

**ARPCO**

**VALVES & CONTROLS**

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**What is an Emergency Shutdown  
Valve?**

The function of the shutdown valve is to *shut-off* the fluid flow inside the fluid flow line or pipe when an emergency that leads to a hazardous situation comes. It is an actuator operated valve mainly used for safety purpose that is why it is called Emergency shutdown valve. It is also known as the shutdown valve or *SDV, ESDV, ESV, ESD*.

It is very important that every instrument engineer must know where the shutdown valve is installed, what fluid flow through it and what standard is used as the design reference.

These shutdown valves are commonly used in oil and gas field in order to reduce the escalation of hazards from one system to other.

#### Types of shutdown valve

There are many types of valves available in the market for example gate valve, globe valve, ball valve and many more. Mostly commonly used shutdown valve is Ball valve.



This is a *ball valve type* shutdown valve, which permits the flow across a pipeline. There is an inlet side and there is an



outlet side. In an open position, the flow is allowed across the pipeline and in the closed position the flow stops.



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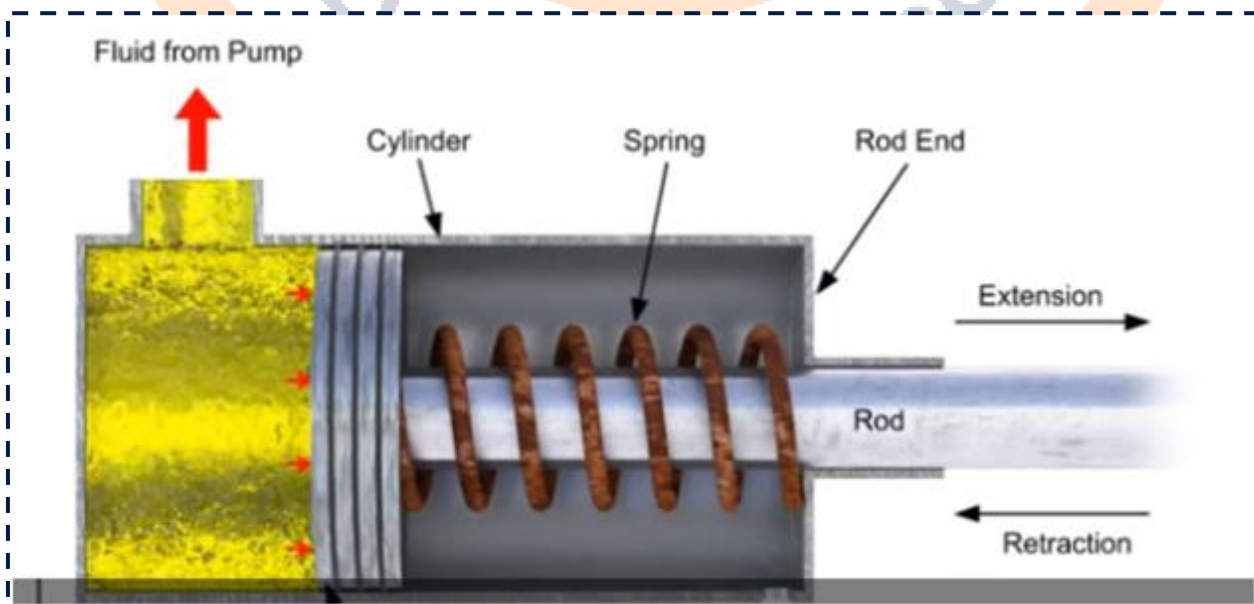
**Actuators in shutdown valve** There are many valve actuators available, but there is something which we should consider deciding which one is suitable for the shutdown valve and for the preparation of the process system. As the function of SDV for emergency needs the actuator must be able to close the valve quickly i.e. the standard timing is 3 secs. We must explain to the vendor that they must make calculations for



this actuator and this will be adjusted with the value to be used, adjusting the needs to stroke power to close the valve. Often used actuator type is single acting spring return.

### LIMIT SWITCH

It is not mandatory to have a limit switch in an actuator. The open and closed valve status is needed to be displayed, then a limit switch is needed. The valve status is locally monitored by this status. It shows either a close or open status.



## Shutdown Valve Features:

### i. Tie Shut Off

a shutdown valve must possess Zero/minimum leakage. Generally, it should pass the seat leakage testing as per API 508 and/or ISO5208.

### ii. Fire-safe

shutdown valve must work even though it is exposed to external fire attacks. Thus, shutdown valve body shall be fire-rated according to API 607 for soft seated valve or API 6FA for API 6A & API 6D valves or BS 6755 Part 2.

### iii. Fast action (From Full Open - Full Close)

The actions of the shutdown valve must be fast. A quarter ball valve is best for quick action. According to thumb rule, shutdown valve shall be able to close within 10 seconds of activation, and time taken from Full open to Full Close must be within 1-2 seconds per inch of shutdown valve size. Therefore, proper selection and sizing of the actuator must be ensured, and all requirements must be fulfilled.

### iv. Minimum passing (when closed)

This feature is needed to minimize the potential of the overpressure of a low-pressure system and spurious trip. A shutdown valve with equal% characteristic (most ball valve will have this feature. However, this shall be confirmed with valve supplier) is the preferred type. With equal% characteristic, it can operate with 10% valve closure give 20% flow reduction, 20% closure give 50% closure.

*v. Minimum disturbance / turbulence to process fluid*

This feature is to minimize unnecessary energy lost. Reduced Bore (RB) ball valve having a hole in the middle would minimize flow direction change and turbulence. Full Bore (FB) ball valve virtually like a pipe- significantly minimize energy lost.

*vi. Fail-safe*

A shutdown valve actuator shall pneumatic/hydraulic fail-safe spring return type. If a shutdown valve fails to close electrical driven type shall not be used.

*vii. Manual field reset*

A shutdown valve must manually be operated at the site. The operator shall ensure that the system is clear and safe and, can be reset on site. No remote reset is allowed.

