CAMERON
A Schlumberger Company

How It Works

Gate valves

All valves are designed to stop, allow, or throttle the flow of a process fluid. Gate valves—one of the original valve designs—are ideally suited for on-off, primarily liquid, service. A gate valve functions by lifting a rectangular or circular gate out of the path of the fluid. When the valve is fully open, gate valves are full bore, meaning there is nothing to obstruct the flow because the gate and pipeline diameter have the same opening. This bore diameter also determines the valve size. An advantage of this fullbore design is very low friction loss, which saves energy and reduces total cost of ownership.

Gate and segment

There are four primary designs for gate valves.

- **Slab gate valves** comprise a single gate unit that raises and lowers between two seat rings and are primarily used for transporting crude oil and NGLs. The G4N fabricated gate valve in the GROVE* valves portfolio and the WKM* Saf-T-Seal* slab gate valve are ideal choices for this application.
- **Expanding gate valves** include two units—a gate and segment—in contrast with slab gate valves, which have one unit. The gate and segment units collapse against each other for travel and separate when the valve is fully opened or fully closed to affect a mechanical seal.
- **Wedge gate valves** are engineered with a tapered gate with metal-to-metal sealing. In contrast with a slab or expanding gate valve, wedge gate valves are not piggable because of the void that is left in the bottom of the valve body when the valve is open. These valves do not have a bore through the gate itself; instead, the gate retracts into the valve body when open, which saves height space.
- **Knife gate valves** are used to cut through extremely thick fluids and dry bulk solids. The design of this valve makes it inherently self cleaning because the knife is cleared of abrasives with each stroke as it passes the seat rings and skirts. The gate unit of this type of valve is thin compared with other gate valve types and is guided in place by the water-type body that sandwiches the gate.

Stem

Gate valves can have a rising or nonrising stem design. Rising stems are attached directly to the gate and provide a visual indicator of the valve position. Nonrising stems are generally threaded into the upper part of the gate and have a pointer threaded onto the top to indicate position. Nonrising stem designs are ideally suited for applications where vertical space is limited, in well applications, and where scraping or pigging is not required.

Gate valves are designed with a sealing unit to provide a tight seal around the stem. Our patented single loaded-spring (SLS) stem seal design, used in Saf-T-Seal slab gate valves and WKM Pow-R-Seal* double expanding gate valves, provides superior leak protection and a self-adjusting seal designed to reduce maintenance.

Bonnets

Gate valves generally have one of four types of bonnets, which provide closure to prevent fluids from leaking out of the valve. Screw-in bonnets are simple, durable sealing units that use pressure to seal. Union bonnets provide easy access to the valve body for applications that may require frequent maintenance or inspection. Bolted bonnets are generally used for larger valves in higher-pressure applications. Pressure seal bonnets are designed for services with pressure in excess of 2,250 psi [15 MPa].

Applications

Because of the diversity of construction materials, trim offerings, and design combinations available with gate valves, they are appropriate for a wide variety of applications. From high-temperature coking units to food and pharmaceutical services, gate valves can be trusted to reliably perform.

The protected seat-face design of double expanding and slab gate valves eliminates degradation of the seat face caused by debris in the process fluid, which makes them ideal for liquid service. When additional protection is needed at points in pipeline applications where operational integrity is vital and the consequences of environmental exposure are higher, such as near waterways and municipalities, double expanding gate valves are a particularly wise choice.

Our smaller 2- to 4-in nonrising stem version of the Pow-R-Seal API 6A expanding gate valve is commonly used in wellhead manifold systems because of its reliable mechanical seal and high pressure capability.

Drilling manifold systems can also be easily designed to use certain gate valves, such as the Cameron DEMCO* valve DM series, with space-saving and versatile mounting designs.

In the power industry, NEWCO* gate, globe, and check valves and DOUGLAS CHERO* forged-steel gate, globe, and check valves are ideal for standard and critical applications, such as steam distribution in power plants. By replacing the body and bonnet flanges with a welded connection, the design of this valve eliminates a leak path, reduces weight, and simplifies the application of exterior insulation. This, in concert with the forged steel body, provides the highest integrity sealing available.

For challenging subsea environments, where pressures are extremely high, temperatures are low, and operation is difficult, subsea manifolds that integrate valves and interface panels are used for critical isolation. The simple design of the Cameron RING-O* subsea valve is ideally suited for integration into these systems and can be actuated manually, via ROV, or hydraulically for ease of operation.

*Mark of Schlumberger.