



**SURVIVAIR®**



**TECHNICAL BULLETIN**

## TECHNICAL BULLETIN #128

**SUBJECT:** Torque Specifications for SCBA Cylinders and Valve Assemblies

**DATE:** **March 7, 2006**

**PRODUCTS AFFECTED:** Survivair® SCBA Cylinder Valves, Part Numbers 921040, 921045, 961165, 921065, 920312, 920322, and 964833 only.

This Technical Bulletin provides information regarding the procedures necessary to inspect the noted Survivair Cylinder and Valve Assemblies for proper torque.

**It is highly recommended that users of Survivair fully wrapped or all aluminum cylinders that have had cylinder valves installed by repair or hydrostatic test centers have the cylinder valves checked to ensure they were installed properly.**

Over the past five years Survivair has received reports of five cylinder valves on various fully wrapped and all aluminum cylinders rupturing and separating from the neck of pressurized cylinders. In the same period, we received reports of eight valves breaking while they were being reinstalled into cylinders. All of these valves had been removed from and reinstalled into cylinders by repair or hydrostatic test centers.

Failure analysis suggested that all of the valves that failed were over-tightened when they were reinstalled. Over-tightening the valve can cause the valve stem to crack or break.



**WARNING: Over-tightening the valve may cause the valve to rupture, which could cause serious injury or death.**

The Survivair specified torque for installing these valves is 70 ft-lb. Measurements of the torque required to loosen valves (breakaway torque) on representative cylinders from departments where these ruptures occurred indicated that they had been installed at torque values as high as 200 ft-lb, again indicating over-tightening as the cause of the failures.

No valves installed at Survivair have ever failed, further suggesting that improper installation by repair and hydro centers caused the failures.

The 70 ft-lb. torque specification was developed with no lubricant between the valve flange and cylinder top. If lubricant is present between the valve flange and cylinder top, the resulting stress on the valve stem at a given torque is much higher than without lubricant and can potentially lead to valve failure.



**WARNING: The presence of lubricant, solvent, or other agent between the valve flange and cylinder top can increase stress and lead to valve failure which may cause serious injury or death.**

This Technical Bulletin has been issued to augment Technical Bulletin 129 ***TORQUE SPECIFICATIONS FOR SCBA CYLINDER AND VALVE ASSEMBLY INSTALLATION INSTRUCTIONS.***

In this Technical Bulletin we have:

1. Added a requirement to check for the presence of lubricant on the valve flange and top of the cylinder.
2. Supplied a procedure to check breakaway torque.
3. Added a warning that over-tightening the valve may cause it to later rupture which could cause serious injury or death.
4. Included a cylinder identification sheet to assist in identifying the cylinder and valve configurations affected by this technical bulletin.
5. Provided a fax sheet to inform Survivair of the results of valve inspections.

Survivair fully wrapped cylinders and Survivair all-aluminum cylinders with valves that have been reinstalled by repair or hydrostatic test centers or any other maintenance group should be checked to verify that the valves were reinstalled correctly and that the valve flange surface is free of lubricant where it mates against the cylinder. You should also verify that the valve has never been over tightened at any time during its history. If a valve was over tightened at any time during its history, it may have been permanently damaged and may rupture under pressure.

This Technical Bulletin provides instructions for checking breakaway torque. If the breakaway torque is greater than 80 ft-lb, if there is lubricant on the valve flange, or if you are not sure that the valve has never been over-tightened, we recommend that the valve be replaced because it may be damaged and could potentially rupture. If the breakaway torque is less than 80 ft-lb, the valve flange is free of lubricant, and you can determine that it has never been over-torqued, the valves may be reinstalled following the attached instructions.

Improper installation of valves by repair or hydrostatic test centers is not covered by the Survivair warranty. **Survivair will not reimburse for the cost of inspection or replacement.** Inspection and replacement of these valves is the responsibility of the owner.



**WARNING: Failure to inspect and replace these valves may cause serious injury or death.**

This Technical Bulletin does not apply to valves used on Survivair hoop wrapped or Survivair steel cylinders. This Technical Bulletin includes a visual aid for identifying the type of cylinder. This Technical Bulletin also does not apply to valves that were installed at Survivair and have never been removed from the cylinder.

Please report the results of all valve inspections, along with the number of valves inspected and the number of valves replaced by using the attached fax form and faxing the information to Survivair @ (800) 201-4407. Please also report any incidence of valve rupture or separation to Survivair at this number (800) 394-0410 and to NIOSH at 1-412-386-4000.

Please provide a copy of this Technical Bulletin and Technical Bulletin 129 to your repair and hydrostatic test centers and to anyone who services your cylinders.

If you have any questions concerning these Technical Bulletins, please contact Survivair Technical Services at 1-800-394-0410.

## SURVIVAIR CYLINDER VALVE REMOVAL FOR VERIFICATION OF BREAKAWAY TORQUE AND INSPECTION PROCEDURE

### EQUIPMENT LIST:

- 1 ea. Dial Torque Wrench with memory needle. Range from 0-150 ft-lbs up to 0-175 ft-lbs.  
(Armstrong 64-402 1/2" 0-175 FT/LB Dial Torque Wrench or equivalent)
- 1 ea. Crowfoot, 1 ¼ inch with drive to match torque wrench.
- 1 ea. Tank vise

### PROCEDURE:

1. Calculate the correction factor (CF) and maximum breakaway direct reading (MBDR) for your torque wrench/crowfoot combination. See "CORRECTIING TORQUE WRENCH READING FOR LENGTH ADDED BY CROWS FOOT" below.
2. Vent all air pressure from the cylinder.
3. Secure the cylinder in the tank vise.



**WARNING: Do not over-tighten the cylinder into the holding fixture. Damage to the cylinder may result. If using a chain vise or other similar device or tools, use padding to prevent cylinder damage. Damage to the cylinder may lead to serious injury or death.**

4. Set memory needle to zero. Place wrench on valve insuring that the crowfoot is fully engaged and the valve touches the bottom of the crowfoot. Apply a slight pressure to the torque wrench and observe that the needle is traveling in the correct direction, increasing force. If the needle moves in the opposite direction, turn the torque wrench over and repeat test.
5. Apply torque slowly until valve moves freely. Observe dial and note if the torque value exceeds the calculated MBDR. If release torque is equal to or less than the MBDR, continue with step #6.  
If release torque exceeds the MBDR, skip to step #7.
6. Service valve as prescribed by Survivair or per your maintenance schedule.
7. Valve bodies, which exceed the maximum allowable release torque, must be replaced. Install new cylinder valve as described in Technical Bulletin 129.

**TORQUE WRENCH CALIBRATION:**

Dial type torque wrenches require calibration to insure accuracy. Survivair recommends checking calibration on a regular service interval or when the wrench has been abused or it has exceeded its maximum torque range. Calibration services may be contracted out of house or calibration stations may be purchased for in house calibration.

**CORRECTIING TORQUE WRENCH READING FOR LENGTH ADDED BY CROWFOOT:**

Torque Correction Factor: using a Crowfoot or any extension on a torque wrench alters the true torque from the direct dial reading. The following procedure will determine the correction factor, CF, for your particular toque wrench with the addition of a 1 1/4" crowfoot. Refer to FIGURE 1

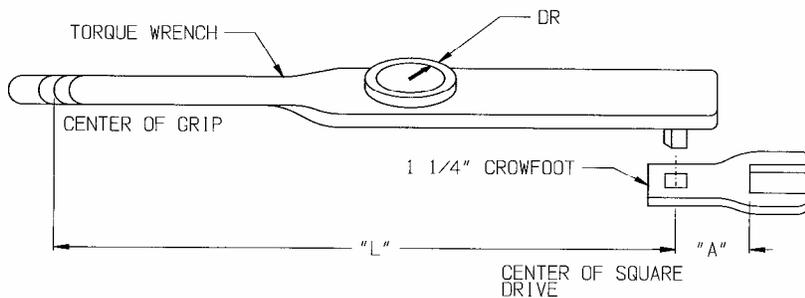


FIG 1

**L** = the handle length generally measured form the center of the square drive to center of the handle grip. Refer to your torque wrench manual for the specific length.

**A** = the distance between the bottom of the crowfoot throat to the centerline of the square drive.

**DR** = the direct reading or the dial on the torque wrench  
**.625** = the distance from the crowfoot throat to the center of the cylinder valve body.  
**CF** = correction factor to convert dial reading to actual torque  
**AT** = actual torque

$$\mathbf{CF = (L + A + .625) / L}$$

$$\mathbf{AT = (DR)(CF)}$$

The maximum permissible breakaway torque limit (actual torque, or AT) is 80 ft-lb. The maximum breakaway direct reading that corresponds to 80 ft-lb can be calculated by dividing 80 by the CF:

$$\mathbf{\underline{MBDR=(80)/(CF)}}$$

The MBDR will allow you to verify that the breakaway torque is below the allowable limit without having to calculate the AT each time. For most torque wrench/crowsfoot combinations, the CF will be approximately 1.1, so the MBDR will be approximately 73 ft-lb.

The installation direct reading (IDR) for installing valves is calculated by dividing 70 (the installation torque value specified by Survivair) by the CF:

$$\mathbf{IDR=(70)/(CF)}$$

F/N: tb128

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(800) 201-4407 Fax

**SURVIVAIR**

# FAX Cylinder Inspection Fax Form

To: **Survivair Customer Service** From: \_\_\_\_\_  
Fax: (800) 201-4407 Pages: 1  
Phone: (800) 821-7236 Date: \_\_\_\_\_  
Re: Survivair Cylinder Valve inspection CC: \_\_\_\_\_

**Please identify the total number of valves inspected by part number and the number of valves replaced.**

Cylinder Valve Part Number	Total Number of Valves Inspected	Total Number of Valves Replaced
921040 used on all-aluminum and fully wrapped cylinders		
921045 used on all-aluminum and fully wrapped cylinders		
961165 used on fully wrapped cylinders		
921065 used on fully wrapped cylinders		
920312 used on fully wrapped cylinders		
920322 used on fully wrapped cylinders		
964833 used on fully wrapped cylinders		

# CYLINDER AND VALVE IDENTIFICATION SHEET

