling nut when pressure is shown on the regulator gauge. Release all pressure from the regulator by opening the bypass valve.
   e. Open the bypass valve slowly to release trapped air.
   f. Close the bypass valve.
   g. With pressure released, unscrew the Audi-Larm coupling nut from the cylinder valve. It is hand-tight and should not require tools.
   h. Inspect the coupling nut threads for damage.
   i. Be sure the o-ring is installed and is not damaged.
   j. Replace the o-ring if it is damaged.