



Valves Technical
Ball Valve Troubleshooting Guide

Spears® True Union, Single Entry and Compact Ball Valves are designed and produced for trouble-free operation and use. However, certain aspects of installation and application can result in valve malfunctions.

This guide identifies some of the more common problems encountered and their necessary corrective actions. Such problems have been categorized as External Leaks, Internal Leaks, Frozen Movements and Structural Breakage.

External Leaks		
Location	Possible Cause	Corrective Action
At Thread/Socket Connections	Improper solvent cementing. Improper threads. Insufficient or improperly applied thread sealant; incompatible sealant (paste). Over-tightened thread joint splitting connector. Insufficient valve support splitting connector.	Replace end connector(s) according to installation instructions. Check threads for proper size; replace or reinstall. Reinstall thread connection according to proper procedures; check paste compatibility. Replace cracked end connector(s). Replace cracked end connector(s). Add support on each side of valve.
At Union Nuts	End connector misaligned. Displaced or damaged O-ring; particles in O-ring groove. System contraction pulling end connectors; improper end connector spacing. Loose Union Nut. Displaced or pinched seal carrier O-ring.	Check system alignment - end connector(s) must be parallel. Check for adequate valve support. Remove valve and inspect O-ring for physical or chemical damage. Check O-ring compatibility, replace accordingly. Clean and re-seat O-ring. Check thermal variations; anchor pipe each side of valve; install expansion loop. Correct spacing. Re-tighten nut. Remove and disassemble seal carrier; re-seat or replace O-ring.
At Stem	Damaged stem O-ring.	Remove and disassemble valve stem; inspect for physical or chemical damage. Check O-ring compatibility, clean and replace accordingly.

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Internal Leaks — In-line Leakage Past Valve	
Possible Cause	Corrective Action
Ball obstruction	Check that the valve is in its "full-closed" position. If not, remove valve and check for solids blocking the ball port. Clean and reinstall valve.
Broken Stem	Remove end connector and check for ball rotation while operating valve. Replace as necessary.
Seal Carrier Loose	True Union Valves - remove valve; CAREFULLY tighten seal carrier (located on inlet end of body). Single Entry Valves - CAREFULLY tighten single Union Nut. IMPORTANT: Generally only a slight adjustment is required (either valve). A properly adjusted valve should have significant resistance to operation without binding - AVOID OVER-TIGHTENING!
PTFE Seat Damage or Debris Laden	Remove and disassemble valve seats. Check for excessive debris and physical damage (nicks, cuts, scoring, etc.). Clean and replace as necessary.
Seat O-ring Displaced, Damaged or Debris Laden	Remove and disassemble valve seat O-rings; check for physical or chemical damage. Check O-ring chemical compatibility; clean and replace accordingly. Check for excessive system flow rate.
Ball Damaged	Remove and disassemble valve ball. Check for physical damage (excessive nicks, scoring, etc.) at seat sealing surface (perpendicular to ball port). Clean surface; replace ball if necessary. Check for chemical damage and valve material (PVC, CPVC) compatibility.
Solvent-Cement (glue) Contamination from Installation Spillage	Remove valve and check for glue deposits on ball or seat areas. Clean, if possible; excessive damage may require component replacement.
Thermal Damage (component distortion)	Check system operating temperatures, external heat sources (including direct sun), and heat generated from system design or valve placement.

Frozen Movements — unable, or very difficult, to open/close; sometimes accompanied by stem break (shear)	
Possible Cause	Corrective Action
Internal Obstructions; Sediment or Particle Buildup; Solvent Cement on Ball	Remove valve and check for solids, debris or solvent cement deposits blocking the ball or valve interior. Check for sediment particles lodged around ball-to-seat contact areas. Remove stem and check for the same. Clean and reinstall.
Over-tight Seal Carrier	True-Union Valves - remove valve; slightly loosen seal carrier (located on inlet end of body). Single Entry Valves - slightly loosen single Union Nut. IMPORTANT: Generally only a slight adjustment is required (either valve). A properly adjusted valve should have significant resistance to operation without binding.
Chemical Attack (generally appears as distortion, peeling, etching or bleaching of ball sealing surfaces or other internal components)	Check valve material (PVC, CPVC) chemical compatibility with system fluids. Be sure to consider operating temperatures with this determination.



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Structural Breakage		
Location	Possible Cause	Corrective Action
Handle broken	Frozen movements. External impact.	See "Frozen Movements" section. Replace. Identify and correct source.
Handle Stripped	Overextending open/close range. Excessive exposure to direct-sunlight has softened handle material.	Replace handle. Shield or screen valve from direct-sun exposure.
Stem Sheared / Broken	Frozen movements; external impact.	See "Frozen Movements" section.
Broken Union Nut	Nut has been overtightened to draw-up or align end connectors; external impact. Inadequate valve supports. Excessive internal pressure / Hydraulic Shock	Adjust spacing between end connectors for proper valve lay-lengths. Check system alignment - end connector(s) must be parallel. Provide system support on each side of valve. Check system pressures and surge pressures; check for entrapped air.
End Connector Break	System misalignment; external impact. Over-tighten thread-joint connection. Inadequate valve support.	Check system alignment - end connector(s) must be parallel. Install new end connector according to installation instructions. Provide system support on each side of valve.
Body Break	External impact. Excessive internal pressure. System misalignment. Inadequate valve support. Chemical attack.	Identify and correct source. Check system pressures and surge pressures; check for entrapped air. Check system alignment - end connector(s) must be parallel. Provide system support on each side of valve. Check chemical compatibility of system fluids.

NOTES: Certain corrective actions of this guide may not be feasible with the Compact Ball Valve (sealed unit).

Improper system operating temperatures and chemical incompatibility can cause a variety of functional and structural failures. Be sure to use proper valve material-types for both temperature and chemical resistance.

Most valve problems are traceable to improper system design or installation. Be sure to have all design performed by a qualified Engineer and installation made by properly trained personnel.

Spears® valve Installation Instructions and Maintenance/Service Procedures should be followed in conjunction with all corrective actions.