

Glossary

Actuator - Device used to open/close or control the valve. Key types include electrical, hydraulic and pneumatic. Movement may be quarter-turn or multi-turn. Actuators may be used when: • valves are remotely located (eg, on pipelines) • valves are located in hazardous areas • manual operation would be time-consuming (eg, with larger valves).

Air valve - Valve that is used to control the flow of air. Flows are normally small, so solenoid valves are suited.

Back pressure - The pressure exerted on the downstream side of a valve seat.

Ball valve - A quarter-turn valve with a spherical closing element held between two seats. Characteristics include quick opening and good shut-off. Ball valves are widely used as on/off valves in the chemical process and other industries. Special designs (with V notches or fingers) are available for throttling applications. Larger valves with heavier balls (eg, on pipelines) may use trunions to help support the ball and prevent damage to soft internals. Designs are typically, one, two or three piece.

Bellows - Sealing device that prevents line media leaking between the stem and the body.

Butterfly valve - A quarter-turn valve that has a circular disk as its closing element. The standard design has the valve stem running through the disk, giving a symmetrical appearance. Later designs off-set the stem, so that the disk 'cams' into the valve seat. Advantages include less wear and tear on the disk and seats, and tighter shut-off capabilities. Many design types are available including inexpensive Teflon or resilient seats for use in water (treatment) plants, etc. More expensive metal seats can be used where high temperatures or aggressive chemicals are encountered. So-called "High Performance" butterfly valves offer zero leakage designs and have been applied in both the chemicals and hydrocarbon processing sectors.

Bypass valve - A small bore valve fitted in parallel to a larger main valve. Bypass valves are used to reduce the differential pressure across the main valve before this latter valve is opened (as otherwise this larger, more expensive valve, may suffer damage to internal components).

Check valve - A valve that is designed to allow the fluid to flow in a given direction but closes to prevent backflow. Types include swing check, tilting disc check and wafer check. Check valves (also called non-return valves) are usually self-acting.

Control valve - A valve that regulates the flow or pressure of a fluid. Control valves normally respond to signals generated by independent devices such as flow meters, temperature gauges, etc. Control valves are normally fitted with actuators and positioners. Pneumatically-actuated globe valves are widely used for control purposes in many industries, although quarter-turn types such as (modified) ball and butterfly valves may also be used.

Cryogenic valves - These are valves suited for use at temperatures below - 40 degrees Celsius.

Diaphragm valve - A bi-directional valve that is operated by applying an external force to a flexible element, or diaphragm (typically an elastomer). Diaphragm valves may be used for slurries (where other valve designs might clog) or in hygienic applications.

Diverter valve - A valve that can change the direction of the flow of a medium to two or more different directions.

Double block and bleed - A valve configuration in that positive shut-off is achieved at both the inlet and outlet sides. A small port is fitted to discharge fluid in the intermediate space. Fitting a gas detector to the port provides assurance of the integrity of the up-stream seal. This configuration is often required to isolate high pressure sections of a system to facilitate safe maintenance, etc.

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Electric actuators - Actuator that uses an electric motor to operate the valve stem.

Extended bonnet - Used when the media is at high or low temperatures, to avoid damage to the sealing elements.

Float valve - A valve that automatically opens or closes as the level of a liquid changes. The valve is operated mechanically by a float that rests on the top of the liquid.

Full bore - Term used e.g. of a ball valve, to indicate that the internal diameter of the valve opening is the same as that of the piping to that it is fitted.

Gate valve - A multi-turn valve that has a gate-like disk and two seats to close the valve. The gate moves linearly, perpendicular to the direction of flow. This type of valve is normally used in the fully opened or fully closed position; it is not suited to throttling applications. Gate valves provide robust sealing, and are used extensively in the petrochemicals industries. This class of valves also includes knife gate valves, conduit gate valves and wedge gate valves. Knife gate valves have much thinner gates with a knife-like edge, making them suited to use with floating solids, eg, as in the pulp & paper industries. Conduit gate valves have a rectangular disk as the closing element. One half of the disk is solid, to close the valve, the other has a circular port, that can be used to open the valve. Wedge gate valves have a wedge-shaped gate that 'wedges' between floating seats to close the valve tightly.

Gearboxes - Used to ensure easier operation of larger valves, particularly ball valves.

Globe valve - A multi-turn valve with a closing element that moves perpendicularly to the valve body seat and generally seals in a plane parallel to the direction of flow. This type of valves is suited both to throttling and general flow control.

Hydraulic actuator - A device fitted to the valve stem than uses hydraulic energy to open and close the valve. Depending on the configuration, the hydraulic fluid may both open and close the valve, or just open the valve. In that latter case, a spring will typically be fitted inside the actuator to return it (and the valve) to the closed position.

Jacketed valve - This valve is design incorporates a so-called jacket around the valve body. Steam is introduced into the jacket to keep the fluids being controlled at the required temperature.

Lift check - This non-return valve design incorporates a piston to damp the disk during operation.

Line blind - A pipeline shut-off device, whereby a flat disk is forced between two flanges. Line blinds are less expensive than valves, but require much more time to operate.

Linear valve - See multi-turn

Multi-ported - Multi-ported valves include additional inlet/outlet ports, to allow fluids to be directed. The ball and plug valve types are ideally suited to multi-port designs.

Multi-turn - Category of valves (such as gate, globe, needle) that require multiple turns of the stem to move the valve from the fully open to the fully closed position. Also known as linear valves. See also quarter-turn.

Needle valve - This multi-turn valve derives its name from the needle-shaped closing element. The design resembles that of the globe valve. Typically available in smaller sizes, they are often used on secondary systems for on/off applications, sampling, etc.

Penstock valve - A type of simple gate valve, used to contain fluids in open channels. Often found in waste water treatment plants.

Pilot valve - Small valve requiring little power that is used to operate a larger valve. See also solenoid valves.

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Pinch valve - A valve in that a flexible hose is pinched between one or two moving external elements to stop the flow. This valve is often used in slurry and mining applications, as its operation is not affected by solid matter in the medium. It is also used with certain gases, as the absence of possible leak paths to the atmosphere ensures good emission control.

Plug valve - This multi-turn valve derives its name from the rotating plug that forms the closing element. The plug may be cylindrical or truncated. In the open position, the fluid flows through a hole in the plug. Lubricated plug valves rely on a sealing compound injected between the plug and the valve body, whilst sleeved plug valves are fitted with a 'soft' insert between the plug and the body.

Pneumatic actuator - A device fitted to the valve stem than uses pneumatic energy to open/close or regulate the valve. Depending on the configuration, the compressed air may both open and close the valve, or just open the valve. In that latter case, a spring will typically be fitted inside the actuator to return the valve to the closed position.

Positioner - Device that ensures the closing or throttling element of a valve moves to or maintains the correct position.

Pressure reducing valve - A self-operating valve used to reduce any excess pressure in a system, eg steam. Also known as a PRV. The valve opens if the internal pressure exceeds that holding the closing element onto the seat.

Quarter-turn - Category of valves (such as ball, plug, butterfly) that require just a 90 degree turn of the stem to move from the fully open to the fully closed position. See also multiturn. Note: some larger valves may be fitted with gearboxes for simpler manual operations, giving them the appearance of a multi-turn valve.

Reduced bore - Indicates that the internal diameter of the valve is lower than the piping to that the valve is fitted.

Regulating valve - This valve type is used to regulate flows to provide a constant pressure output.

Sampling valve - A valve that is fitted to a reactor or pipeline to allow small sample of a fluid to be withdrawn for further testing. In simple cases a standard gate or needle valve, for example, may be used. The disadvantage is, that inappropriate use may result in spillage. As an alternative, valves are available that 'trap' a small quantity of fluid in a chamber, and only this small amount of fluid is released when the valve is operated.

Solenoid valve - Solenoid valves, typically of the needle globe type, are operated by an electrical solenoid. They are often deployed as pilot valves, i.e., fitted to actuators that in turn control larger valves.

Spring return - See Pneumatic actuator.

Subsea Valve - A valve that is designed for use in sea water. For example, installed in a pipeline on the sea bed.

Swing check - This non-return valve has a hinged disk as the closing element.

Tank valve - A valve arranged for fitting at the bottom of a tank or process vessel.

Wellhead valve - Wellhead valves are used to isolate the flow of oil or gas at the takeoff from an oil or gas well. The design is usually a plug or gate valve.

Wafer design - The construction of wafer design valves allows them to be 'sandwiched' between flanged sections of pipeline. The benefit is lower bolting requirements. Typically used with certain butterfly and check valves.

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