

INTRODUCTION TO SPEARS® VALVES



Since 1969, Spears® Manufacturing Company has developed high quality thermoplastic piping system components to better meet industry needs. Spears® thermoplastic valves have been developed through years of product improvement testing, combined with the latest in computer aided engineering and manufacturing technology. Today, Spears® valves are recognized for their quality, reliability and long service life. Backed by the best in customer service and product availability, Spears® valves are the first choice for use in a wide variety of applications, including Industrial & Chemical Processing, Turf & Irrigation, Pool & Spa, and numerous Original Equipment Manufacture products.

Valve Function Basics

Ball Valves

Ball valves derive their name from the on/off function accomplished by means of a flow-controlling ball located in the center of the valve body. A hole through the center of the ball (valve bore) connects the inlet and outlet sides of the valve for fluid stream transfer. The ball rotates 90° on an axis perpendicular to the fluid stream in order to block flow in the “off” position. The ball is held in place between two valve seats, which serve as a “bubble tight” seal off, while providing lubrication during valve operation. Elastomer O-rings are used in the stem and seal carrier to prevent fluid leakage. Pressure drop is virtually eliminated in the full-open position, since the valve bore is the same size as Schedule 80 system piping. The T-Style ball valve is a special configuration incorporating a Tee fitting at one end of the valve. This design maintains close proximity of the valve to the fluid mainline to minimize “dead leg” of potential fluid accumulation, where required by specific application.

3-Way Ball Valves

3-Way ball valves are “diverter” style ball valves that provide an additional port to redirect the fluid stream. Valve configurations are either vertical (bottom branch port) or horizontal (side branch port). Multiple ball-port options are available in which different hole patterns in the valve ball provide alternative paths to divert flow. These diverter style 3-Way ball valves have no shutoff on the branch ports.

Check Valves

Check valves are automatic valves that open with forward flow and close with reverse flow. Exact operation will vary depending on the type of check valve mechanism. These include a ball (Ball Check), a swinging disc (Swing Check), a “double disc” (Butterfly Check), a weighted plug (Y-Check), and spring assisted types of check devices. These include a spring assisted swinging disc (Spring Check) and a spring mounted linear disc (In-Line Spring Check). Regardless of type, a check valve has a closure device positioned in the valve body between inlet and outlet so that the fluid stream is easily transmitted in the direction of flow, but is allowed to move against the check device in the event of flow in the reverse direction. Reversed flow is stopped or held in “check” by fluid backflow pressure which seats the closure device against the valve body. Standard elastomer O-ring seals are used in all Spears® Ball Check Valves and Industrial Swing Check Valves. Utility Swing and Spring Check Valves, and Butterfly Check Valves use an elastomer membrane seal; In-Line Spring Check Valves and Y-Check valves use an elastomer seat. Spears® Check Valves have been carefully engineered to minimize pressure drop and can be installed in either horizontal or vertical positions, within the limitations of the specific type of closure device. Ball Check Valves are well suited for general applications of fluids free from debris and entrained solids. Butterfly Check Valves have minimum space requirements and, along with Swing Check Valves, are better for use with fluids containing solids or debris. Swing Check Valves additionally allow higher volume of fluid transmission. Industrial Swing Check models can be fitted with an optional counter balance device to further control closing speed. The Utility Spring Check Valve (spring assisted Swing Check) aids in valve closing, while the In-Line Spring Check can be adjusted for resistance to opening pressure.

Swing Check Ball Valves

Swing check ball valves are a special design that combines the basic function of a ball valve and a swing check valve for use in general purpose applications where an in-line ball and check valve configuration is required



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Gate Valves

Gate valves perform an on/off function accomplished by means of a flow-controlling gate centered in the valve body between the inlet and outlet sides of the valve. The gate moves along a vertical stem axis, perpendicular to the fluid stream, thereby blocking the flow in the closed position and variably increasing the flow as the gate is moved to the full open position. Spears® gate valves use either a cylindrical plug (Plug Gate Valves) or a wedge-shaped gate and sealing surface design (regular Gate Valves). Both provide positive shut off when engaged with the valve body in the closed position and feature non-rising type stem. This provides vertical movement of the gate without extension of the stem above the valve body.

Butterfly Valves

Butterfly valves are rotary valves in which a disc is rotated 90° to open or close the flow passage. In the full closed position, the disc seals against an elastomer seat. Flow control can be accomplished by varying the degree to which the disc is opened. Spears® Standard and True Lug type Butterfly Valves utilize a special offset disc and low contact seat designed. Spears® Wafer style Butterfly Valve incorporates a special low contact, disc-mounted seat and centered disc. These designs minimize operation torque and improve sealing capabilities over conventional rubber seated valves.

Diaphragm Valves

Diaphragm valves utilize a moveable elastomeric membrane, or “diaphragm”, to constrict the flow passage through the valve, thereby controlling or throttling fluid flow. The diaphragm additionally isolates system fluids from internal moving parts of the valve. In the Weir-Type design, a raised area in the center of the waterway serves as a seal-off point for the elastomeric diaphragm. When installed in a horizontal position, this additionally facilitates drainage of fluid from the valve. From the full-open position, operation of the valve is accomplished by rotating the handle to vertically move a compressor unit on a threaded shaft. This compresses the attached elastomeric diaphragm to constrict the waterway and finally seal-off flow. Spears® diaphragm valves provide an indicator in the center of the handle for 360° visibility of valve position, and a special stop on the compressor to prevent damage from over-tightening. The T-Style “Zero Dead-Leg” Diaphragm Valve is a special configuration incorporating a Tee fitting at one end of the valve. This design maintains close proximity of the valve to the fluid mainline to minimize “dead leg” of potential fluid accumulation, where required by specific application.

Globe Valves & Y-Pattern Valves

Globe valves are characterized by a partition separating the two halves of the body with a center passage that is opened and closed by a screw-down/screw-up seat mounted at right angle to the body. The “Globe” name was derived from the original spherical body design for these valves. Globe valves offer excellent flow regulating characteristics, but have a high resistance due to the turning flow path. The Y-Pattern Valve (aka, “oblique valves”) is a hybrid globe valve incorporating an angled stem. This less restrictive flow path design improves flow while maintaining the same excellent throttling characteristics as a globe valve.

Needle Valves

Needle valves are small sizes of globe valves fitted with a tapered plug. The tapered plug or “needle” is screwed in or out of a mating orifice in the body and thus controls the effective orifice size. Needle valves are excellent for metering and other fine adjustment flow control applications. Spears® Needle Valves use PTFE stem seals and no elastomers for optimum chemical resistance. These are produced in both a conventional “globe” pattern and convenient right-angle pattern design for application versatility.

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ISO 9001 Certified Design & Manufacturing Quality Program

Spears® Quality Management System is certified to the strict requirements of ISO 9001 for optimum control of product design, development, and production. Quality improvement and customer satisfaction are central to each stage of producing Spears® valves from conception through final delivery.

Development & Testing

The foundation of Spears® products is development, testing, and more testing. Spears® valve development combines proven experience with structural testing at the design level. Materials and design are correlated in computer engineering stress analysis to yield the optimum structure and function of each valve component. Resulting products are then subjected to numerous tests for performance validation of dimensional stability, sealing capability, hydrostatic burst pressure, operational torque, flow capacity, vacuum application suitability and cyclic pressure analysis. Once approved, production valves and components are routinely subjected to dimensional, functional and burst pressure verification tests.

100% Sealing Capability Verification

All Spears® ball valves are air-tested for 100% verification of positive sealing during the manufacturing process.

Hydrostatic Burst Pressure Verification

Representative valve samples are routinely subjected to an internal hydrostatic pressure of 3.2 times their designated pressure rating in a 60-70 second test per ASTM D 1599 during each production run.

Vacuum Service

Validation of Spears® valves rated for vacuum service is determined from 1-hour tests at 26 in. Hg vacuum with less than 1 in. Hg loss. A vacuum lubricant should be applied to elastomer-seated valve seats, such as Spears® Butterfly Valve or True Union Ball Check Valve, to prevent the seat from drying out in vacuum service applications.

Spears® Valve Innovations

Not all plastic valves are the same. Spears® valves incorporate several unique features not found in competitive products. The following are a few examples of Spears® innovative improvements to conventional valve designs.

Spears® Safe-T-Shear® Stem

This important SAFETY FEATURE was developed to help prevent line fluids from leaking out in the event of ball valve stem damage. Engineered for high strength, the stem incorporates a special shear point to control accidental breakage. Over-torquing breaks occur above the stem O-ring leaving the seal intact until repair or replacement can be made.

Spears® Heavy Buttress Thread Components

When it comes to handling the hydraulic force of high internal pressures, the brute strength of the buttress thread is clearly the best. Its broad bearing surface with an angular backing provide greater thrust support than conventional square-cut, ACME-type threads commonly used in similar ball valve components. All Spears® Ball Valve union nuts and seal carriers are designed with buttress threads for greater strength and pressure handling capabilities — one of the strongest in the plastic valve industry!

Low Torque, Low Wear Butterfly Valve Seats

Spears® Butterfly Valves provide the lowest operating torque available. Sealing contact between disc and seat takes place only at the close of the valve, allowing free travel through the full range of opening. This unique design eliminates seat creep, extrusion and wear typical with conventional liner-type seats. Exclusive design interlocks seat and body to prevent washout or blowout.

Flow Balanced Ball Check Valves

Improper ball check valve design can significantly restrict flow, create ball-chatter and even result in reverse ball travel and open flow shutoff! As a result of extensive design testing, Spears® has engineered the internal flow characteristics of the True Union Ball Check Valve to optimize fluid transmission and virtually eliminate ball-chatter.

Special Reinforced (SR) Female Plastic Threads

This patented Special Reinforced (SR) design is one of the most significant improvements in female plastic thread reliability. Not just an added reinforcing ring, this unique pre-compression design compensates for expansion forces generated from normal tapered pipe thread joint make-up. Radial stress is neutralized in normal installations and contained in severe over tightening situations. Spears® SR Threads are available on a variety of Spears® industrial valves using SS316 reinforcement for optimum chemical and corrosion resistance. Spears® SR Female Spigot Adapters are also available for quick conversion of any slip-socket style valve end connector (see Spears® Schedule 80 catalog and price sheets).