BALL VALVE MAINTENANCE

GUIDELINES FOR TRUNNION BALL VALVES:
COMMISSIONING, HYDROSTATIC PRESSURE TESTING,
PIGGING, AND TROUBLESHOOTING
VALVE COMMISSIONING

• Design phase of project - *Proper selection criteria for new valves*

• Shipping, Handling - *Proper lifting and storage practices*

1. Make sure to use lifting lugs or wrap straps around the body of the valve when lifting, do not lift the valve by wrapping chains or straps around the gear operator or stem of the valve.
2. Store valves inside out of the weather if possible, make sure that end caps remain in place until installation. Transport and store in the fully open position.

• Inspection - *Inspect valve and components*

1. Inspect valve for any damage caused in shipping.
2. Check to make sure all fitting are tight and in working order.
3. Check the gear operator to confirm gear case is properly greased.

• Fitting identification - *ALWAYS consult the valve manufacture to positively identify the location, style and design features of various fittings. Valve model and serial number will be needed for accurate identification.*

1. Seat sealant injection fitting.
2. Stem sealant injection fitting.
3. Body vent or drain fitting.
5. Pipe fittings and unknown fittings.

• Pre-Lubrication - *Lubricate all valves prior to installation*

1. Grease both seat sealant injection fittings until enough grease will cover the seat pocket of the valve in the full open position.
2. Do not grease stem injection fitting.
3. Replace end caps after greasing the valve and keep in place until installation.

• Proper documentation and record keeping - *serial number, size, manufacture, top works and location of the valve.*
HYDROSTATIC TESTING & PIGGING GUIDELINES

• Hydrostatic Testing  *When ball valves are installed in a piping system that requires hydrostatic testing of the adjoining pipe, follow these procedures to minimize any damage that could occur to the sealing surface and seat seals inside the valve.*

1. The valve should be in the fully open position when the injection of test fluids begins. This will allow any pipeline debris to be flushed through the valve bore and out of the piping.

2. Once the piping system has been purged of the debris and the system has been completely filled with the test fluid, the ball should be placed in the partially open position (approximately 10 degrees from the fully open position). This allows test fluid into the body cavity of the valve.

3. The valve is now ready to be pressure tested.

4. Upon completion of hydrostatic pressure testing, the valve should be returned to the fully open position before removing the test fluid from the piping system. The test fluid in the body cavity can be drained through the body drain port located on the lower portion of the valve body.

5. Close the body bleed fitting and return the valve to required operating position, either fully opened or fully closed.

6. If the valve is equipped with seat sealant injection fittings, the valve seat pockets should be filled with an approved valve lubricant to displace any test fluid from behind the seats.

• Pigging

1. Make sure valves are in the full open position before pigging the system.

2. After the pig passes thru the valve and into the receiver or launcher, do not cycle the valve closed. Grease each seat one half ounce per inch per seat ring then cycle the valve closed.

3. Drain the body drain fitting.
REGULAR MAINTENANCE

• Maintenance should begin prior to installation

1. Change out faulty or suspect fittings.
2. Fill the seat sealant system; spread the sealant inside in the “seat pocket”.
3. Check and set the valve stops.
4. Fully document all service performed.

• Top –Up the Seat Sealant System

1. Immediately after welding (if valve is a weld end valve).
2. After the hydrostatic test.
3. After repeated cycling.

• Annual Maintenance Steps

1. Drain body cavity.
2. Inject flush in seat sealant injection fitting if necessary.
3. Inject grease in seat seal injection fittings, 1/2 ounce per inch per seat ring.
4. Cycle the valve open and closed several times. If you cannot cycle valve completely open or closed, cycle it partially.
5. Document all maintenance of each valve.
<table>
<thead>
<tr>
<th>Trouble</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The valve is hard to operate.</td>
<td>Actuator Unit</td>
<td>Refer to actuator maintenance manual or remove actuator cover and check stem adaptation and linkage for damage.</td>
</tr>
<tr>
<td></td>
<td>Infrequent operation - lack of lubrication</td>
<td>Lubricate seats with valve lubricant and actuator with suitable industrial grease.</td>
</tr>
<tr>
<td></td>
<td>Ice in valve operator</td>
<td>Apply heat or inject antifreeze solution into valve, but consult with authorized dealer prior to using remedy on operators.</td>
</tr>
<tr>
<td></td>
<td>There is a build up in the seat area due to line cont.</td>
<td>Clean the seat area as outlined in Routine Seat Cleaning.</td>
</tr>
<tr>
<td>Ball is not properly aligned with bores of seats.</td>
<td>Restrictions in bore of valve or stop not set properly</td>
<td>Remove bore restrictions or check stop in worm gear actuator and/or actuator limit switches.</td>
</tr>
<tr>
<td>Erratic Operation</td>
<td>Damaged actuator unit</td>
<td>Replace broken or damaged parts</td>
</tr>
<tr>
<td></td>
<td>Restriction of pneumatic actuator vent</td>
<td>Remove restriction</td>
</tr>
<tr>
<td></td>
<td>Faulty power supply</td>
<td>Check power supply</td>
</tr>
<tr>
<td></td>
<td>Infrequent operation - lack of lubrication</td>
<td>Lubricate seats with valve lubricant and actuator with suitable industrial grease</td>
</tr>
<tr>
<td>Valve is leaking between tailpiece and body.</td>
<td>Damaged O-Ring seal</td>
<td>Disassemble and replace O-Rings.</td>
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<tr>
<td>Leakage around valve stem</td>
<td>Damaged O-Ring seal</td>
<td>Inject valve sealant into stem fitting (if present) or replace stem O-Ring.</td>
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<tr>
<td></td>
<td>Ice in body of valve</td>
<td>Apply heat or inject antifreeze solution into body of valve. Drain periodically to eliminate water accumulation.</td>
</tr>
<tr>
<td></td>
<td>Improper setting of actuator limit switches or stops in worm gear</td>
<td>Reset actuator limit switches or stops for proper closing</td>
</tr>
<tr>
<td></td>
<td>Infrequent operation - lack of lubrication</td>
<td>Lubricate seats with valve lubricant and actuator with suitable industrial grease.</td>
</tr>
<tr>
<td>Valve will not close.</td>
<td>Damaged Fitting</td>
<td>Tighten safety cap or replace safety cap if damaged WARNING: Never remove entire grease fitting when valve is under pressure.</td>
</tr>
<tr>
<td></td>
<td>Trash in fitting</td>
<td>Inject a small amount of cleaner into fitting to dislodge trash.</td>
</tr>
<tr>
<td>Valve will not seal.</td>
<td>Contamination around seat area due to service</td>
<td>Clean the seat area as outlined in Routine Seat Cleaning.</td>
</tr>
<tr>
<td></td>
<td>Damaged seat face or seat O-Ring</td>
<td>Inject seat sealant for temporary seal or replace seals</td>
</tr>
<tr>
<td></td>
<td>Valve not fully closed</td>
<td>Check that operator or limit-switches do not stop the rotation of ball prior to reaching the fully closed position.</td>
</tr>
<tr>
<td></td>
<td>Valve stops incorrectly set</td>
<td>Adjust stops on actuator</td>
</tr>
<tr>
<td>Gear operator hard to operate or stuck</td>
<td>Water in gear</td>
<td>Drain water and lubricate if possible. Replace weather seal if applicable.</td>
</tr>
<tr>
<td>Pneumatic operators excessive chatter during operation</td>
<td>Low air flow</td>
<td>Increase air flow and operation speed</td>
</tr>
<tr>
<td></td>
<td>Dried operator seals</td>
<td>Lubricate operator cylinder and seals with approved lubricant</td>
</tr>
<tr>
<td></td>
<td>Restriction in vent</td>
<td>Clear restriction</td>
</tr>
<tr>
<td></td>
<td>Actuator was undersized for service conditions</td>
<td>Check torque requirements of valve for service conditions</td>
</tr>
<tr>
<td></td>
<td>Service conditions require routine maintenance and/or lubrication</td>
<td>Refer to operator maintenance manual</td>
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</tbody>
</table>
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TOP TEN LIST

1. Know your ball valve – is it a trunnion or a floater? Know how it functions.

2. Make sure you have maintenance manuals for every valve, do not hesitate to call manufacturer for information or access it online.

3. Remember that ball valves will leak if out of alignment by a few degrees. In operation they should be fully opened or closed.

4. Know the features and the functions of fittings on the valve.

5. Use back up wrenches when removing caps off of buttonheads, drain, and vent fittings.

6. If the stem seal is working properly and is not leaking DO NOT grease the stem lube fitting.

7. Flushing, greasing, and operating ball valves on a regular basis will improve performance – by reducing seat to ball seizure

8. Don’t use an automotive grease gun to inject sealants and lubricants into ball valves.

9. As a rule, when commissioning, pigging and hydrotesting, grease up to one ounce per inch per seat ring. Annual maintenance of 1/4 ounce per inch per seat ring is suggested. (On sealant injection with a hand pump it will take approximately 25 strokes per ounce. try to)

10. Document valve location, size, manufacturer, class, top works, commissioning and maintenance.