

# Flow-Tek®

Subsidiary of BRAY INTERNATIONAL, Inc.

## INSTALLATION - MAINTENANCE MANUAL

Severe Service Series M4 Ball Valve





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### 1. SAFETY INFORMATION - DEFINITION OF TERMS

READ AND FOLLOW THESE INSTRUCTIONS:

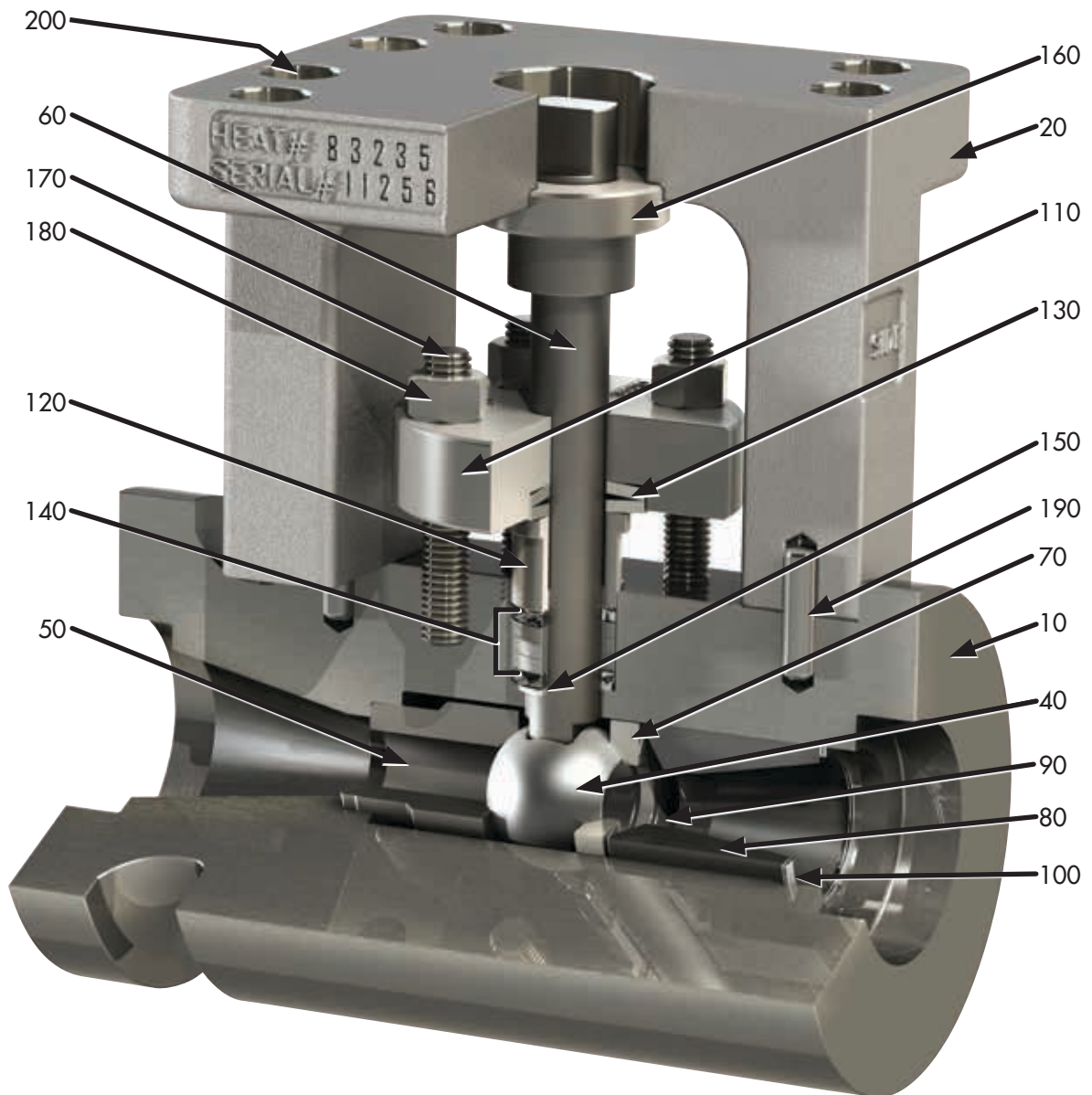
	<b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	<b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
<b>NOTICE</b>		Used without the safety alert symbol indicates a potential situation which may result in damage to the valve and void of warranty.

**2. BILL OF MATERIALS**

Item #	Component	Qty.
10	Body	1
20	Bracket	1
40	Ball	1
50	Seat	1
60	Stem	1
70	Pusher Seat	1
80	Transition Sleeve	1


Item #	Component	Qty.
90	Seat Spring	1
100	Retainer Ring	1
110	Gland Flange	1
120	Gland Follower	1
130	Belleville Spring	2
140	Packing Set	1
150	Metal Anti-Extrusion Ring	1

Item #	Component	Qty.
160	Stem Bearing	1
170	Stud, Gland	4
180	Nut, Gland	4
190	Roller Pin	2
200	Non-removable Screw (Hidden from view)	4



### 3. NAMEPLATE INFORMATION

Nameplate Info	Stamp	Nameplate Info	Stamp	Nameplate Info	Stamp
MODEL:	Valve Series Model	BALL:	Ball Material	MAX P:	Maximum Pressure
SIZE:	Nominal Pipe Size x Bore	SEAT:	Seat Material	MAX T:	Maximum Temperature
B16.34:	Pressure Class	STEM:	Stem Material	S/N:	Valve Serial Number
BODY:	Body Material	B/S CTG:	Ball/Seat Coating Code	P/N:	Valve Part Number

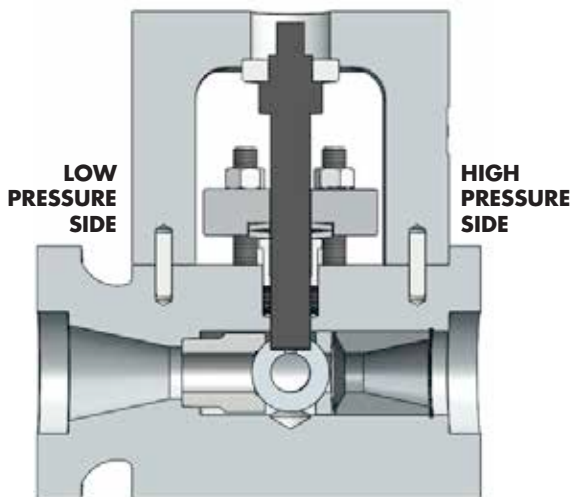
	MODEL:		SIZE:		B16.34:	
	BODY:		BALL:		SEAT:	
	STEM:		B/S CTG.:		MAX T:	*F
	MAX P:	psi@100F		bar@38C		
	S/N:			P/N:		

### 4. DESIGN

Our Series M4 valve is designed as a “free floating” ball with uni-directional sealing seat. These valves are typically used in the power industry. It is important and critical to install the valve correctly in the pipeline to assure the valve will isolate the proper side of the piping system.

This product is designed for long life and economic initial investment. Repair of the valve internals is not recommended or approved by Flow-Tek.

Low emission, live loaded packing material and energized gasket rings eliminate atmospheric leaks in the most severe applications. Outer stem bushing prevents side loading on stem.




### 5. USE

The valve should be maintained as part of an overall preventative maintenance program and in accordance with Flow-Tek’s recommended pressure, temperature and corrosion limits to ensure a long service life.

During shipment, storage, and in operation, the valve should be fully open or fully closed. A valve left in the partially open position during service will suffer premature wear to the ball and seat sealing surfaces.





**WARNING**

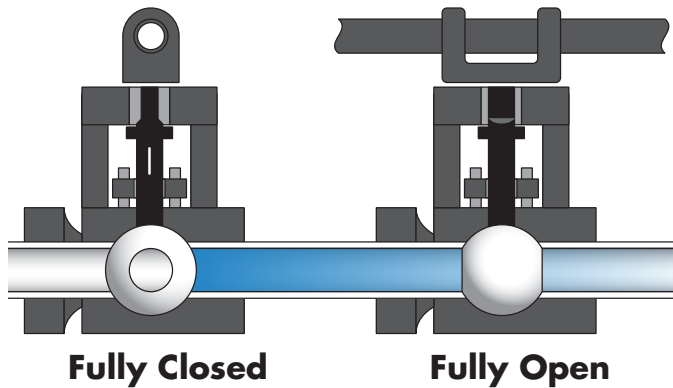
Before installing this equipment, confirm that it is suitable for the intended service. Refer to the nameplate for maximum allowable service conditions for this product.

## 6. OPERATION

The M4 ball valve is a 1/4 turn (90°) operation valve. The valve is opened by a 1/4 turn counterclockwise and closed by a 1/4 turn clockwise.

### Visual Indicators

If valve handle is in-line with pipeline, valve is in the open position; if handle is perpendicular to pipeline, then valve is in the closed position.



The scribe line can be used to set operator open/close stops if the operator cannot be removed from valve. Valve shown in closed position.



### NOTICE

Misalignment will result in high operational torque and may damage valve stem and seals.

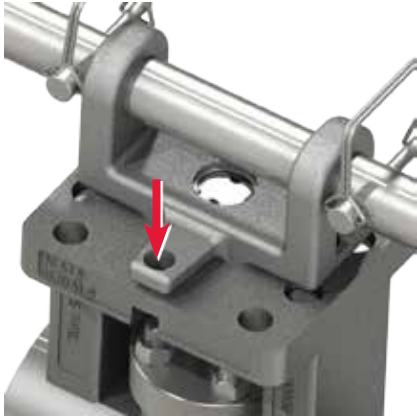
Avoid 180° rotation of the ball and/or stem as this could cause premature wear to the ball/seat lapping surface thus reducing effective sealing/isolation which may lead to **void of warranty**.

When cycling the valve open or close, make sure that the valve is fully opened and fully closed to wipe away any accumulation of debris on the ball and seat sealing surfaces. This ensures optimal performance and long valve life.

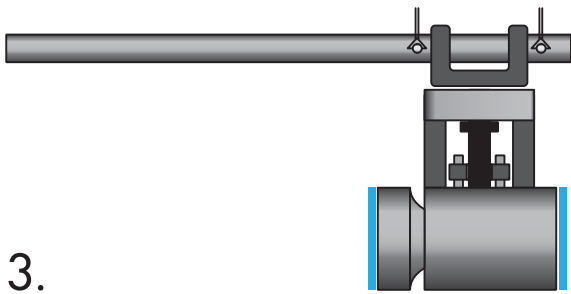
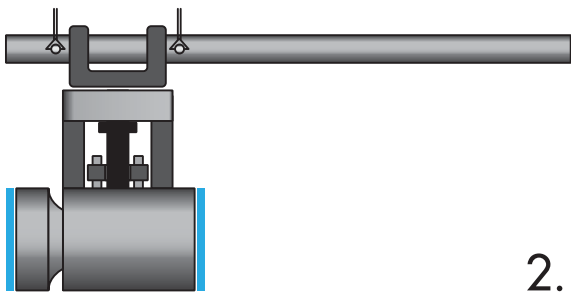
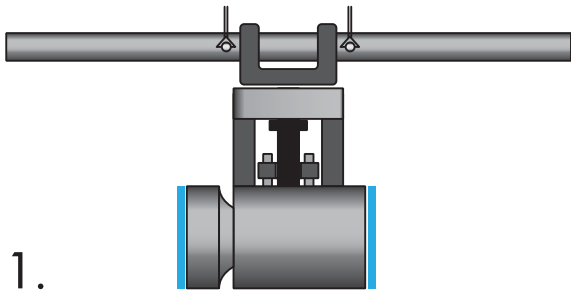
The actuator must not be re-oriented without removal from the valve. This prevents 180° rotation of the ball and assures the mate-lapped ball and seat surfaces to match. Seat leakage may occur when the ball and seat surfaces are not matched.

**Handle**

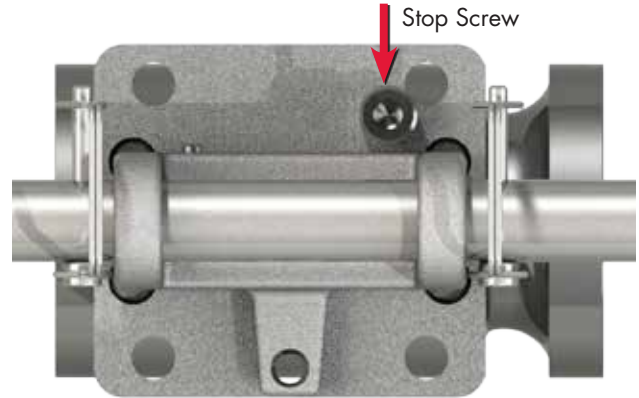
Lock-out devices may be used in this hole.



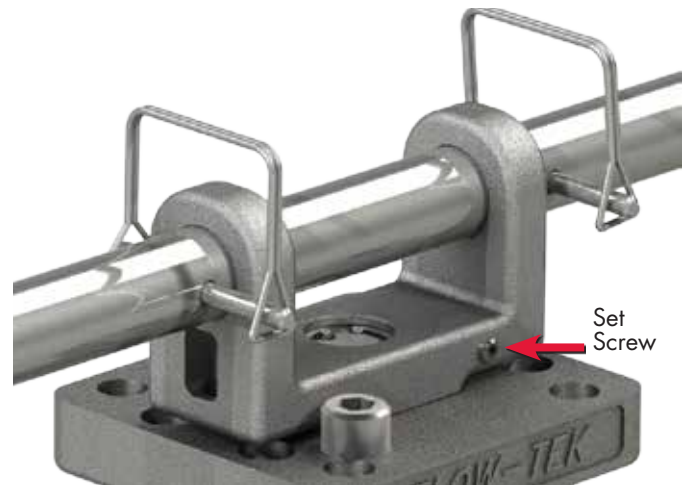
Lever can be secured in any of three positions



The stop screw is placed in the threaded hole of the bracket and tightened.



Place the set screw in the adaptor and adjust so that when the valve is in closed position, the set screw touches the stop screw.



## 7. INSTALLATION



The valve may be oriented in any position on the pipeline. Before installing the valve, the valve should be placed in the open position.

### NOTICE

Before installing the valve the pipes must be flushed clean of dirt, burrs, and welding residues, or the seats and ball surface will be damaged.

Large valves and actuators may need external support to prevent excess piping loads from affecting valve operation.

1. Clean the pipeline, connecting socket, and the weld area on the pipe.

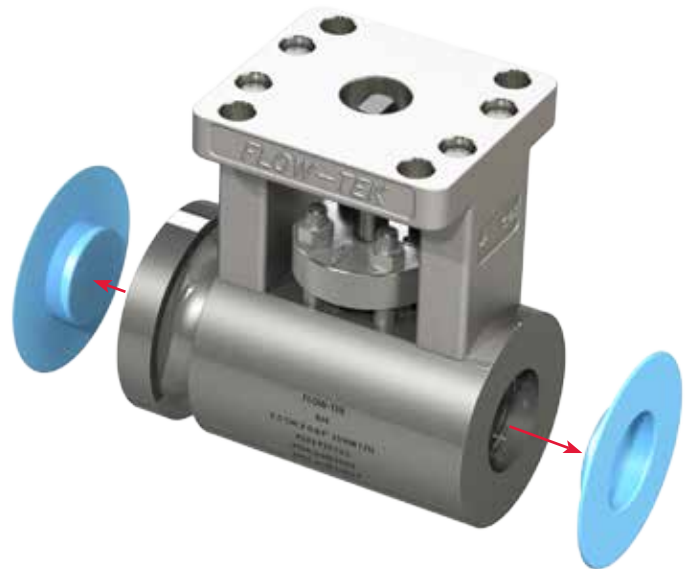
### NOTICE

Identify the preferred sealing direction of the valve by positioning the valve in piping where the 'High Pressure End' is positioned toward the highest pressure against the valve when the valve is closed. Valve should be installed so that the primary sealing occurs at the low pressure end.

2. Position valve in piping. Verify that the valve and actuator/handle orientation is correct.

**NOTE:** Support or lift as required, using lifting lugs or nylon straps around the valve body. Do **not** lift or support by the actuator alone. Refer to Section 9 – Handling and Lifting for more information.

3. Secure valve in place.
4. Remove the plastic protective caps from the valve ends. Do not remove the contraction rings.



5. Inspect the valve bore and remove any debris.
6. Verify that the ball is in the open position prior to welding to protect the ball from possible damage.
7. Follow appropriate welding procedure when welding pipe to the valve ends.

**NOTE:** Figures used in this document show only SW end connections; however, BW connections are also available.



**NOTICE**

When welding, assure that the temperature of the valve body does not exceed 1100°F.  
Verify packing torque prior to placing valve in service as packing consolidation is expected.

**Post Weld Heat Treatment (PWHT)**

Post weld heat treatment shall be performed localized only; PWHT in a kiln is NOT allowed. After welding the valve in the pipeline, follow the instructions below for PWHT:

1. Prior to heat treatment, install heating blankets, as shown, covering the weld areas up to the valve body socketweld.



**WARNING**

Do not allow valve body temperature to exceed 1100°F during welding or post weld heat treating. To avoid body temp exceeding 1100°F, perform PWHT on one end then normalize to room temperature before proceeding to the second end. Valve body reaching to higher temperatures will lead to void of warranty.

2. Stress relieve the welds using appropriate procedures. Refer to ASME B31.1 Table 132, Postweld Heat Treatment.
3. Verify operation. After installation of the valve in the pipeline, cycle the valve to ensure proper operation.

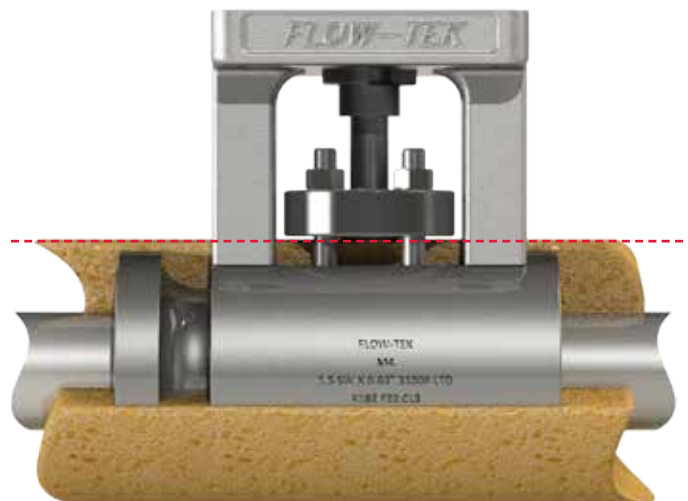


**WARNING**

Do not pressurize the line without an actuation device properly installed and working on the valve.

**Valve Insulation**

Valve insulation should not extend above the packing gland. Refer to the dotted line in the picture below:





## 8. MAINTENANCE



### WARNING

Depressurize the line before loosening any packing gland nuts.



### NOTICE

Check packing gland nuts periodically, and re-torque if necessary.

Open/Close the valve intermittently (at least once a year). Valves should always be fully opened or fully closed to wipe away any accumulation on the sealing surfaces.

After installation, verify bolting torque at the following locations:

1. Gland Flange (or Stem Packing)
2. Valve Operator Mounting (if present)

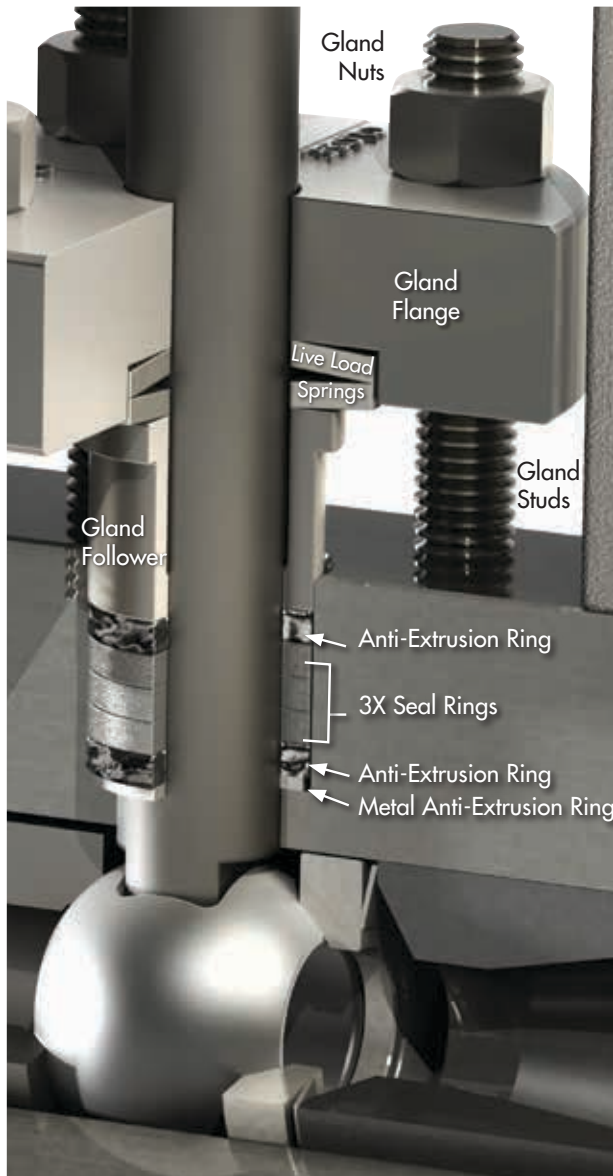


**Table 1 - Packing Torques lbs/in**

		ASME Class			
		1700	2500	3100	4500
MAWP (psi):		4250	6250	7750	11250
Valve Bore	0.63	35 42 max	52 63 max	65 78 max	94 113 max
	1.03	48 58 max	70 85 max	87 105 max	127 152 max
	1.56	75 90 max	111 133 max	137 165 max	199 239 max

Check the bolting at these locations periodically. If bolting torque is lower than the specified values, re-torque bolting as necessary. Test certification available upon request.

## Repacking Procedure



1. Loosen and remove gland nuts and/or gland studs holding gland flange in place.
2. Slide the gland flange, live load springs (X2), and the gland follower upwards.
3. Using a small pick or scribe, carefully remove stem packing set. Make sure that all of the packing is removed. Do not remove the metal anti-extrusion ring at the bottom of the packing box.
4. Clean packing box with an air hose before installing the new packing set.

### NOTICE

Do not scratch the stem or the packing bore in the body. Scratches could cause a leak.

Before installing the new packing, make sure the packing box is clean. Use of an air hose to clean debris from packing box is permitted.

5. When installing the new packing set install the rings one at a time. Packing set should have an anti-extrusion ring on each end. Use the gland follower as a packing tool to stuff each packing ring all the way down against the previous ring.
6. Slide the gland follower, the live load Belleville springs, and the gland flange down the stem so that the scribe lines are matched. If necessary rotate the gland flange so that the two scribe lines are aligned.

### NOTICE

The gland flange must be pulled down evenly to prevent cocking or side loading, as this could cause damage to the packing and prevent the valve from operating properly.

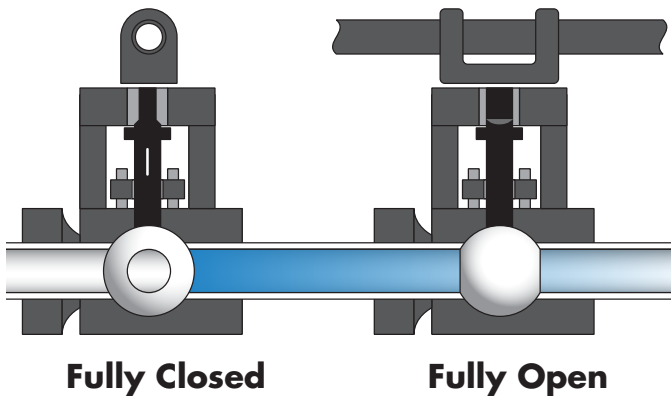
Make sure that the gland flange remains perpendicular to the stem, and the gap around the stem remains concentric during tightening process.

Refer to Table 1 - Packing Torques.

7. In some cases the studs may unscrew from the body at the same time the nuts are removed. This is acceptable. Assure during replacement that studs are reassembled to the full thread depth.
8. Apply anti-seize to stud threads and bottom face of hex nuts.
9. Insert studs into threaded holes. Install nuts onto each stud and torque to specified value. Be sure to torque in a cross pattern to avoid uneven loading. **Packing assembly torques are given in Table-1.**
10. Cycle the valve a few times to ensure proper re-packing. Verify packing torque after cycling and re-torque if necessary.

## 9. REMOVING VALVE FROM SERVICE

Before the valve is removed from service it should be placed in the open position to prevent internal damage to valve components.



### WARNING

Depressurize the line and close the valve before removing the valve from the pipeline.

## 10. HANDLING AND LIFTING

1. The valve should be lifted in such a way that the body supports the load.
2. The end protector covers should be kept in place on the end connections during all handling. Remove only during final installation of the valve.
3. The ball should be fully open during the installation of the valve. Failure to keep the ball fully open during installation could cause damage to the valve.
4. Do **not** leave the valve in the partially open position for an extended period of time.
5. Do not lift the valve from the actuator, positioner, or limit switch.

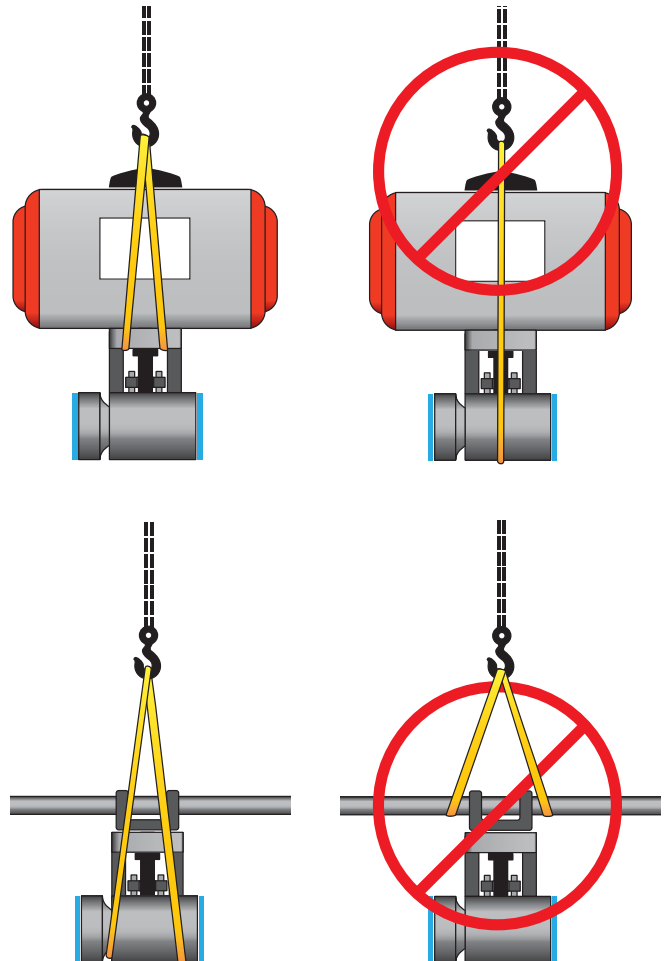


### CAUTION

The end connection necks are suitable places to attach lifting slings/straps. Never use hand wheels or other protruding parts of the gearbox or actuator not designated for this purpose.

### NOTICE

During handling, protect the end connection faces and fittings against damage from the lifting devices. Failure to cover faces and fittings could cause damage to the valve.



## 11. TRANSPORT AND STORAGE

### Transport

Valves will be shipped in wooden crates that are plastic lined. Upon arrival at the site, valves general condition should be inspected right away for any potential shipping damage. Any damage should be reported to Flow-Tek.

### Short Term Storage (Up to 3 Months)

1. Ball valves should remain in the original shipping containers and be placed on pallets of wood or other suitable materials. End protectors should remain on the valve ends until the valves are installed to prevent the entrance of dirt.
2. Valves should be stored in the open position to protect the ball and seat.
3. Storage of ball valves can be in an open uncovered area provided provisions are made for inclement weather such as tarps or sheeting. Valves with actuators shall be stored under cover until ready for installation.

### Long Term Storage (Over 3 Months)

1. Valves should be stored in the open position to protect the ball and seats.
2. Ball valves should remain in the original shipping containers and be placed on pallets of wood or other suitable materials and stored indoors. End protectors should remain on the valve ends until the valves are installed to prevent the entrance of dirt
3. The storage environment should be dry and not have severe swings in temperature and humidity.

