

# Anson Gate Valves, Manifolds, and Trees





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# Anson Products

## We design and produce a wide range of high-pressure products, including valves, manifolds, trees, and flowline equipment.

Our customers include all major production and service companies. Our equipment is used across several applications, including well testing and flowback, drilling and workover, well intervention and stimulation, and exploration and production. Our main manufacturing plant located in Gateshead, in the Northeast of England, is only a short distance from the original facility where the Anson product was created in 1981.

Since that time, the product range has grown and, in turn, so has our manufacturing capability. As part of NOV, we have a wealth of technical and hands-on expertise and are close to our customers, wherever their operations may be.

Building on our reputation for producing quality products, we continue to innovate and introduce new technical solutions. From initial design to aftermarket support, we work to customer and industry standards, providing individual components to entire well service packages. Our years of experience within the industry gives our customers confidence in our equipment and people.

The Anson™ product line is part of the Intervention and Stimulation Equipment (ISE) business unit within NOV alongside other trusted, industry-leading brands including Axelson, Elmar, Rolligon, Hydra Rig, and more. By leveraging the technical expertise throughout the business unit, we can collaborate to create your complete package from one trusted vendor.

## Quality

The Anson brand has been synonymous with quality since the company originated, and this is a culture that is still instilled within our people and processes today. We are independently audited continuously to ensure that we maintain the high quality that our customers have expected for decades. The primary Anson manufacturing facility works to a Health, Safety, and Quality Management System per the following:

### ISO 9001:2015

ISO 9001 exists to ensure that customers get consistent, high-quality products and services. The seven quality management principles are customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making, and relationship management.

### ISO 14001

ISO 14001 sets out criteria for an effective environmental management system, assuring the company and customers that environmental impact is being measured and improved.

### ISO 45001

ISO 45001 gives guidance for its use, to enable organizations to provide safe and healthy workplaces by preventing work-related injury and ill health, as well as by proactively improving its OH&S performance.

### API Q1

Published by the American Petroleum Institute (API), Q1 is specifically for manufacturers of oil and gas equipment, to demonstrate its commitment to a sound quality management system.

### API 6A

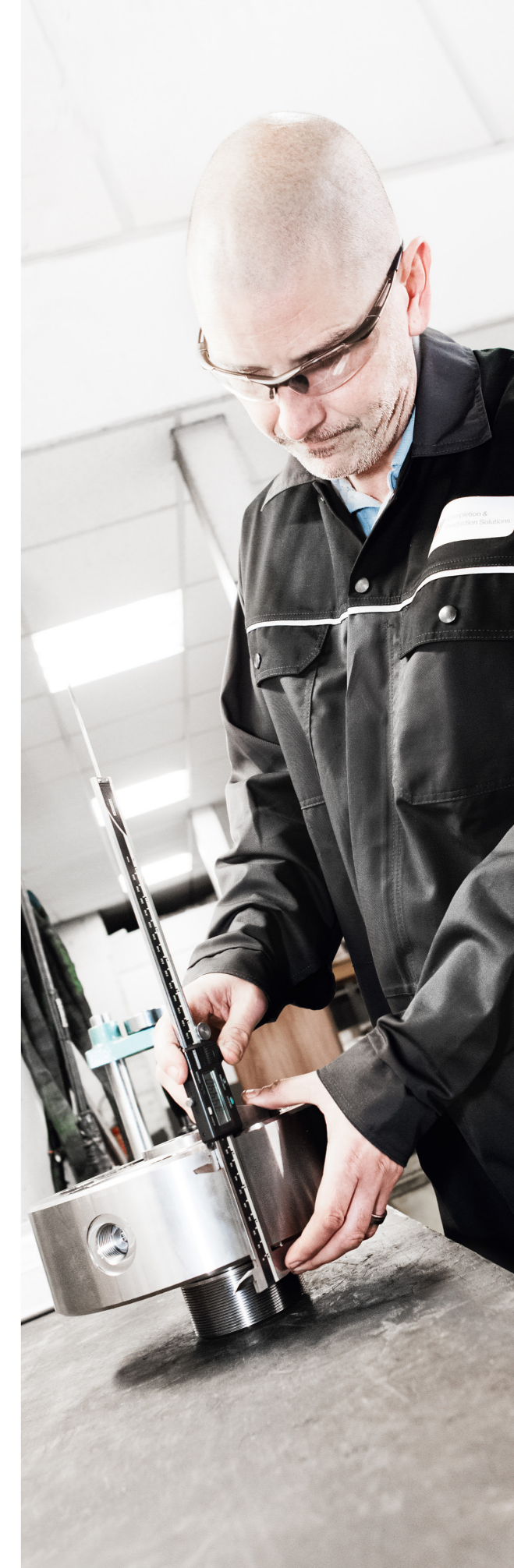
The facility is an API 6A license holder, and our license number is 6A-0313. API 6A is an international standard that specifies requirements for design, materials, inspection, and production of wellhead and Xmas tree equipment for use in the oil and gas industry. We adhere to this standard for all applicable equipment and are licensed to stamp this equipment with the API monogram.

### PED CE

The facility is PED certified to module H. The Pressure Equipment Directive (PED) sets out standards for the design and fabrication of pressure equipment, for free placing into the European market.

We are also an active member of the Association of Wellhead Equipment Manufacturers.

Besides the recognized industry standards that we follow, within NOV, we also have additional specifications and procedures focusing on HSE and Quality—ensuring that these remain at the forefront of everything that we do.





# E-Type Gate Valves

## API 6A Gate Valves

Our Anson through conduit gate valve was developed in 1991 to satisfy the need for a high-quality, high-specification valve. The E-Type is a true bi-directional valve with low operating torque. It is robust, easy to maintain, and is supported by NOV's worldwide aftermarket teams.

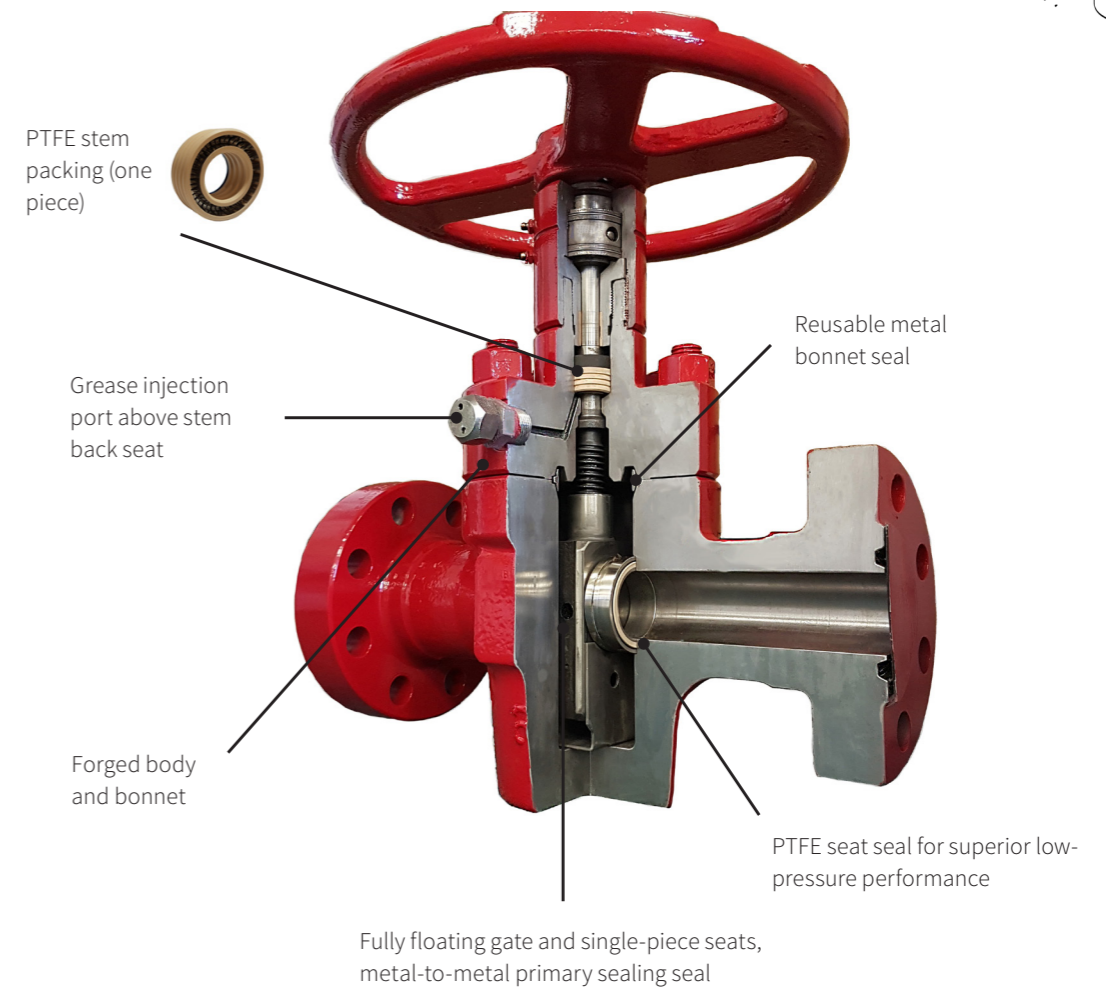
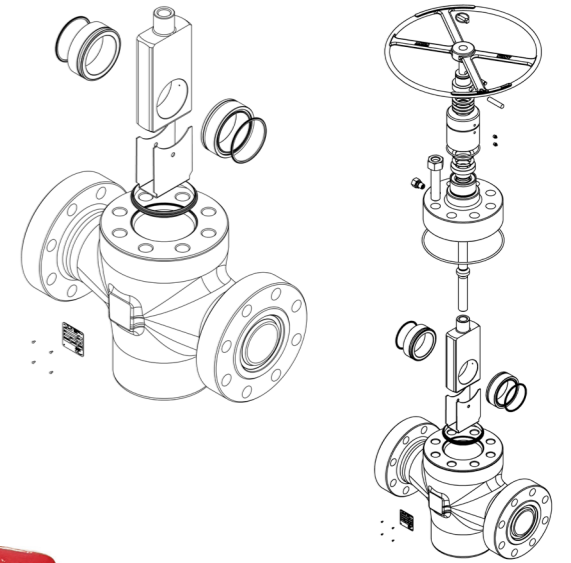
Anson gate valve technology is used across various applications – well testing, flowback, drilling, exploration, production, and well intervention. This field-proven design with multifunctionality makes the E-Type gate valve one of the most trusted valves in our ever-changing industry.

### Specifications

- Uses no performance-limiting elastomers
- Available from 2,000 to 20,000 psi in sizes 1<sup>3</sup>/<sub>16</sub>- to 9-in. bore
- Designed, manufactured and tested in accordance with API 6A
- Material class, temperature range, product specification level (PSL) as per API 6A
- API 6A mongrammable
- Qualified for Class II Sandy Service (API 6AV1)
- Qualified for high-pressure/high-temperature (HPHT) service (API 6A Annex F PR2 to 350°F) and extreme low-temperature service (API 6A Annex F PR2 to -75°F)

## Features

- **Body and bonnet:** Integral one-piece forged body and bonnet with minimal pressure boundary penetrations.
- **Gate and seat design:** The seats in the E-Type gate valve are fully floating. This, combined with a solid slab gate, gives a true downstream seal resulting in exceptionally low operating forces. Gate and seat replacement are possible with the valve inline, without the need for special tools.
- **Bi-directional sealing:** The E-Type gate valve is a true bi-directional valve. Being fully symmetrical, it effectively seals pressure from either direction without the risk of pressure lock.
- **Body to bonnet seal:** A seal is achieved between the body and bonnet using metal-to-metal sealing technology. The seal is reusable.
- **Seals:** The E-Type gate valve uses high-performance PTFE seals with CRA spring energizer and uses no performance-limiting elastomers.
- **Handwheel:** The E-Type gate valve is supplied with a rugged handwheel that employs a double detent quick-release mechanism. A shear pin is provided to protect the valve's internals from damage and is replaceable without having to dismantle the valve or take it out of line.



# Hydraulically Actuated E-Type Gate Valves

## Fail-Safe Close and Fail-Safe Open

Fail-safe close (FSC) and fail-safe open (FSO) E-Type gate valves are designed with fail-safe spring return actuators, offering a flexible solution for emergency shutdown valves (ESD) and other fail-safe applications. Fluid is applied to one side of the piston to move the gate, and a spring within the cylinder generates the energy for the opposite motion.

The fail-safe actuator is a self-contained unit that allows for quick removal from the valve bonnet if necessary when the valve is still under line pressure.

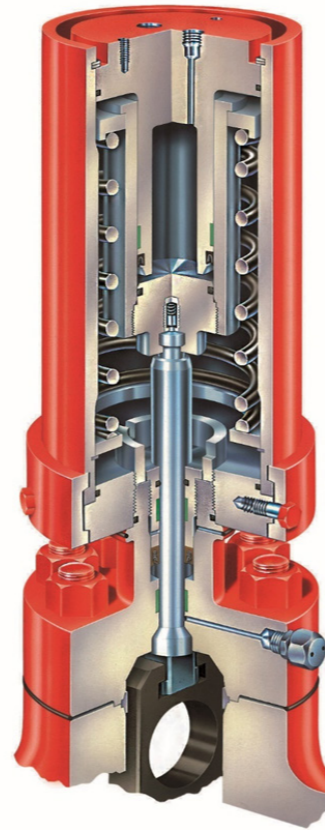
The design also allows for quick and easy maintenance, and no drift adjustment is necessary to set the stroke.

### Features

- Linear hydraulic single acting spring return
- Normal operating pressure of 3,000 psi (4,500 psi max)
- Translating hydraulic cylinder
- Compact design
- Hard-chrome plated cylinder
- The T-slot connection between stem and gate
- Multi-lipped pressure and spring energized stem seals
- Fully weather sealed
- Automatic back seating - fire resistant
- Twin guide bearings for stem
- Pressure relief port above valve stem packing
- No drift adjustment required to set the stroke
- API 6A Annex F PR2F qualified

### Options

- Safety head device fitted to prevent damage to valve or actuator
- Can be supplied as part of an Emergency Shutdown Valve assembly
- Quick exhaust valve can be included for optimal shutdown time
- Position indication by rising stem, clear inspection plate or limit switch feedback



## Emergency Shutdown Valves

We provide Anson E-Type fail-safe valves can as part of a complete emergency Shutdown (ESD) valve assembly. Generally situated upstream of the choke manifold, the standalone ESD valve is used to safely and quickly isolate the downstream equipment from the high-pressure wellbore fluids. These valves are critical to protecting personnel, equipment, and the environment.

The ESD is used in conjunction with an NOV control system to allow the valve's remote operation. Closure times can be critical, and the ESD valve can be enhanced with the inclusion of a quick exhaust valve in the hydraulic return line, shutting the valve in less than five seconds.

Generally, the ESD valve will be supplied enclosed in a skid frame and include inlet and outlet crossovers. Skids can be provided per DNV 2.7-1.

We also supply wellhead pneumatic surface safety valves, as part of our surface safety products (SSP) product line. Including Axelson™ type actuators, we have the most extensive offerings of remote-controlled monitoring and actuator systems in the industry. Our SSP pneumatic actuator can be supplied with the Anson E-Type body and internals, incorporating two field-proven and trusted product lines.

## Double Acting Actuator

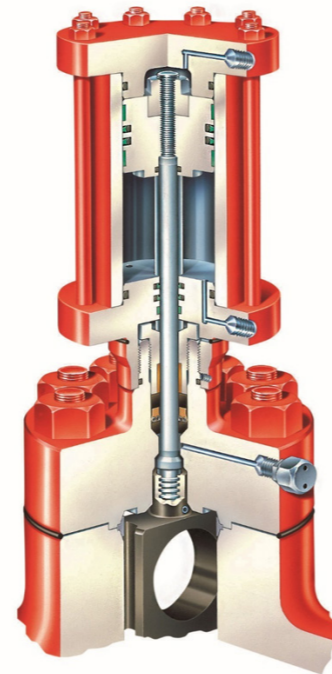
Anson E-Type gate valves are available with double acting (DA) hydraulic actuators and double acting with manual override (DAO). Fluid is supplied to connections below and above the piston, the pressure operates the valve, and in turn the gate to open or close.

### Features

- Linear hydraulic double acting
- Normal operating pressures of 1,500 or 3,000 psi
- Compact design
- Robust enclosure
- Double hydraulic piston seals and guide rings
- Fully weather sealed
- Simple construction with a minimum number of components
- API 6A Annex F PR2F qualified

### Options

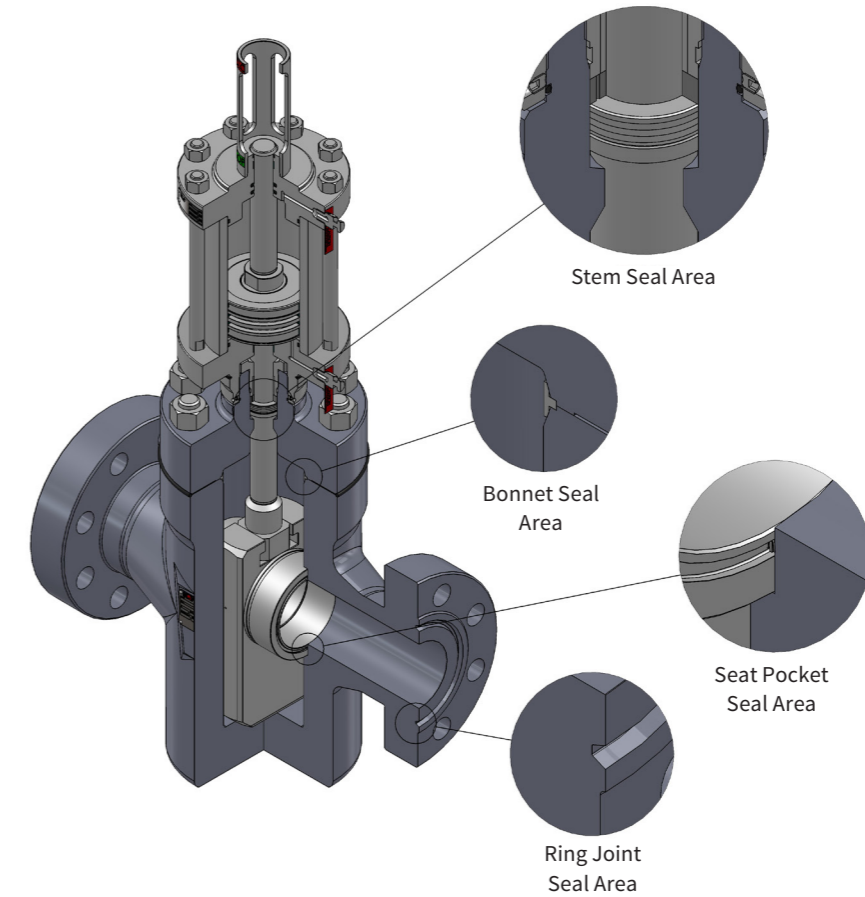
- Manual override (DAO) with a handwheel.
- Position Indication by a rising stem, limit switch feedback



Anson E-Type with DA actuator and manual override built into an NOV choke and kill manifold for drilling application.

## Enhanced Corrosion Protection

Additional corrosion protection can be applied to certain areas of the gate valve to increase the service life of the equipment. For material classes DD through to FF, CRA 625 weld overlay can be applied to all ring grooves, body seat pockets, stem seal, and bonnet seal.



### API 6A Material Classes (Trim Levels)

The table below shows the options available with the Anson E-Type gate valve. The trim level chosen is dependent on the severity of service anticipated over the lifetime of the valve. It is possible to upgrade a lower specification of E-Type should more severe service be encountered later in the valve's life.

Material Class	Body/Bonnet	Gate/Seat	Stem
AA	AISI4130 (API 75k)	AISI4130 (API 75k)	AISI 4140 hardened
BB	AISI4130 (API 75k)	ASTM A564 Type 630 (17-4PH)	CRA718 or CRA725
DD*	AISI4130 (API 75k)	AISI4130 (API 75k)	AISI 4140 hardened
EE*	AISI4130 (API 75k)	ASTM A564 Type 630 (17-4PH)	CRA718 or CRA725
FF*	ASTM A182 F6NM (Mod)	ASTM A564 Type 630 (17-4PH)	CRA718 or CRA725
HH*	AISI4130 (API 75k) c/w CRA 625	CRA 718	CRA718 or CRA725

\*Suitable for sour gas service and certified in accordance with NACE MR-01-75/ISO15156

#### NOTES:

1. Other material options are available on demand.
2. Grease fitting rated as per valve material class.



# Manifolds and Trees

## Manifolds

We have considerable experience in the design and manufacture of manifolds used across several applications and often to a bespoke design. The manifolds can be comprised of Anson gate valves, plug valves, choke valves, as well as API studded blocks and hammer union fittings. We design and manufacture all the major components used within our manifolds, giving us full control over the project from start to finish.

In addition to layout and design choices for manifolds, we also offer variations for the type of actuation to suit your requirements, either manual operation (handwheel) or choice of actuation, operated by an NOV control system from a remote location.

The most common manifold that we produce is the choke manifold. Choke manifolds are used in several applications both onshore and offshore. They are an arrangement of shut off valves and choke valves, designed for controlling and reducing surface well pressure upstream of the process equipment. Two choke valves are incorporated within the assembly to allow the manifold to function at all times, even if service needs to be performed on one of them.

Anson E-Type gate valves are also used within many other manifolds and assemblies, including:

- Diverter manifolds
- Debris catcher manifolds
- Choke and kill systems
- Managed pressure drilling systems
- Sand management systems
- Process equipment

## Surface Test Trees (Flowheads)

We have been at the forefront of surface test tree (STT) technology since the early 1990s and have designed and manufactured some of the largest flowheads in the marketplace for deepwater applications. Our flowheads range in size from 2 1/8 to 9-in. nominal bore and are used in multiple applications across the world.

The surface test tree provides a means of well control during testing or intervention on a production well. The configuration of the tree can be dictated by the user or by design code requirements.

The standard design incorporates Anson E-Type gate valve technology within the main flowhead block, a low-torque dynamic string swivel, handling subs, flow and kill wings, and a lower master valve.

The main block assembly, which includes dual production bore isolation valves (master and swab), allows for the full-bore passage of coiled tubing or wireline tools. The wing valves (flow and kill), located between the master and swab valves, isolate the STT from the well test equipment and are used to allow the flow of wellbore fluids and injection of kill. The kill line into the STT can be supplied complete with an inline non-return valve to prevent any wellbore fluid's return to the kill pump.

All hydraulic lines can be terminated in a hydraulic bulkhead, or stab plate mounted on the flowhead block.

The Anson low-torque, dynamic string swivel is typically situated below the main flowhead block assembly. This industry-leading string swivel allows for the rotation of the drill string. At the same time, the STT remains stationary, preventing the transfer of torque to the landing string/riser due to any rig rotational movement. For applications where the tree assembly includes a hydraulic lower master valve, we can offer a "live center" swivel design, which provides hydraulic communication between the rotating and static sections of the tree. The surface test tree can be supplied, designed, tested, and manufactured per ISO13628-7 /API 17G.

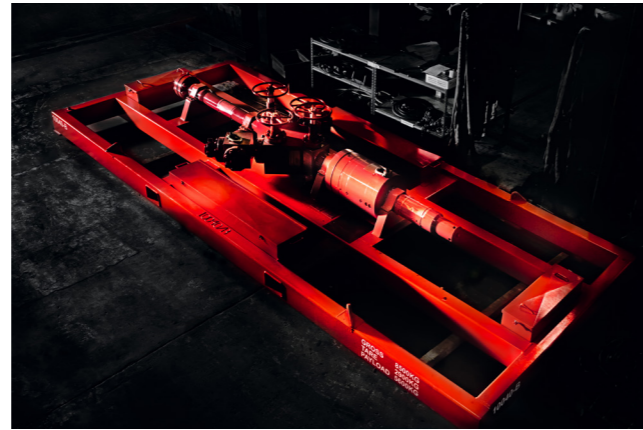
A lower master valve can be included to isolate the swivel and flowhead block from wellbore pressure completely. The handling sub located above the main block enables rig elevators to raise and lower the tree in the derrick. The handling sub can be used to interface with wireline or coiled tubing equipment as required. Flow wings allow hydraulic umbilical connection from the rig floor to the kill and flow valves on the flowhead block.

As an alternative to the conventional, large-bore surface test tree, we have developed the Anson compact surface test tree. The compact design retains the same functionality and benefits of the traditional tree while significantly reducing the space envelope by 20% and overall weight by 14%. This evolutionary design makes rigging up in an offshore coiled tubing application an easier process.



## Frac/Acidizing Heads

Similar in design to surface test trees, Anson frac, and acidizing heads are used for severe service stimulation operations both on land and offshore.



## Control Systems

All Anson actuated gate valves, ESD, manifold assemblies, and trees can be supplied with a bespoke control system to suit your requirements. Control systems allow valves to be operated from a safe distance, protecting personnel and equipment. Our control systems are designed and manufactured in house.



## Xmas Trees and API 6A Surface Safety Valves

The Anson E-Type gate valve can be used on monoblock Xmas trees or with API studded blocks and loose valves on conventional Xmas tree designs.

Anson E-Type gate valves and Xmas trees are available with our range of API 6A surface safety valves (SSVs), as part of our Surface Safety Products product line.



# Gate Valve Spare Parts and Service

The E-Type gate valve range has been designed on a modular basis making numerous components interchangeable across sizes and pressure ratings.

The result of this has been to significantly reduce the cost of manufacture of both valves and spare parts. Substantial savings are made and passed on to the customer in the form of competitively priced valves and spare parts.

We understand your need for minimizing costly downtime. As your equipment moves into the field, we are standing by to support you with some of the best customer service in the industry. Our highly trained service technicians are available around the globe to help to keep your operations running smoothly.

Advice is freely given in the full knowledge that we at Anson can also benefit from an operator's practical experience, as it is mainly from feedback from the end user that improvements can be made. Listening to what our customers have to say is and shall remain the cornerstone of our business.

Always use OEM parts to ensure that you get the best out of our equipment and the intended life of the product.





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