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BCA DEALER CYLINDER REFILL PROCEDURE

1.0 General Information

This procedure outlines the process by which authorized BCA refill centers should complete a refill on an empty BCA compressed air float cylinder ("cylinder"). The refill equipment utilized should meet BCA minimum requirements as outlined below to ensure a quality refill is performed.

2.0 Minimum Requirements

1. The air utilized to fill BCA cylinders MUST be dry breathable compressed air.
2. The refill equipment MUST be capable of filling to a pressure of 3300 psi.
3. A pressure gauge separate from the cylinder gauge must be used for refill equipment.
4. The secondary pressure gauge MUST have an accuracy of a least ± 50 psi across the operating range or be Grade 2A or higher. We recommend purchasing the BCA Refill Center Kit, which includes an approved secondary gauge.
5. The fill rate should be slow enough to keep the cylinder from becoming hot to the touch.
6. The fill station MUST have a bleed port that allows the pressure to bleed fast enough that the cylinder check valve closes and no pressure drop is observed.
7. A clean work place MUST be available for resetting and re-greasing the cylinder O-rings.

3.0 Cylinder Components

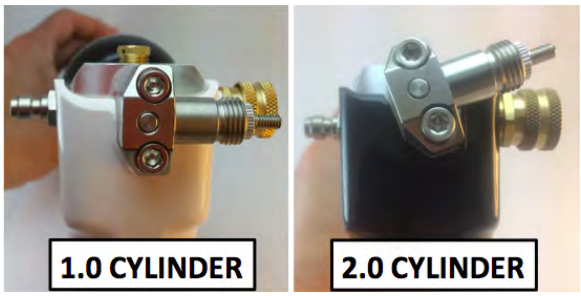

Fig 2: Hex screws and valve stem housing for 1.0 and 2.0 Float cylinders

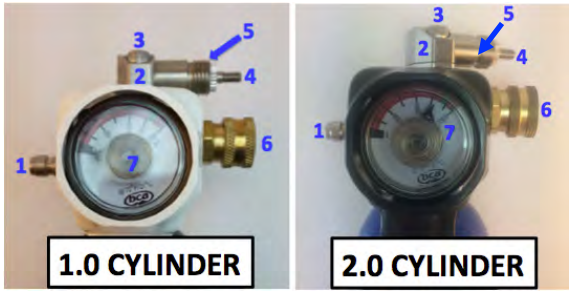

Fig 1: Cylinder head assembly for 1.0 and 2.0 Float cylinders

1. Fill port
2. Valve stem housing
3. Hex screws
4. Trigger pin connection
5. Trigger pin housing connection
6. Quick connect coupler
7. Cylinder pressure gauge

Cylinder Inspection

NOTE: Proceed with refill if cylinder resembles **O** photos. Refill cylinder but advise customer to contact BCA warranty department if cylinder resembles **O** photo. Reject for warranty and contact BCA warranty department if cylinder resembles **X** photo (see the link below).

1. Record the following on the Release of Liability, Waiver of Claims, Assumption of Risk and Indemnity Agreement ("BCA Release") before refilling a cylinder:

    a. Serial number or manufacture date code, depending on the date it was manufactured.
        - For 1.0: cylinder head serial number located on the back of the cylinder head as shown in Figure 3 or cylinder head four digit manufacture date code (xx-xx) located on the cylinder head, as shown in Figure 4.
        - For 2.0: cylinder head manufacture date code (xx-xx) located on the cylinder head, as shown in Figure 4.
    b. Shop, technician name, and date.

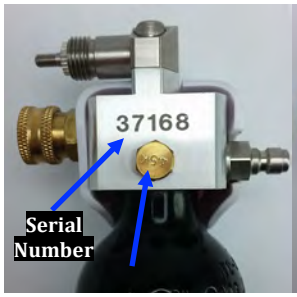

Figure 3: **O** – serial number and brass burst disc

Figure 4: **O** – manufacture date code and brass burst disc

Figure 5: **O** No burst disc

2. Inspect the following:

a. Complete a visual inspection of the cylinder and cylinder head for damage and dents.
b. Confirm the quick connect coupler has an O-ring and retaining clip installed. See Figure 7.
c. Inspect the trigger pin threads for damage and ensure the pin is not bent. See Figures 8 and 9.
d. Confirm the cylinder head has a burst disc. See Figures 3 and 4.

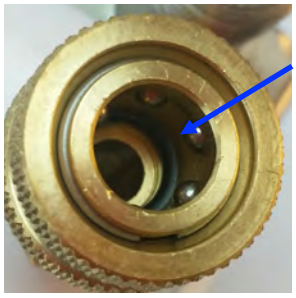
Figure 7: O Retaining clip


Figure 8: O Straight trigger pin


Figure 9: X Bent trigger pin and bad gauge

e. If any damage as described above is observed or component parts are missing, the cylinder should not be refilled, and the customer should be instructed to contact BCA to arrange for a replacement.
http://backcountryaccess.com/services/warranty/

4.0 Cylinder Refill

WARNING: Before refilling or working on a cylinder, ensure there is no pressure left in the system. If the pressure gauge does not read zero, then connect the cylinder to the Float airbag, deploy the system, and re-check the pressure to make sure it is zero. Releasing compressed air from the cylinder without the Float airbag connected could cause injury.
NOTE: The refilling equipment should meet the BCA minimum requirements set forth in Section 2.0.
NOTE: The refill center must maintain the cylinder O-rings according to sections 4.1 and 4.2 or verify that the customer has done so.

Please visit our Float Resources page to see our video on cylinder maintenance:
www.backcountryaccess.com/services/float-resources

4.1 Cleaning the Head-to-Cylinder O-ring

NOTE: This procedure is only to be performed if the customer has removed the cylinder head from the cylinder or if the cylinder is experiencing a slow leak.

NOTE: For a cleaning supply list see Appendix A found on page 7.

1. Unscrew the cylinder head from the cylinder. See Figure 10.
2. Remove the head-to-cylinder O-ring with a toothpick or dental pick. See Figure 11.

3. Inspect and clean the threads on the cylinder head and cylinder with rubbing alcohol and a lint-free cloth or Q-tip. Allow components to dry.
4. Apply a small amount of Dow Corning high vacuum grease around the O-ring and place it in the O-ring groove on the cylinder. See Figure 12.
5. Screw the cylinder head back onto the cylinder until hand tight.


Figure 10

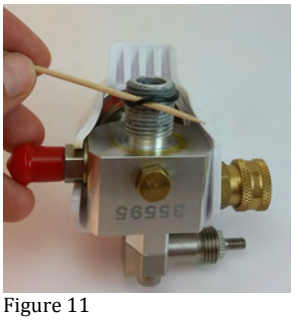
Figure 11


Figure 12

WARNING: Do not utilize tools or excessive force to tighten the cylinder head onto the cylinder; this may damage the cylinder head assembly.

4.2 Resetting the Valve Stem O-ring

1. Unscrew the hex screws on the trigger housing with a 5/32" Allen wrench. See Figure 13.
2. Pull the trigger pin out with your fingers and then slowly remove the trigger housing from around the valve stem. See Figure 14.
3. Pull the valve stem out of the cylinder head with your fingers. See Figure 15.
4. Use a dental pick or toothpick to remove the valve stem O-ring. Use care to avoid scratching the valve stem and O-ring groove. See Figures 16 and 17.

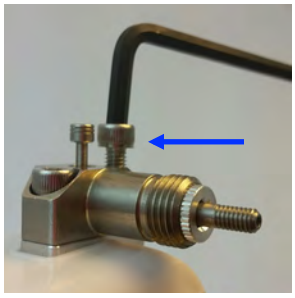
Figure 13: Hex screws

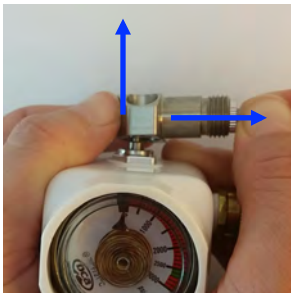
Figure 14: Pull trigger pin right and remove housing simultaneously.

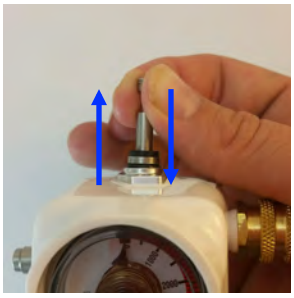
Figure 15: Pull valve stem up to remove. Push down firmly to reinstall.

NOTE: As a result of discharging the cylinder, the valve stem O-ring is likely to be displaced from its groove, as shown in Figure 16.

5. Remove the old valve stem O-ring. See Figures 16 and 17. Apply Dow Corning high vacuum grease to a new valve stem O-ring and install in the valve stem groove. See Figure 18. Place the valve stem back inside the cylinder head. See Figure 15.


Figure 16: Valve stem O-ring


Figure 17: O-ring removal


Figure 18: Reset O-ring

NOTE: Ensure the installed valve stem O-ring is free of contamination.

6. Reinstall the trigger housing by pulling out the trigger pin and placing it over the valve stem. See Figure 14.
7. Install the hex screws on the trigger housing and tighten with a 5/32" Allen wrench until hand tight. Make sure the valve stem is flush with the top of the housing. See Figures 19 and 20.

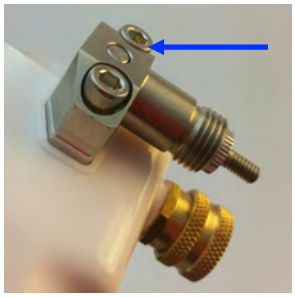
Figure 19: **O** Flush valve stem

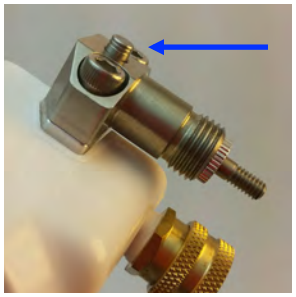
Figure 20: **X** Improperly installed valve stem

4.3 Filling the Cylinder

Note: Do not refill using any gas other than dry breathable compressed air.

1. Connect fill port on the cylinder to the fill station and begin filling slowly. See Figure 21.


Figure 21: Pull back on the quick connect coupler to connect to and disconnect from the fill station.

2. Always use a secondary pressure gauge for filling cylinders to the required pressure. If using a regulator, set the pressure to 2700 psi for the 1.0 Float system or 3000 psi for the 2.0 Float system. Allow the cylinder pressure to

equalize to the required pressure (on the secondary gauge) for 1 minute. You will notice the cylinder warms up as it fills: this is normal. Do not overheat.

3. Inspect the pressure gauge on the cylinder head and ensure it reads between 2500-2700 psi (1.0 cylinder) or 2800–3000 psi (2.0 cylinder).
4. Quickly bleed the air from the fill station while ensuring that the reading on the cylinder pressure gauge does not decrease. If the system is bled too slowly, the check valve will not close immediately, causing a loss in pressure.
5. Remove cylinder by disconnecting the quick connect coupler. See Figure 21.
6. Place cylinder inspection label on cylinder. See Figure 22.
7. Allow cylinder to cool to room temperature (approximately 20°C/68°F) and top off to required pressure if needed.
8. Advise refill center customers that in 14 days, they should check the reading on the cylinder pressure gauge–at room temperature–and record it on the cylinder inspection label. See Figure 22. If the pressure reading is more than 100 psi lower than the pressure recorded at the time of the refill, they should contact BCA.

Figure 22: Cylinder inspection label.

9. In addition, always advise customers to check their cylinder pressure each time they are preparing to travel in the backcountry. Cylinder pressure should always be recorded at room temperature, as readings will be lower at cold temperatures.
10. Always have refill customers sign the BCA Release. This form must be completed, signed, and kept on file by the refill center.

NOTE: It is not necessary to perform periodic hydrostatic testing on BCA cylinders. Federal regulation, 49 CFR § 180.209 states "*Any cylinder not exceeding 2 inches outside diameter and less than 2 feet in length is excepted for volumetric expansion test.*" See 49 CFR § 180.209

Appendix A-Cleaning Supply List

1. Dow Corning high vacuum grease
2. 5/32" Allen wrench
3. Head-to-cylinder O-rings
4. Valve stem O-rings
5. Toothpick
6. Q-tips
7. Alcohol