TOLEDO FIRE & RESCUE DEPARTMENT

D-11 SCBA and Related Equipment

Maintenance Manual

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Visual Inspection of Cylinders (SCBA, 02 and SCUBA)

SCBA, OXYGEN or SCUBA cylinders carried on the air wagons or on other apparatus should be visually inspected daily, using the 0700 Hour Check procedure, detailed later in this procedure. Certain problems or conditions, as noted in the 0700 check, would be cause to place a suspect cylinder out of service. Faulty equipment should be depressurized and sent to the Maintenance Bureau with SCBA Equipment Repair Form 300-16 for SCBA equipment or Repair Form 300-15 for OXYGEN and SCUBA cylinders as found on your station dashboard, within the TFRDweb website LINK

WARNING: If a high pressure cylinder is known to have been subjected to any unusual treatment, accident, or condition, it should be immediately placed out of service, depressurized and sent to the Maintenance Bureau.

Procedures for Filling SCBA Cylinders

- Officers on duty at Stations #3, #4, #5, #6, and #18 are responsible for assuring that proper procedures are being used for filling air cylinders.
- Verify the rated capacity of cylinders to be filled.
- All Toledo Fire and Rescue Department SCBA cylinders, both 30 and 60 minute sizes, are rated at 4500 psi. In a mutual aid operation, always verify and double check the rated capacity of the cylinder being filled if it is not from TFRD.
- Before filling cylinders, you must do a visual inspection. Check the hydrostatic test date and the

rated capacity in psi. DO NOT FILL A CYLINDER THAT IS OUT OF DATE FROM THE LAST HYDROSTATIC TEST DATE (See “COMPRESSED GAS CYLINDER SERVICE LIFE AND HYDROSTATIC TEST INTERVAL” (table below).

Steel, aluminum and gray carbon fiber cylinders are tested every five (5) years. For air cylinders, this information should be on a label attached to the body of the cylinder. For oxygen and SCUBA cylinders, this information is stamped near the neck of the cylinder.

COMPRESSED GAS CYLINDER - SERVICE LIFE AND HYDROSTATIC TEST INTERVAL			
CONSTRUCTION	**TYPE**	**HYDRO-TEST EVERY**	**SERVICE LIFE**
STEEL	SCUBA, OXYGEN, ETC.	5 YEARS	INDEFINITE*
ALUMINUM	SCBA, SCUBA, OXYGEN, ETC.	5 YEARS	INDEFINITE*
CARBON FIBER COMPOSITE	SCBA GRAY	5 YEARS	15 YEARS

> * INDEFINITE AS LONG AS CYLINDER PASSES VISUAL INSPECTION AND HYDROSTATIC TESTING AT PRESCRIBED INTERVALS

- Open the valve of the cylinder to be filled briefly (approximately 1/4 tum) to blow out any foreign material in the valve. Do the same with the compressor fill valve while holding the hose connector. **CAUTION:** Do not discharge compressed air toward any person. Make sure the bleeder valve on the filling station hose is closed. Connect fill hose with quick connect to air cylinder valve. Open cylinder, close compartment door to cascade system then open valve on cascade system to fill SCBA.
- **DO NOT** adjust the pressure regulator on the control fill panel, this valve is preset to 4500PSI and does not need to be adjusted. Never adjust hand wheel of pressure regulator fully in or out as this will damage plastic threads and/or seat, placing the compressor out-of-service.
- Open the fill control valve slowly. The recommended fill time should not exceed 500 psi per minute. If the SCBA is filled too rapidly, the air and cylinder will heat up and the cylinder will not be full, when cool (when air cools, its volume is reduced). If #1 cascade cylinder does not fill the cylinder, close cascade valve# l and open cascade valve #2. Proceed until the cylinder is filled to the rated capacity.
- Close air fill control valve and air cylinder valve. These fill stations have bleed valves for relieving pressure from the fill connections. Bleed off pressure in the fill hose and then remove cylinder.
- When filling two or more cylinders at the same time, the above procedure will be used while gating air fill control valves according to residual pressure in the cylinders being filled. **Never** try to fill cylinders with different pressure capacities at the same time.

NOTE: TFRD compressors are rated at 5000-6000 psi. **ALL compressors shall be regulated to a maximum of 4500 psi output for filling SCBA cylinders.**

Only Water Rescue Team members are authorized to fill S.C.U.B.A. cylinders.

SCBA Air Compressor

- Check oil level. Reading should be between indicators at bottom of dipstick. Don't overfill. One cupful will raise the low-level reading to overfill.
- If system has separate CO monitor, observe carbon monoxide monitor gauge, moisture pickup tube and green light. All should be functioning properly.
- Open all cascade cylinder valves two (2) complete turns, only.
- Turn compressor power switch on. The compressor will start. Observe oil pressure gauge, it should read 950 psi. The knocking noise heard when first starting is normal until back-pressure builds up in the final stage piston. Any other suspicious noise would be cause to shut down the unit.

Drain the condensate reservoir from the compressor weekly on tool day.

SCBA 0700 Hour Check

SCBA equipment must pass the tests listed below before use. If the equipment fails to meet any of the tests, the condition must be corrected before using the equipment. Observed deficit in the function of any component of the SCBA equipment will necessitate that component's removal from service. Faulty equipment should be sent to the Fire Maintenance Bureau with a SCBA Equipment Repair form 300-16. Spare harnesses are available on the air wagons or through the Fire Maintenance Bureau.

Air Cylinder Inspection

Inspect cylinders before use, and check for problems or conditions detailed as follows. If any are present, drain air and send to Maintenance Bureau. **DO NOT REFILL**.

Check for:

- Service life/date last hydro-tested (see table above)
- Make sure cylinder knob is not bent and turns easily
- Signs the cylinder has not been well cared for and maintained
- Signs the cylinder was not stored properly or shows signs of damage
- Signs or knowledge that cylinder dropped, fell or was struck or was in an accident
- Signs or knowledge that cylinder was exposed to chemicals or extremely corrosive atmosphere/environment

- Check for gouges, dents, scrapes, cuts, loose fibers, missing resin or other damage such as severe abrasion
- Evidence that cylinder was stored with water, material or matter inside the cylinder, or was stored in a place where exposed to chemicals or corrosive materials
- Signs of exposure to fire or high heat, including any one or more of the following:
    - Charring or blistering of the resin, paint or protective coating
    - Melting or charring of the metal
    - Distortion of the cylinder and/or any cylinder accessory
    - Removal of any resin resulting in loose fibers being visible
    - Melting of fuse plugs, valve hand wheel, valve protector, and/or any valve component or cylinder accessory
    - Has been partially or fully repainted or treated to hide suspected damage and/or fire damage
    - Is known or suspected to be leaking
    - Is known or suspected of having a crack
    - Was found empty (when it should have been full) and there is no known reason for it to be empty
- Check for other signs of damage

If a cylinder is known to have been subjected to any unusual treatment, accident, or condition, it should be immediately placed out of service, depressurized and sent to the Maintenance Bureau.

Facepiece Inspection 0700

- Inspect the facepiece for rubber deterioration, dirt, cracks, tears, holes, or tackiness.
- Check the head harness and straps for breaks, loss of elasticity, signs of wear and missing buckles or straps
- Inspect the lens for cracks, any deep scratches, and a tight seal with the facepiece rubber. Any signs of compromised lens the fire shop must be notified.
- The exhalation valve must be clean and operate easily. Make sure the face piece is rinsed toughly after cleaning to avoid any built-up residue to create a problem.
- For inhalation valve test, hold facepiece up to your face, put your hand on the inlet connection,

breathe in and hold for 10 seconds. The facepiece should collapse to your face for a good, tight seal.

- Inspect the facepiece coupling for damage.

MSA G-1 HUD (heads-Up Display) Light Patterns

Observe the operation of the HUD device (Heads-Up Display) in the following steps:

The HUD has lights on the unit that indicate different functions and measurements. The following is a description of each:

RIGHT SIDE LED's	
4 Green LED's	Air cylinder tank has 75-100%
3 Green LED's	Air cylinder tank has 50-74%
2 Yellow LED's	Air cylinder tank has 34-49%
1 Red LED	Air cylinder tank has 0-33%
LEFT SIDE LED's	
Red for the following: 	•Primary Thermal Alarm - Flashing •PASS Pre-Alarm - Flashing •PASS Full Alarm - Solid •PASS Manual Activation - Solid •Electronics Failure - Flashing
Blue flashing for the following: 	•Potential Thermal Alarm
Yellow flashing for the following: 	•Low Battery Warning Condition

Air Cylinder and Harness Pressure Gauges

- Slide a full air cylinder into the metal cylinder band from the top or bottom, secure the dovetail assembly on the back of the air cylinder into the slot in the back-frame. Connect the quick connect coupling nut to the cylinder.
- Make sure there is a minimum of 4000 psi in the high-pressure air cylinder. Open the cylinder valve fully to pressurize system, then close the cylinder valve and watch the harness pressure. If the needle drops more than 100 psi in 10 seconds, there is a leak.

- Open the cylinder valve fully to pressurize system.
- Be sure you can see both gauge needles, one on the air cylinder and one on the control module. Also, be sure the gauge is not bent, damaged and in good working order.
- Verify that the difference between the control module gauge and the gauge on the cylinder is no more than 450 psi. If the difference is more than 450 psi, try a different bottle before taking the SCBA out of service. (No more than 10% difference)
- Leave PASS device motionless to check for three (3) stages of pre-alarm and final full alarm.
- Open the by-pass knob fully. Listen for air flow. Close the by-pass knob.
- Bleed the main line slowly. Watch the pressure gauge and note when the audible alarm sounds. This should be at approximately 1575 psi.
- Make sure the low air pressure warning on the control module is both visible and audible.
- Inspect the harness gauge hose for any visible damage.
- Check battery level on Control Module by pressing and holding green button until battery icon appears on screen.
    - When there are two (2) “bars” remaining the lithium-ion battery will need to be changed.

Audible Alarm

- Check that the bell is in the proper alignment and on tightly.
- If the bell is loose, remove the harness from service.
- Inspect the quick coupling and the quick connect nut attached to the air cylinder making sure the coupling and nut are clean, free of debris and there is no visible damage. Also, be sure there is an O-ring, and that it is not damaged. It is hand-tightened and should not require tools.

High Pressure Hose

- Check all high-pressure hose, looking for cuts or abrasions. If present, have the Fire Maintenance Bureau replace the hose.

Harness

- Straps open.
- Adjust waist strap.

- Check buckles (chest and waist).
- Check cylinder clamp.
- Check chest straps.
- Check lumbar pad making sure pad moves freely and is able to be safely locked in all three positions.
- Make sure mask mounted regulator (MMR) can be securely locked into holster on waist strap.

General

- Check for cleanliness and dryness.
- Check extra cylinders.
- Any deficit in the function of a mask will necessitate the removal of the mask from service.
- Check all high pressure hoses for loose fittings.
- Check for O-ring on MMR.

Cleaning and Disinfecting Facepiece

- Thoroughly wash the facepiece and nose cup in mild cleaning solution (NDC provided by the fire shop). A soft brush or sponge can be used to scrub the soiled facepiece.
- Allow the facepiece to air-dry only. Using any type of heat source, including direct sunlight, will deteriorate the rubber.

Cleaning the Harness

Check the harness pressure gauge and, if necessary, release any pressure trapped in the system by opening the bypass knob. Remove the quick connect coupling from the air-cylinder. Squeeze both button’s and lift to unlock the clamp down latch, then slide the cylinder out.

- Wipe off all surface dirt with a sponge dampened (not soaking) in mild cleaning solution such as NDC. Rinse the sponge and squeeze it dry.
- Do not allow water to enter the second stage regulator.
- Wipe dry with a clean cloth.
- Let the harness air-dry.

Cleaning the Cylinder

Air cylinders should be recharged as soon as possible.

Cylinders should be stored completely filled only.

- Clean exterior with mild soap solution. Assure that cylinder interior remains dry.
- Check for damage.
- If damage is found, drain the air from the cylinder and place the cylinder out of service. Send to the Maintenance Bureau with form 300-16.

See Also:
