



# Valve Solutions for Offshore Production

Customized, expansive portfolio of daily service and high-spec valves engineered for safe and reliable operation



Production

Separation

Processing and compression

Storage, metering, and export

## Safe. Durable. Engineered.

Recognizing the weight, space, and safety concerns in offshore production, our portfolio of high quality, critical service valves, and valve automation solutions is designed to have a reduced footprint while performing reliably in crucial offshore environments, including dirty service and high-pressure/high-temperature applications.

Backed by complete life-of-field services, a team of valve experts, and an international distributor network, we help keep processes running offshore with quick access to service technicians, replacement valves, and spare parts.

# Production

In offshore production environments, well fluids typically come through at high pressures, as a combination of gas, oil, water, chemicals, and solids. Production valves are the first line of defense to ensure safety and operational reliability. These valves must be able to withstand severe, dirty service and varying pressure services.

The TEXSTEAM\* plug valves are designed for high corrosion resistance, bubble-tight sealing, and high-wear, high-impact resistance. These valves have a long history of reliability in tough service conditions such as abrasive or severe service applications found in pre-separation operations offshore.

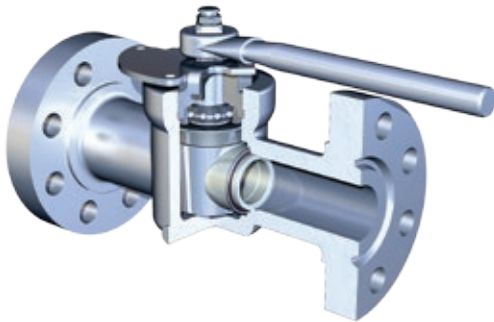
Our ball valve portfolio has customizable options like metal-to-metal seats, sealing arrangements, and internal coatings, helping to extend the valve service life when erosive, corrosive, or combinations of extreme service conditions are present.

The GROVE\* side-entry trunnion mounted ball valves are built for the ease of operation in demanding pressure and temperature applications. GROVE ball valves are available in a variety of sizes, pressure classes, materials, and configurations ideally suited to meet the requirements of the dirty service conditions in offshore production environments.

For extreme service conditions, our TK\* trunnion-mounted ball valves utilize robust components designed around wide seat sealing surfaces and optional non-corrosive plated or weld over-lay on internal wetted surfaces making it ideal for pre-separation offshore. TK ball valves are available in a variety of stainless steel and high-nickel alloys which can be applied to the valve's critical areas, thus improving valve performance and increasing service life.



*Production valves are the first line of defense to ensure safety and operational reliability offshore.*



## **TEXSTEAM Super G plug valve**

*Internal sealant paths provide sealing on damaged seats, extending service life. The valve is also in-line repairable, which significantly reduces downtime.*



## **GROVE side-entry ball valves**

*Our GROVE team invented and patented the double piston effect (DPE) seat design. This design allows for both seats to seal with pressure acting from the same side of the valve. In the event one seat becomes damaged, the user has the added advantage of the opposite seat sealing.*



# Separation

While at lower pressures, separation is a key section of any offshore production facility. During separation, process fluids may still be corrosive and contain abrasives and chemicals. Valves must be selected and designed to last in this harsh service.

The DOUGLAS CHERO\* forged steel gate, globe, and check valves are ideal for critical applications. The valve's welded bonnet joint eliminates the body/bonnet flanges, reducing weight and simplifying the application of exterior insulation. The welded bonnet helps ensure containment of the high-pressures experienced within this application.

TBV\* critical service floating ball valves, such as the series 1800 and series 3300, are synonymous with severe service. Both of these valves were

engineered specifically for abrasives, slurries, and corrosives, and they come in a wide range of materials to provide reliable operation under a variety of service conditions.

In addition to TBV critical service floating ball valves, offshore operators use double isolation-and-bleed (DIB) valves because they require proven isolation downstream of the valve, allowing for safer maintenance. Our TBV series 5500 ball valve has two individual isolation valves (closure members) in one compact design. When pressurized from one side, this compact design provides reliable, redundant isolation in critical areas, to protect workers and equipment, while saving space and reducing weight.



## ***DOUGLAS CHERO forged steel gate, globe, and check valves***

*Cameron quick-turn, stocked DOUGLAS CHERO valves are utilized regularly in offshore applications around the world.*



## ***TBV series 5500 valves***

*DIB valves allow for easier maintenance, especially for minor repairs under pressure, thus reducing downtime.*

# Processing and Compression

After separation, process fluids go through a series of treatment, processing, and compression units. Gas treatment includes dehydration and removal of other corrosive/unsafe elements. Water is removed from liquids, and enhanced recovery techniques are utilized to help ensure the minimum amount of hydrocarbons are wasted. Valve requirements depend on the process, and for each requirement, Cameron has a solution.

The WKM\* D series trunnion-mounted ball valve incorporates the latest valve design practices and technologies for a standard and reliable isolation solution. As pressure increases, the WKM D series ball valve's seals tighten, making it more difficult for product or pressure to escape the valve. WKM 310 floating ball valves complement the D series where smaller bore isolation requirements exist.

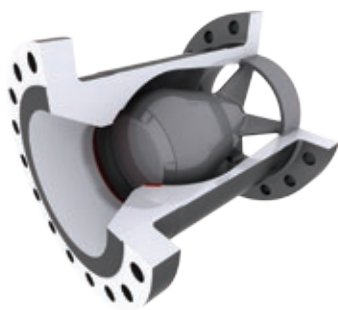
The WKM high-performance and triple offset (TOV) butterfly valves offer single isolation where space and weight are at a premium without sacrificing reliability. Both the WKM high-performance and TOV are specifically designed to provide reliable sealing in high-cycle applications, allowing the valve to last longer without requiring replacement or maintenance. In addition, the low torque requirements of these valves allow for smaller actuators. The WKM TOV features metal-to-metal disc to body seals, allowing the valve to handle a variety of services and high and low temperatures. These features translate directly to CAPEX and OPEX savings over the life of the facility.

Process applications such as gas treatment, gas dehydration, enhanced recovery, or other processes that require positive shutoff are found in this stage of offshore production. Standard isolation valves often cannot handle the higher temperatures or high cycling required. The ORBIT\* rising stem ball valves have been specifically designed to operate at low and high operating temperatures (-150 to 800 degF [-101 to 427 degC]), to provide repeatable bubble-tight sealing that is not dependent on the line pressure, and have friction-free sealing contact, which minimizes operating torques and maximizes long-term cycling performance.

The ENTECH\* nozzle check valves have been designed with industry breakthrough computational flow analytics to ensure minimal pressure drop and response time. With a design that reduces external leakage paths and utilizes metal-to-metal sealing for reduced-maintenance operation, it is the optimal solution for critical backflow protection in compression and other areas.



*During treatment, processing and compression, Cameron valves are utilized to ensure minimum product loss and increased throughput.*



## **ENTECH nozzle check valves**

*ENTECH valves have a non-slam design to prevent reverse flow, and their short stroke length reduces closing time and eliminates water hammer, thus avoiding damage to the compressor equipment.*



## **WKM D series ball valves**

*A modern double block and bleed trunnion ball valve engineered with today's latest technology for maximum standardization across a wide range of services, equaling a lower cost of ownership to our customers.*



## Storage, Metering, and Export

Once separated, treated, and compressed, the fluids are measured and then either stored, shipped, injected back into the reservoir, or flared. Storage and metering require leak-free positive isolation and product segregation to eliminate product and revenue loss. Export valves, particularly around the pig launcher/receiver, are critical safety components and meet special isolation procedures.

The GENERAL VALVE\* Twin Seal\* double block-and-bleed plug valve is used for liquids metering, sampling, and storage applications. Providing friction-free mechanical positive double isolation-and-bleed (DIB-1) capabilities, the Twin Seal valve helps ensure repeatable bubble-tight sealing and reduced maintenance.

As a companion to the GENERAL VALVE Twin Seal plug valve, the ORBIT rising stem ball valve also excels in gas metering services where repeatable positive mechanical bubble-tight sealing is required.

For export applications, the GROVE Twin Ball valve combines two valves into a single body, reducing weight, envelope dimensions, and potential leak paths in an area where space is limited. This valve utilizes the proven GROVE valve design in a twin ball body, satisfying double-isolation requirements as specified in most process safety management systems. Twin Ball valves can be customized for almost any service condition.



*Since space and weight is a concern in export applications, Cameron offers the GROVE Twin Ball valve, which combines two valves into a single body.*

# Services

As the largest global service network for valves operating in the oil and gas industry, our service network is there, whenever and wherever you need it.

For offshore fixed and floating platforms, our service team is ready to meet routine, emergency, or preventative maintenance challenges.

- Field services and repair
- 24/7, 365 days/year support
- Valve/actuator/spares stock availability
- Onsite machining
- Asset management options (preservation and storage)
- Embedded programs with engineering and/or technical support
- Engineering solutions
- Reliability engineering
- Preventative maintenance programs
- Extensive trusted network of service partners
- Condition monitoring (ValveLink, ValveSmart)
- Chokes bench testing and repair/maintenance

# Valve Automation

## Actuators and control systems

The LEDEEN\* quarter-turn pneumatic actuators are used for on/off or modulating control of any ball, plug, or butterfly valve utilizing compressed air, natural gas, or nitrogen actuator supply. Since platforms and FPSOs have compressed air systems on board, the quarter-turn pneumatic actuators are ideally suited for offshore environments.

## High-performance worm gear operators

Our MAXTORQUE\* gear technology features patented AutoLock\* technology that allows for high-performance worm gear solutions with the self-locking characteristics of conventional gearboxes. This means faster operating times and up to a 75% reduction in the workload required to operate a valve, leading to improved worker efficiency on manual valves. Using MAXTORQUE high-performance gears for motorized packages significantly reduces motor size, reducing cost, weight, and power requirements.

## Manual gear operators and valve accessories

The DYNATORQUE\* valve accessories support the valve operation, safety, and testing needs of valves offshore with innovative engineering and rapid delivery.

## CASE STUDY

### Multi-skilled teams

#### The customer challenge

An offshore platform operator in Western Australia needed flange and valve management services. Due to the limited amount of space in offshore installations, the number of people needed to be kept to a minimum.

#### The cameron solution

Two Cameron teams comprised of one engineer, lead hand, and two service technicians with competency in flange management, hydrotesting, valve repair, and machining were mobilized. In addition to the core services the operator had requested, the multi-skilled teams were asked to hydrotest joints and pipe spools; cut pipe; and machine pump bases and vessel faces. The team also had further capabilities to pop test PSVs, manage actuation, etc.

#### The result

Utilizing our multi-skilled technicians provided for less handoffs (helping to avoid potential HSE issues), less dead time in between tasks, less bed space, and more accountability for the tasks. This saved the operator two hydrotesting personnel and two machining personnel, at a minimum, approximately \$4 million USD.

## CASE STUDY

### Emergency start-up support

#### The customer challenge

A platform operator in Southeast Asia had partnered with an unreliable service provider that did not have the required valve competencies. As a result, there were extensive valve failures due to mishandling, poor preservation, flange damage, and internal contamination of the valves leading to scoring of seats and balls.

#### The cameron solution

Cameron was called in to rectify the situation. A total of 133 personnel were mobilized at short notice to survey, strip, repair, and/or replace 900 valves over a period of nine months to ensure first gas on schedule.

#### The result

An estimated \$100 million USD was lost on \$70 million USD worth of valves, but the operator made it to the scheduled first gas.

# Valve Solutions for Offshore Production



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