



WHEN ASSEMBLING A HALE (CLASS 1) DIRECT HANDLE VALVE (SHORT, LONG, OR SWIFT HANDLE™ – TYPICALLY CONTROLLING DISCHARGE #1, DISCHARGE #2 OR INTAKE PONY SUCTION ON AN APPARATUS), USE THIS SERVICE BULLETIN AND THE CLASS 1 VALVE MANUAL (P/N 119138) TO SET THE LOCKING TORQUE FOR A VALVE TO MAKE SURE IT HOLDS POSITION DURING TESTING. ALL REFERENCED DOCUMENTS ARE AVAILABLE FROM THE TECH RESOURCE CENTER ON THE HALE WEBSITE ([HTTPS://WWW.HALEPRODUCTS.COM](https://www.haleproducts.com)). SEE ALSO SB-162

**NOTES:** Recommended O-ring lubricant: Synthetic Multi Purpose Clear O-ring Lubricant (Synthetic NLGI Grade 2 Heavy Duty, Multi Purpose)

Recommended thread lock compound: Loctite™ 2670 (or equivalent thread lock compound). To remove thread lock compound, soak in Loctite™ solvent and use mechanical abrasion (such as a wire brush).

Recommended Solvent: Safety Kleen® or Stoddard Solvent (or equivalent) (Use lime scale remover & soft bristle brush for mineral deposits) (Alcohol is the recommended cleaner for removing grease and/or oil.)

SB92 (referenced by the Class 1 Valve Manual P/N 119138) does NOT apply.

Table 1. Applicable Kit

Kit Number	Description	Remarks
546-00077-000	2.5-in Class 1 Valve Shim Set	Kit contains one (1) each 0.005 and 0.007 shim, two (2) 0.010 shims, a compressor (wave) spring, and the trunnion screw O-ring.

## SAFETY

Safety headings (ATTENTION or IMPORTANT; WARNING or CAUTION) that immediately precede a step apply directly to that step and all sub steps. Safety headings that precede an entire procedure apply to the entire procedure. Whenever a safety heading appears, refer to the listings below to determine the minimum precaution(s) and possible result(s) if disregarded.

**ATTENTION ▲ CAUTION**

INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH IF NOT AVOIDED MAY RESULT IN MINOR OR MODERATE INJURY.

**IMPORTANT ▲ NOTICE**

ADDRESSES PRACTICES NOT RELATED TO PERSONAL INJURY (EQUIPMENT DAMAGE)

**Table 2. Tools And Consumables List**

Standard Tools	Special Tools	Consumables
PPE (Protection For Eyes and Hands)	Dial Indicator Torque Wrench (0-50 ft-lbs or 0-600 in-lbs)	Safety Kleen® or Stoddard Solvent (or Equivalent)
3/4-inch Socket		O-ring Lubricant (See NOTES on page 1.)
Vice (With Jaw Pads)		Lime Scale Remover
Ratchet		Soft Bristle Brush
Torque Wrench (40 ft-lbs)		Shop Rag(s) (As Required)
Calipers *		Loctite™ 2670 (or equivalent)
		Loctite Solvent

\* Use calipers or feeler gauges (0.010, 0.007, and a 0.005 inch required) to determine the thickness of all shims if NOT marked/identified.

#### PREPARE VALVE FOR CHECKING OPERATING TORQUE

##### ATTENTION ⚠ CAUTION

**RELEASE ALL PRESSURE FROM THE SYSTEM. LOCK OUT THE EQUIPMENT IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS. OPEN DISCHARGE VALVES, REMOVE SUCTION TUBE AND DISCHARGE VALVE CAPS TO ENSURE RELEASE OF RESIDUAL PRESSURE.**

Match mark/note valve and handle orientation then remove the valve from the apparatus per the OEM/apparatus manufacturer instructions.

Disassemble the valve so it can be inspected for serviceability and cleaned. See paragraph 6.3 Valve Exploded Parts List located in the Class 1 Valve Manual (P/N 119138) for an exploded view of the valve and for component identification.

1. Remove both valve seals. (One on each side of ball.)

**NOTES:** Chucking the valve up in a bench vice makes working on the valve much easier. When using a vise always use jaw pads to protect valve.

Rotate valve in vise to access each side of the valve as required.

##### IMPORTANT ⚠ NOTICE

**THE BALL MAY FALL OUT OF THE VALVE BODY AFTER THE HANDLE OR TRUNNION SCREW IS REMOVED. ALWAYS MAINTAIN CONTROL OF THE BALL AS UNEXPECTED MOVEMENT MAY ALLOW THE BALL TO FALL OUT OF THE VALVE BODY.**

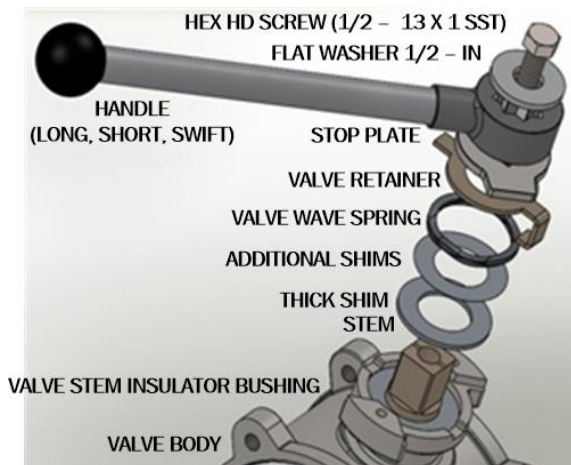
2. Disassemble valve as follows.
  - a. Match mark/note handle position on valve.
  - b. Remove handle, see Figure 1. (See paragraph 6.3, Valve Exploded Parts List, in Class 1 Valve Manual (P/N 119138) for component identification.)
    - 1) Using a 3/4-inch socket and ratchet (set CCW), loosen handle retaining screw.
    - 2) Remove screw.

- 3) Remove 1/2-inch flat washer.
- 4) Lift handle off valve stem.
- c. Remove existing shims and wave spring.  
See **Figure 1**.
- 1) Lift stop plate off valve stem.

**NOTES:** Match mark/note tab side of valve retainer to valve body.

The tab may need to be bent outward to clear the valve body.

- 2) Lift valve retainer off valve stem.
- 3) Lift wave spring off valve stem.  
Discard spring.



**Figure 1.**

**NOTES:** If only one shim is installed it is called the thick shim.

If more than one shim is installed, the thickest shim is the thick shim. The shim measures 0.070 to 0.082-inch.

- 4) Lift shim (or shims) off valve stem.

**NOTES:** If using a vise, rotate the valve in the vise to access the bottom of the valve.

Do NOT allow the ball to fall out of the valve body.

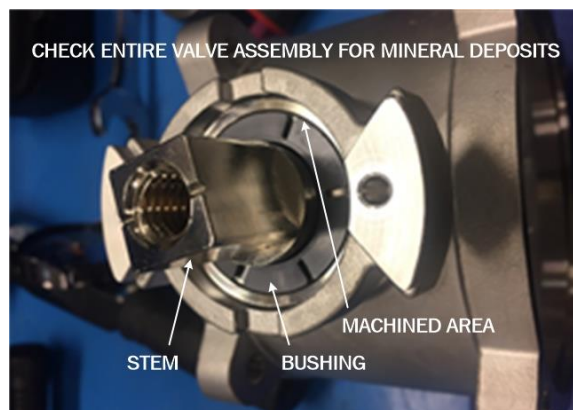
- d. Remove trunnion screw.
  - 1) Using a 3/4-in socket and ratchet (set CCW), loosen trunnion screw.
  - 2) Remove trunnion screw.
  - 3) Remove O-ring from trunnion screw. Discard O-ring.

- e. Remove ball.

**NOTE:** Push/pull the ball away from the valve stem and then remove the ball from the valve body.

### 3. Clean valve.

- a. Clean machined area around stem. Stem and surrounding area must be free of oil or grease. See **Figure 2**.
  - 1) Using Safety Kleen® or Stoddard Solvent (or equivalent), clean entire valve assembly and removed components.
  - 2) Using alcohol and clean shop rag, remove oil and grease from thick shim, valve stem, bushing, and surrounding machined area.



**Figure 2.**

- b. Check entire valve assembly for mineral deposits.
    - 1) If mineral deposits are present, loosen/soften deposits by soaking valve/components in lime scale remover.
    - 2) Remove deposits using additional lime scale remover and a soft bristle brush.
  4. Assemble valve stem assembly as follows.
    - a. Install shim pack.
      - 3) Place thick shim on top of valve stem insulator bushing. See Figure 3.
      - 4) Place typical additional shims on top of thick shim. See Figure 4.
- NOTE:** Typical additional shims are two 0.010 shims. [0.010 + 0.010]. (Located in kit.)

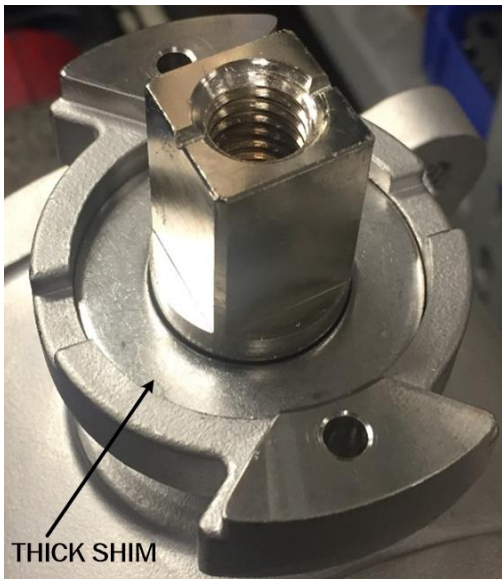


Figure 3.

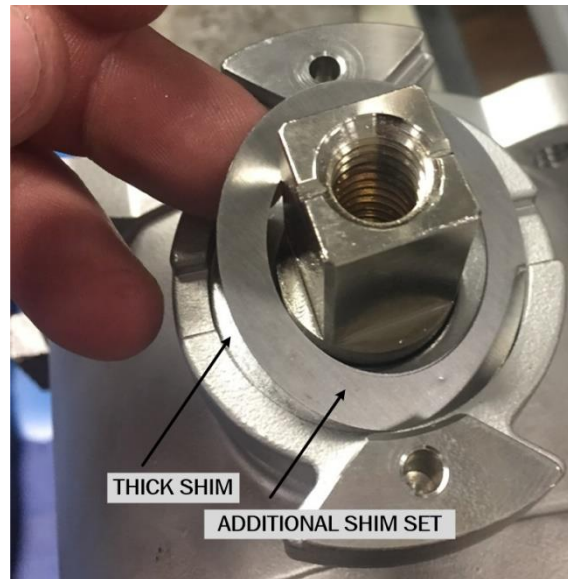


Figure 4.

- b. Install wave spring (new from kit). See Figure 5.
- c. Install valve retainer (per match mark/note). See Figure 6.
- d. Install stop plate. See Figure 7.

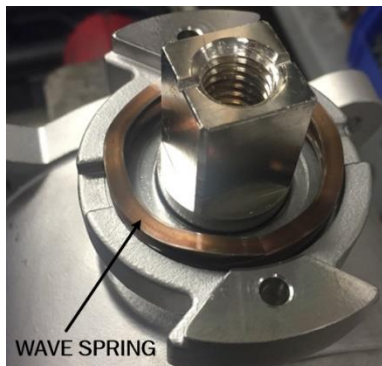


Figure 5.

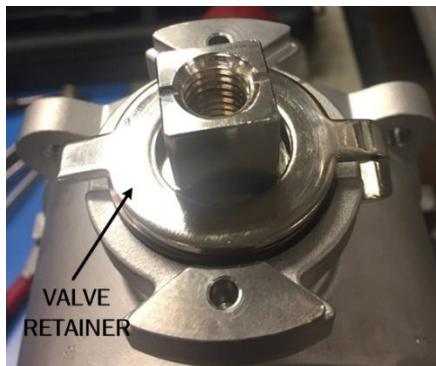


Figure 6.

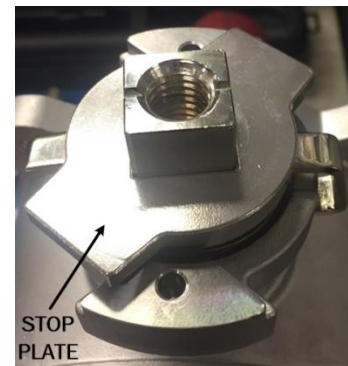


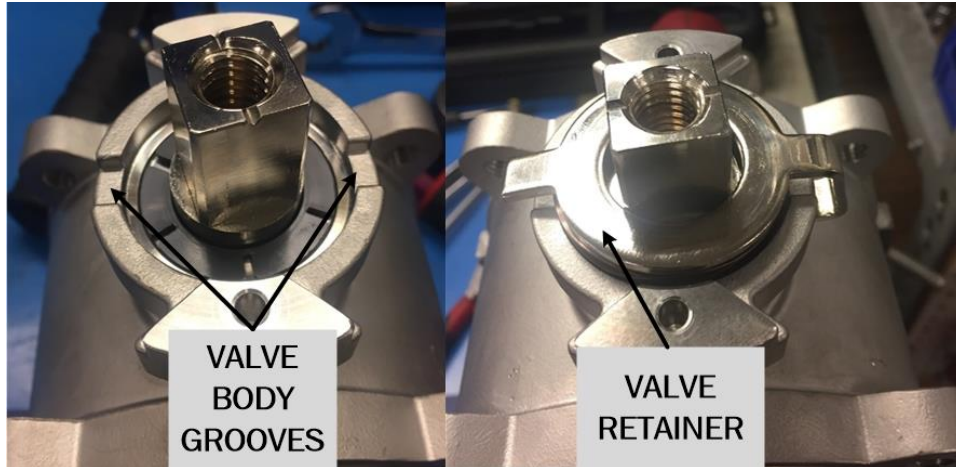
Figure 7.



- e. Install handle (per match mark/note).
- f. Install flat washer.
- g. Install retaining screw.
  - 1) Hand start retaining screw.

**IMPORTANT ⚠ NOTICE**

**AS THE RETAINING SCREW IS TIGHTENED, ENSURE THE VALVE RETAINER ALIGNS WITH THE GROOVES ON THE VALVE BODY. SEE FIGURE 8.**



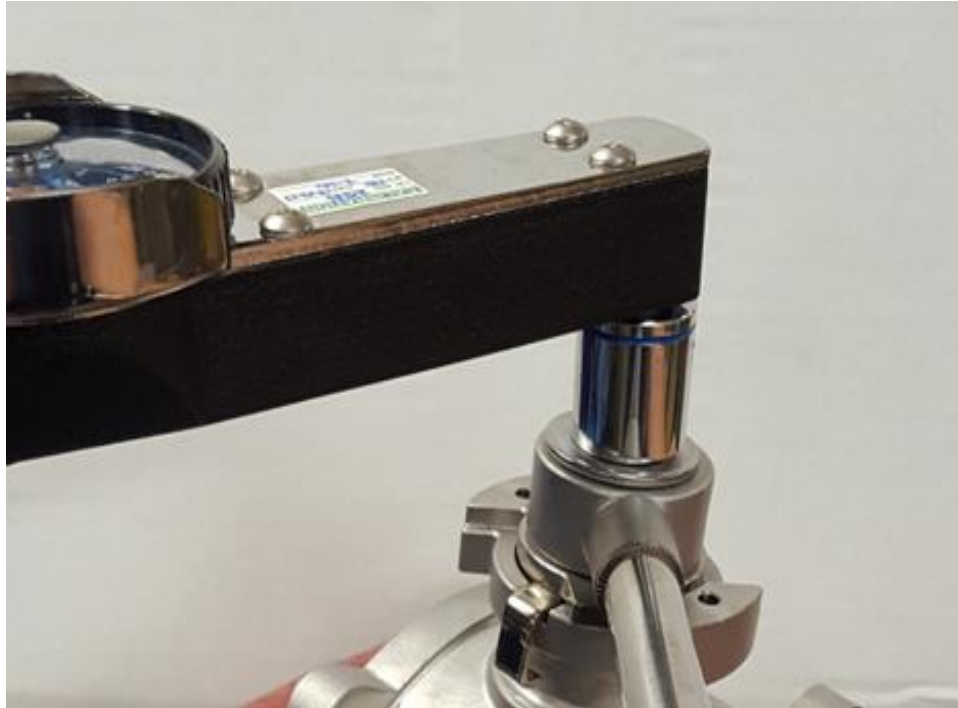
**Figure 8.**

- 2) Tighten retaining screw using 3/4-in socket and ratchet (set CW). Do NOT over tighten retaining screw.
  - 3) Using torque wrench, torque retaining screw to 40 ft-lb.
5. Perform **Check Operating Torque**.

## CHECK OPERATING TORQUE

Using a dial indicator torque wrench and a 3/4-inch socket check the torque required to turn the valve from the closed to the open position and then from the open to the closed position.

See **Figure 9**. If the torque wrench reading exceeds 27 ft-lbs (325 in-lbs) or is less than 18 ft-lbs (215 in-lbs) the valve fails the check and requires corrective action. Perform the check as follows:



**Figure 9.**

**NOTE:** If valve is being held in a vice, turn the valve so the handle is up.

1. Turn valve handle fully CCW.
2. Place dial indicator torque wrench with 3/4-inch socket on handle retaining screw.

### NOTES

Always torque the handle retaining screw before checking the operating torque or the results will be inaccurate.

Hitting the stop (open or closed) will cause a false reading. **ONLY** count the reading during the transition.

3. Using dial indicator torque wrench, turn valve CW. Note maximum torque required to turn valve.
4. Repeat Step 1 and Step 3 (above) as required to obtain a confident reading.
5. Go to **Determine Required Corrective Action As Listed In Table 3**.

**DETERMINE REQUIRED CORRECTIVE ACTION AS LISTED IN TABLE 3.**

If the check fails, perform the following steps to determine what corrective action will correct the valves operating torque.

1. Compare maximum torque required to turn valve (see Check Operating Torque above) to Check Results listed in Table 3.
2. Determine what shim (or shims) must be added to (or removed from) valve to correct operating torque using Check Results and Notes from Table 3.

**Table 3. Check Results Dictate Action Required**

Check Results Ft-lb (in-lb/Nm)	Notes	Action Required
< 15 (180 / 20)	Add a 0.007 shim to the typical shims.	Install three (3) shims (0.010 + 0.010 + 0.007)
15 to < 18 (180 / 20) to < (215 / 25)	Add a 0.005 shim to the typical shims.	Install three (3) shims (0.010 + 0.010 + 0.005)
18 to 27 (215 / 25) to (325 / 36)	No shim change required.	No shim change required
> 27 to 31 (325 / 36) to (372 / 42)	Reduce installed shims to 0.003 less than typical shims.	Install two (2) shims (0.010 + 0.007)
>31 to 40 (372 / 42) to (480 / 54)	Reduce installed shims to 0.010 less than typical shims.	Install one (1) shim (0.010)
> 40 (480 / 54)	Replace wave spring and start over.	Remove existing wave spring and install a new wave spring with the typical shim pack

**Typical shim pack consists of two (2) shims (0.010 + 0.010).**

3. If required, perform **Adjust Shim Pack**; otherwise perform **Assemble Valve After Adjusting Shim Pack**. (See next page.)



## ADJUST SHIM PACK

1. Locate ft-lb reading listed in Table 3 (under **Check Results**).
2. Use Table 3 to determine how to adjust additional shims.
  - a. If **Check Operating Torque** result is less than 18 ft-lb (215 in-lb or 25 Nm), disassemble handle assembly and add shims as listed under **Notes**. Then assemble handle assembly and perform **Check Operating Torque** again.

**NOTE: As an example:**

Three (3) shims are present [the thick shim and two (2) 0.010 shims].

The Check Results = 15 ft-lb.

Table 3 Notes directs the addition of a 0.005 shim to the existing three (3) shims.

After assembling handle, perform the Check Operating Torque procedure again.

The Check Results = 20 ft-lb.

The valves operating torque is corrected; complete valve assembly and then return the valve to service.

- b. If **Check Operating Torque** result is greater than 27 ft-lb (325 in-lb or 42 Nm), disassemble handle assembly and remove/exchange shims as listed under **Notes**. Then assemble handle assembly and perform **Check Operating Torque** again.

If the operating torque is still out-of-range, continue the process until the operating torque is in range or until all possible shim pack combinations are exhausted.

If the operating torque is still out-of-range and no combination of additional shims (including the new wave spring) corrects the problem, contact Hale Products Customer Service at 800-533-3569 for further assistance.

## ASSEMBLE VALVE AFTER ADJUSTING SHIM PACK

Complete the valve assembly after obtaining the correct operating torque. Additionally, NFPA requires apparatus testing after returning the repaired valve (or valves) to service and installation on the apparatus. Perform the following steps to complete valve assembly and apparatus installation.

**IMPORTANT ▲ NOTICE**

**DO NOT DISASSEMBLE THE HANDLE ASSEMBLY AFTER THE OPERATING TORQUE HAS BEEN SET. THE OPERATING TORQUE MAY BE NEGATIVELY AFFECTED BY THE DISASSEMBLY/ASSEMBLY PROCESS.**

1. Prepare trunnion screw for installation.

**IMPORTANT ▲ NOTICE**

**FAILURE TO CLEAN THREADS WILL RESULT IN A FALSE TORQUE READING.**

- a. Remove thread lock compound from trunnion screw. (See NOTES on page 1.)
- b. Install new O-ring (from kit) as follows.
  - 1) Using recommended O-ring lubricant, lubricate trunnion screw and O-ring. (See NOTES on page 1. The lubricant helps prevent O-ring damage during assembly.)
  - 2) Using care NOT to cut or damage O-ring on threads, seat O-ring in O-ring groove (adjacent to screw head).

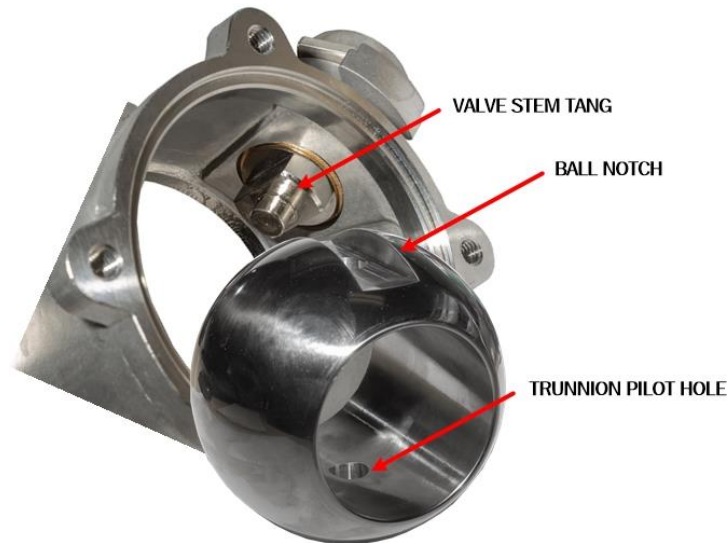


**NOTE:** Placing the valve in a bench vice with both the handle and trunnion screw hole accessible is the easiest way to assemble the valve due to the torque required when installing the trunnion screw.

**IMPORTANT ⚠ NOTICE**

**THE BALL MAY FALL OUT OF THE VALVE BODY WHEN THE HANDLE OR TRUNNION SCREW IS REMOVED. ALWAYS MAINTAIN CONTROL OF THE BALL AS UNEXPECTED MOVEMENT MAY ALLOW THE BALL TO FALL OUT OF THE VALVE BODY.**

1. Install ball in valve body as follows. See **Figure 10**.



**Figure 10.**

- a. Slide notch (groove) in ball over tag on valve stem.
- b. Center ball in valve body.
- c. If required hold ball in place until trunnion screw is installed.
2. Install trunnion screw as follows. See **Figure 10**.
  - a. Apply small amount of Loctite™ 2670 (or equivalent) to trunnion screw threads.
  - b. Hand start trunnion screw in valve body.
  - c. Using a 3/4-in socket and ratchet (set CW), tighten trunnion screw. Do NOT over tighten trunnion screw.
  - d. Using torque wrench (set CW), torque trunnion screw to 40 ft-lb (480 in-lb or 54 Nm).
3. Install both valve seals. (One goes on each side of the ball at each valve body opening.)
4. Install repaired valve on apparatus, per match marked/noted orientation, using OEM/apparatus manufacturer instructions and/or Class 1 Valve Manual (P/N 119138).

Perform the testing required by NFPA (1901, 1906, 1911, etc.) or EN 1028 after installing a repaired valve (or valves) on the apparatus. (Typically the minimum testing would be a dry vacuum test and then complete the apparatus/pump/valve performance testing.)