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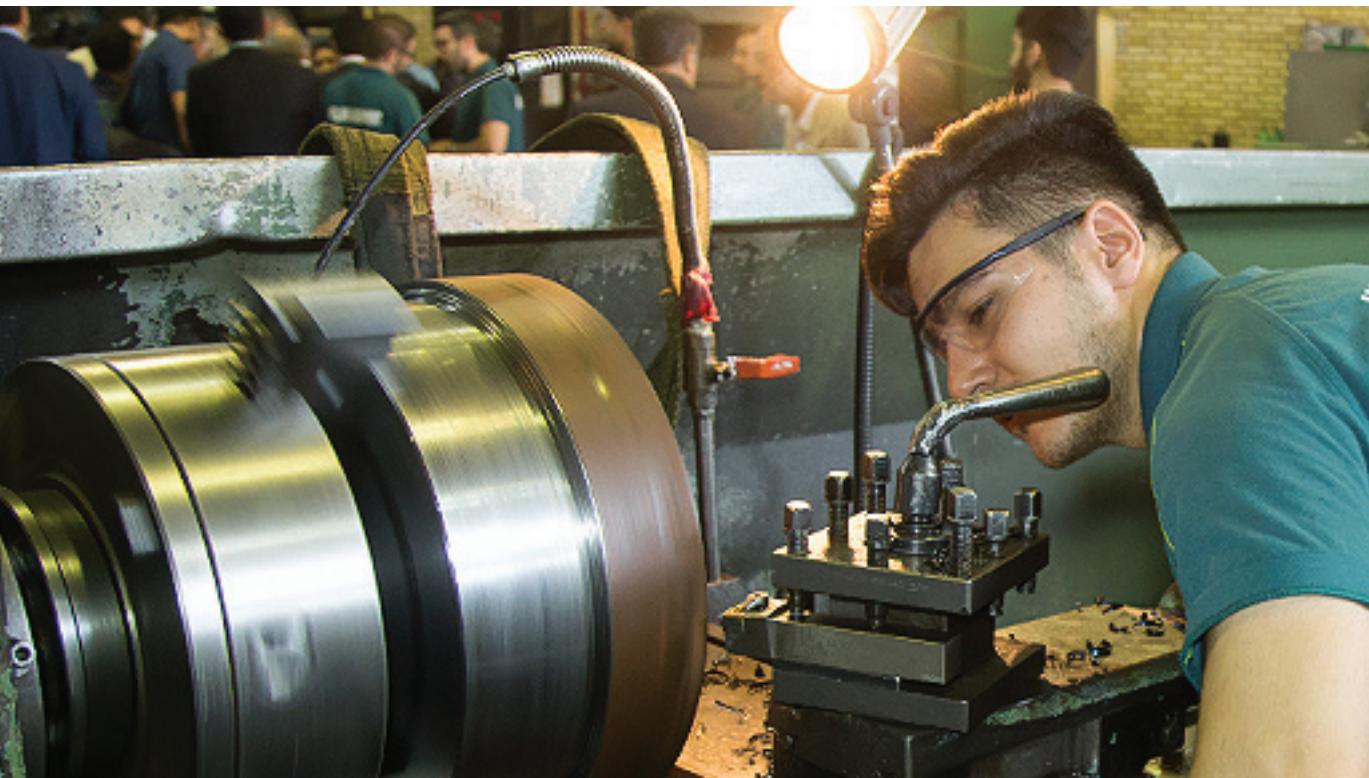
ABOUT WETCO

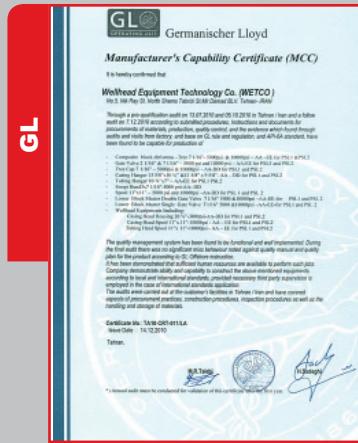
History

In 2001, PEIC (Petroleum Equipment Industries Co.) established a joint venture with the oil and gas division of ABB in order to manufacture wellhead equipment and provide related services in Iran. ABB-PEIC JV started manufacturing different sections of wellhead under supervision of ABB-Vetco Gray in Shams Abad plant which is located 45 km South of Tehran.

In 2004, a financial consortium acquired the oil and gas division of ABB and the JV continued the business with new name; Vetco-PEIC. During a year Vetco-PEIC JV succeeded to expand the production line and manufacture valves and trees.

The consortium sold his share to PEIC in 2005 and PEIC established WETCO as a subsidiary company. Now WETCO (Wellhead Equipment and Technology Co.) is a leading manufacturer of surface wellheads, x-trees and valves to the oil and gas industry in Iran.





Know more about PEIC

Company in Brief

By the strategy of Ministry of Petroleum to supply their industrial equipment by local industries, therefore Industrial Development and Renovation Organization (IDRO) established PETROLEUM EQUIPMENT INDUSTRIES COMPANY (PEIC) IN 1991 to invest in production and services related to mentioned fields. The main manufacturing plant has been established for manufacturing Wellhead equipment and X-mas trees, Turbo Compressors, Centrifugal process pumps, Mechanical seal, Casing and Tubing plant, Steel Valves, Pipe fittings, Fin fan air coolers, Fuel pump dispensers, Gaskets and Fasteners. Some of these companies have been privatized to private sector.

In 2010 the remaining Holding company (PEIC) was privatized. The main shareholder of this group is Oil Pension Fund Investment Company (OPIC).

We are manufacturing wellhead equipment and piping material for oil, gas, petrochemical and power plant industries on the base of international standard API, ASTM, BS and ...

PEIC manufactures above mention production by various material such as: carbon steel, alloy steel, stainless steel and NACE application for high and low temperature and different size and pressure.

Our quality control system covers all production line from raw material, forging and casting, machining, assembly, test, painting and packing by trained staff.

We are sure you will be satisfied by our quality, delivery time and competitive price in all range of production.



P.E.I.C





Under PEIC five manufacturing companies were established as below

- Wellhead Equipment Technology Co. (WETCO)
- Pars Pangan Company
- Tehran Sufa Company
- Gostaresh ShirSazi Company (GSSCO.)
- Toos Payvand company

Iran

Tehran

Kermanshah

Qom / Sarajeh

Mosian

Dehloran

Lali

Masjed Soleyman

Haftkel

Dalan

Hendijan

Bibi Hakimeh

Khark

Asaloyeh

Lavan

Henqam Island

Kish



Sarakhs



Covering the oil & gas patch with over 50 locations around IRAN:

- Asaloyeh Zone
- Dalan Gas Filed
- Tabnak Gas Filed
- Shanol Gas Filed
- Homa Gas Filed
- Varavi Gas Filed
- Kangan Gas Field
- Sarakhs-Khangiran Gas Filed
- South Pars Gas-Phase 9, 10, 13, 14, 22, 24 (23)
- Persian Gulf Islands
- Lavan Island Gas Filed
- Siri Island Oil Filed
- Kharg Island Oil Filed
- Hendijan Oil Filed
- Henqam Island Oil Field
- Resalat Oil Filed
- Reshadat Oil Filed
- Bahregan Oil Filed
- Ahvaz Zone
- Masjed Soleyman Oil Filed
- Dehloran Oil Filed
- Paydar Oil Filed
- Lali 31 Oil Field
- Abteymour Oil Filed
- Haftkel Oil Filed
- Mansouri Oil Field
- Yadavar Oil Filed
- Azadegan Oil Filed
- Gashou Gas Filed
- North and South Yaran Oil Field
- Balaroud Oil Filed
- Bibi Hakimeh Oil Filed
- Darquain Oil Filed
- Ahvaz Oil Filed
- Aghajari Oil Filed
- Kermanshah-Naft Shahr Oil Filed
- Kish Island Gas Filed
- Qom-Serajeh Gas Filed
- Salman Oil Field
- Central Oil Field
- Aghar Gas Filed
- Sarvestan Oil Filed
- Bangestan Oil Filed
- Kashan Gas Field
- North Oil Field-Golestan

OVERVIEW

Our products are from standard flanged wellheads to custom-engineered critical service systems, FMC Surface Wellhead offers a broad spectrum of products and systems to fit your budget and performance parameters, wherever the well, whatever the application.

Safety First

Nothing wastes your investment more than rig downtime from failures in equipment and safety practices therefore WETCO conducts ongoing safety training programs with daily, weekly and monthly service safety meetings about the safety of personnel and equipment.

WETCO accepts the responsibility to protect the environment and the health and safety of our employees, their families and the public. Health, safety and environment (HSE) performance is a core value and will be managed as an integral part of our business to benefit employees, neighbors and shareholders.

Critical Service Application

Wellhead performance is about the performance of your valves and seals. Innovations in valve design and in elastomer and metal to metal seals technology, long experience in engineering and servicing wellheads and, and state of the art expertise in materials have made WETCO a leader in critical service applications, including:

- Extreme Sour Service
- Extreme Corrosive Service
- Fire-Resistant Technology
- High Flow-Erosive Service

The Bottom Line

A wellhead represents only 35%- of the cost of a well, but what a vital investment, Choose precisely, the right solution for your well can reduce both drilling and completion costs. WETCO can help you to optimize your bottom line.

Technology

WETCO substantial investment in R&D and applied engineering which includes advanced, full-scale testing laboratories assures continual innovation as well as continual improvements and enhancements in our products and services across the board.



Quality Policy

Wellhead Equipment Technology Company (WETCO) works in the field of design, manufacture and installation of wellhead equipment and Xmas Tree and is committed to providing quality products for maximum satisfaction of the clients.

This has been achieved by selecting and applying specialist and promising engineers and technicians, as well as by implementation quality control systems and according to ISO14001:2004 , ISO29001:2007 , ISO9001:2008 and HSAS18001:2007 criteria.

Quality policy of the company is based on the following topics and all staff is committed to its effective implementation.

- 1 Quality promotion and continuous improvement in order to increase client's satisfaction.
- 2 The company has attempted to identify processes and determining of organizational goals and is monitoring its implementation and specified structure by using the integrated management system.
- 3 Use of expert team and effort in creating a spirit cooperation and commitment in implementation of organizational goals and increasing productivity.
- 4 Creation of appropriate and practical solutions in order to increasing competitive ability to develop market share.
- 5 Environmental protection and prevent environmental pollution, identifying and monitoring factors in accordance with requirements and relevant legislations.
- 6 Identifying occupational hazards to protect health of employees, monitoring and evaluation in order to prevent the occurrence of accident and reduction of relevant risks.
- 7 Efficient use of energy resources and creation of appropriate strategies in order to prevent of waste.

FIRE TEST

The test consists of subjecting valves to a flame of specific thermal power (EG. jet fire) for a specified period (typically 30 or 120 minutes). The integrity of the component at the end of the test indicates that the test itself has been passed. The relevant governing specification is the API6FA.

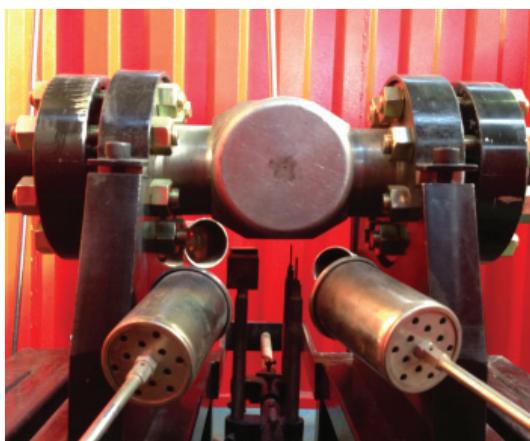
The various fire safe tests are conducted by special trained personnel and witnessed by Third Party inspectors according to the most recognized international standard specifications



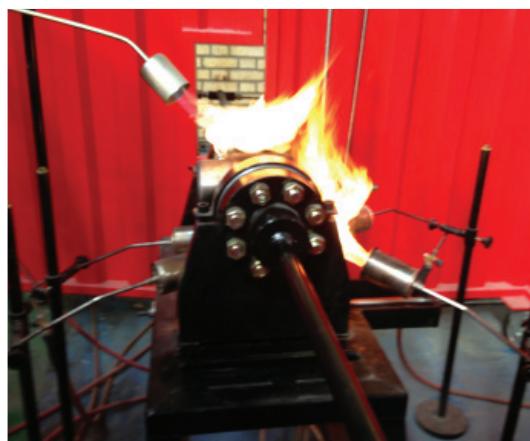
Fire test room and accessories



Fire test room and accessories



Test standard from ignition



Test valve during burn period



PR2 TEST

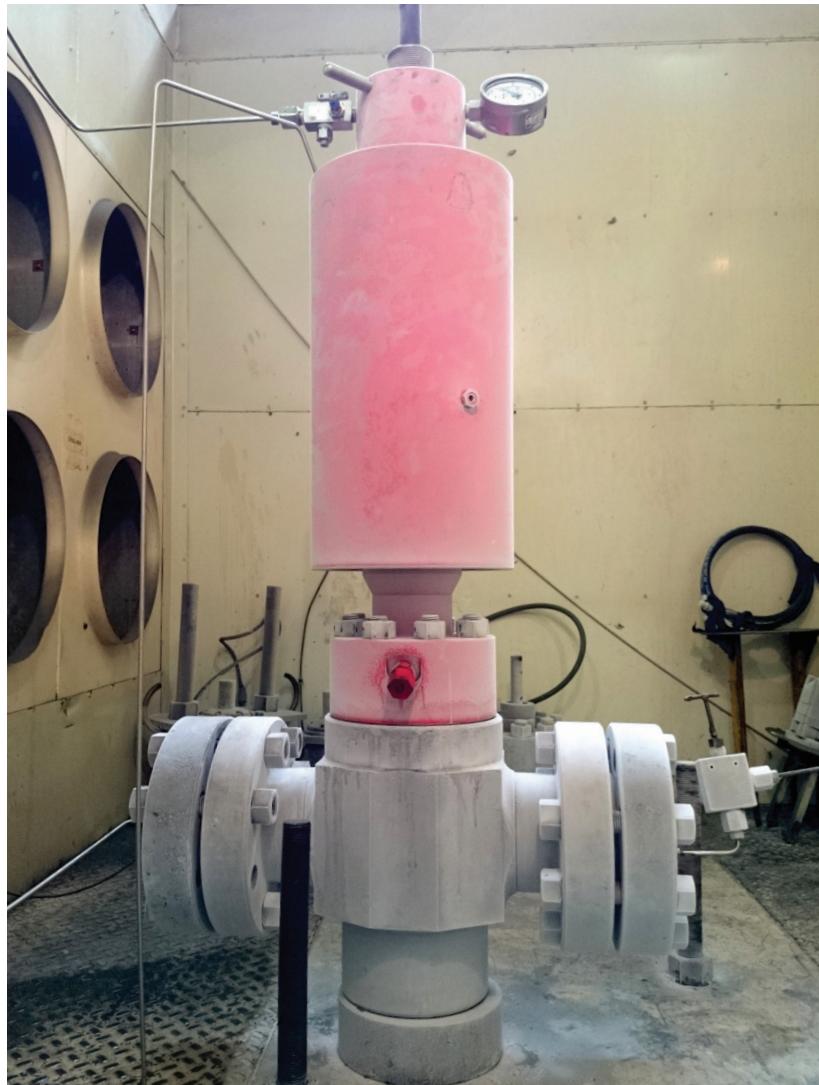
There are two design validation procedures, corresponding to performance requirement levels PR1 and PR2.

The API 6A Appendix F PR2 qualification test is undoubtedly the most widespread, combining both the effects of pressure (P), and temperature (T).

Note: if the design changes, the test must be re-conducted.

There are different types of temperature cycles in addition to the operation cycles. The operating cycles are typically 200, including those at high and low pressure.

To extend the validity of the qualification PR2 to similar components, one can apply the concept of scaling – dimensionally and by pressure class, in accordance with API 6A.



WELLHEAD

Since day one, our company has been listening to the needs of our customers and has concentrated on engineering, manufacturing and upgrading the technology in order to accomplish these needs and provide the finest-quality products. Along with the growth and expansion of oil and gas fields and products and difficulty of drilling projects, WETCO has been responsible to the customers requirements for safe and reliable wellhead systems to achieve maximum productivity with economic considerations.

In this part of our catalog, we introduce our wellhead products families which are categorized into conventional and time saving types. They are designed in accordance with API 6A standard, ASME, ASTM, NACE MR0175 and other relevant standards.

With the help of this catalog you can identify precisely what you will need for your fields based on your drilling environments, your well characteristics and your economic parameters.





CONVENTIONAL WELLHEAD

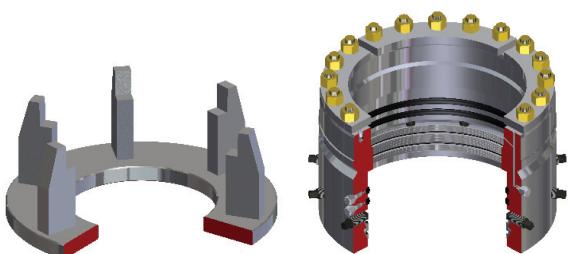
CONVENTIONAL WELLHEAD

The conventional wellhead system is designed for use with all well depths and all types of completions. It offers the industry's highest capacity conventional spool-type wellhead. The conventional wellhead incorporates the casing head housing, the casing head spool, the casing hangers, the tubing head spool and the tubing hanger which are listed in next page.

Conventional wellheads are made up by casing head housing, casing spools, a tubing spool, and a tubing head adapter. They represent the most traditional equipment used to drill and complete a well. Their main advantages are in low cost, simplicity of installation, and adoption of several annular seals from elastomeric types to metal-to-metal types. They are available from 2,000 psi to 15,000 psi with all types and sizes of casing programs.

Specialized and critical service equipment is designed and manufactured through close consultation with customers to meet their application's specific requirements and service type. This includes specialized materials for sour service and CO₂, corrosion resistant alloys (CRA), water flood, multiple completions, coiled tubing and instrumentation lines, and multi-bowl equipment.

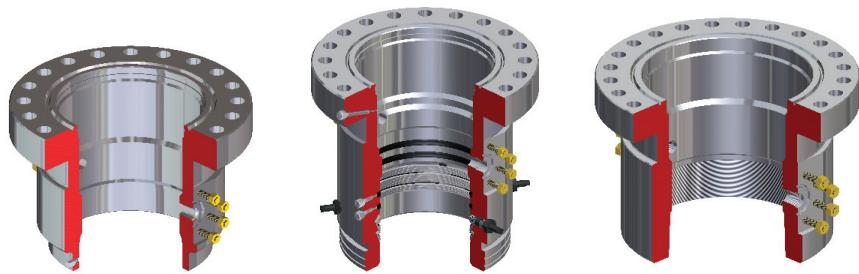
**LANDING
RING**



1101

10130

**CASING
HEAD
HOUSING**

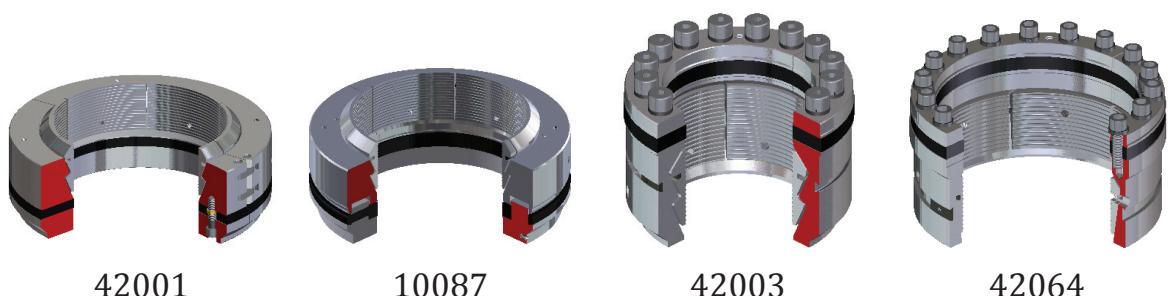


1221

10129

1223

**CASING
HANGER**



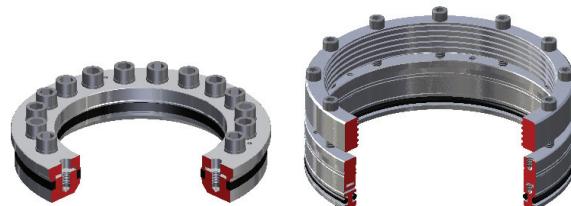
42001

10087

42003

42064

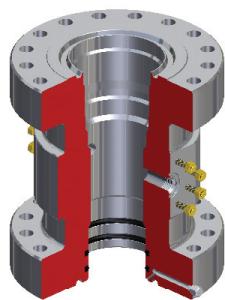
**SECONDARY
PACK-OFF**



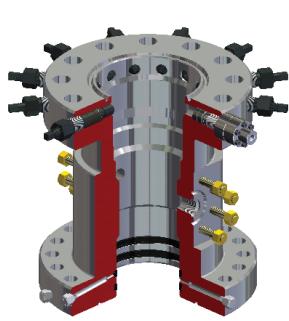
4500

4400

**CASING
HEAD
SPOOL**

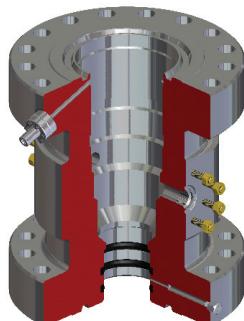


1300

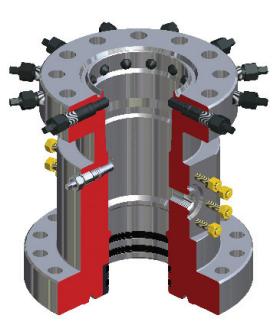


**TUBING
HEAD
SPOOL**

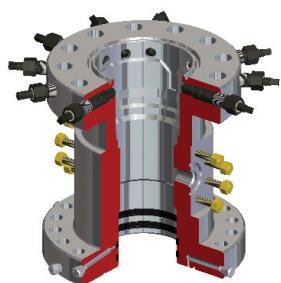
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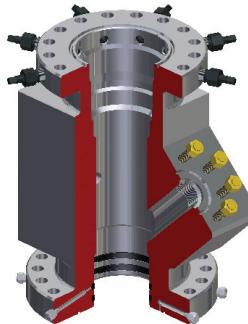
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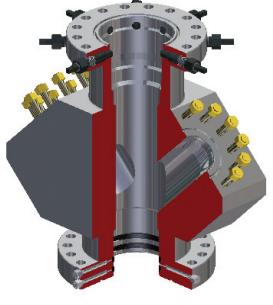
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1418



1406



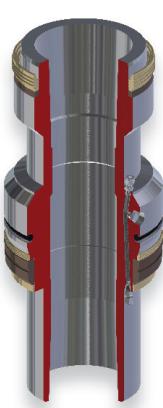
1402



41008



41013



10133



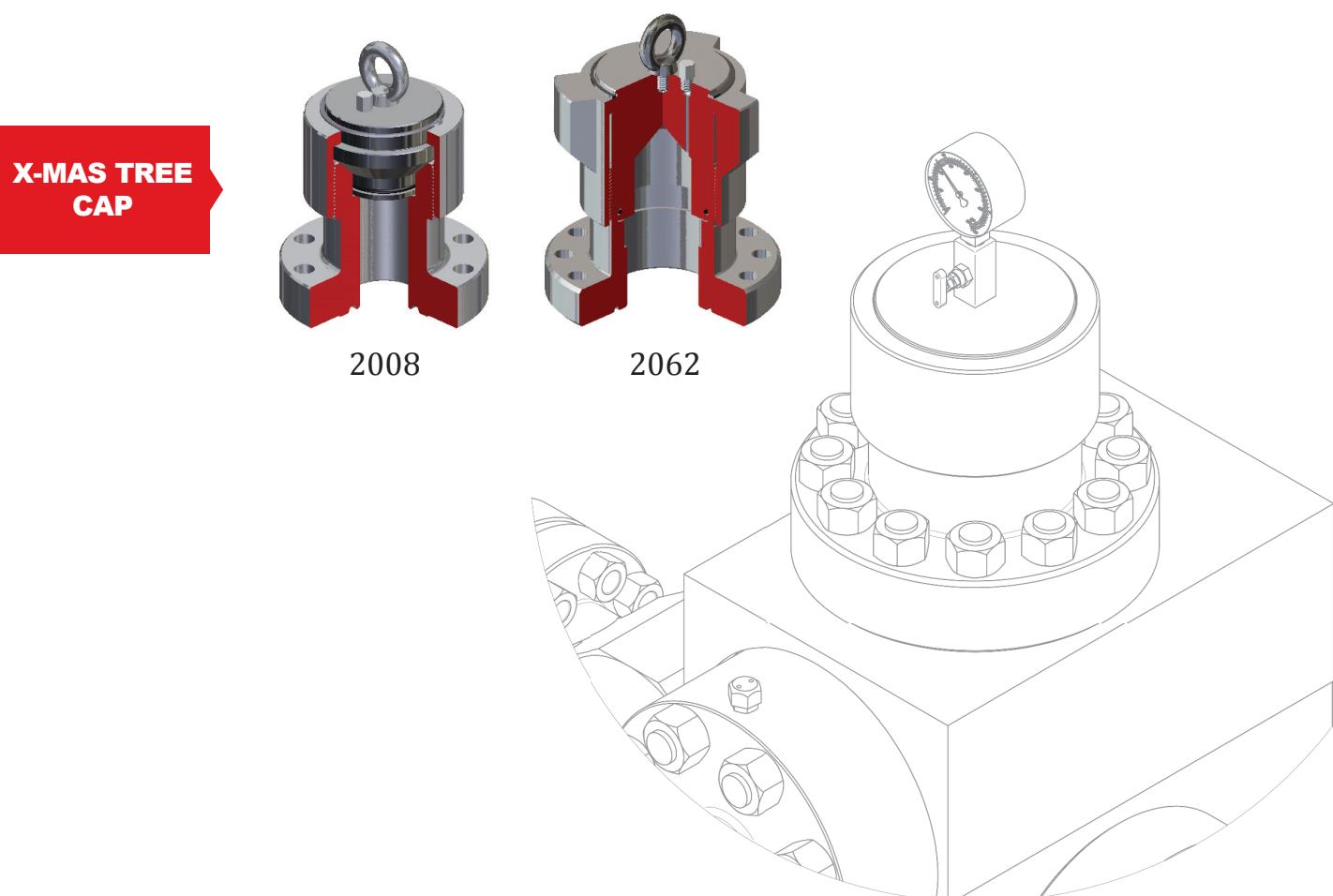
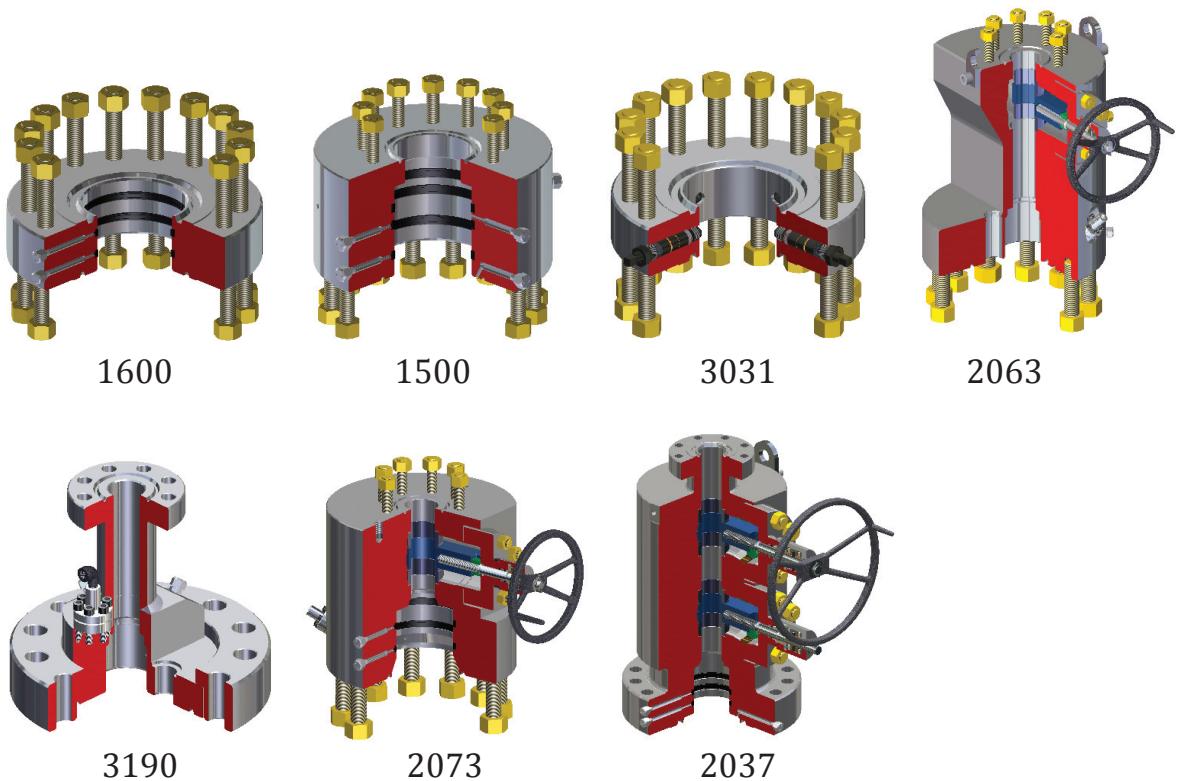
41036



41032

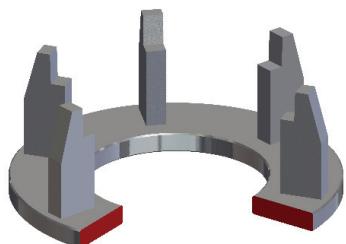


43037



Landing Ring

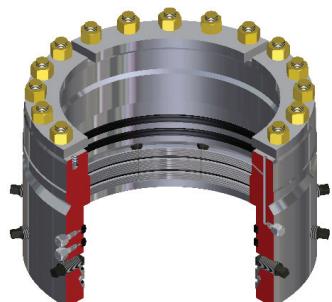
Description: A landing ring is a type of handling accessory that has one function in common with a welding collar. It supports the string of casing and screen during installation. Most contractors rely upon their personal experience but some of them prefer to use landing rings to construct very deep wells requiring an extremely heavy string of casing and screen. Commonly, landing rings are attached only to the upper joints of blank casing that bear the greatest the loads during the latter stages of well construction. Some contractors also prefer to use landing rings when handing large diameter casing (30, 26, 24, 20-inch diameter). There are no formal guidelines or specific parameters for the use of landing rings.



1101

Features and Benefits

- Is appropriate for on-shore wellhead in order to prepare a balanced surface for welding.



10130

Features and Benefits

- Seals the well bore while drilling out for surface casing.
- Slip Lock diverter adapter can easily and quickly be removed after landing and cementing surface casing. The adapter can remain attached to the drilling riser system for subsequent wells.
- Reduces installation time by eliminating the need for welding.
- Available in 30", 26", 24", 20 ". Other sizes can be manufactured on request.

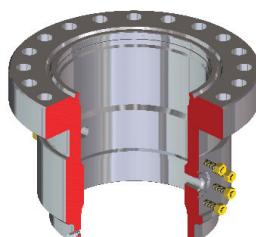
Casing Head Housing

Description: The casing head housing is the lowest part of the wellhead assembly and is almost always connected to the surface casing string. It supports subsequent drilling wellhead and completion equipment. Casing heads have a straight-bore bowl design that minimizes risk of damage to sealing areas by drilling tools, and prevents test-plug and bowl-protector wedging problems when pressure is applied. The design also reduces maintenance costs and enables suspension of heavy casing loads.

Casing Head Housing accepts Casing Hanger and Pack off assembly and can be furnished with female thread, slip-on weld and slip-on-lock lower connection. Standard outlets are LINE PIPE threads or API studded connection with optional VR threads.

Functions

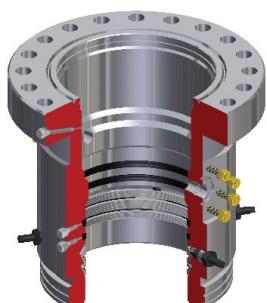
- Provides for attachment to surface casing string.
- Supports blowout preventers while hole is drilled for next casing string.
- Provides for suspending and packing off the next casing string.
- Provides outlets for annular access.
- Provides for testing BOPs while drilling



1221

Features and Benefits

- Accept both automatic and non-automatic slip type casing hanger.
- Top connection can be either flanged or hub connection.
- Bottom preparation is slip-on-weld.

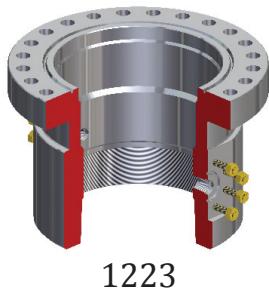


10129

Features and Benefits

- 10129 offers the same features as 1221 except the 3rd option.
- Bottom preparation is slip-on-lock.
- Has locking screws to fix slips around the casing
- The system achieves the necessary seal using elastomeric FS-Seals or plastic-Injection energized P-Seals.
- Proper orientation of the head can be achieved.
- Is used with 10130 Landing Ring.

CONVENTIONAL WELLHEAD



Features and Benefits

- 1223 offers the same features as 1221 except the 3rd option.
- Bottom preparation is buttress female thread.

| BOTTOM SIZE (in) | TOP FLANGE | | SIDE OUTLET | |
|---------------------|--------------|------------------------|--------------|------------------------|
| | SIZE (in) | WORKING PRESSURE (PSI) | SIZE (in) | WORKING PRESSURE (PSI) |
| 20 | 21-1/4 | 2000 | 2-1/16 | 3000 / 5000 |
| 20 | 20-3/4 | 3000 | 2-1/16 | 3000 / 5000 |
| 18-5/8 | 21-1/4 | 2000 | 2-1/16 | 3000 / 5000 |
| 18-5/8 | 20-3/4 | 3000 | 2-1/16 | 3000 / 5000 |
| 13-3/8 | 16-3/4 | 5000 | 2-1/16 | 3000 / 5000 |
| 13-3/8 | 13-5/8 | 3000 | 2-1/16 | 3000 / 5000 |
| 13-3/8 | 13-5/8 | 5000 | 2-1/16 | 3000 / 5000 |

When ordering Casing Head Housing, specify the followings:

A. WETCO Model

B. Bottom Connection

- 1- Thread type, slip-on weld, slip-on lock
- 2- Casing size

C. Top Connection

- 1- Flange / Clamp Hub
- 2- Size
- 3- Working pressure

D. Side Outlet

- 1- Threaded / Studded
- 2- Size
- 3- Working Pressure

E. Option

- 1- With or without lockdown screw
- 2- With or without base plate

F. API 6A Requirements

- 1- Material Class
- 2- Temperature Class
- 3- PSL

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

CONVENTIONAL WELLHEAD

Casing Hanger

Description: Casing hangers are the most important elements in your wellhead and are typically the primary driver in your wellhead selection.

Slip-type casing hangers provide a method to transfer the weight or tension load of a casing string to a casing head or spool. Slip-type hangers are available in automatic-sealing and non-automatic-sealing varieties. Automatic hangers have seals which are energized by casing weight, while non-automatic hangers have seals which require means other than casing weight to be energized. Non-automatic hangers are typically used when insufficient casing load is available or when cementing back to the surface.

Critical criteria to select the appropriate casing hanger are:

- Automatic or manual sealing
- The load capacity

Functions

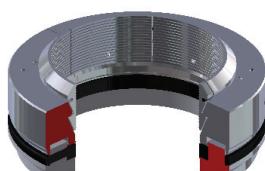
- Provides for easy wraparound or split installation at any location on the casing string.
- Provides for suspension of the casing load from a casing head or spool.
- Provides a means to center the casing string in the head or spool.
- Provides an annular seal.



42001

Features and Benefits

- Fits all WETCO casing head housings and casing head spools.
- Is designed to suspend typically encountered casing loads.
- Provides automatic pack-off sealing.
- Has Interlocking slip segments.
- Slips engage casing evenly, distributing casing load to the bowl.

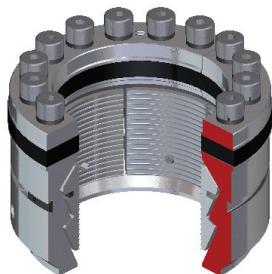


10087

Features and Benefits

- 10087 offers the same features as 42001
- Incorporates heavy-duty hinge.
- Allowing for ease of installation; has rugged, extensively tested, field-proven design.

CONVENTIONAL WELLHEAD



42003

Features and Benefits

- Fits all WETCO casing head housings and casing head spools
- Has a compression pack-off above the slips.
- Provides interlocking slip segments.
- Hangers can be lowered through blowout preventers and landed before or after cement has set.
- Isolates test pressure from hanging load, which allows for higher casing load/pressure combinations.
- Slips engage casing evenly, distributing casing load to the bowl.



42064

Features and Benefits

- 42064 offers the same features as 42003
- Fits in spools which has limitation on diameter.

CASING HANGER / SLIP TYPE

| NOMINAL SIZE (in) | CASING SIZE (in) | TYPE | |
|----------------------|---------------------|-----------|---------------|
| | | AUTOMATIC | NON-AUTOMATIC |
| x 13-3/8 20 | 13-3/8 | ✓ | ✓ |
| x 10-3/4 13-5/8 | 10-3/4 | ✓ | ✓ |
| x 9-5/8 13-5/8 | 9-5/8 | ✓ | ✓ |
| x 7 11 | 7 | ✓ | ✓ |

When ordering Casing Hanger, specify the following:

- A.** WETCO Model
- B.** Casing size
- C.** Casing weight
- D.** Slip size

- E.** API 6A Requirements
 - 1- PSL
 - 2- Temperature Class
 - 3- Material Class

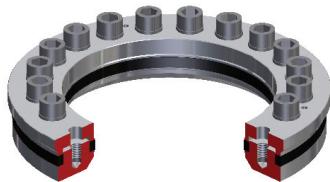
NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4
- PSL is not applicable for SLIP Type Casing Hanger

CONVENTIONAL WELLHEAD

Secondary Pack-off

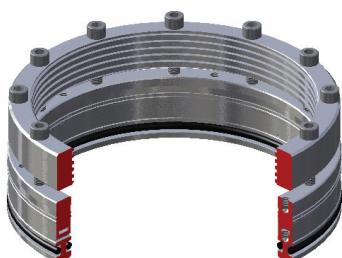
Description: It consists of either elastomer or metal seal which is installed after casing hanger or tubing hanger. The seal assembly is installed over the casing after it is cut-off. Pressure applied to the top of the seal assembly is transferred to the casing head, not the slips.



4500

Features and Benefits

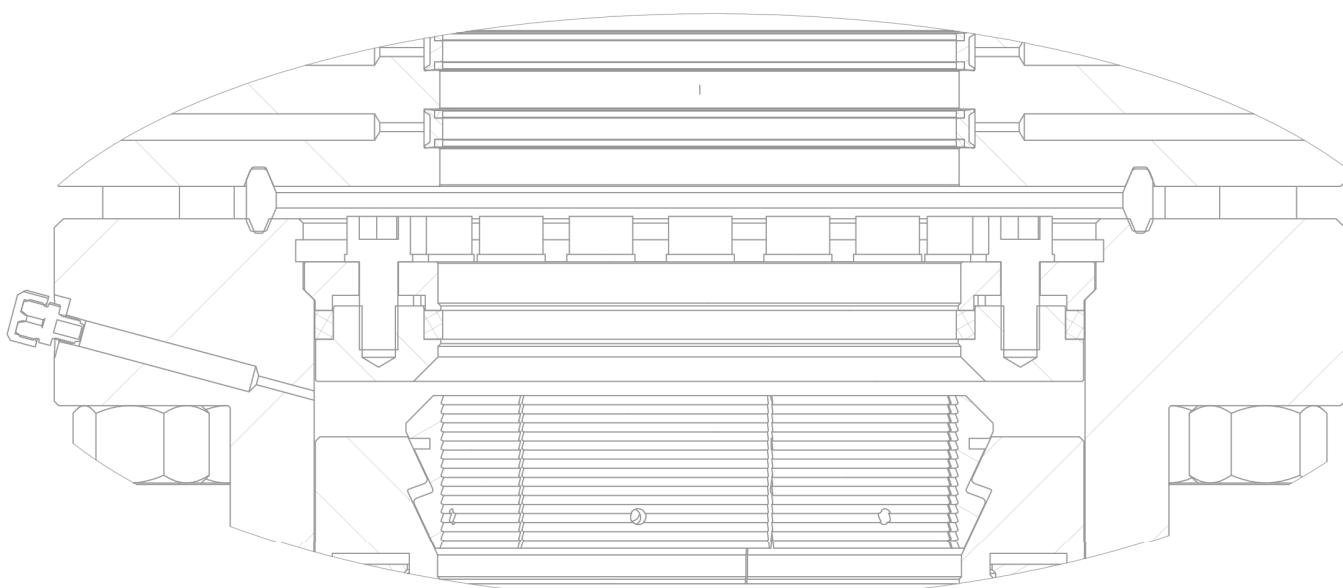
- The 4500 seal pack-off is designed to be installed after the casing has been landed, cut off and dressed.
- It is designed to provide test qualification of p-seal an gasket test up to 80% of casing collapse.



4400

Features and Benefits

- Available with elastomer and metal-to-metal seals.
- Is used with tubing hanger.
- Provides more safety.
- Metal seals are energized by screw pressure. Also screws are used for retrieving.



Casing Head Spool

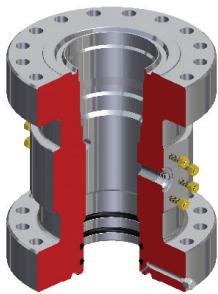
Description

The casing head spool has a top bowl to accommodate the casing hanger. The spool also has a bottom bowl with a pack off seal and is provided with a plastic packing injection port with bleeder outlet and a test port. The top and bottom connection can be either flanged or hub connection.

Standard outlets are LINE PIPE threads or API studded connection with optional VR threads. Tie down screws can be furnished on request.

Functions

- Provides a load shoulder in the top bowl to support a casing hanger.
- Provides a controlled bore in the top bowl for the casing hanger seal.
- Provides a seal in the bottom bowl to pack off the previous casing string and isolate flange or clamp hub seals and casing hanger seals from internal casing pressure.
- Provides side outlets for annular access.
- Provides a port for pressure-testing casing seals and flange connections.
- Provides for supporting and testing BOPs while drilling.
- Provides retention for bowl protector while drilling.



1300

Features and Benefits

- Has a straight bowl.
- Top and bottom connection can be either flanged or hub connection.
- Accept automatic and non-automatic casing hanger.
- Is available with studded or threaded outlets.
- Accept P-seal and FS-seal at bottom.
- Straight bowl prevents wedge-locking of bowl protectors, casing hangers and test plugs.

CONVENTIONAL WELLHEAD

| BOTTOM FLANGED | | TOP FLANGED | | SIDE OUTLETS | | SEALS (in) |
|----------------|---------------------------|--------------|---------------------------|--------------|---------------------------|---------------|
| SIZE (in) | WORKING PRESSURE (PSI) | SIZE (in) | WORKING PRESSURE (PSI) | SIZE (in) | WORKING PRESSURE (PSI) | |
| 21-1/4 | 2000 | 13-5/8 | 3000 | 2-1/16 | 5000 | P-SEAL 13-3/8 |
| 20-3/4 | 3000 | 13-5/8 | 5000 | 2-1/16 | 5000 | P-SEAL 13-3/8 |
| 16-3/4 | 5000 | 13-5/8 | 5000 | 2-1/16 | 5000 | P-SEAL 13-3/8 |
| 16-3/4 | 5000 | 13-5/8 | 10000 | 2-1/16 | 10000 | P-SEAL 13-3/8 |
| 13-5/8 | 3000 | 11 | 5000 | 2-1/16 | 5000 | P-SEAL 9-5/8 |
| 13-5/8 | 5000 | 13-5/8 | 5000 | 2-1/16 | 5000 | P-SEAL 13-3/8 |
| 11 | 3000 | 11 | 3000 | 2-1/16 | 5000 | P-SEAL 9-5/8 |
| 11 | 3000 | 11 | 3000 | 2-1/16 | 5000 | P-SEAL 8-3/4 |
| 11 | 5000 | 11 | 5000 | 2-1/16 | 5000 | P-SEAL 7 |
| 11 | 5000 | 11 | 5000 | 2-1/16 | 5000 | P-SEAL 9-5/8 |
| 11 | 10000 | 11 | 10000 | 2-1/16 | 10000 | P-SEAL 9-5/8 |
| 11 | 10000 | 11 | 10000 | 2-1/16 | 10000 | P-SEAL 7 |
| 11 | 10000 | 11 | 10000 | 2-1/16 | 10000 | FS-SEAL 9-5/8 |

When ordering Casing Head Spool, specify the following:

A. WETCO Model

B. Bottom Connection

- 1- Flange / Clamp Hub
- 2- Size
- 3- Working pressure

C. Top Connection

- 1- Flange / Clamp Hub
- 2- Size
- 3- Working pressure

D. Side Outlet

- 1- Studded / Threaded
- 2- Size
- 3- Working pressure

E. Option

- 1- With or without lockdown screw
- 2- Bottom seal and configuration

F. API 6A Requirements

- 1- PSL
- 2- Temperature Class
- 3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Tubing Head Spool

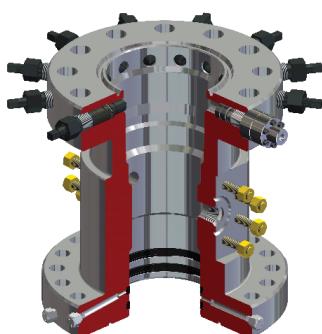
Description

The tubing head spool is the top spool on a surface wellhead assembly. It is installed after the last casing string to provide a load shoulder to support the tubing string and a seal bore for the tubing hanger or production casing/tubing annulus seal. When the well is completed, the tree is installed on top of the tubing head spool with a tubing head adapter.

A straight-bore bowl design minimizes risk of damage to sealing areas by drilling tools and prevents wedging of the tubing hangers, bowl protectors and test plugs.

Functions

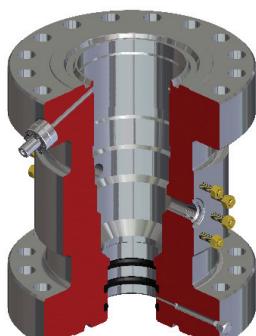
- Provide a load shoulder inside the head to support tubing hangers and pack-offs.
- Provide a controlled bore against which the hanger or pack-off can seal.
- Provide for a secondary annulus seal around the top of the previous casing string.
- Provide access to the annulus between the tubing string and the production casing.
- Provide a means to support and test BOPs while completing the well.



1400

Features and Benefits

- Has a straight-bore design compatible with all WETCO tubing hangers.
- Is available with studded and threaded outlets.
- Top flange is prepared for tie down locking screw.
- Accept P-seal and FS-seal at bottom.
- Seal bore is less likely to be damaged during drilling.

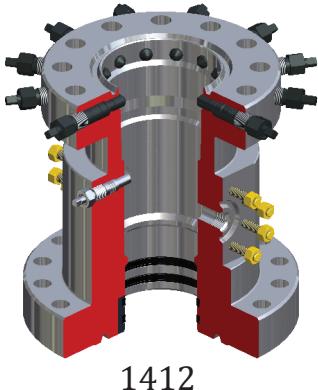


1417

Features and Benefits

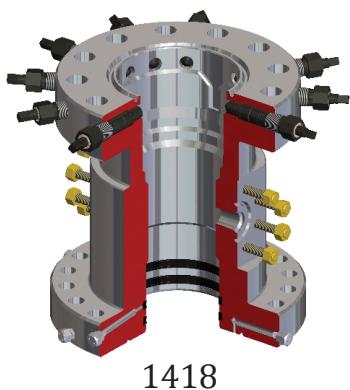
- 1417 offers the same features as 1400 except 3rd option.
- Accept 41036 tubing hanger.
- Restrains the well pressure by latch mechanism instead of tie down locking screw.

CONVENTIONAL WELLHEAD



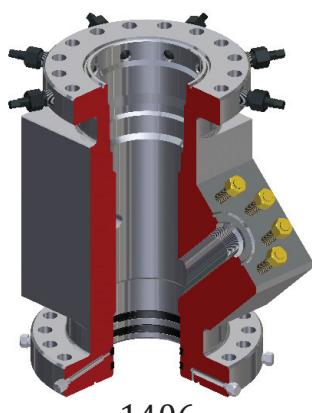
Features and Benefits

- 1412 offers the same features as 1400.
- Accept the TH41-ESP-G tubing hanger.
- The guide screw fixes the tubing hanger in correct direction of penetrator exit on tubing head adapter.
- Accept the 41032 at top.



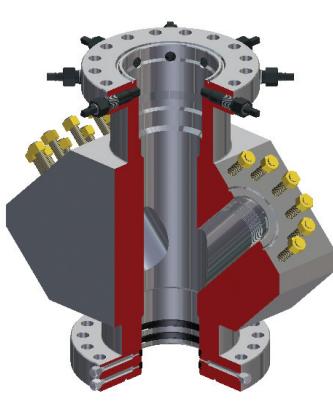
Features and Benefits

- 1418 offers the same features as 1400.
- Accept the TH41-ESP-P tubing hanger.
- Prepared a V-notch in the tubing head spool which sets the tubing hanger in correct direction of penetrator exit on tubing head adapter.
- Accept the 43037 at top.



Features and Benefits

- 1406 offers the same features as 1400.
- Has one outlet elevated at 45°.
- It is used in low pressure wells to inject gas, water, ...



Features and Benefits

- 1402 offers the same features as 1406.
- Has two outlets elevated at 45°.
- Outlets are prepared for back pressure valves.

CONVENTIONAL WELLHEAD

| BOTTOM FLANGED | | TOP FLANGED | | SIDE OUTLETS | | P-SEAL (in) |
|----------------|---------------------------|--------------|------------------------------|--------------|---------------------------|----------------|
| SIZE (in) | WORKING PRESSURE (PSI) | SIZE (in) | WORKING PRESSURE (PSI) | SIZE (in) | WORKING PRESSURE (PSI) | |
| 11 | 3000 | 11 | 3000 | 2-1/16 | 5000 | 7 |
| 11 | 5000 | 7-1/16 | 5000 | 2-1/16 | 5000 | 7 |
| 11 | 5000 | 11 | 5000 | 2-1/16 | 5000 | 9-5/8 |
| 11 | 5000 | 11 | 5000 | 7-1/16 | 5000 | 9-5/8 |
| 11 | 10000 | 11 | 10000 | 2-1/16 | 10000 | 7 |
| 11 | 10000 | 11 | 10000 | 2-1/16 | 10000 | 9-5/8 |
| 11 | 10000 | 11 | 10000 | 2-1/16 | 10000 | 10-3/4 |
| 13-5/8 | 3000 | 11 | 3000 | 2-1/16 | 5000 | 9-5/8 |
| 13-5/8 | 3000 | 11 | 5000 | 2-1/16 | 5000 | 9-5/8 |
| 13-5/8 | 3000 | 11 | 5000 | 7-1/16 | 5000 | 9-5/8 |
| 13-5/8 | 5000 | 11 | 5000 | 2-1/16 | 5000 | 9-5/8 |
| 13-5/8 | 5000 | 11 | 10000 | 2-1/16 | 10000 | 9-5/8 |
| 13-5/8 | 5000 | 13-5/8 | 5000 | 2-1/16 | 5000 | 10-3/4 |
| 13-5/8 | 10000 | 13-5/8 | 10000 | 2-1/16 | 10000 | 10-3/4 |

When ordering Tubing Head Spool, specify the following:

A. WETCO Model

B. Bottom Connection

- 1- Flange / Clamp Hub
- 2- Size
- 3- Working Pressure

C. Top Connection

- 1- Flange / Clamp Hub
- 2- Size
- 3- Working Pressure

D. Side Outlet

- 1- Studded / Threaded
- 2- Size
- 3- Working Pressure

E. Option

- 1- With or without lockdown screw
- 2- Bottom seal size and configuration

F. API 6A Requirements

- 1- PSL
- 2- Temperature Class
- 3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Tubing Hanger

Description: Tubing hangers are installed in the top bowl of a tubing head spool. Tubing hangers both suspend tubing and provide a primary annulus seal between the tubing and production casing.

Hangers are run through the blowout preventers and are landed in the top bowl of the tubing head. Tubing hangers are available for any type of tubing completion. Tubing hangers also act as a mean to access and manipulate additional smaller tubing lines that are utilized down hole and extended to the surface on the outside of the tubing string or strings. Pack-offs allow tubing string manipulation for setting packers or displacing fluid while sealing the annulus between the tubing and the production casing.

Standard tubing hanger arranged with compression seal for the annulus, extended neck, with lift thread and back-pressure valve profile.

Mandrel Type Tubing Hanger with metal to metal seals are used with Tubing Spool and are equipped with metal to metal seal for fluids which prohibit the use of elastomer seals. These hangers have metal rings at the top and bottom for sealing. The rated working pressure range is 5000 psi to 15000 psi.

Tubing hangers fitted with single or dual hydraulic control lines.

These are equipped with metal to metal seals for fluids prohibiting the use of elastomeric seals. Sealing is affected by metal ring mounted on the top of the hanger and load applied to the bottom of the hanger body.



41008

Features and Benefits

- Bottom connection is box thread.
- Top connection can be both box and pin thread.
- Has one or more continuous control line exit.
- Sealing between tubing hanger and tubing head spool metal to metal seal and provided by O-ring.

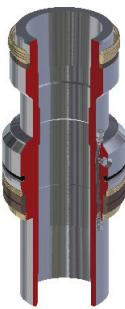


41013

Features and Benefits

- Bottom connection is box thread.
- Top connection can be both box and pin thread.
- Has one or more non-continuous control line exit.
- Sealing between tubing hanger and tubing head spool metal to metal seal and provided by O-ring.

CONVENTIONAL WELLHEAD



10133

Features and Benefits

- Top and bottom connection is box thread.
- Has one or more continuous control line exit.
- Sealing between tubing hanger and tubing head spool is provided by metal seal mechanism including two metal seal and a shoulder ring.
- Sealing between neck of tubing hanger and x-mas tree is provided by metal seal mechanism including one metal seal and a shoulder ring.



41036

Features and Benefits

- Bottom connection is box thread.
- Top connection is pin thread.
- Has one or more continuous control line exit.
- Sealing between tubing hanger and tubing head spool is provided by two H-seals.
- Sealing between neck of tubing hanger and tubing head bonnet is provided by metal seal mechanism including one career, two float rings and two H-seals.
- Fixes in correct situation by latch mechanism



41032

Features and Benefits

- Top and bottom connection is box thread.
- Has one or more continuous control line exit.
- Prepared for passing penetrator complex.
- Sealing between tubing hanger and tubing head spool provided by two O-rings.
- Sealing between neck of tubing hanger and tubing head bonnet is provided by metal seal mechanism including one career, two float rings and two H-seals.
- Prepared a V-notch to accepts the guide screw.



43037

Features and Benefits

- Top and bottom connection is box thread.
- Has one or more continuous control line exit.
- Prepared for passing penetrator complex.
- Sealing between tubing hanger and tubing head spool provided by one O-ring.
- Sealing between neck of tubing hanger and tubing head bonnet is provided by metal seal mechanism including one career, two float rings and two H-seals.
- Prepared a pin to set in correct direction.

CONVENTIONAL WELLHEAD

| NOMINAL SIZE (in) | EXTENDED NECK (in) | BOTTOM THREAD | | TOP THREAD | | BPV (in) |
|-------------------|--------------------|---------------|-------------------|--------------|-------------------|----------|
| | | SIZE (in) | TYPE | SIZE (in) | TYPE | |
| 13-5/8 | 9.25 | 7 | VAM TOP / NEW VAM | 9-5/8 | ACME PIN | 7 |
| 13-5/8 | 6-5/8 | 4-1/2 | VAM TOP / NEW VAM | 7 – 6TPI | STUB ACME PIN | 4 |
| 11 (10-3/4) | 9-5/8 | 7 | VAM TOP / NEW VAM | 9-1/2 -4TPI | STUB ACME PIN | 6-5/16 |
| 11 (10-3/4) | 9-5/8 | 7 | VAM TOP / NEW VAM | 7 | VAM TOP / NEW VAM | 6-5/16 |
| 11 (10-3/4) | 9-5/8 | 4-1/2 | VAM TOP / NEW VAM | 9-1/2 – 4TPI | STUB ACME PIN | 4 |
| 11 (10-3/4) | 9-5/8 | 4-1/2 | VAM TOP / NEW VAM | 4-1/2 – 4TPI | STUB ACME PIN | 4 |
| 11 (10-3/4) | 7 | 5-1/2 | VAM TOP / NEW VAM | 5-1/2 | VAM TOP / NEW VAM | 5 |
| 11 (10-3/4) | 7 | 4-1/2 | VAM TOP / NEW VAM | 4-1/2 | VAM TOP / NEW VAM | 4 |
| 11 (10-3/4) | 7 | 3-1/2 | VAM TOP / NEW VAM | 3-1/2 | VAM TOP / NEW VAM | 3 |
| 11 (10-3/4) | 6-3/8 | 4-1/2 | VAM TOP / NEW VAM | 4-1/2 | ACME | 4 |
| 11 (10-3/4) | 6 | 4-1/2 | VAM TOP / NEW CAM | 4-1/2 – 4TPI | STUB ACME | 4 |
| 11 (10-3/4) | 5-1/2 | 4-1/2 | VAM TOP / NEW VAM | 4-1/2 – 4TPI | STUB ACME | 4 |
| 11 (10-3/4) | 5 | 3-1/2 | EUE | 3-1/2 | EUE | 3 |
| 7-1/16 | 5 | 3-1/2 | EUE | 3-1/2 | EUE | 3 |

When ordering Tubing Hanger, specify the following:

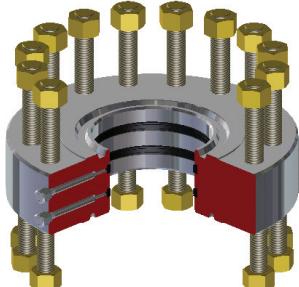
- A.** WETCO Model
- B.** Nominal Size
- C.** Extended Neck Diameter
- D.** Bottom Thread
 - 1- Size
 - 2- Type
 - 3- Male thread or female thread
- E.** Top Thread
 - 1- Size
 - 2- Type
 - 3- Male thread or female thread

- F.** Option
 - 1- With or Without Control Line Exit
 - a. Continuous
 - b. Non-continuous
 - c. Size
 - 2- E.S.P
 - 3- Seal type and configuration
- G.** API 6A Requirements
 - 1- PSL
 - 2- Temperature Class
 - 3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

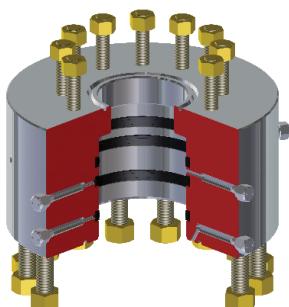
Adapters



1600

Features and Benefits

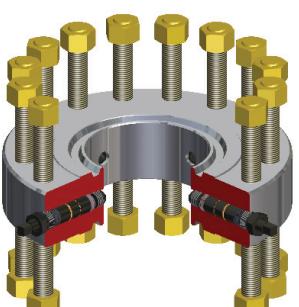
- Simple transition piece between spools when needed.
- is available with flanged or studded top connection.
- Top and bottom connection is studded.
- Available with double P-seal or FS-seal to pack the casing string.
- Prepared for two injection ports and two test ports with injection grease fitting in order to test and pack the seals.



1500

Features and Benefits

- Simple transition piece between spools when needed.
- Top and bottom connection is studded.
- Available with triple P-seal or FS-seal to pack the casing string.
- Prepared for three injection ports and three test ports with injection grease fitting in order to test and pack the seals.



3031

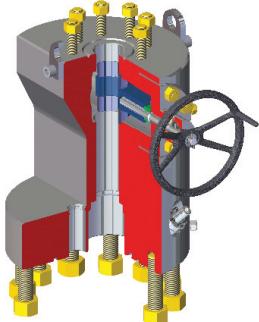
Features and Benefits

- Simple transition piece between the Christmas tree and the tubing head spool. when needed.
- Top and bottom connection is studded.
- Used to lock the tubing hanger with lock down screws.

CONVENTIONAL WELLHEAD

Tubing Head

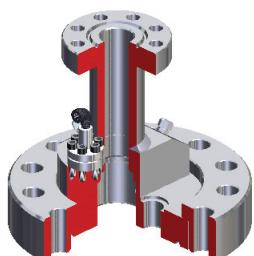
The tubing head adapter provides a transition between the Christmas tree and the tubing head spool. Tubing head adapters are available for all types of single string completions, including those using electric submersible pumps. These adapters come with flanged or studded-flanged top connections. They are available in all standard API flange sizes, pressures and trims.



2063

Features and Benefits

- Has seal bores to accommodate both a tubing hanger neck seal and an electrical power feed-thru device.
- Bottom connection is studded.
- Top connection can be both studded and flanged.
- Has a manual gate valve as master valve.
- Has different types of seal and ports to pack the neck of tubing hanger.
- Prepared for control line exit.

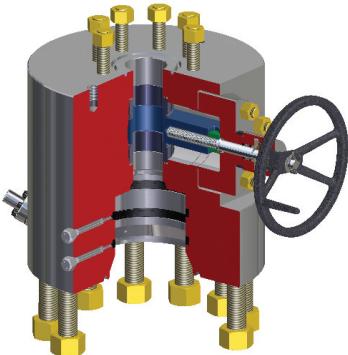


3190

Features and Benefits

- Has seal bores to accommodate both a tubing hanger neck seal and an electrical power feed-thru device.
- Is equipped with rotating flanges to mate to the tubing head spool.
- Positive alignment can be obtained through the use of optional features in the mating ESP hanger.

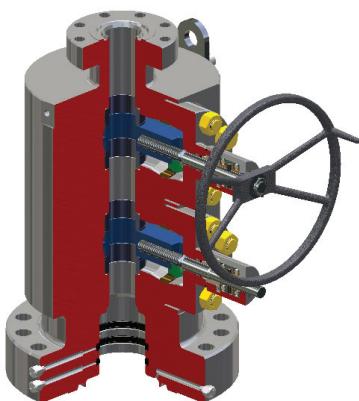
Tubing Head



2073

Features and Benefits

- Top and bottom connection can be both studded and flanged.
- Available with a manual gate valve as master valve.
- Prepared for double or triple seals to pack the neck of the tubing hanger.
- Designates test ports and injection ports to test and pack the seals.
- Prepared for control line exit as the clients request.



2037

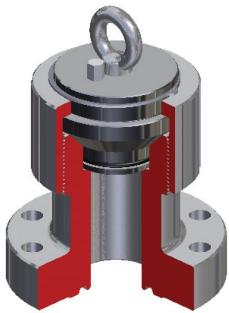
Features and Benefits

- DGV offers the same features as LBM except 2nd option.
- Available with two manual gate valves.

CONVENTIONAL WELLHEAD

X-MAS Tree Cap

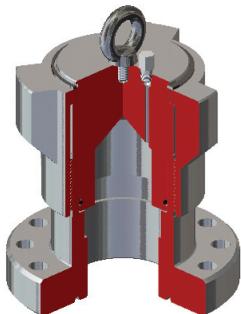
Description: The tree cap bolts to the top of X-MAS Tree and provides quick access to the tubing bore via a nut and plug assembly. It is basically consisting of a Flanged body, Blanking Plug, Nut as principal parts and O-ring as secondary parts. Blanking Plug has a provision to accommodate needle valve and pressure gauge to ascertain inside pressure of the well. They are available in all standard API flange sizes, pressures and trims.



2008

Features and Benefits

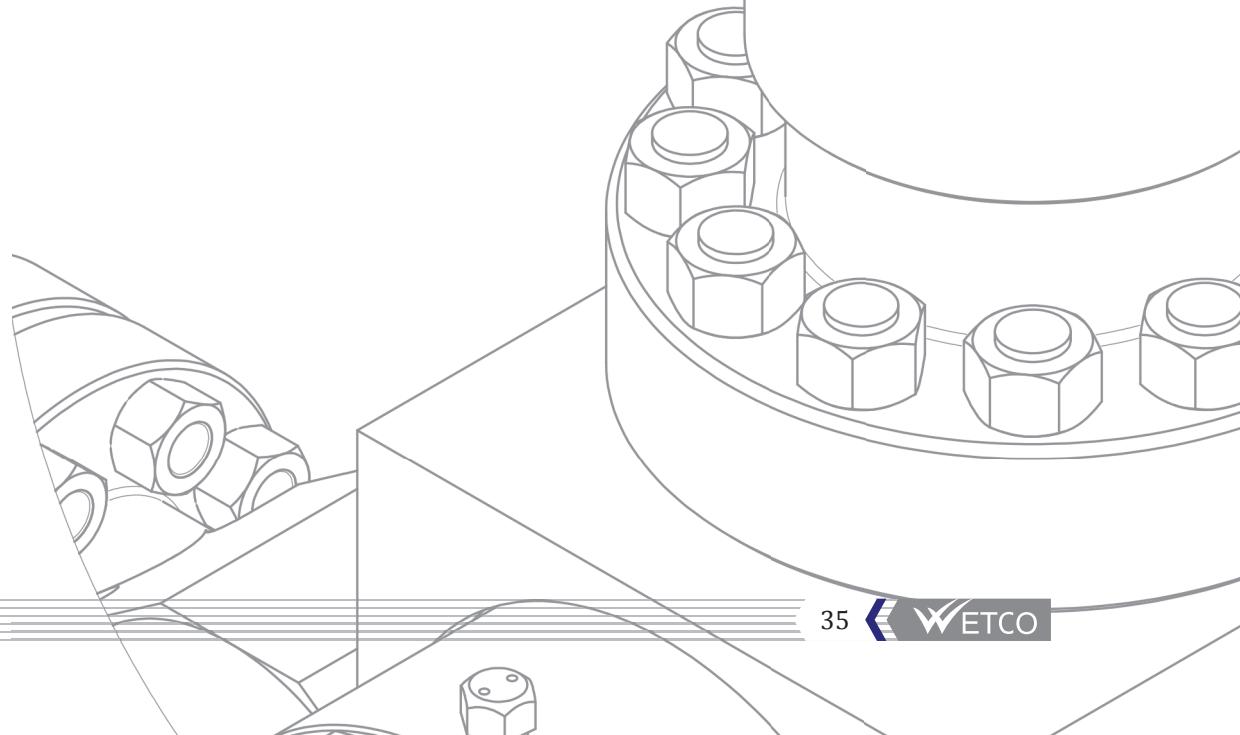
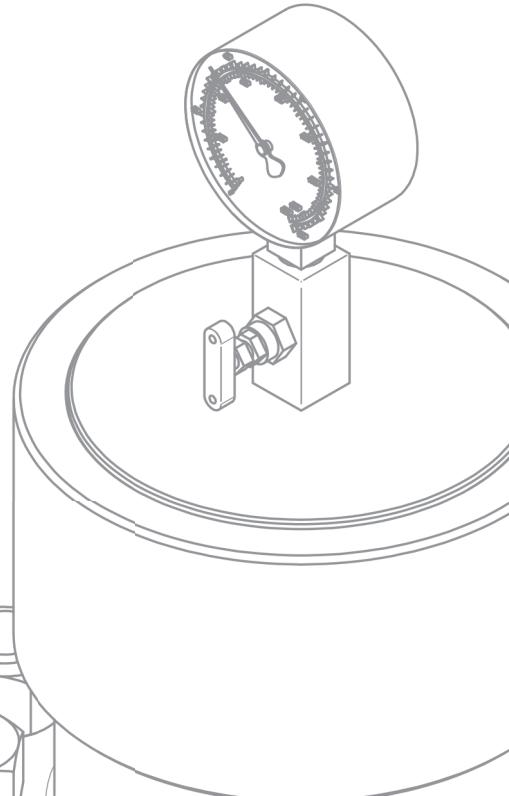
- Provides access to the wellhead for service and monitoring.
- The nut fixes the plug in its situation.



2062

Features and Benefits

- 2062 offers the same features as 2008.
- Has hammer nut for easier operation.



CONVENTIONAL WELLHEAD

| BOTTOM FLANGED | | BORE SIZE (in) | TOP THREAD | LIFT THREAD |
|----------------|---------------------------|-------------------|---------------------------------|---------------|
| SIZE (in) | WORKING PRESSURE (PSI) | | | |
| 3-1/8 | 3000 | 3-1/8 | | - |
| 4-1/16 | 3000 - 10000 | 4-1/16 | 8-3/8 4TPI ACME QUICK UNION | 4-1/2 NEW VAM |
| 5-1/8 | 10000 | 5-1/8 | 11-1/2 4TPI ACME QUICK UNION | - |
| 7-1/16 | 3000 - 5000 | 6-3/8 | 9-1/2 4TPI ACME QUICK UNION | - |
| 7-1/16 | 10000 | 5-1/8 | 11-1/2 4TPI ACME QUICK UNION | - |
| 7-1/16 | 10000 | 6-3/8 | 11-1/2 4TPI ACME QUICK UNION | - |

When ordering X-MAS Tree Cap, specify the following:

| | |
|---|--|
| <p>A. WETCO Model</p> <p>B. Bottom flanged</p> <p style="margin-left: 20px;">1- Size</p> <p style="margin-left: 20px;">2- Working pressure</p> <p>C. Bore size</p> | <p>D. Top Thread</p> <p>E. API 6A Requirements</p> <p style="margin-left: 20px;">1- Material Class</p> <p style="margin-left: 20px;">2- Temperature Class</p> <p style="margin-left: 20px;">3- PSL</p> |
|---|--|

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4
- PR : 1,2

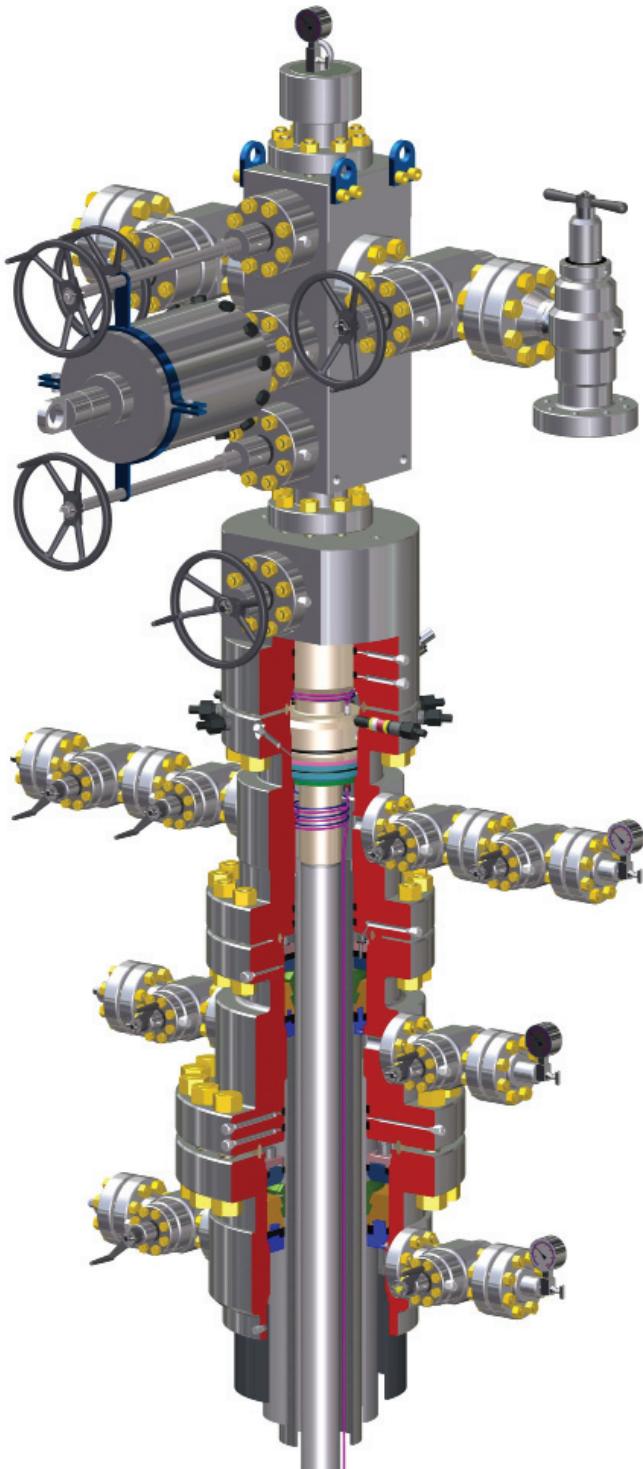
Conventional Wellhead Completion

Developed for higher-volume flow rates and applications where erosion due to those flow rates might be an issue.

Features and Benefits

- API 6A standard both flanged and studded connections.
- Separate stage for each drill phase.
- Automatic slip type casing hanger.
- Elastomer seals.
- Designed to operate up to 15000 PSI working pressure.
- Consist of lower master valve and solid block.
- Uses secondary pack-off in order to provide requirement condition for testing the seals.
- Uses standard running and installation tools.
- Available with or without continuous control-line porting. Multiple ports are available if required.
- Suitable for sour, corrosive environments and when producing in environmentally sensitive areas.
- Available in material class HH.
- Production environments include oil and gas.
- The wire cut actuator becomes the primary surface safety device during wire-line operations.
- Uses adjustable choke valve in order to adjust the pressure of oil or gas.

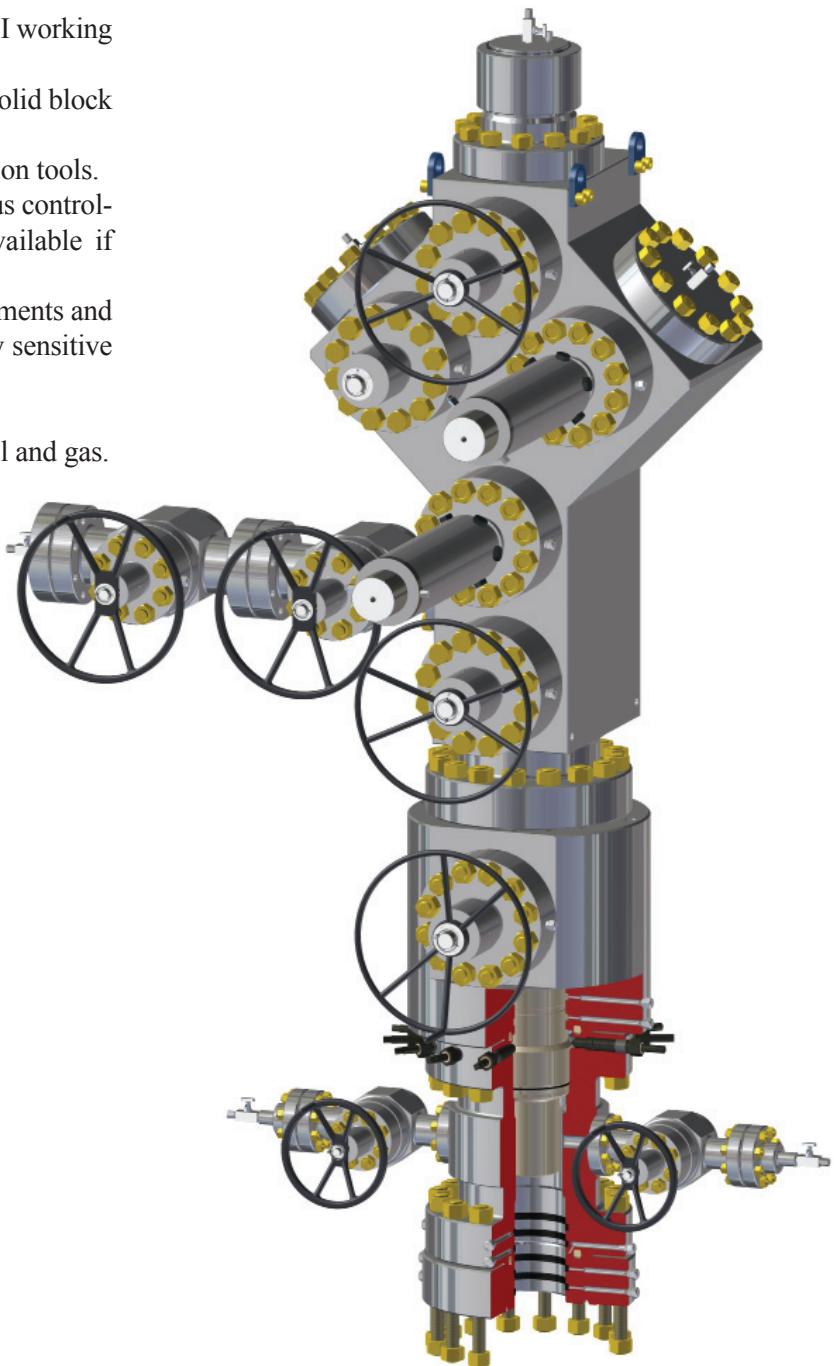
VARIAN



AG(H)

Features and Benefits

- API 6A standard both flanged and studded connections.
- Separate stage for each drill phase.
- Elastomer seals.
- Designed to operate up to 15000 PSI working pressure.
- Consist of lower master valve and solid block Y-type.
- Uses standard running and installation tools.
- Available with or without continuous control-line porting. Multiple ports are available if required.
- Suitable for sour, corrosive environments and when producing in environmentally sensitive areas.
- Available in material class HH.
- Production environments include oil and gas.



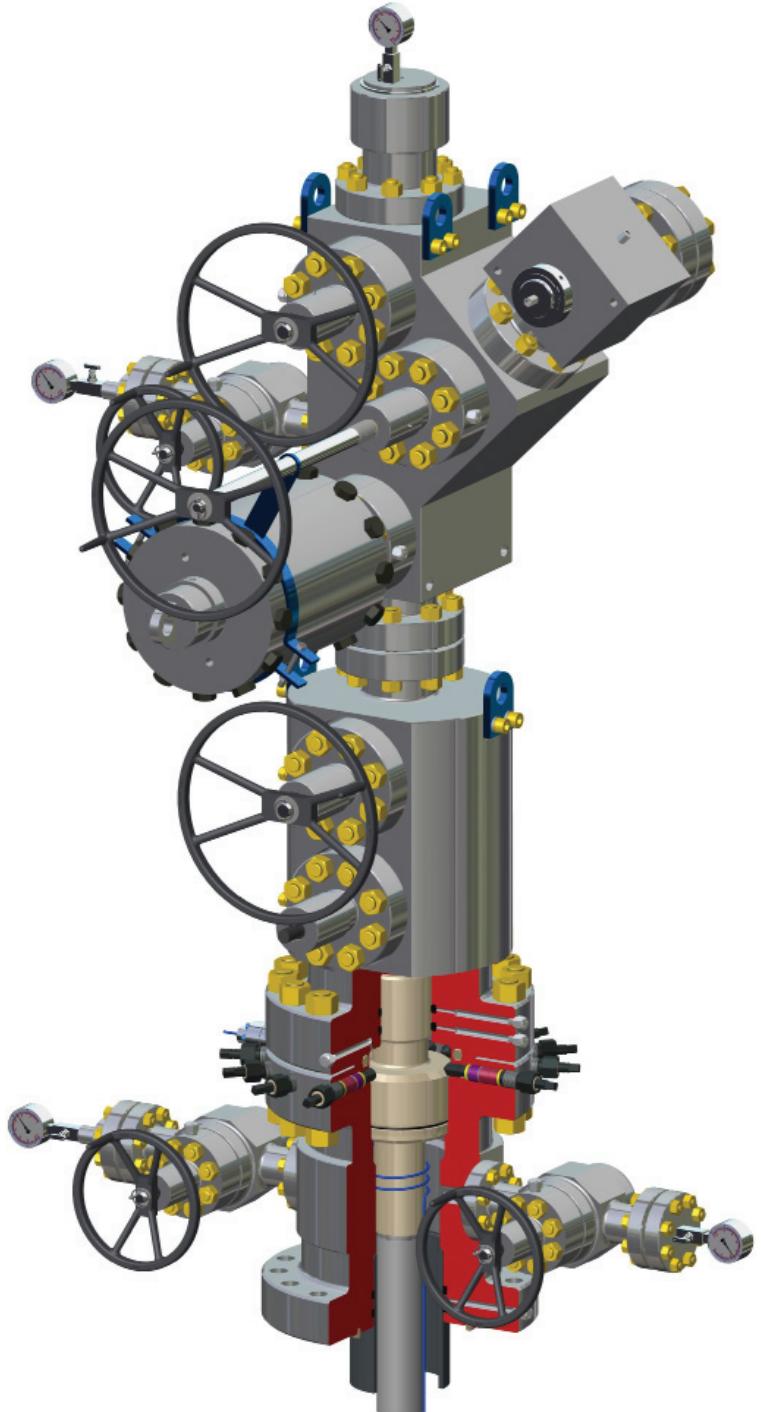
Conventional Wellhead Completion

The composite block can be configured where it is best suited for the Operator's well site.

Falat Zone

Features and Benefits

- API 6A standard both flanged and studded connections.
- Separate stage for each drill phase.
- Elastomer seals.
- Designed to operate up to 15000 PSI working pressure.
- Consist of double gate valve and solid block.
- Uses standard running and installation tools.
- Available with or without continuous control-line porting. Multiple ports are available if required.
- Suitable for sour, corrosive environments and when producing in environmentally sensitive areas.
- Available in material class AA-HH.
- Production environments include oil and gas.
- The wire cut actuator becomes the primary surface safety device during wire-line operations.
- Uses positive choke valve in order to balance the pressure of oil or gas.



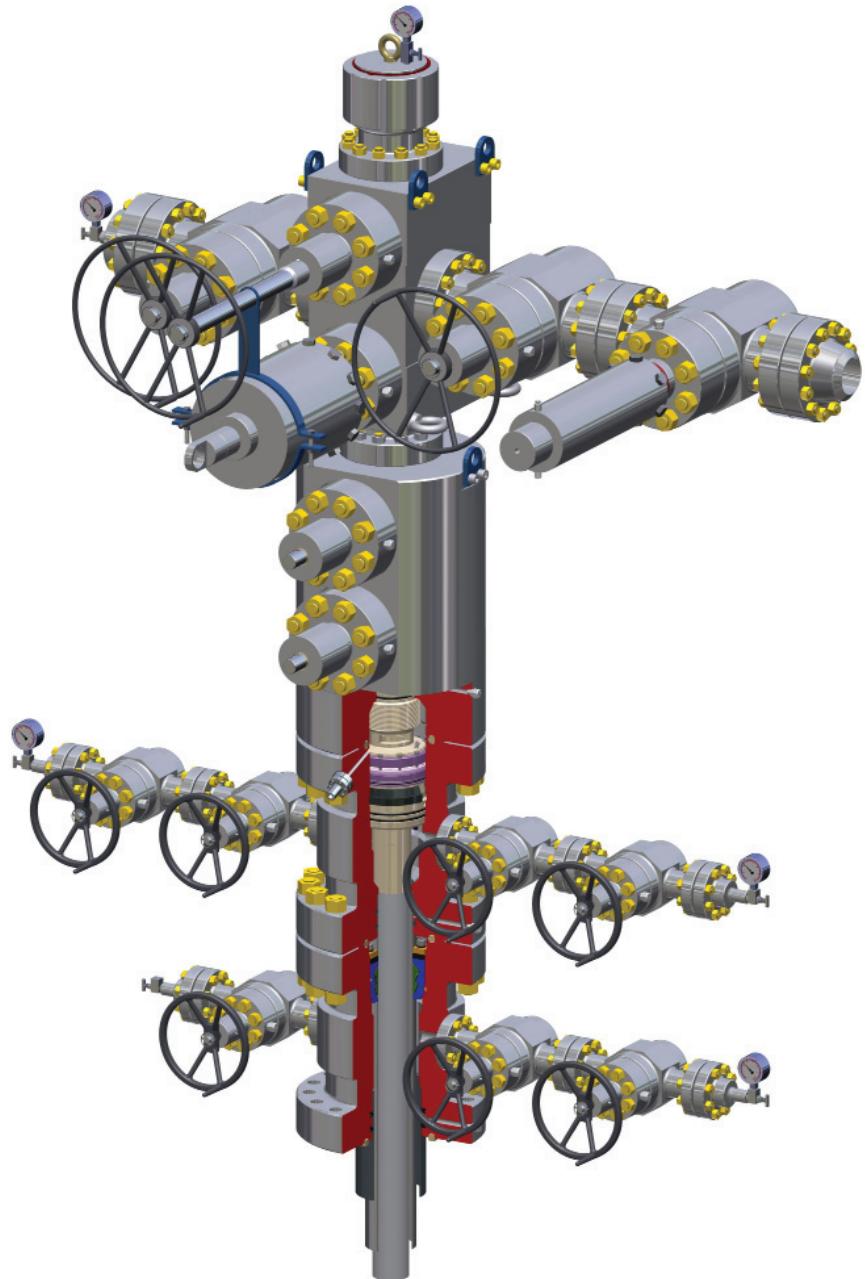
Conventional Wellhead Completion

Developed to support well fracturing operations in today's natural gas completion processes. In addition, the system works well for applications where high production rates deplete rapidly.

Features and Benefits

- API 6A standard both flanged and studded connections.
- Separate stage for each drill phase.
- Non-automatic slip type casing hanger.
- Elastomer seals.
- Designed to operate up to 10000 PSI working pressure.
- Consist of double gate valve and solid block.
- Uses standard running and installation tools.
- Available with or without continuous control-line porting. Multiple ports are available if required.
- Suitable for sour, corrosive environments and when producing in environmentally sensitive areas.
- Available in material class AA-HH.
- Production environment is gas.
- The wire cut actuator becomes the primary surface safety device during wire-line operations.
- Uses non-wire cut actuator in flow line.
- Utilizes metal-to-metal seal technology between tubing hanger and tubing head spool.
- Uses a carrier with float rings as metal seal to pack the neck of tubing hanger.

Kish Gas Zone



Conventional Wellhead Completion

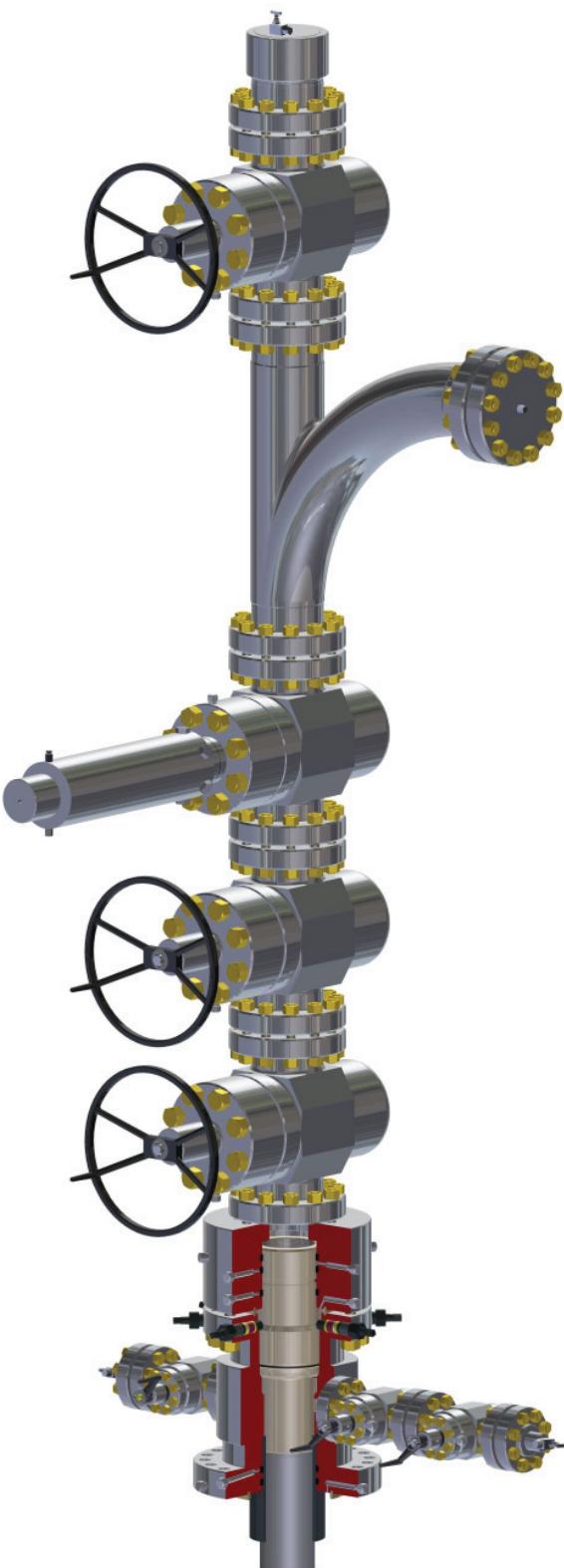
The system works well for applications where high production rates deplete rapidly and a siphon string is to be added to further enhance production.

This type of completion eliminates the need for wellhead isolation tools and tree savers during the well fracturing job. The system supports standard jointed tubing or coiled tubing completions.

Features and Benefits

- Available up to 15,000 psi wells.
- Suitable for sandy oils and when producing in environmentally sensitive areas or in close proximity to the populous (AA to DD).
- Reduces fracturing stack rental costs because of the smaller size.
- Available with non-continuous control-line porting.
- Utilizes surface safety valve with non-wire cut actuator

V(H)



Conventional Wellhead Completion

E.S.P (Electrical Submersible Pump)

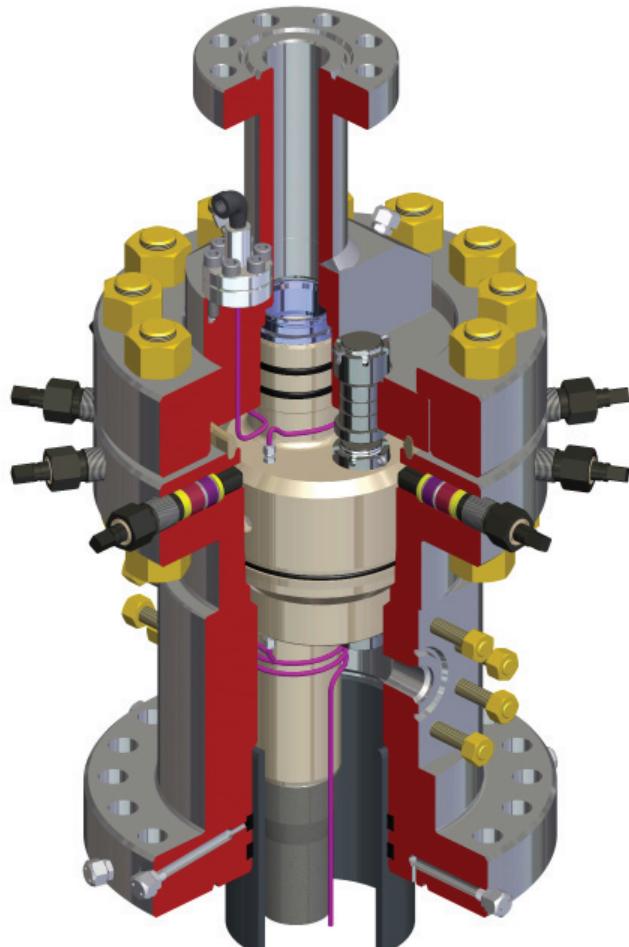
Developed to allow the submersible pump to be retrieved with minimal well intervention and with a coiled tubing unit. The well is produced out of the annulus; thus, the flow line stays intact during any well intervention.

A recognized disadvantage of E.S.Ps is inherent maintenance that is required on any down hole pump. This design concept allows the maintenance to occur in a fraction of the time with conventional E.S.P completion methods.

Features and Benefits

- Continuous flow line connection with BOP intervention.
- Complete well serviceability under “live well” conditions.
- Isolation of electrical cable and cable splice.
- Quick work over and recompletion connections.

E.S.P





TIME SAVING WELLHEAD

TIME SAVING WELLHEAD

Description:

The system eliminates one complete BOP nipple-down/nipple-up thereby saving significant rig time. Additionally, specially designed service tools can reduce installation time even further. The time saved (estimated at approximately 17 hours) makes this product a cost-effective alternative to conventional spool type surface wellheads. Compared to conventional wellheads, the time saving wellhead improves safety by reducing the number of potential leak paths. The system completely eliminates one major flange connection and replaces all external lockdown screws with internal retaining rings. In order to take full advantage of the time-saving capabilities of this system, the system is normally recommended for applications where the risk of a casing becoming stuck is very low.

Features

- Improved safety
 - Eliminates one flange connection
 - Eliminates all lockdown screws
- Time savings
 - Reduced BOP/diverter handling
 - Replaces lockdown screws with lock rings
- Flexible system
 - Emergency equipment
 - Alternate casing programs
 - Adapts to conventional equipment for extended casing programs

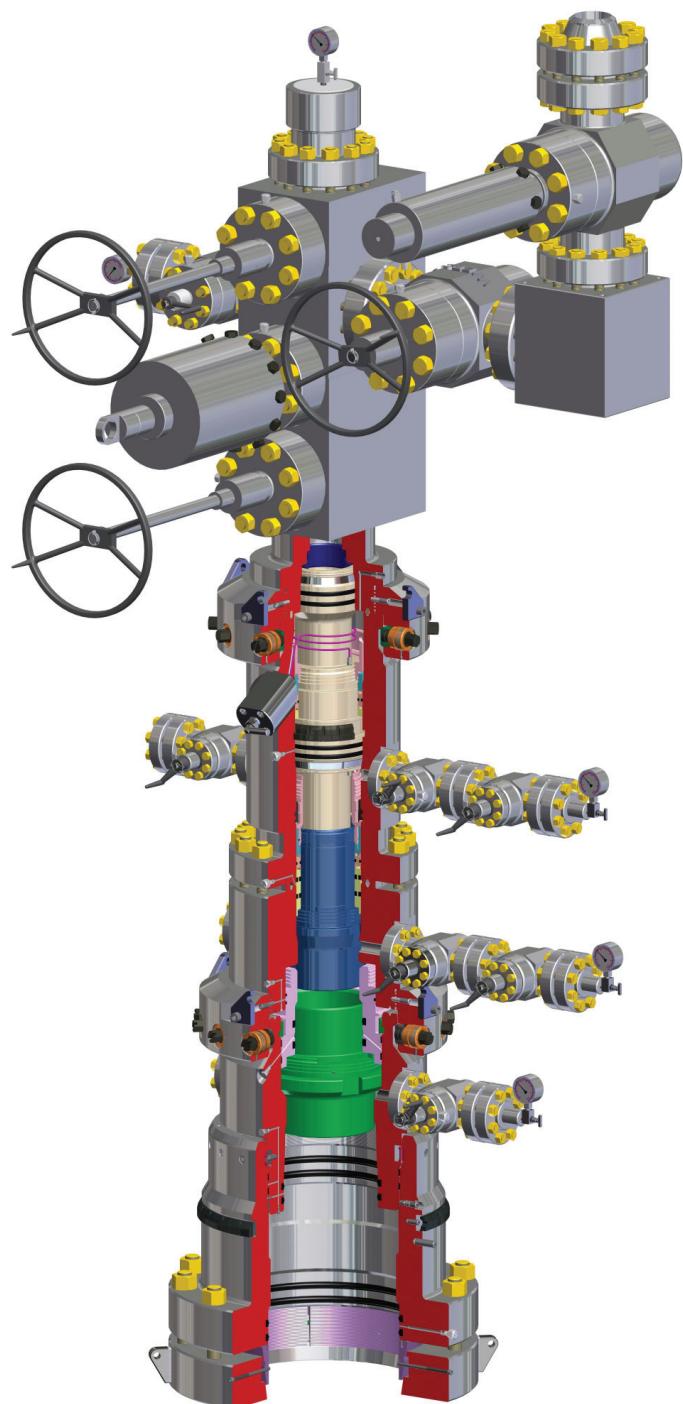
One of the inherent dangers of the industry is working under the Diverter/BOP stack when it is being installed or removed. The features we have incorporated in our Diverter Attachment Assemblies greatly minimize the amount of time one is required to spend on the wellhead deck during these operations.

Time savings were also a strong consideration taken into account during the development of our Diverter Attachment assemblies. Ability to land casing strings without nippling down and the speed associated with the installation and removal of the mandrel hanger..

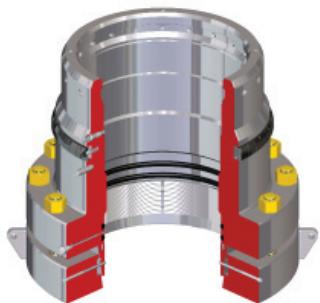
UNITIZED COMPLETION

UNITIZED

- Split system made up as a single unit permits drilling two or more phases without removing BOPs.
- Has fluted mandrel casing hangers with ACME running threads and appropriate pack-offs.
- Simple pack-offs with metal or elastomer seals are held in place with internal latch.
- Consist of L11-S landing ring, C12-U casing head housing, C13-U as lower spool, T14-U as upper spool and C707-U clamp for connection.
- Uses standard running, retrieving and installation tools
- Available with continuous control-line porting. Multiple ports are available if required.
- Consist of solid block which is prep for sealing the neck of tubing hanger.
- Utilizes internal latches or lockdown screws for retention of seals.
- Offers reduced installation time, lowers costs overall.
- Eliminates working under BOP stack, increasing safety.
- Requires contingency equipment.



Landing Ring

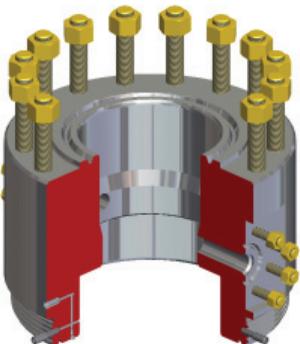


1102

Features and Benefits

- Seals the well bore while drilling out for surface casing.
- Slip Lock diverter adapter can easily and quickly be removed after landing and cementing surface casing. The adapter can remain attached to the drilling riser system for subsequent wells.
- Reduces installation time by eliminating the need for welding.
- Available in 30", 26", 24", 20 ". Other sizes can be manufactured on request.
- This type of Landing Ring system minimizes rig time by connecting to housing by latching mechanism.

Lower Spool



1312

Features and Benefits

- Top connection is studded.
- Bottom is connected to the Casing Head Housing 1206 with the clamp model 7120.
- Accept mandrel casing hanger.
- Is available with studded or threaded outlets.

When ordering LOWER Spool, specify the following:

| | |
|-----------------------------|-------------------------------|
| A .WETCO Model | 3- Working pressure |
| B .Bottom Connection | E .API 6A Requirements |
| C .Top Connection | 1- PSL |
| D .Side Outlet | 2- Temperature Class |
| 1- Studded / Threaded | 3- Material Class |
| 2- Size | |

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Casing Head Housing



1206

Features and Benefits

- Top connection is hub.
- Accept 4346 casing hanger.
- Connected to the 1102 landing by locking ring mechanism.
- Is available with studded or threaded outlets.
- Accept buttress thread with FS-seal if you have to cut the casing at bottom.

| BOTTOM SIZE (in) | TOP CLAMP HUB CONNECTION | | | SIDE OUTLET | |
|---------------------|--------------------------|-----------------------------|------------|--------------|-----------------------------|
| | SIZE (in) | WORKING PRES- SURE (PSI) | HUB NUMBER | SIZE (in) | WORKING PRES- SURE (PSI) |
| 20 | 21-1/4 | 2000 | #18 | 2-1/16 | 3000 / 5000 |
| 20 | 20-3/4 | 3000 | #18 | 2-1/16 | 3000 / 5000 |
| 18-5/8 | 21-1/4 | 2000 | #18 | 2-1/16 | 3000 / 5000 |
| 18-5/8 | 20-3/4 | 3000 | #18 | 2-1/16 | 3000 / 5000 |
| 13-3/8 | 13-5/8 | 3000 | #11 | 2-1/16 | 3000 / 5000 |
| 13-3/8 | 13-5/8 | 3000 | #13 | 2-1/16 | 3000 / 5000 |

When ordering Casing Head Housing, specify the followings:

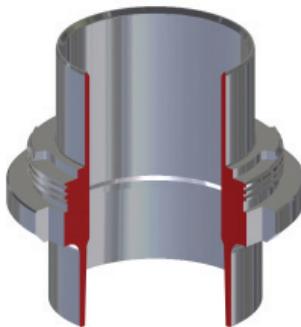
- A** .WETCO Model
- B** .Top Connection
- 1- Size
- 2- Working pressure
- C** .Side Outlet
- 1- Threaded / Studded

- 2- Size
- 3- Working Pressure
- D** API 6A Requirements
- 1- Material Class
- 2- Temperature Class
- 3- PSL

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Mandrel Casing Hanger



4346

Features and Benefits

- Fluted mandrel hanger allows for taking returns during the cementing process.
- Hanger can be internally locked down by a pack-off rated to 10,000 psi, with an integral snap ring.
- Designed to withstand 20,000 ft.lbf of rotational torque.
- Left hand running threads.
- Has a lower tonging neck and upper neck with secondary sealing area and lifting thread.
- Has a 45° load shoulder and can replace slip hangers in conventional wellhead spools – improves rig time and enhances safety of rig operations.

| NOMINAL SIZE (in) | BOTTOM THREAD | | TOP THREAD | | LOCKING RING |
|----------------------|---------------|----------|---------------|-----------|-----------------|
| | SIZE (in) | TYPE | SIZE (in) | TYPE | |
| 20 | 13-3/8 | BUTTRESS | 17-1/4 – 2TPI | STUB ACME | x |
| 13-5/8 | 10-3/4 | VAM TOP | 11 – 4TPI | STUB ACME | ✓ |
| 13-5/8 | 9-5/8 | BUTTRESS | 10-1/4 – 4TPI | STUB ACME | ✓ |

When ordering Casing Hanger, specify the following:

A .WETCO Model

B .Casing size

C .Casing weight

D .API 6A Requirements

1- PSL

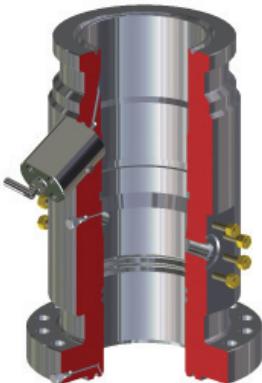
2- Temperature Class

3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Upper Spool



1420

Features and Benefits

- Has a straight-bore design compatible with all WETCO tubing hangers.
- Is available with studded and threaded outlets.
- Top connection is hub.
- Accept 4148 tubing hanger.
- Restrains the well pressure by latch mechanism instead of tie down locking screw.

When ordering UPPER Spool, specify the following:

- A** .WETCO Model
- B** .Bottom Connection
- C** .Top Connection
- D** .Side Outlet
 - 1- Studded / Threaded
 - 2- Size
 - 3- Working Pressure

- E** .API 6A Requirements
 - 1- PSL
 - 2- Temperature Class
 - 3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Tubing Hanger



Features and Benefits

- Top and bottom connection is box thread.
- Has one or more continuous control line exit.
- Sealing between tubing hanger and tubing head spool is provided by one float ring and two H-seals.
- Sealing between neck of tubing hanger and tubing head bonnet is provided by one float ring and two H-seals.
- Fixes in correct situation by latch mechanism.
- Has secondary pack-off complex.

4148

When ordering Tubing Hanger, specify the following:

A .WETCO Model

B .Nominal Size

C .Extended Neck Diameter

D .Bottom Thread

1- Size

2- Type

E .Top Thread

1- Size

2- Type

F .Option

1- With or Without Control Line

Exit

a. Continuous

d. Non-continuous

2- Esp

3- Seal type and configuration

G .API 6A Requirements

1- PSL

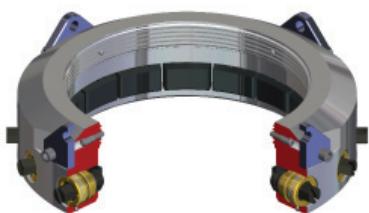
2- Temperature Class

3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Quick Lock Clamp



7120

Description:

7120 consists of a series of segments which are mechanically isolated from one another, permitting each segment to act as an independent clamp. The contact surface between the segments and the hubs acts as a ramp to maximize vertical clamping force.

These Clamps are available in sizes from 7 11/16 to 21 14/16 inches for standard or sour-gas services to 15,000 psi, 0oF to 250oF, providing mechanical and operational advantages over other connectors.

Superior “clamping” by design

The assembly consists of a series of segments which are mechanically isolated from one another, permitting each segment to act as an independent clamp. It uses a travel nut with a retainer bolt to secure the segments onto the hub. When the travel nuts are being loosened, the retainer bolts keep the nuts and segments together, causing the nuts to positively retract the segments.

The nut threads are coated to provide a lower coefficient of friction, reducing make-up torque and dramatically increasing thread life. The result: you get enhanced clamping and higher end load capacities in a compact, preassembled design with significant safety advantages.

Mates with conventional clamp hubs

These Clamps mate to time saving clamp hubs using API RX or BX ring gaskets.



Pack-Off



4452

Features and Benefits

- Uses an expanding latch ring retention mechanism for locking mandrel casing hanger.
- The latch ring can be set and unset from the rig floor through the BOP stack for saving rig time.
- Available with elastomer and metal-to-metal seals to provide more safety.
- Has specific tool for running and retrieving.



4454

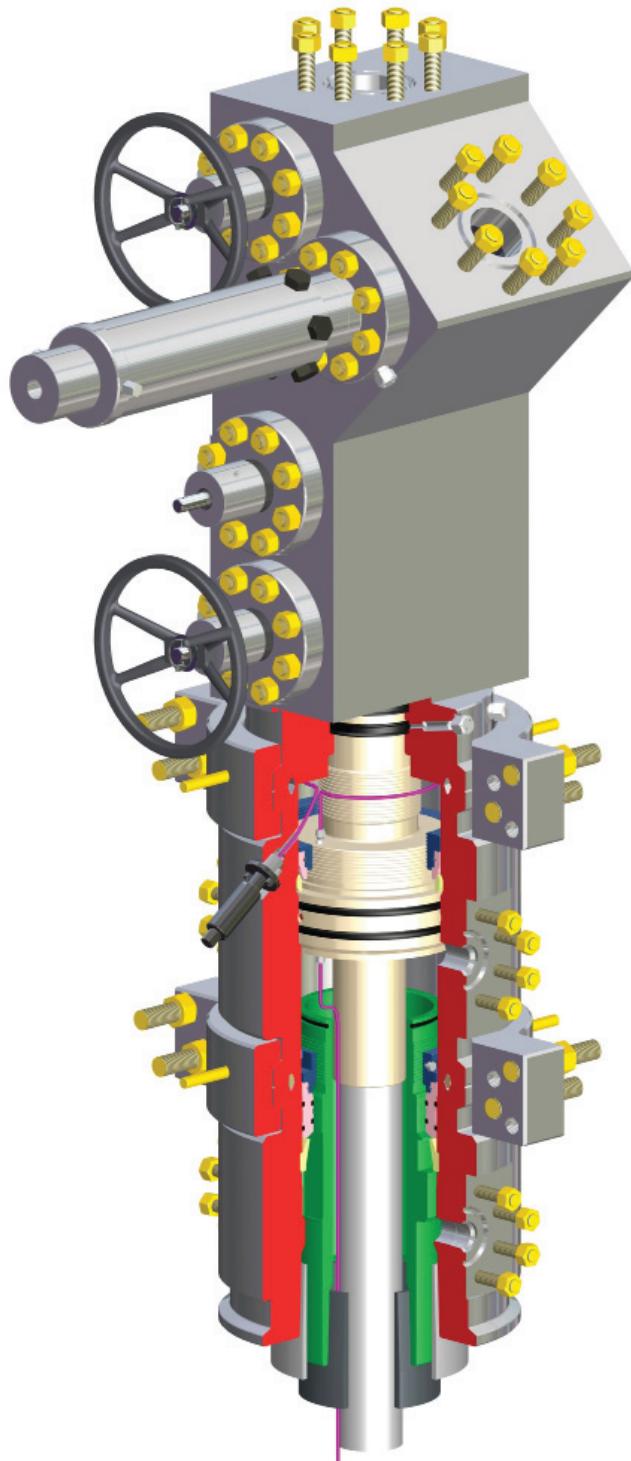
Features and Benefits

- 4454 offers the same features as 4452 except 3rd option.
- Available with elastomer seals.
- Used for contingency situation.



UNIHEAD

- Permits drilling two or more phases up to 15000 PSI working pressure without removing BOPs.
- Has fluted mandrel casing hangers with ACME running threads and appropriate pack-offs.
- Simple pack-offs with metal or elastomer seals are held in place with internal latch.
- Consist of C13-UH as lower spool and T14-UH as upper spool. (No need to casing head housing.)
- Spools are connected with C707-Uh clamp.
- Uses standard running, retrieving and installation tools
- Available with continuous control-line porting. Multiple ports are available if required.
- Consist of solid block which is prep for sealing the neck of tubing hanger.
- Bottom connection of solid block is hub and it is connected to upper spool with C707-UH clamp.
- Offers reduced installation time, lowers costs overall.
- Eliminates working under BOP stack, increasing safety.



Lower Spool



10164

Features and Benefits

- Top connection is studded.
- Accepts mandrel casing hanger.
- Is available with studded or threaded outlets.

When ordering Lower Spool, specify the following:

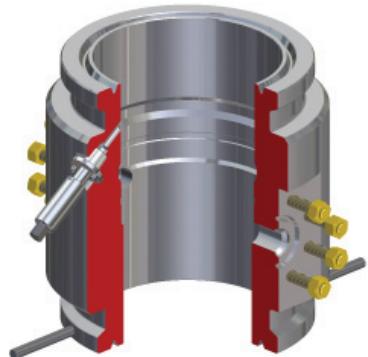
| | |
|------------------------------|--------------------------------|
| A . WETCO Model | 2- Size |
| B . Bottom Connection | 3- Working pressure |
| C . Top Connection | E . API 6A Requirements |
| 1- Size | 1- PSL |
| 2- Working pressure | 2- Temperature Class |
| D . Side Outlet | 3- Material Class |
| 1- Studded / Threaded | |

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4



Upper Spool



10163

Features and Benefits

- Top and bottom connection is hub.
- Is available with studded or threaded outlets.
- Prep for control line exit.

When ordering Upper Spool, specify the following:

A .WETCO Model
B .Bottom Connection
 1- Size
 2- Working Pressure
C .Top Connection
 1- Size
 2- Working Pressure

D .Side Outlet
 1- Studded / Threaded
 2- Size
 3- Working Pressure
E .API 6A Requirements
 1- PSL
 2- Temperature Class
 3- Material Class

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4

Fast Clamp



70076

Description:

70076 are the parts which are often used in the wellhead system for hub connection.

C707-UH features:

1. Reduce rig time.
2. Decreasing makeup time.
3. Savings to the operator.
4. Easy to install.
5. Increase Rig and Personnel Safety.

Pack-Off



10183

Features and Benefits

- Is run with mandrel casing hanger with threaded connection.
- Available with elastomer seals.
- Uses balls to convert the torque of running tool to vertical pressure in order to energize the metal seal.
- Has specific tool for running and retrieving.

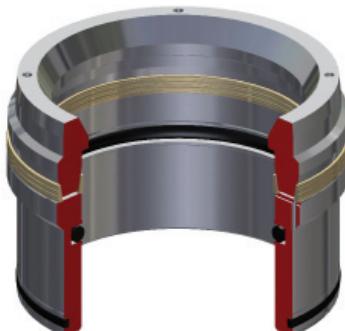


10115

Features and Benefits

- Is run with mandrel casing hanger with threaded connection.
- Available with elastomer and metal-to-metal seals to provide more safety.
- Uses balls to convert the torque of running tool to vertical pressure in order to energize the metal seal.

Has specific tool for running and retrieving



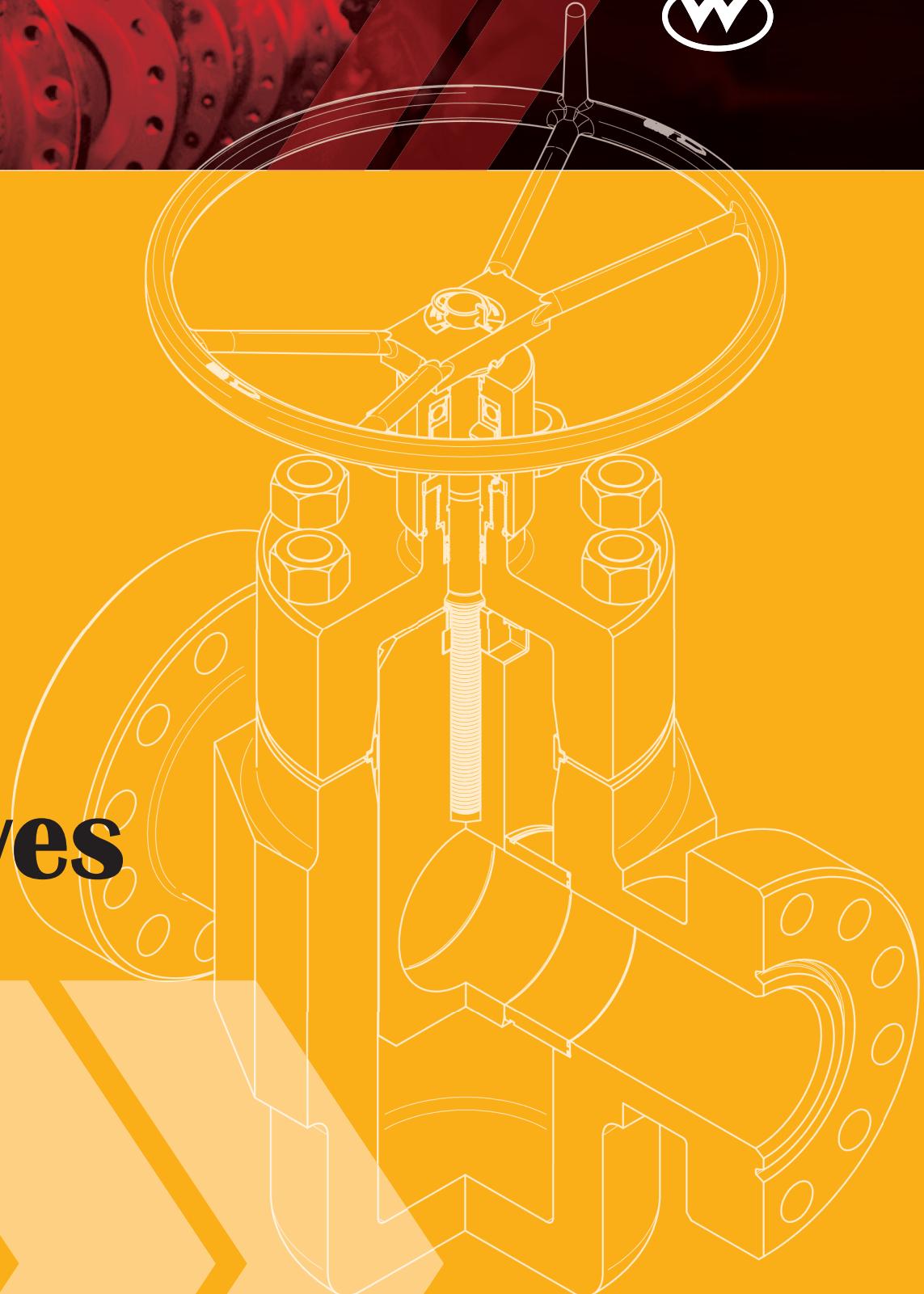
10185

Features and Benefits

- Is used in contingency situation.
- Available with elastomer and metal-to-metal seals to provide more safety.
- Available with elastomer and metal-to-metal seals to provide more safety.



Valves



Gate Valve

Description:

All valves are designed to stop, allow or throttle the flow of a process fluid. Gate valves are one of the original valve designs and ideally suited for on/off, primarily liquid, service.

A gate valve functions by lifting a rectangular 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 full-bore design is very low friction loss, which saves energy and reduces total cost of ownership.

These full bore gate valves are designed to provide a fully energized metal-to-metal seal between the gate and seat surfaces at all times.

Gate valves are manufactured according to API 6A and NACE MR0175 standards which are available in various sizes from 2 1/8" to 9 8/5" and different working pressure from 2000 to 15000 PSI.

Various material and temperature classes and different coating for seat, gate and stem are available per client request.

Main parts:

Bonnet

Bonnets provide closure from leaks for the body of the valve. Bolted bonnets are designed for services with high pressure in excess of 2000 PSI to 15000 PSI.

Gate

Slab gate valves are comprised of a single gate unit which raises and lowers between two seat rings and are primarily used for transporting crude oil.

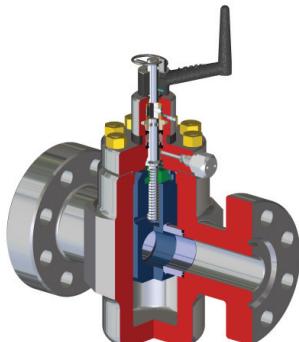
Stem

Gate valves can have either a rising or non-rising stem design. Rising stems are attached directly to the gate and provide a visual indicator of the valve position. Non-rising stems are generally threaded into the upper part of the gate and have a pointer threaded onto the top to indicate position.

Easy Maintenance

WETCO Valves are designed to last the life of the valve with a minimum of maintenance. Lubrication of the stem bearings and occasional greasing of the valve are the only routine maintenance required.

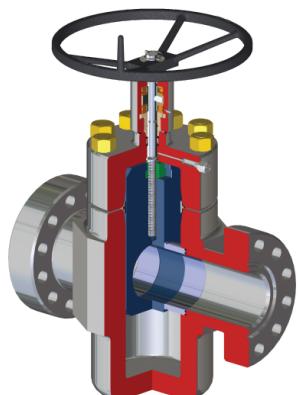
Gate Valve



2012

Features and Benefits

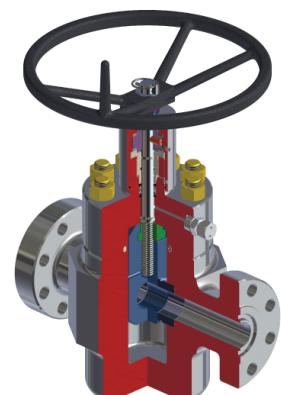
- Sizes 216/1-» to 416/1-».
- Working pressure up to 5000 PSI.
- Materials available for H2S service in-accordance with NACE MR-0175-.
- Body/Bonnet metal seal by R-type bonnet gasket
- Non-rising stem.
- Forged body and bonnet construction.
- Bi-directional sealing.
- Metal-to-metal stem backseat.
- One-piece gate.
- Metal to metal sealing is provided between seat and gate.



2016

Features and Benefits

- W-300 offers the same features as 2012.
- Sizes 116/13-» to 9-».
- Working pressures are 5000, 10000 and 15000 PSI.
- Materials available for H2S and CO2 service in accordance with NACE MR-0175-.
- Body/Bonnet metal seal by VG-type bonnet gasket.

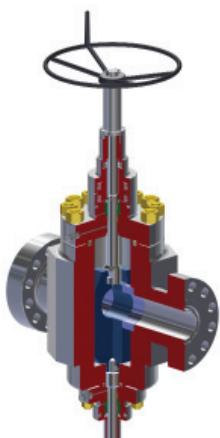


2021

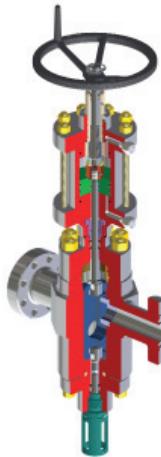
Features and Benefits

- W-400 offers the same features as 2012.
- Size 216/1-» & Working pressure 15000 PSI.
- Materials available for H2S service in-accordance with NACE MR-0175-.
- Body/Bonnet metal seal by C-type bonnet gasket

Gate Valve



2051



H.M

Features and Benefits

- Size 58/1-» & Working pressure 15000 PSI
- Forged body and bonnet construction.
- Bi-directional sealing.
- Metal-to-metal stem backseat.
- One-piece gate.
- Metal to metal sealing is provided between seat and gate
- Materials available for H2S service in-accordance with NACE MR-0175-.
- Body/Bonnet metal seal by C-type bonnet gasket
- Rising stem
- Ball screw mechanism to reduce operating torque
- The valve will remain in position after release of actuator pressure due to the balanced stem design (lower stem balances pressure thrust on upper stem).

Features and Benefits

- The valve will remain in position after release of actuator pressure due to the balanced stem design (lower stem balances pressure thrust on upper stem).
- The required operating pressure for the double acting actuator is usually much lower than published minimum pressure.
- The valve lower stem indicates valve position, viewed through slots in the lower stem protector/indicator
- It can be Manually operated if the hydraulic pump is not available.

| SIZE (in) | WORKING PRESSURE (PSI) | FLANGED END | THREADED END | BORE (in) |
|-----------|------------------------|-------------|--------------|-----------|
| 1-13/16 | 10000 | ✓ | N.A.* | 1-13/16 |
| 2-1/16 | 3000 – 5000 | ✓ | 2" LP BOX | 2-1/16 |
| 2-1/16 | 10000 – 15000 | ✓ | N.A.* | 2-1/16 |
| 3-1/8 | 3000 – 5000 | ✓ | N.A.* | 3-1/8 |
| 3-1/16 | 10000 | ✓ | N.A.* | 3-1/16 |
| 4-1/16 | 2000 – 10000 | ✓ | N.A.* | 4-1/16 |
| 5-1/18 | 3000 – 15000 | ✓ | N.A.* | 5-1/8 |
| 7-1/16 | 3000 – 10000 | ✓ | N.A.* | 6-3/8 |
| 7-1/16 | 3000 – 5000 | ✓ | N.A.* | 7-1/8 |
| 9 | 5000 | ✓ | N.A.* | 8 |
| 9 | 5000 | ✓ | N.A.* | 9 |

*N.A: NOT APPLICABLE

Note: Air test up to 100 PSI and Gas test up to 10% of working pressure, as per client's request.

Gate Valve

When ordering Manual Gate Valve, specify the following:

| | |
|--------------------------------------|--------------------------------|
| A . WETCO Model | E . API 6A Requirements |
| B . Size and Working pressure | 1- Material Class |
| C . Bore size | 2- Temperature Class |
| D . Option | 3- PSL |
| 1- Flanged end | |
| 2- Threaded End | |

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4
- PR : 1,2
- Grease provides low torque and excellent washout resistance, and are hydrocarbon, H2S, and CO2 resistant.

| | Material | Coating | Material Class | PSL |
|--------|---|------------------------------------|-----------------------------|-----------|
| Body | Low alloy steel 4130 | - | AA / BB / DD / EE | 1 , 2 , 3 |
| | Stainless steel 410 | - | AA / BB / CC / DD / EE / FF | 1 , 2 , 3 |
| | Low alloy steel 4130, cladded with Inconel 625 | - | HH | 2 , 3 |
| Bonnet | Low alloy steel 4130 | - | AA / BB / DD / EE | 1 , 2 , 3 |
| | Stainless steel 410 | - | AA / BB / CC / DD / EE / FF | 1 , 2 , 3 |
| | Low alloy steel 4130, cladded with Inconel 625 | - | HH | 2 , 3 |
| Gate | Low alloy steel 4130 / 4140 | ENP/Nitration/ Tungsten carbide | AA / DD | 1 , 2 , 3 |
| | Stainless Steel 410 | Tungsten carbide | BB / CC / EE / FF | 1 , 2 , 3 |
| | Stainless steel 17-4PH | Tungsten carbide | BB / CC / EE / FF | 1 , 2 , 3 |
| | Inconel 718 | Tungsten carbide | HH | 1 , 2 , 3 |
| Seat | Low alloy steel 4130 / 4140 | ENP/Nitration/ Tungsten carbide | AA / DD | 1 , 2 , 3 |
| | Stainless steel 410 | Tungsten carbide | BB / CC / EE / FF | 1 , 2 , 3 |
| | Stainless steel 17-4PH | Tungsten carbide | BB / CC / EE / FF | 1 , 2 , 3 |
| | Inconel 718 | Tungsten carbide | HH | 1 , 2 , 3 |
| Stem | Low alloy steel 4130 / 4140 | Nitration / QPQ | AA / DD-NL | 1 , 2 , 3 |
| | Stainless steel 410 | Nitration / QPQ | BB / CC / EE-1.5 / FF-1.5 | 1 , 2 , 3 |
| | Stainless steel 17-4PH | Nitration / QPQ | BB / CC / EE-0.5 / FF-0.5 | 1 , 2 , 3 |
| | Inconel 718 | Nitration / QPQ | DD-NL / EE-NL / FF-NL / HH | 1 , 2 , 3 |

Choke valve

Description:

WETCO manufactures Positive, Adjustable and Cage chokes in pressure rating up to 15,000 psi WP With different style of end connection.

Choke valve selection is often based on early life production process data and capital expenditure (valve price). However, choke valves are critical elements in production facilities, malfunction or failure of a choke valve can seriously affect safety, the environment and production rates. Valve selection should be based on economic arguments and long-term perspectives.

Choke Valve restricts the flow through the valve by reducing the flow area through the valve body to achieve a desired flow rate. 2" Choke Valves have a maximum orifice size of 1" while 3" Choke Valves have a maximum orifice size of 2".

WETCO chokes is ideally suited for a broad range of choke applications, including wellheads, production manifolds, choke and kill manifolds, well testing, and cleanup operations.

Safety first

Fluids that include sand and other particles at conditions with high pressures, temperatures and velocities mean that the performance of a choke valve is critical. Can safety be assured for personnel, the installation and the environment under all circumstances?

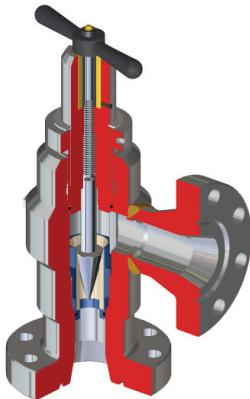
Installation

Choke Valves are primarily installed in-line of a flow back system on a fracturing site: Manifold, Assemblies. The important thing is to ensure that the size of the choke valve meets the correct application.

Choke Valve should be installed in the line with the flow media coming into the inlet connection and making a 90 degree turn to pass through the orifice opening in the seat or choke bean and exiting through the outlet flange.

Choke Valve can be installed in any orientation without affecting performance; but orientation should be addressed to ensure ease of routine maintenance and the potential for solids accumulation in the thread areas.

Choke valve



2075

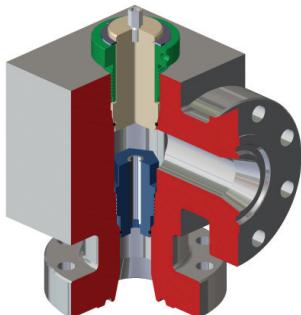
Description:

Adjustable Chokes are meant for variable flow. It has externally controlled indicator showing orifice size in the increment of 2" and 4". The variation in choke size is achieved by rotating hand wheel to obtain desired flow rate at downstream side.

Adjustable chokes are only designed to generate a pressure drop and should never be used to isolate a flow line. Any attempt to forcibly close the choke to isolate the flow may damage the valve stem and affect the performance of the assembly.

Features:

- Forged body
- Easy operation and maintenance
- Bonnet nut has rugged integrally forged lugs for hammering nut loose.



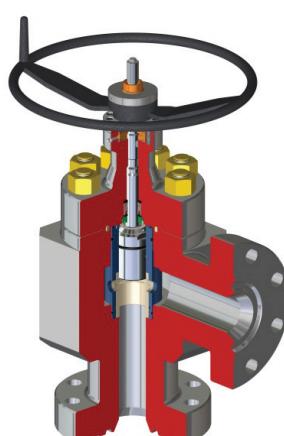
2004

Description:

Positive Choke Valves provide a fixed flow rate through the use of a choke bean. The flow rate is controlled by the choke bean orifice size selected.

Features:

- Forged body
- Easy operation and maintenance
- Metal bonnet/cap seal is optional.



2005

Description:

The cage choke valve uses the plug as the controlling element, and throttles the flow on the internal diameter of the ported cage. The ports in the cage are sized and arranged to give the most appropriate combination of controllability and flow capacity for each application.

A major consideration when sizing the choke valve is the ability to achieve closely managed well startup while also optimizing capacity towards the end of well life to maximize production.

The cage design is highly optimized, and incorporates the largest possible flow area, making it ideal for high-capacity applications.

To improve erosion resistance reputable choke suppliers use solid Tungsten Carbide for the throttling parts, this results in minimum sensitivity of the cage and piston to:

- flow-induced side loads
- vibration-induced fatigue and
- impact by particles

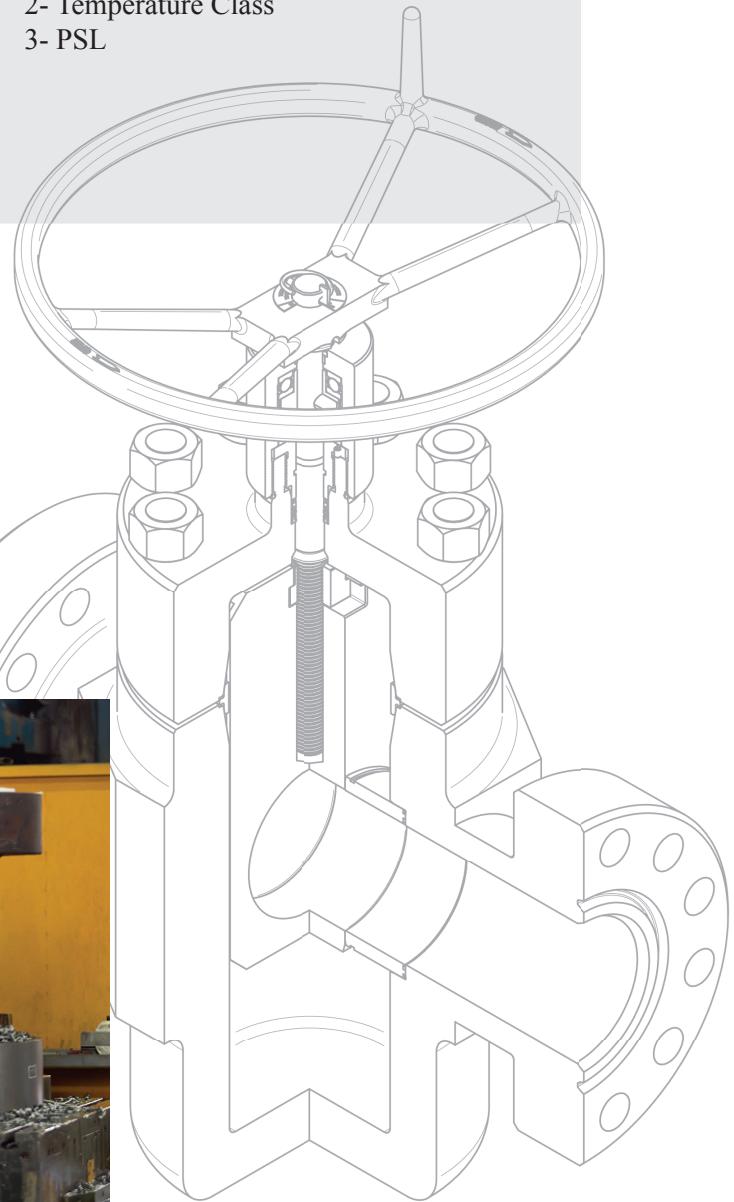
Choke valve

| SIZE (in) | WORKING PRESSURE (PSI) | BORE (in) | FLANGED END | TYPE | |
|--------------|---------------------------|--------------|-------------|----------|------------|
| | | | | POSITIVE | ADJUSTABLE |
| 2-1/16 | 10000 - 3000 | 2-1/16 | ✓ | ✓ | ✓ |
| 4-1/16 | 10000 - 3000 | 4-1/16 | ✓ | ✓ | ✓ |
| 7-1/16 | 10000 - 3000 | 6-3/8 | ✓ | x | ✓ |

When ordering Choke Valve, specify the following:

- A** . WETCO Model
- B** . Size and Working Pressure
- C** . Bore Size
- D** . Type
 - 1- Positive
 - Needle
 - Cage
 - 2- Adjustable

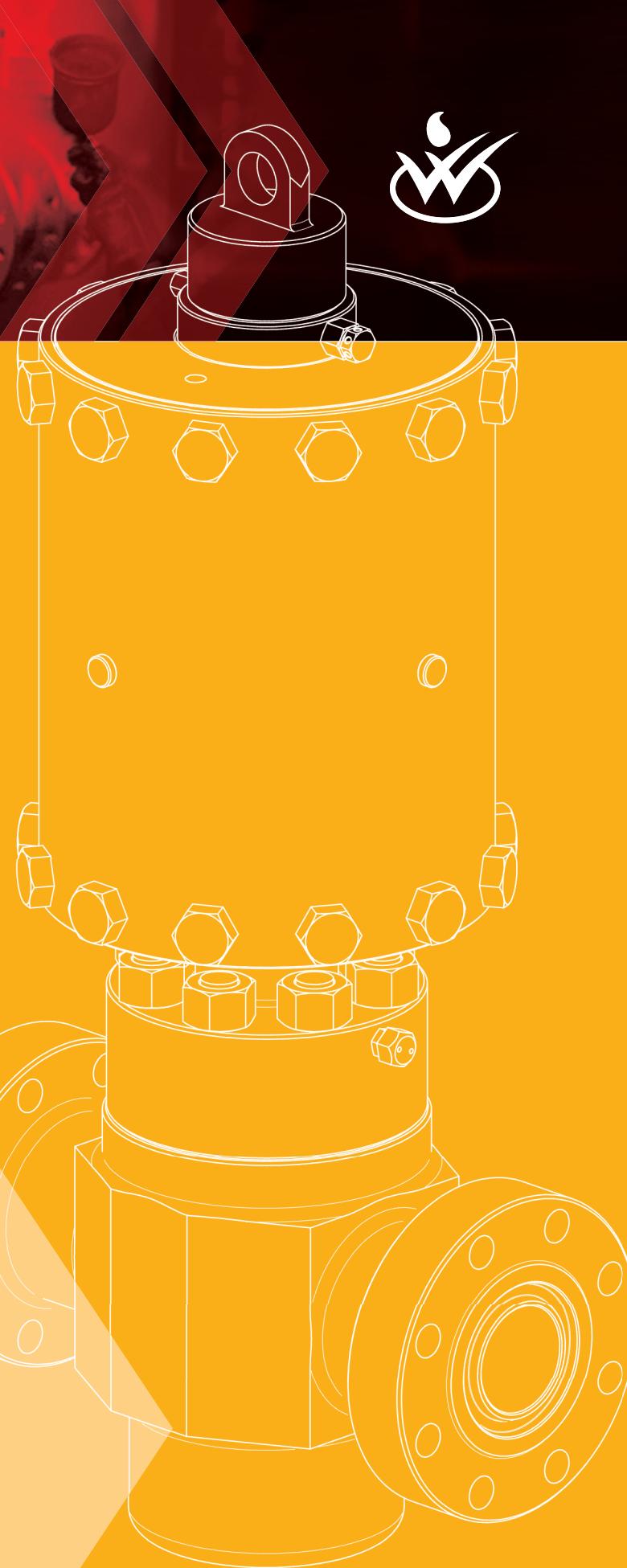
- E** . API 6A Requirements
 - 1- Material Class
 - 2- Temperature Class
 - 3- PSL



NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4
- PR : 1,2





Actuator Products



Actuator Products

Description:

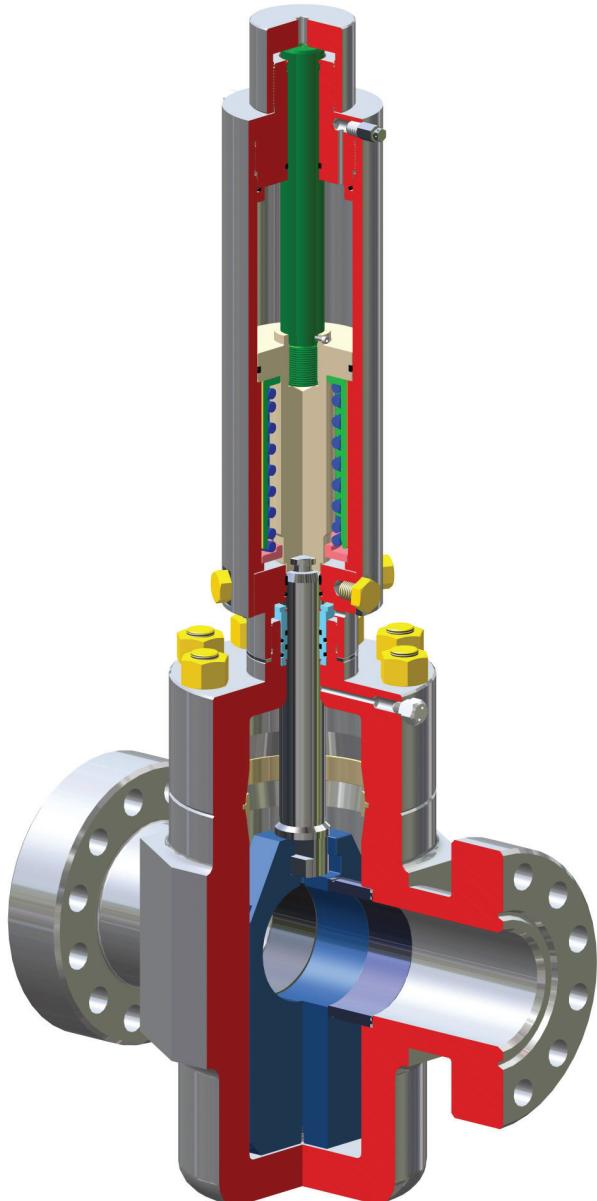
The Hydraulic Actuator is a ratio-piston-type actuator mounted on a reverse-acting gate valve (normally close).

The surface safety valve (SSV) is a hydraulically actuated fail-safe gate valve for testing oil and gas wells with high flow rates, high pressures or the presence of H2S. The SSV is used to quickly shut in the well choke manifold upstream in the event of over pressure, failure, a leak in downstream equipment, or any other well emergency requiring an immediate shut-in. The SSV is remotely operated by an emergency shutdown device, which can be triggered automatically by high or low pressure pilot actuators. If an emergency occurs, this feature reduces the possibility of personnel injuries.

A number of SSV models are available for different well conditions (pressures, temperatures and flow rates) and with various connections, such as API-6A flanges. All SSV models have interchangeable crossover connections and are protected by a compact, removable lifting frame.

The SSV uses a proven metal-to-metal, double-sealing design for harsh environment operations and complies with all applicable environmental requirements. All SSVs are manufactured under type approval or design verification review and provided with a certificate of conformity and full quality file.

Surface Safety Valve



2026

Description:

As part of a surface safety system, the actuator will shut off flow from the well in the event of a catastrophic event.

The 2026 surface safety valve is a hydraulically controlled actuator that is operated by a closed hydraulic system completely independent of well fluids and pressure.

Hydraulic pressure acting on the piston holds the valve open. Loss of hydraulic pressure in the actuator cylinder allows the well or flow-line pressure acting on the area of the lower stems to force the stem and gate closed.

Recommended for use in high-pressure and/or large-bore applications.

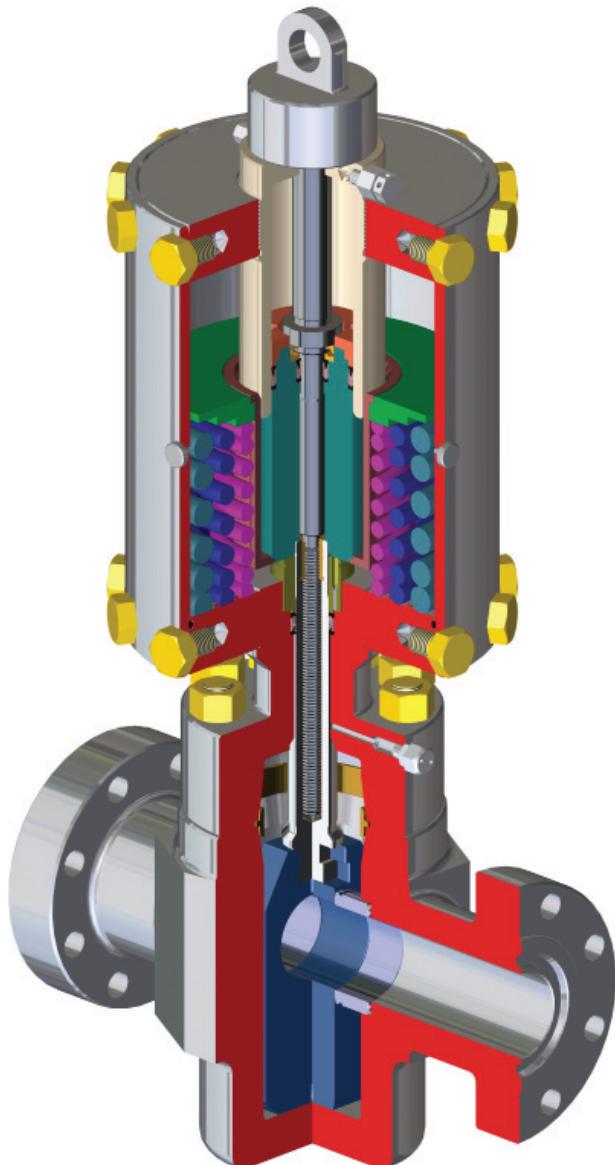
Features

- Control line port can be rotated 360°.
- Hydraulic section is resistant to corrosion.
- Has a quick-disconnect clamp.

Benefits

- In the event of a fire, the metal-to-metal seal between bonnet and lower stem acts as a secondary seal if the stem packing is damaged.
- Has a back-seat test port and packing leak detection port.
- Oil port can be rotated 360 degrees for easy alignment of power-source control line.
- Has a lifting eye to facilitate removing the actuator when mounted horizontally..
- E.N.P (electrolysis nickel process) is used on hydraulic cylinder for corrosion resistance.
- Hydraulic piston is hard chromed for corrosion resistance.

Surface Safety Valve



2034

Description:

The 2034 actuators are used on the secondary master valve. They are the primary surface safety device during a wire-line operation.

As part of a surface safety system, the actuator will shear the wire-line and seal off the flow from the well in the event of a catastrophic event.

The HP-HYW surface safety valve is a hydraulically controlled actuator that is operated by a closed hydraulic system completely independent of well fluids and pressure.

Hydraulic pressure acting on the piston holds the valve open. Loss of hydraulic pressure in the actuators cylinder allows the well or flow-line pressure acting on the area of the lower stems to force the stem and gate closed. The spring package is sized to cut a specific size of wire-line.

Features

- Coiled spring design provides cutting force.
- Control line port can be rotated 360°.
- Hydraulic section is resistant to corrosion.
- Has a quick-disconnect clamp.

Benefits

- In the event of a fire, the metal-to-metal seal between bonnet and lower stem acts as a secondary seal if the stem packing is damaged.
- Has a back-seat test port and packing leak detection port.
- Spring packages are designed to fit customer application.
- Oil port can be rotated 360 degrees for easy alignment of power-source control line.
- Has a lifting eye to facilitate removing the actuator when mounted horizontally.
- E.N.P (electrolysis nickel process) is used on hydraulic cylinder for corrosion resistance.
- Hydraulic piston is hard chromed for corrosion resistance.

Actuator Products

| SIZE (in) | WORKING PRESSURE (PSI) | BORE SIZE (in) | FLANGED ENDS |
|--------------|----------------------------|-------------------|--------------|
| 4-1/16 | 3000 - 10000 | 4-1/16 | P |
| 7-1/16 | 3000 - 10000 | 6-3/8 | ✓ |

When ordering Surface Safety Valve, specify the following:

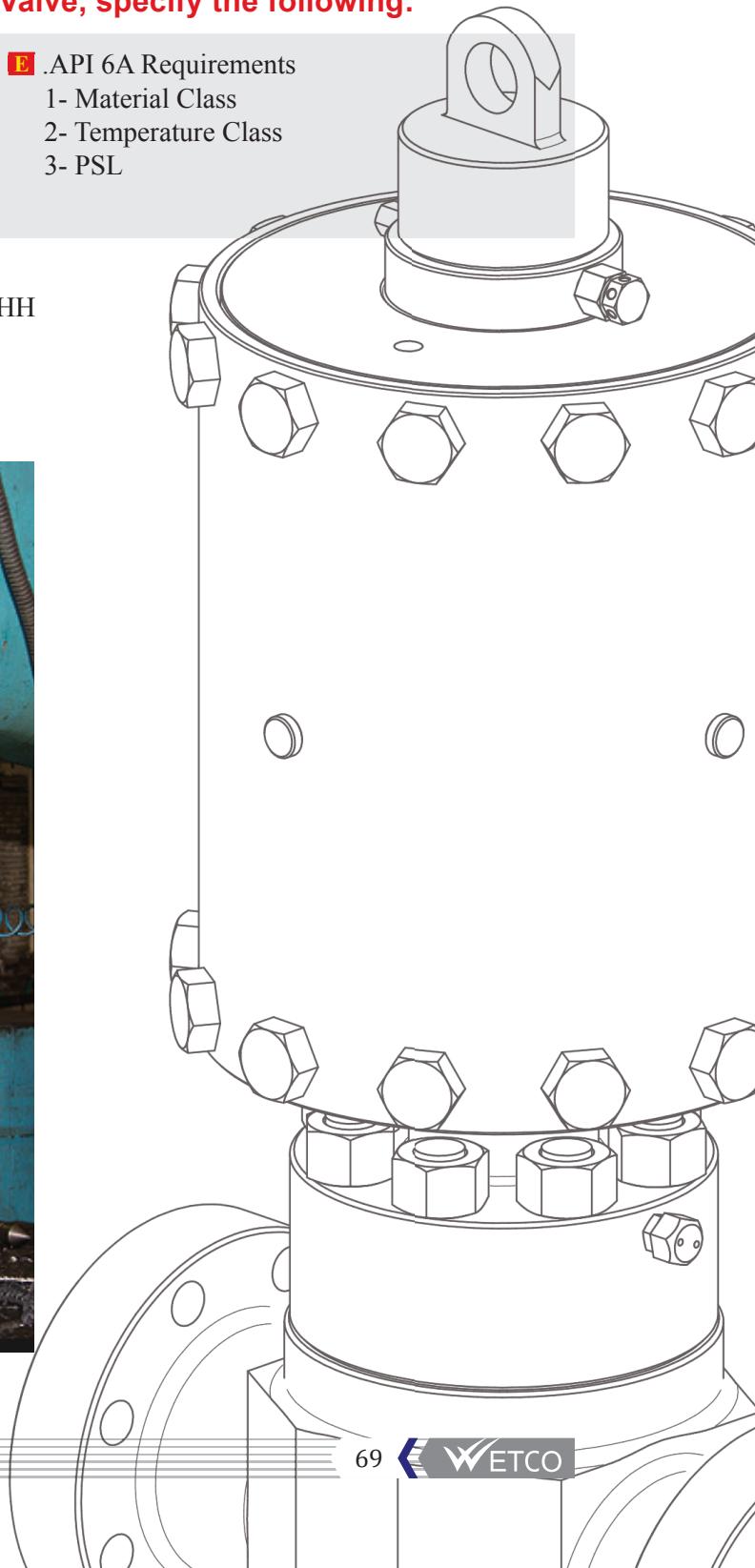
- A** .WETCO Model
- B** .Size and Working Pressure
- C** .Bore Size
- D** .Option

1- With or without pilot

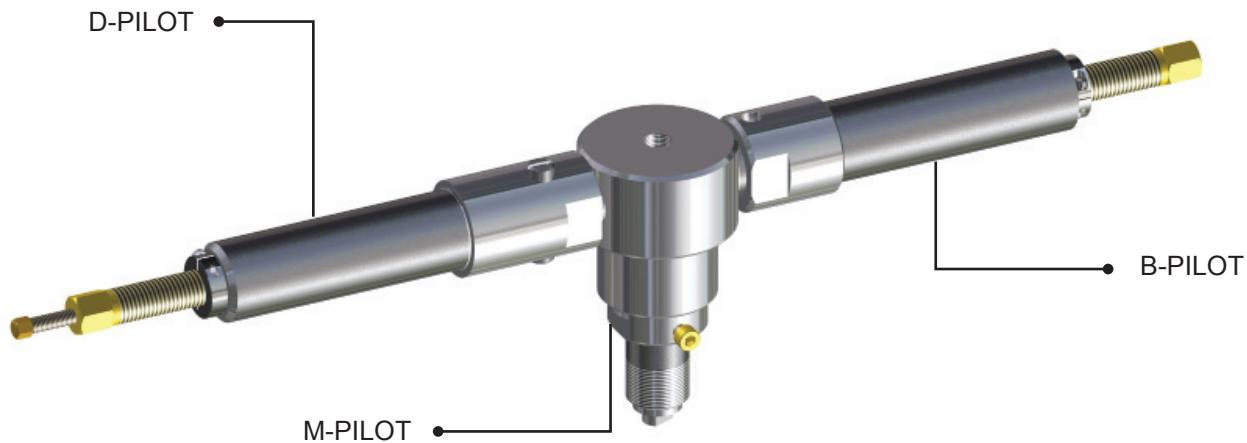
- E** .API 6A Requirements
 - 1- Material Class
 - 2- Temperature Class
 - 3- PSL

NOTE: According to API 6A

- Material Classes: AA, BB, CC, DD, EE, FF, HH
- Temperature Classes: K, L, N, P, S, T, U, V
- PSL: 1, 2, 3, 3G, 4



OTIS TYPE PILOT



OTIS type pilot which is installed on surface safety valve, includes of D, B and M pilots.

D-pilot

The D-Pilot is a spring-loaded, pressure-activated pilot that initiates the closing of SSV-02. It is a high- pressure sensing pilot that detects an abnormal increase in pressure in the flow-line or pipe-line. When pressure from the line being monitored exceeds a preset value, the check ball comes off seat and exhausts the actuator body pressure to atmosphere. With pressure absent from the actuator chamber, the gate valve closes.

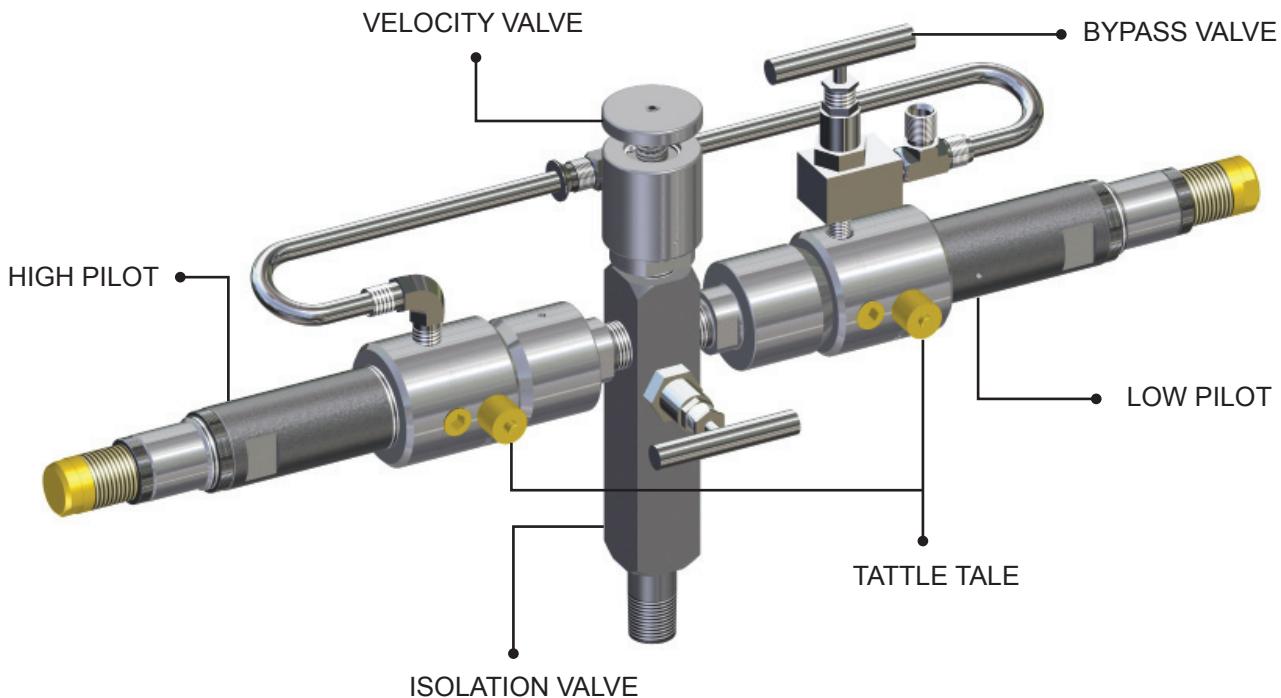
B-pilot

The B-Pilot initiates the closing of SSV-02. It is a low- pressure sensing pilot that detects a reduction in pressure of the flow-line or pipe-line. Pressure from the monitored line holds the pilot ball on the seat against a preset spring constant. Any abnormal reduction in pressure causes the spring to force the ball off seat and exhaust the pressure from the actuator chamber. With the pressure absent from the actuator chamber, the gate valve closes.

M-pilot

The M Pressure-Sensing Pilot is a pressure-operated actuator pilot typically used in high-pressure control circuits. This pilot depends on another pilot (or pilots) for operation. Many times, monitoring low and high-pressure fluctuations in the flow-line is better accomplished by separate pilots. This combination of pilots allows flexibility in surface safety system design. Combination high- and low-pressure pilots are normally used with the SSV-02 when control of the safety valve must take place from a remote, high-pressure source. The M-Pilot also enables the surface safety valve to be controlled by a pressure source other than line pressure. The action of this pilot exhausts the safety valve chamber, closing the valve.

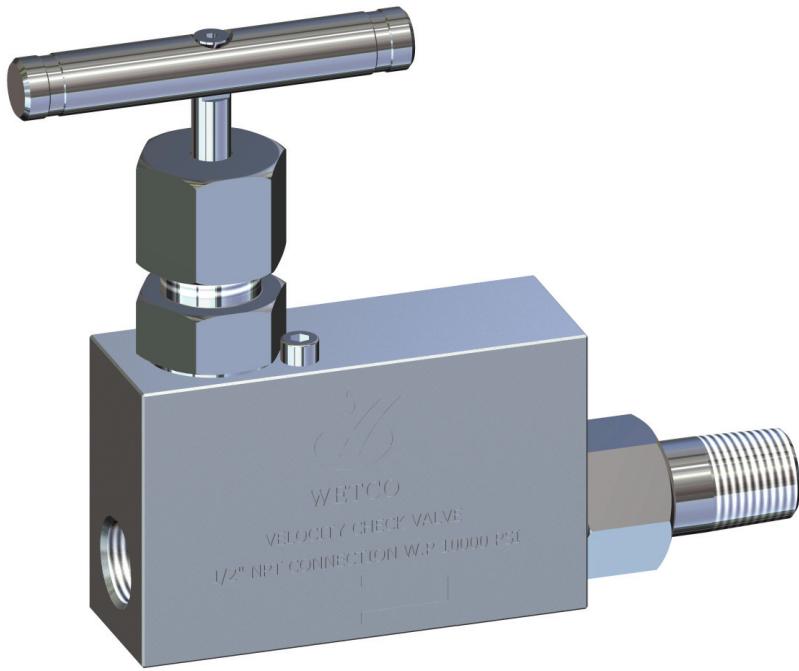
LPO SYSTEM



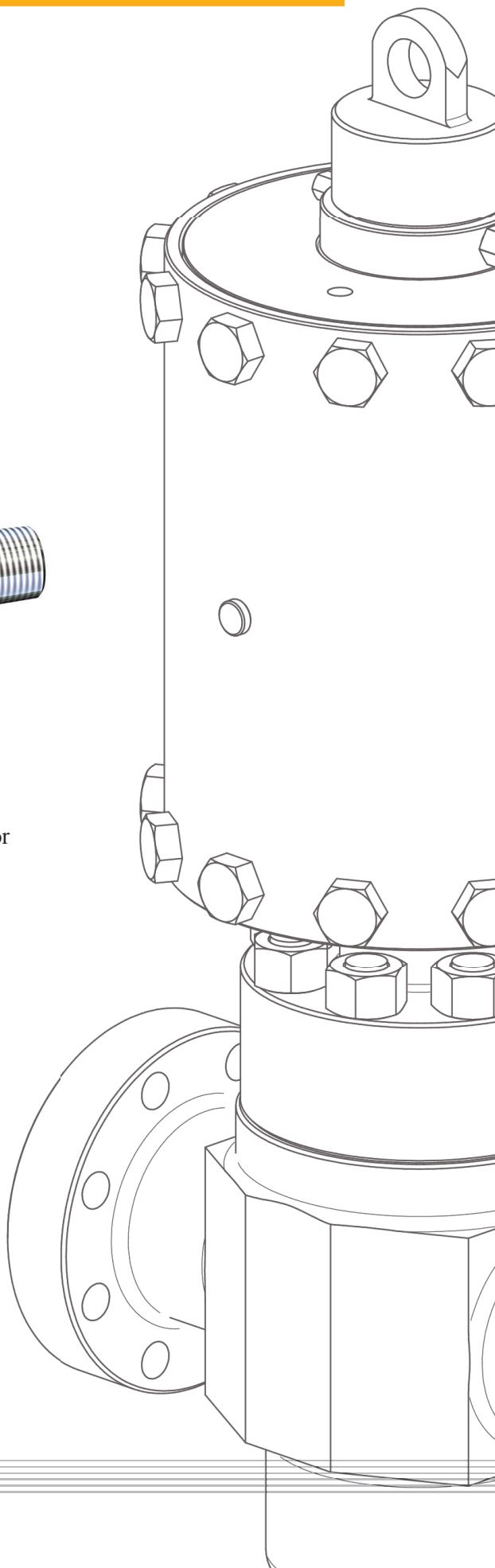
The Control System is a set of components that include:

- An isolation valve, to isolate the wellbore or flow-line fluids from the system.
- A high pressure sensing switch or pilot. The High Pilot bleeds the fluids from the actuator when the wellbore or flow-line pressure is greater than the spring force in the pilot.
- A low pressure sensing switch or pilot. The Low Pilot bleeds the fluids from the actuator when the wellbore or flow-line pressure is lower than the spring force in the pilot. . A velocity check valve.
- The Velocity Check valve prevents fluids flowing into the actuator to replace the fluids bleeding out of it when the High Pilot or Low Pilot is tripped. The velocity check valve is overridden during valve opening to allow fluids to enter the actuator. The Velocity Check Valve is overridden by pushing down on the manual button.
- A low-pressure pilot bypass valve. The Low Pilot Bypass Valve is closed to isolate the actuator fluids from the Low Pilot to prevent the Low Pilot from bleeding fluids from the actuator before the wellbore or flow-line fluid pressure is stabilized. Once the wellbore or flow-line fluids are stabilized the Low Pilot must be placed in service by opening the bypass valve. . Tattle tales.
- The Tattle Tales will show which pilot, High or Low, tripped and closed the valve. This helps in trouble shooting after the valve has shut in.

VELOCITY CHECK VALVE



- Is used on Flow lines to prevent loss of media caused by burst hoses or failed connections
- Soft seal for bubble tight closing
- Prevents reverse flow in circuits
- Low pressure differential to effect seal
- Stainless Steel spring for long life
- Large bore for improved flow through the valve
- Choice of thread forms
- Versatile design for Male/Female or compression ends





Tools of Wellhead



Wear Bushing



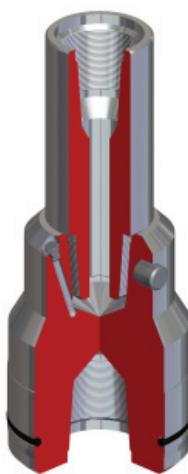
Wear bushing is usually used to prevent casing head spool shoulder or tubing head spool shoulder from the damage during drilling operations. Running tool for wear bushing is used to send or retrieve wear bushing, with excellent reliability and safety.

Main size: 7-1/16», 11», 13-5/8», 20-5/8», 21-1/4 ect.

Features

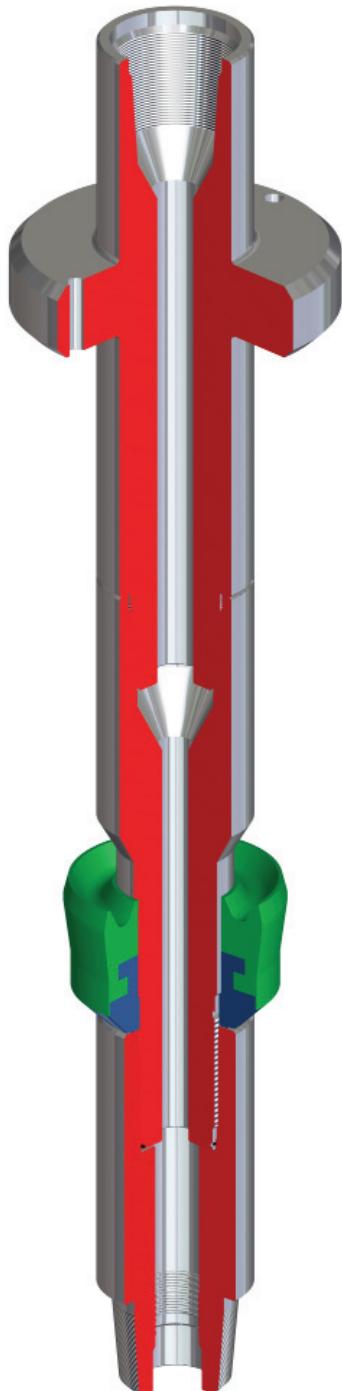
- Protects the metal-to-metal sealing surface inside the casing head and the wellhead.
- Easily installed and retrieved with combination tool.
- BOP stack can be tested with wear bushing installed.

Combination Tool



- Combination tool runs and retrieves nominal wear bushings within a given wellhead size.
- Tests the BOP stack with or without wear bushing installed.

Cup Tester



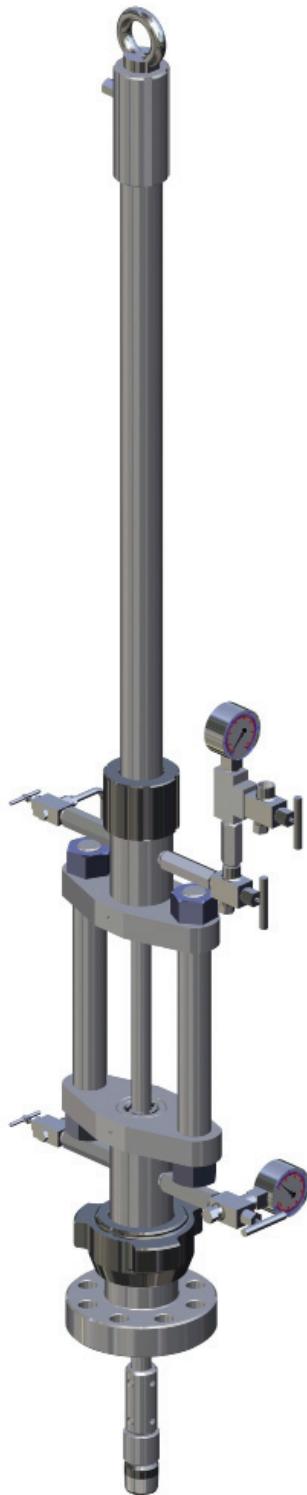
Cup tester is designed to be attached to the drill string and then lowered into the casing beneath the wellhead to pressure test the blowout preventer stack and the wellhead. When the cup tester is lowered into the casing beneath the wellhead, pressure is applied to either a test pump, or by hoisting type cup after filling the hookup with water. The latter method is fast and accurate.

The cup tester assemblies are rated to the API standard mill test pressure for casing sizes up to 10,000 PSI. Special reinforcing can be offered on all cup sizes and casing weight ranges to hold up to 15,000 PSI.

When ordering please specify:

- Casing size & weight
- Connections

VR Plug Tool



Valve removal plug running& retrieving tool is a key device in valve maintenance during pressure holding.

It consists of connector, cylinder, piston, end cover, stop valve, handle wheel, and so on.

It could be applied to side outlet of casing head housing, casing head spool, and tubing head spool to change and repair valve while containing pressure.

Way Back Pressure Valve



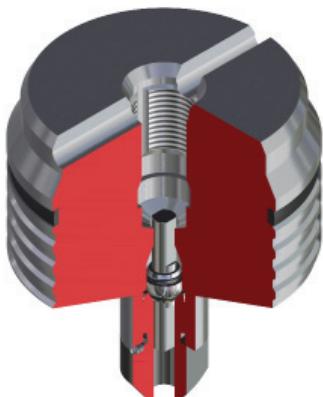
The one-way back pressure valve safely seals tubing pressure to 15000 psi. BPV are used during the inflation of Christmas trees, BOP removal and to prevent backflow of fluid into the tubing.

BPV reduce downtime and operating costs by allowing for repairs without killing the well.

Features

- Sizes available from 1-1/4" to 6-5/16".
- Nipple down and up the drilling BOP stack.
- Nipple up or down Christmas tree.
- Replace the master valve.

Way Back Pressure Valve



The two-way back pressure valve safely seals tubing pressure to 15000 psi. BPV are used during the inflation of Christmas trees, BOP removal and to prevent backflow of fluid into the tubing.

BPV reduce downtime and operating costs by allowing for repairs without killing the well.

Features

- Sizes available from 1-1/4" to 6-5/16".
- Nipple down and up the drilling BOP stack.
- Nipple up or down Christmas tree.
- Test the Christmas tree (2-way check).
- Replace the master valve.

BPV Running Tool



The running tool is installed on the back pressure valve by the right hand thread and the pin which is set on the tool, is accommodated in the groove of BPV Then the assembly is installed on the tubing hanger by the left hand thread and the BPV is set on the correct place and the tool is removed.

BPV Retrieving Tool



The retrieving tool is used for removing the back pressure valve by the right hand thread. By this tool the BPV can be removed easily.

Lubricator



WETCO's Lubricators which connect directly to the top of a X-Mas tree above the master valve are available in various sizes and end connections and pressure ratings varying from 5000 to 15000 PSI both for standard and sour service.

Operating a Lubricator is by far the most dangerous aspect of well head service work. Therefore extreme caution has to be exercised while operating this tool.



Seal Technology

Sealing technology is at the core of all pressure and flow control technology. Engineered seal designs and materials are vital to the integrity and functionality of much of the equipment used in our industry, including, surface wellheads and trees, tubing hangers, valve bodies, seats and stem packing, and more.

The unique WETCO design philosophy and our engineering and research expertise help address new sealing challenges as the industry moves into higher pressures and temperatures. For example, our wellhead seals must isolate increasingly higher-pressure zones and seals in valves and chokes used in hydraulic fracturing must maintain integrity in the now standard high-intensity operations.

Sealing technology types

Seals are used in a number of different types including O-rings, S seals, P-seals, H-seal, FS-seal and metal seals.

1. Elastomer Seals

Elastomers are suitable for a wide range of process conditions and are compatible with most oil and gas process fluids. They work by being squeezed between two sealing surfaces, forming a barrier for the isolated fluid.

O-ring seal is very limited in its ability to bridge large extrusion gaps and remain intact without some kind of anti-extrusion device. In addition, some seal designs



cannot keep a bubble-tight seal over the wide temperature ranges and large pressure variations encountered.

WETCO response to these new API requirements addresses the limitations found in traditional interference and slab-packing applications with the following key design features:

- Seals meet API Spec. 6A, Appendix F, Performance Requirement Level Two (PR2) pressure and temperature cycle testing.
- Anti-extrusion devices are incorporated into each type of seal design to compensate for thermal expansion/contraction of the seal element and for installation clearances.
- All seal elements and anti-extrusion components are continuous.
- Anti-extrusion devices are integrally molded into the seal element, making them easier to install and more durable.
- All seals are designed to provide proper squeeze, volume fill and stretch under all API tolerance conditions, i.e., the largest diametric gap possible and the worst-case misalignment of sealing surfaces.

2 . Metal Seal

WETCO patented metal seal design has addressed many issues traditionally associated with metal seals to become a technological breakthrough for wellhead equipment. WETCO metal seals are rugged enough for the oilfield operation, have simple installation procedures, are easily tested after installation and are reusable in most applications.

In most applications WETCO Energy Systems metal seals are “self-energizing” and do not rely on a wedging action, suspended weight or flange make-up force to affect a seal. The seal is “pressure assisted” and can work in any pressure.

- Meet API Spec. 6A, Appendix F, Performance Requirement Level Two (PR2) pressure and temperature cycle testing.
- Are rated for all API material classes, including class HH (H2S/CO2 service) and are also amine resistant.
- Can be made from almost any high-strength steel or corrosion-resistant alloy, for use in extreme corrosive services.
- Work in all temperature ranges, from - 20°C arctic service to 645°C for fire-resistant applications.
- Are easy to install and test and can withstand standard oilfield handling.
- Do not deform (crush) metal, either on the seal or on the mating surfaces, so both are normally reusable, minimizing work over costs.

P-SEAL



- ▶ The P-Seal has elastomer seal ring that seal against rough casing. The seal is energized by injecting sealant into pressure rings. Metal back up rings prevent pressure extrusion during thermal cycling.

FS-SEAL



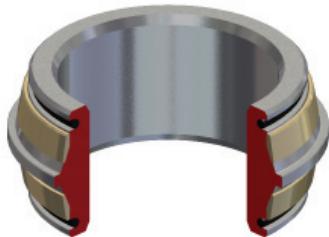
- ▶ The FS-Seal has been designed to seal against rough casing where wide tolerances and varying surface finishes create difficult sealing conditions. It is utilized as a large cross-section interference seal to bridge large extrusion gaps associated with sealing on rough mill casing. The bump provides higher sealing contact stresses, while the curved recess on the back of the seal controls the amount of compression (squeeze) on the seal element by allowing it to deflect outward when sealing against a larger-than-normal outer-casing diameter or an out-of-round section of casing.

H-SEAL

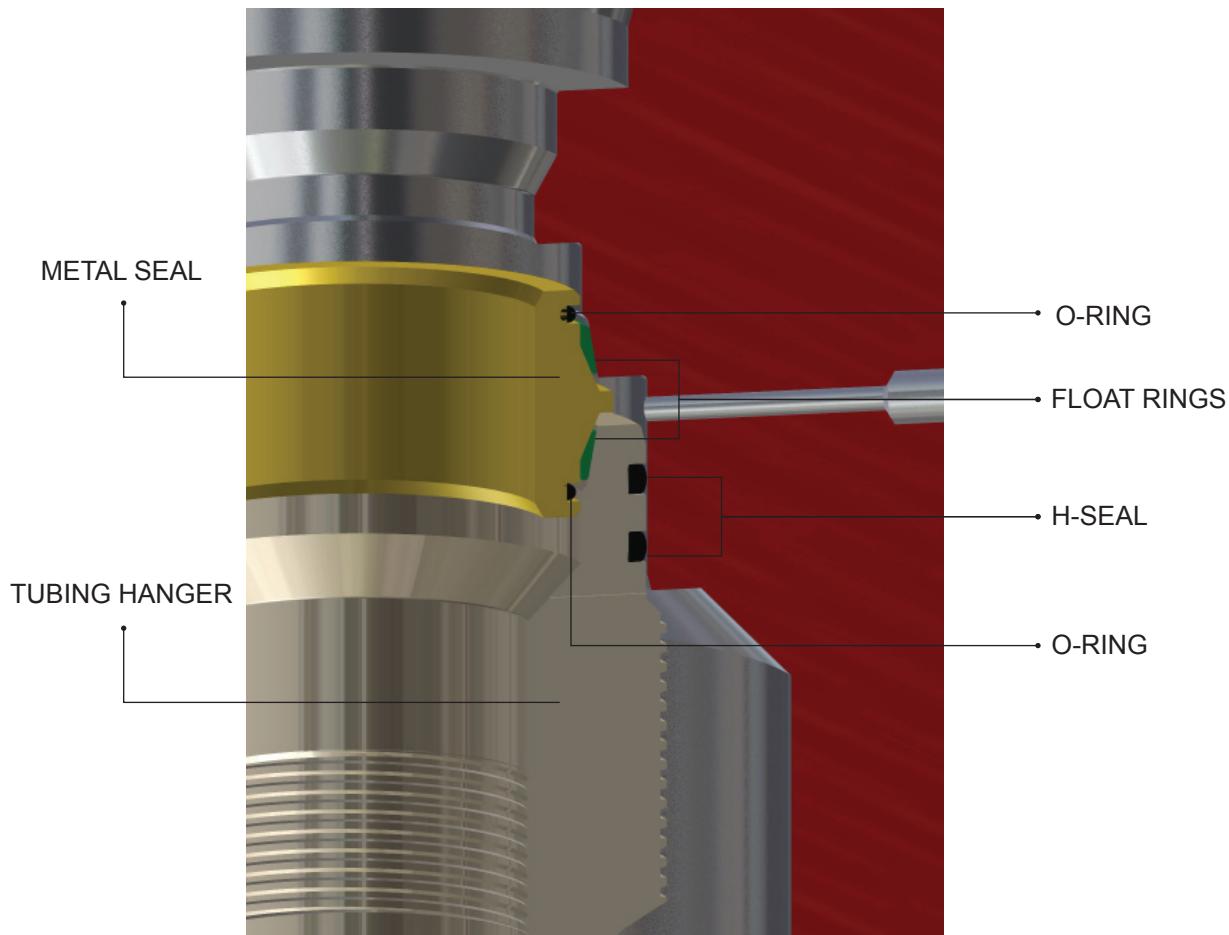


- ▶ The seal geometry uses the flat base to provide superior gland stability, therefore prevent seal twisting or spiral failure. In addition, this design allows the seal to maintain its performance in high pressure environment up to 15,000 psi in some cases.

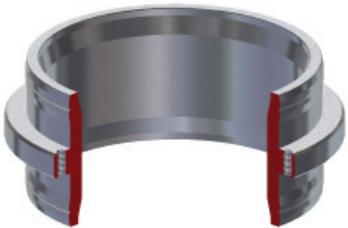
CFR SEAL



CFR (Carrier with float rings assembly) is accommodated on neck of Tubing Hanger. It can resist high corrosive well fluids and pressure up to 15,000 PSI working pressure regardless of thermal or pressure cycling. In the fully installed position, the seal lips engage a straight bore above the entry ramp (see illustration). The CFR seal maintains sufficient contact-sealing stress even at very low pressure. As working pressure increases, contact-sealing stresses increase, making it seal even tighter. Also external surface of the carrier can tolerate the pressure up to 15000 PSI.

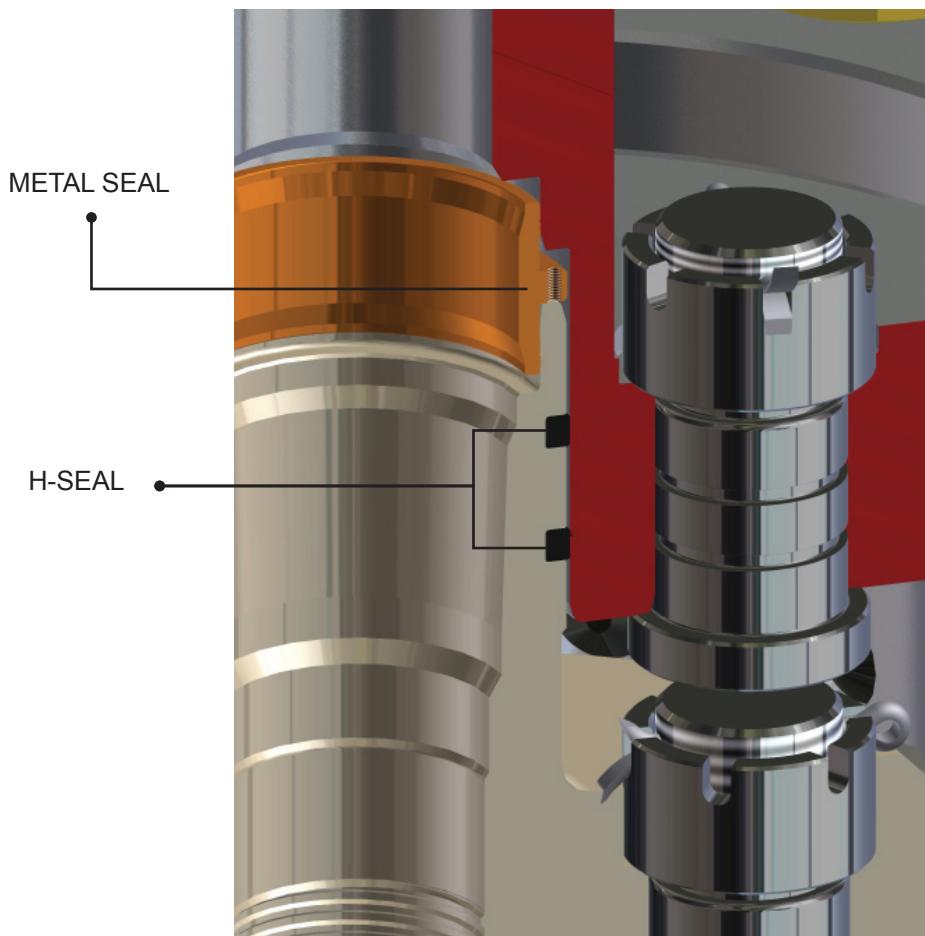


MTBS SEAL



MTBS seal is energized by interference between the designated primary sealing surface and the metal seal's contact area with that sealing surface. This seal is an integral double-ended seal sleeve manufactured from high-strength, low-alloy steel or corrosion-resistant alloy. The seal can be installed separately and can be easily replaced.

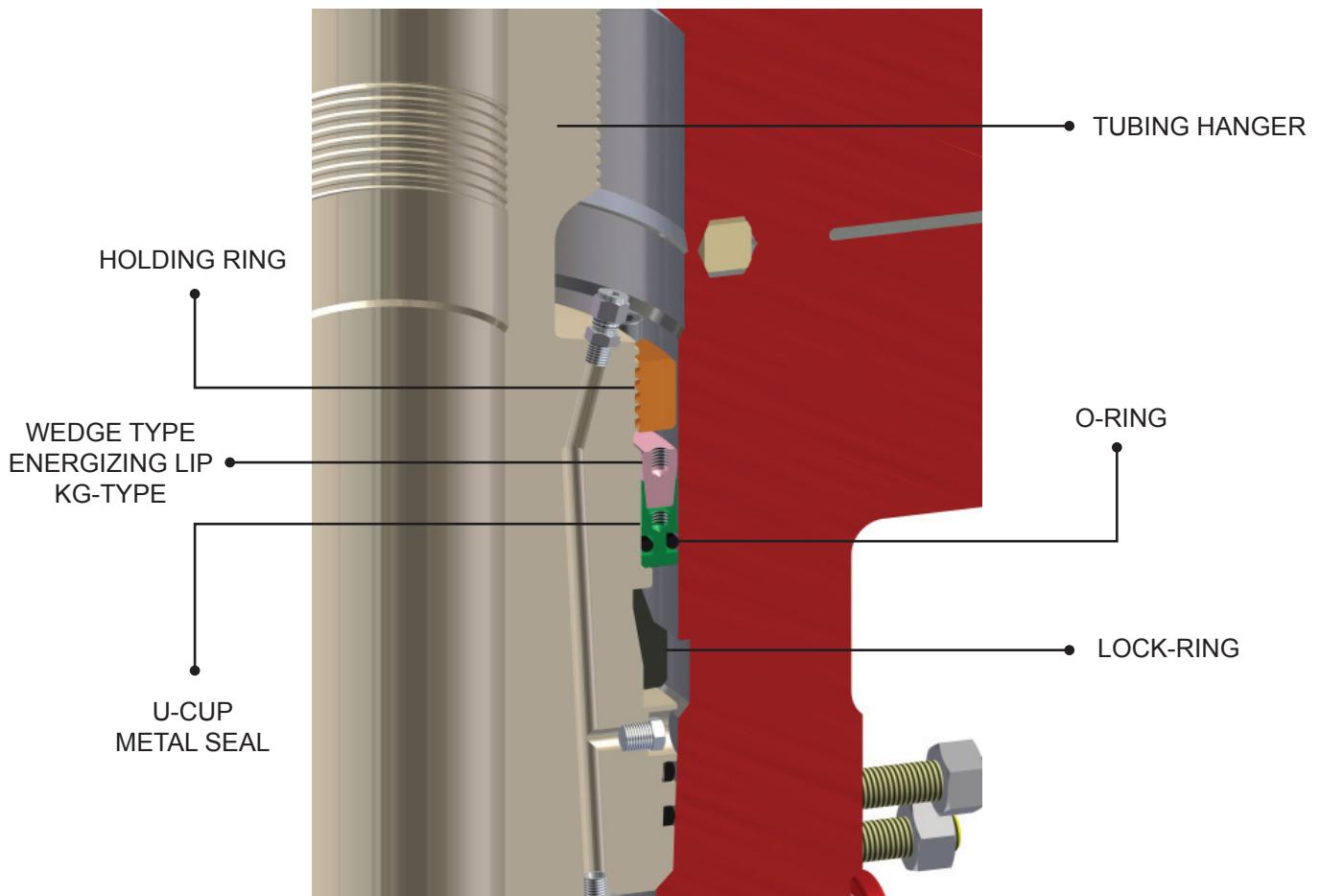
The seal design is based on an interference fit with pressure-intensified sealing. As the tubing head bonnet is nippeded-up, the seal lip ("bump") engages an entry ramp in the seal bore, radially deflecting the seal lip inward, creating the contact stress required to effect a seal. In the fully installed position, the seal lips engage a straight bore above the entry ramp. The seal maintains sufficient contact-sealing stress even at very low pressure. As working pressure increases, contact-sealing stresses increase, making it seal even tighter.



UNILATERAL U-CUP SEAL



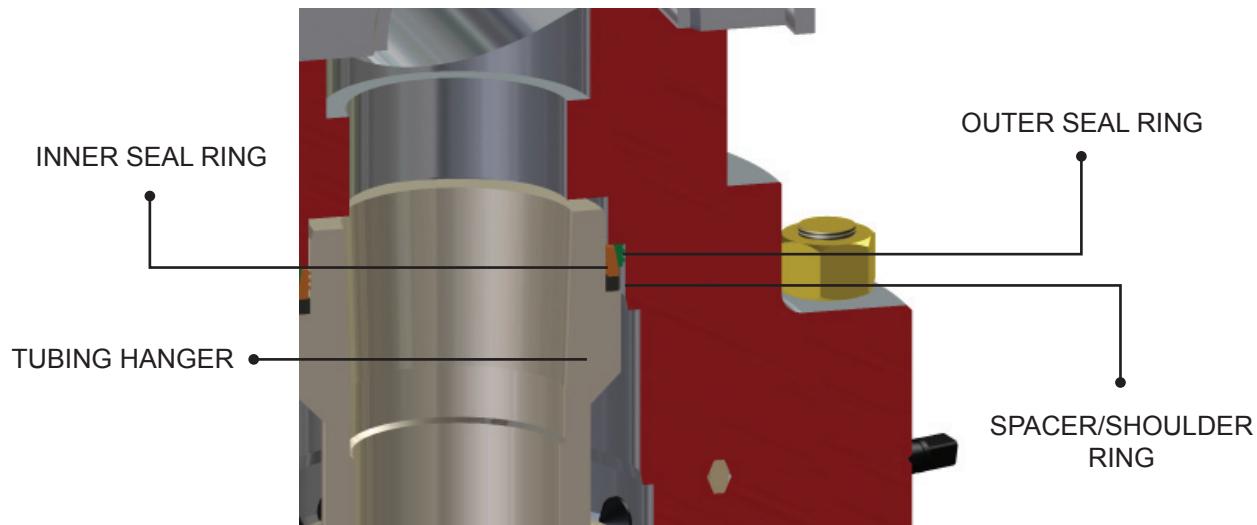
Unilateral U-CUP seal is used in KG wellhead systems for special mandrel casing hanger and tubing hanger which requires mechanical force to affect a seal. The seal can be run separately and is energized by the force applied on wedge type energizing lip. The material of metal seal is stainless steel 410.



SLIDER METAL SEAL



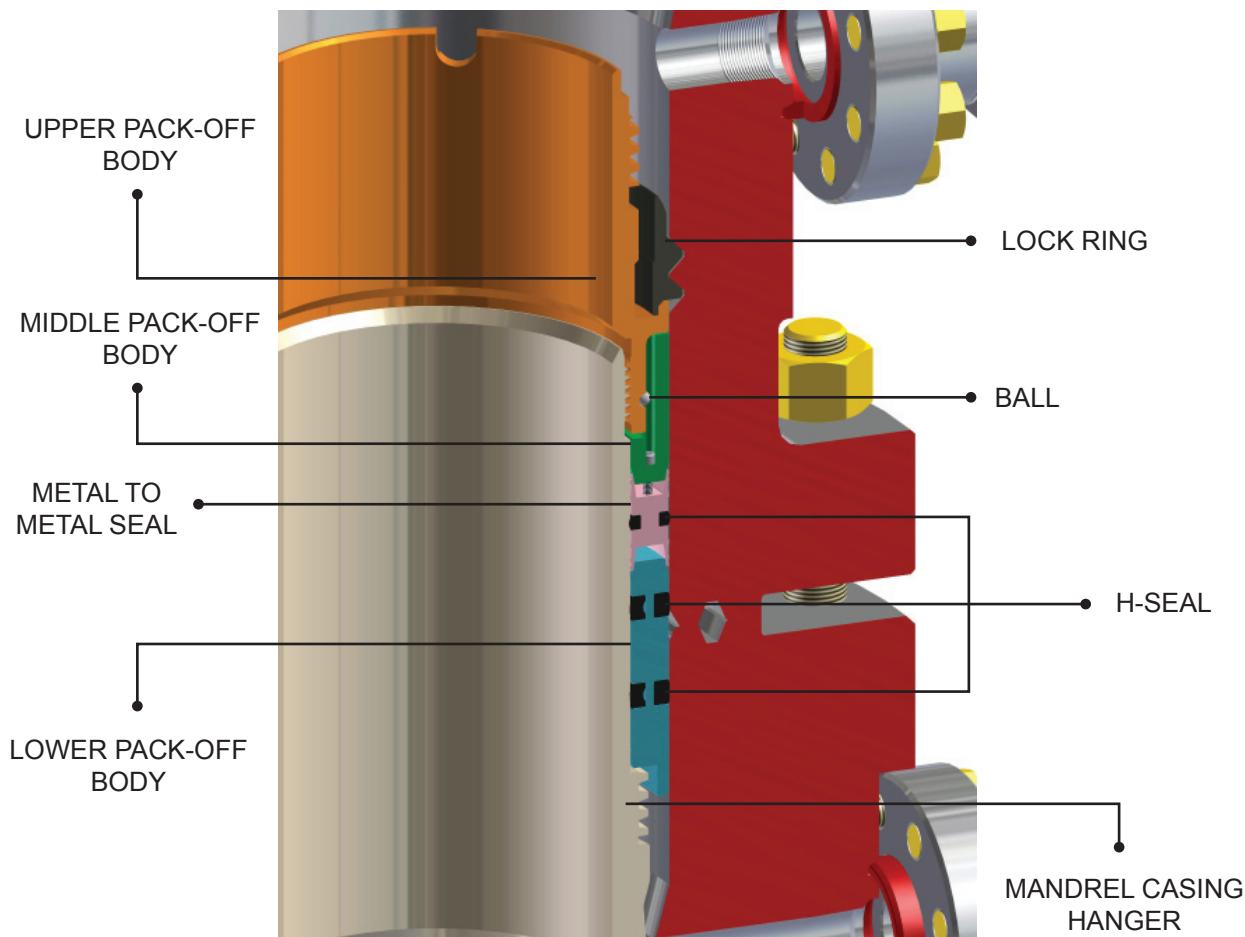
we design and manufacture a metal to metal top seal between the tubing head adapter or x-mass tree and hanger for traditional or modern efficient design requirements.



BILATERAL U-CUP SEAL



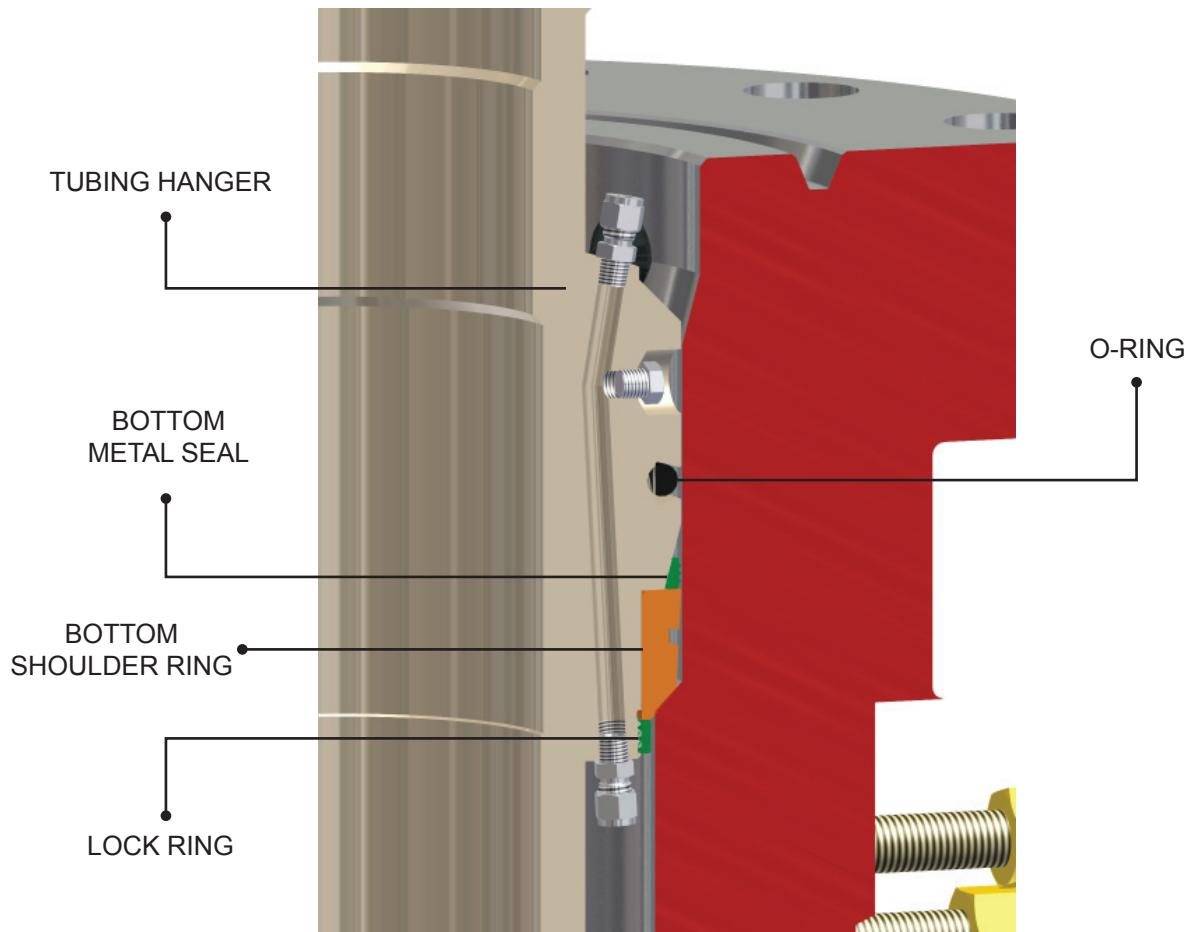
Bilateral U-CUP seal is used in unitized wellhead systems for special mandrel casing hanger and tubing hanger. The pack-off requires a running tool to apply torque on upper pack-off body. The bearing mechanism converts this torque to vertical force to affect the seal.

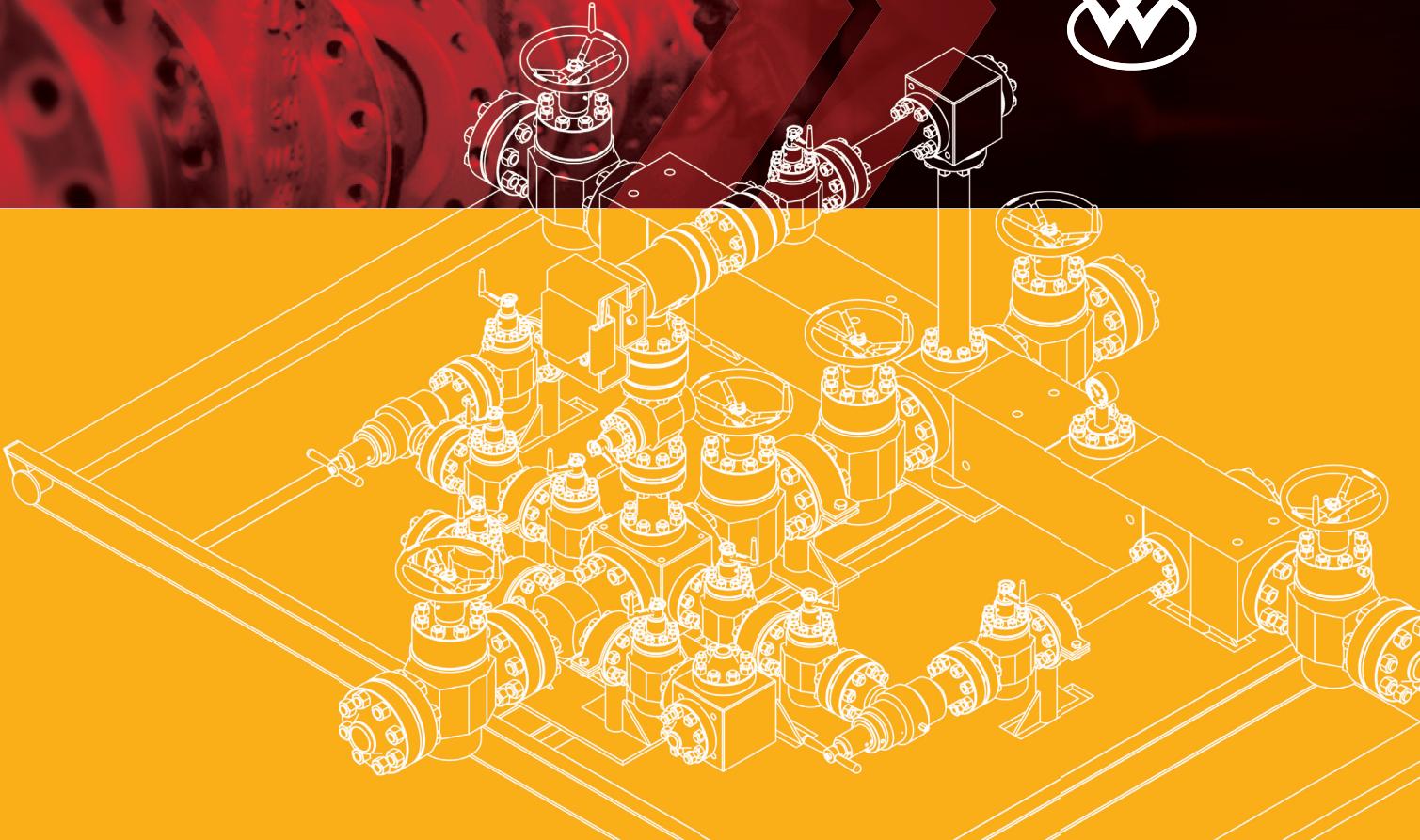


BOTTOM METAL SEAL



Bottom metal seal is used in HTP wellhead systems for special tubing hanger applications. It is compatible with a wide range of temperatures and corrosive environments, does not require special installation tools and is simple to install, is NACE compatible, is compatible with tubing head spool strength and is compatible with tubing string strength properties. The material of metal seal is stainless steel 316.





CHOKE AND KILL MANIFOLD

CHOKE AND KILL MANIFOLD

Description:

The Well Test Choke Manifold is the primary means of controlling the Well Flow at surface by operation (opening or closing) of the adjustable or fixed choke.

Adjustable (Variable) Choke: Primary function enables the fixed choke to be changed during operations. Secondary function enables greater flexibility for wellbore cleanup rates.

Fixed (Positive) Choke: Calibrated Choke Beans to give more accurate flow control or predetermined fluid rates at various test conditions.

The operation of these chokes under the client's objectives are verified by WETCO's Design of Service in accordance to API RP 14E / ISO 13703 to withstand erosion resulting from the very high velocities occurring and immediately downstream from the choke orifice, thus maintaining equipment integrity and test objectives.

The Choke Manifold design enables dual-flow paths that control the well flow at surface from the upstream control equipment to the downstream process equipment and allows the operator to perform choke changes without interference to operations or test objectives.

Features

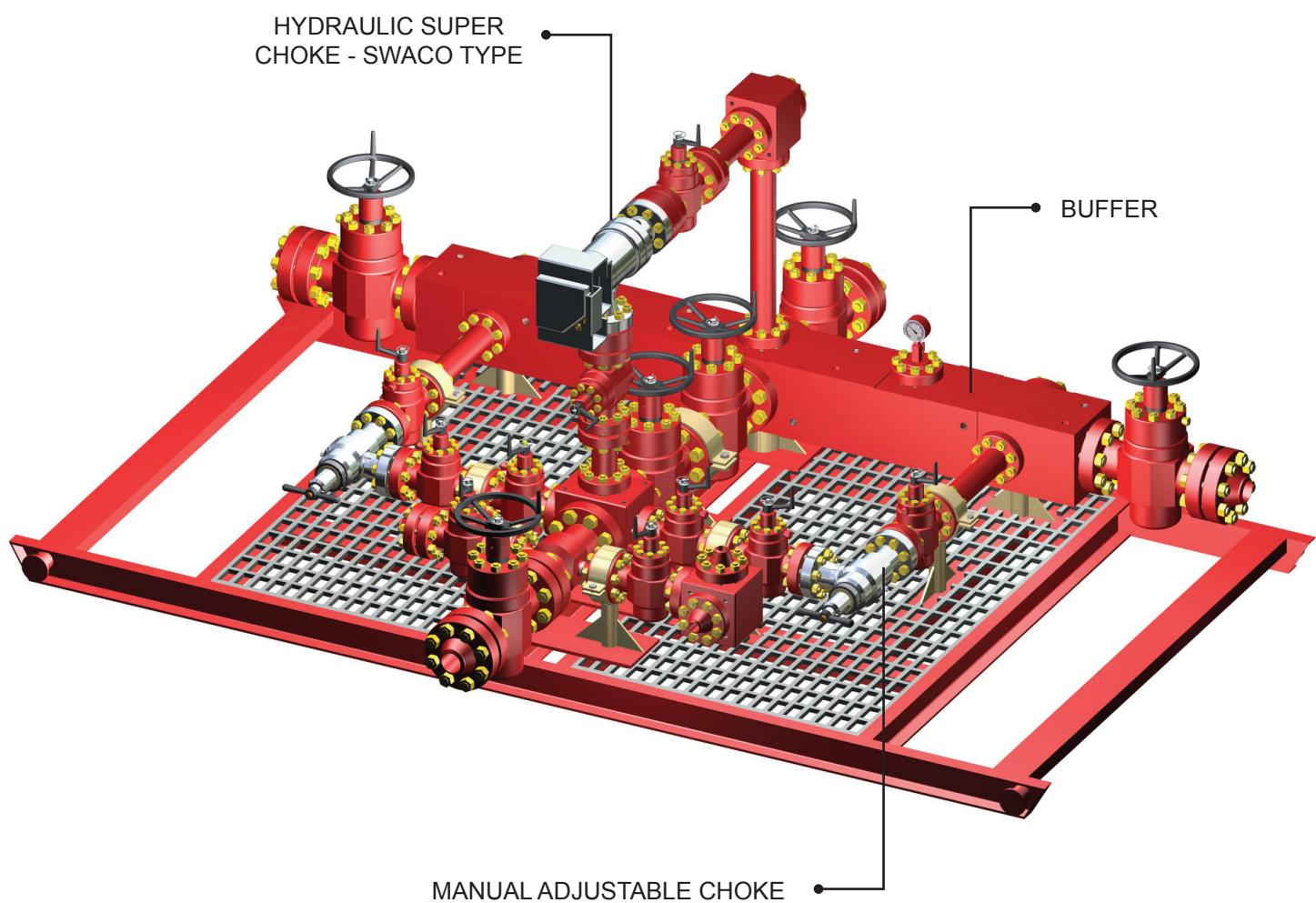
- Allows for multiple choke and gate valve configurations
- Pressure ratings from 5,000-15,000 PSI
- Q Available bore sizes from 2-1/6 to 4-1/6-in.
- Dual-choke configurations
- Adaptable for all location requirements
- Meets HJS service requirements per NACE MR0175 and standard service Manifolds optionally

available

- Optional double-block and bleed configurations
- Accommodates remotely operated, manual and positive chokes monogrammed to API 6A
- and/or API 16C
- Hydraulic or manually operated gate-valves monogrammed to API 6A
- Manifolds available with API 16C monogram option

Benefits

- Regulates pressure and flow control
 - *Adaptable to variety of chokes and gate valve configurations
- Facilitates application-specific configurations
 - Allows for safely circulating out a kick
- Offers small footprint configurations
 - Meets all industry safety, durability standards
- Minimizes downtime
- Reduces blowout risks Assures equipment integrity
- Contains harmful H2S emissions
- Enhances HSE profile



WELLHEAD EQUIPMENT TECHNOLOGY COMPANY
STANDARD PRODUCTS FOR
API 6A-20th Edition Service Conditions

| H2S BELOW 0.05 psia NON-NACE Based on equipment working pressure | | | H2S 0.05 to 0.5 psia NACE sour service Based on equipment working pressure | | | | | | |
|--|---|---------------------------------------|---|---|--------------------------------------|--|--|--|--|
| Non-Corrosive CO₂ BELOW 7 psia Based on flowing pressure | API service: | AA | CO ₂ below 7 psia & H2S below 0.05 psia Non-Sour & Non-Corrosive | API service: | DD-0.5 | CO ₂ below 7 psia & H2S 0.05 to 0.5 psia Sour & Non-Corrosive | | | |
| | Part | Material | | Part | Material | | | | |
| | General API material requirements for this material class | | | General API material requirements for this material class | | | | | |
| | Bodies & Bonnets | Carbon or Low-Alloy Steel | | Bodies & Bonnets | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | Internal Parts | Carbon or Low-Alloy Steel | | Internal Parts | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | Tubing Hanger Mandrels & Stems | Carbon or Low-Alloy Steel | | Tubing Hanger Mandrels & Stems | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | | | | *SS can be used for internal parts, tubing hanger mandrels, or stems | | | | | |
| | WETCO Products | | | WETCO Products | | | | | |
| | Wellhead, Tbg Head | AA(Carbon or Low-Alloy Steel) | | Wellhead, Tbg Head | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | Adpt, Tee, Tree Cap | AA(Carbon or Low-Alloy Steel) | | Adpt, Tee, Tree Cap | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| Slightly Corrosive CO₂ 7 to 30 psia Based on flowing pressure | Valves 5M & below | AA(Carbon or Low-Alloy Steel) | | Valves 5M & below | DD-NL | | | | |
| | Valves 10M & up: | BB w/17-4 SS stem | | Valves 10M & up | EE-0.5 w/ 17-4 SS stem | | | | |
| | Tbg Hgr | AA(Carbon or Low-Alloy Steel 110 ksi) | | Tbg Hgr | DD-NL (AISI 4130 ,80 ksi max) | | | | |
| | | | | *use FF-0.5 (17-4 SS) tbg hanger if >80 ksi req'd | | | | | |
| | | | | Customer has the option to specify materials for ZZ Material Class | | | | | |
| | API service: | BB | CO ₂ 7 to 30 psia & H2S below 0.05 psia Non-Sour & Slightly Corrosive | API service: | EE-0.5 | CO ₂ 7 to 30 psia & H2S 0.05 to 0.5 psia Sour & Slightly Corrosive | | | |
| | Part | Material | | Part | Material | | | | |
| | General API material requirements for this material class | | | General API material requirements for this material class | | | | | |
| | Bodies & Bonnets | Carbon or Low-Alloy Steel | | Bodies & Bonnets | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | Internal Parts | Stainless Steel | | Internal Parts | Stainless Steel(AISI 410) | | | | |
| Moderately to Highly Corrosive CO₂ ABOVE 30 psia Based on flowing pressure | Tubing Hanger Mandrels & Stems | Stainless Steel | | Tubing Hanger Mandrels & Stems | Stainless Steel(AISI 410) | | | | |
| | WETCO Products | | | WETCO Products | | | | | |
| | Wellhead, Tbg Head | AA(Carbon or Low-Alloy Steel) | | Wellhead, Tbg Head | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | Adpt, Tee, Tree Cap | AA(Carbon or Low-Alloy Steel) | | Adpt, Tee, Tree Cap | Carbon or Low-Alloy Steel(AISI 4130) | | | | |
| | Valves(all) | BB | | Valves(all) | EE-0.5 w/17-4 SS stem | | | | |
| | Tbg Hgr | CC(17-4 SS) | | Tbg Hgr | FF-0.5(17-4 SS) | | | | |
| | | | | Customer has the option to specify materials for ZZ Material Class | | | | | |
| | API service: | CC | CO ₂ above 30 psia H2S below 0.05 psia Non-Sour & Moderately to Highly Corrosive | API service: | FF-0.5 | CO ₂ above 30 psia H2S 0.05 to 0.5 psia Sour & Moderately to Highly Corrosive | | | |
| | Part | Material | | Part | Material | | | | |
| | General API material requirements for this material class | | | General API material requirements for this material class | | | | | |
| Based on flowing pressure | Bodies & Bonnets | Stainless Steel | | Bodies & Bonnets | Stainless Steel(AISI 410) | | | | |
| | Internal Parts | Stainless Steel | | Internal Parts | Stainless Steel(AISI 410) | | | | |
| | Tubing Hanger Mandrels & Stems | Stainless Steel | | Tubing Hanger Mandrels & Stems | Stainless Steel(AISI 410) | | | | |
| | WETCO Products | | | WETCO Products | | | | | |
| | Wellhead, Tbg Head | N/A unless exposed to well flow | | Wellhead, Tbg Head | N/A unless exposed to well flow | | | | |
| | Adpt, Tee, Tree Cap | Stainless Steel | | Adpt, Tee, Tree Cap | FF-NL(AISI 410) | | | | |
| | Valves(all) | Stainless Steel | | Valves(all) | FF-0.5 w/17-4 SS stem | | | | |
| | Tbg Hgr | CC(17-4 SS) | | Tbg Hgr | FF-0.5(17-4 SS) | | | | |
| | | | | Customer has the option to specify materials for ZZ Material Class | | | | | |
| | For CO₂ partial pressures above 200 psia, WETCO recommends considering additional factors that influence the effect of CO₂, including: | | | | | | | | |
| <ul style="list-style-type: none"> • Temperature • pH • H₂S level • Chloride ion concentration | | | <ul style="list-style-type: none"> • Sand production • Water production and composition | | | • Types and relative amounts of produced hydrocarbons | | | |
| consult with engineering to determine if HH-NL should be recommended for some or all components in your assembly | | | | | | | | | |
| Note: | | | | | | | | | |
| <ul style="list-style-type: none"> • Per API 6A: The user is ultimately responsible for the selection of Material Classes and Temperature Ratings of equipment. • The latest edition of NACE MR0175 is referenced by API 6A 20th edition (effective 2-1-05) for sour service, and does not allow 17-4 SS for tubing hanger mandrels or stems above 0.5 psia H₂S partial pressure unless the customer supplies or approves material specifications per section 4.2.3.3 to build ZZ trim equipment for a specific application. The manufacturer cannot rate ZZ equipment for a specific H₂S partial pressure. • Chokes not Included • Please contact Engineering at WETCO with any questions about the use of this information | | | | | | | | | |

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| H2S 0.5 to 1.5 psia NACE sour service Based on equipment working pressure | | | H2S above 1.5 psia NACE sour service Based on equipment working pressure | | |
|---|---|---|--|--|--|
| API service: | DD-1.5 Sour & Non-Corrosive | CO2 below 7 psia & H2S 0.5 to 1.5 psia | API service: | DD-NL Sour & Non-Corrosive | CO2 below 7 psia & H2S above 1.5 psia |
| Part | | Material | Part | | Material |
| General API material requirements for this material class | | | General API material requirements for this material class | | |
| Bodies & Bonnets | | Carbon or Low-Alloy Steel(AISI 4130) | Bodies & Bonnets | | Carbon or Low-Alloy Steel(AISI 4130) |
| Internal Parts | | Carbon or Low-Alloy Steel(AISI 4130) | Internal Parts | | Carbon or Low-Alloy Steel(AISI 4130) |
| Tubing Hanger Mandrels & Stems | | Carbon or Low-Alloy Steel(AISI 4130) | Tubing Hanger Mandrels & Stems | | Carbon or Low-Alloy Steel(AISI 4130) |
| *SS can be used for internal parts, tubing hanger mandrels, or stems | | | *SS can be used for internal parts EXCEPT tubing hanger mandrels & stems | | |
| WETCO Products | | | WETCO Products | | |
| Wellhead, Tbg Head | Carbon or Low-Alloy Steel(AISI 4130) | Wellhead, Tbg Head | Carbon or Low-Alloy Steel(AISI 4130) | | |
| Adpt, Tee, Tree Cap | Carbon or Low-Alloy Steel(AISI 4130) | Adpt, Tee, Tree Cap | Carbon or Low-Alloy Steel(AISI 4130) | | |
| Valves 5M & below | DD-NL | Valves (all): | chk w/ eng-trims vary by model & working pressure | | |
| Valves 10M & up | EE-1.5 w/ 410 SS stem | Tbg Hgr | DD-NL (AISI 4130 ,80 ksi max) | | |
| Tbg Hgr | DD-NL (AISI 4130 ,80 ksi max) | | | | |
| *use FF-1.5 (410 SS) tbg hanger if >80 ksi req'd | | | *use HH-NL (Inconel 718) tbg hanger if >80 ksi req'd | | |
| Customer has the option to specify materials for ZZ Material Class | | | Customer has the option to specify materials for ZZ Material Class | | |
| API service: | EE-1.5 Sour & Slightly Corrosive | CO2 7 to 30 psia & H2S 0.5 to 1.5 psia | API service: | EE-NL Sour & Slightly Corrosive | CO2 7 to 30 psia & H2S above 1.5 psia |
| Part | | Material | Part | | Material |
| General API material requirements for this material class | | | General API material requirements for this material class | | |
| Bodies & Bonnets | | Carbon or Low-Alloy Steel(AISI 4130) | Bodies & Bonnets | | Carbon or Low-Alloy Steel(AISI 4130) |
| Internal Parts | | Stainless Steel(AISI 410) | Internal Parts | | Stainless Steel(AISI 410) |
| Tubing Hanger Mandrels & Stems | | Stainless Steel(AISI 410) | Tubing Hanger Mandrels & Stems | | CRA(Inconel 718, ...) |
| WETCO Products | | | WETCO Products | | |
| Wellhead, Tbg Head | Carbon or Low-Alloy Steel(AISI 4130) | Wellhead, Tbg Head | Carbon or Low-Alloy Steel(AISI 4130) | | |
| Adpt, Tee, Tree Cap | Carbon or Low-Alloy Steel(AISI 4130) | Adpt, Tee, Tree Cap | Carbon or Low-Alloy Steel(AISI 4130) | | |
| Valves(all) | EE-1.5 w/ 410 SS stem | Valves(all) | EE-NL w/ Inconel 718 stem | | |
| Tbg Hgr | FF-1.5(410 SS) | Tbg Hgr | HH-NL (Inconel 718) | | |
| Customer has the option to specify materials for ZZ Material Class | | | Customer has the option to specify materials for ZZ Material Class | | |
| API service: | FF-1.5 Sour & Moderately to Highly Corrosive | CO2 above 30 psia H2S 0.5 to 1.5 psia | API service: | FF-NL Sour & Moderately to Highly Corrosive | CO2 above 30 psia H2S above 1.5 psia |
| Part | | Material | Part | | Material |
| General API material requirements for this material class | | | General API material requirements for this material class | | |
| Bodies & Bonnets | | Stainless Steel(AISI 410) | Bodies & Bonnets | | Stainless Steel(AISI 410) |
| Internal Parts | | Stainless Steel(AISI 410) | Internal Parts | | Stainless Steel(AISI 410) |
| Tubing Hanger Mandrels & Stems | | Stainless Steel(AISI 410) | Tubing Hanger Mandrels & Stems | | CRA(Inconel 718, ...) |
| WETCO Products | | | WETCO Products | | |
| Wellhead, Tbg Head | N/A unless exposed to well flow | Wellhead, Tbg Head | N/A unless exposed to well flow | | |
| Adpt, Tee, Tree Cap | FF-NL(AISI 410) | Adpt, Tee, Tree Cap | FF-NL(AISI 410), any fittings are AISI 316 SS | | |
| Valves(all) | FF-1.5 w/ 410 SS stem | Valves(all) | FF-NL w/ Inconel 718 stem | | |
| Tbg Hgr | FF-1.5(410 SS) | Tbg Hgr | HH-NL (Inconel 718) | | |
| Customer has the option to specify materials for ZZ Material Class | | | Customer has the option to specify materials for ZZ Material Class | | |
| | | | API service: | HH-NL Sour & Moderately to Highly Corrosive | CO2 200 psia & H2S above 0.5 psia |
| Part | | Material | Part | | Material |
| General API material requirements for this material class | | | General API material requirements for this material class | | |
| Bodies & Bonnets | | Low-Alloy Steel(AISI 4130 Inconel 625 Clad) | Bodies & Bonnets | | |
| Internal Parts | | CRA(Inconel 718, ...) | Internal Parts | | |
| Tubing Hanger Mandrels & Stems | | CRA(Inconel 718, ...) | Tubing Hanger Mandrels & Stems | | |
| WETCO Products | | | WETCO Products | | |
| Wellhead, Tbg Head | Use Alloy Steel(AISI 4130) unless exposed to well flow | Wellhead, Tbg Head | Use Alloy Steel(AISI 4130) unless exposed to well flow | | |
| Adpt, Tee, Tree Cap | HH-NL, any fittings are Inconel | Adpt, Tee, Tree Cap | HH-NL, any fittings are Inconel | | |
| Valves(all) | HH-NL | Valves(all) | HH-NL | | |
| Tbg Hgr | HH-NL (Inconel 718) | Tbg Hgr | HH-NL (Inconel 718) | | |
| Customer has the option to specify materials for ZZ Material Class | | | Customer has the option to specify materials for ZZ Material Class | | |
| | | | API service: | HH-NL Sour & Moderately to Highly Corrosive | CO2 200 psia & H2S above 0.5 psia |
| Part | | Material | Part | | Material |
| General API material requirements for this material class | | | General API material requirements for this material class | | |
| Bodies & Bonnets | | Low-Alloy Steel(AISI 4130 Inconel 625 Clad) | Bodies & Bonnets | | |
| Internal Parts | | CRA(Inconel 718, ...) | Internal Parts | | |
| Tubing Hanger Mandrels & Stems | | CRA(Inconel 718, ...) | Tubing Hanger Mandrels & Stems | | |
| WETCO Products | | | WETCO Products | | |
| Wellhead, Tbg Head | Use Alloy Steel(AISI 4130) unless exposed to well flow | Wellhead, Tbg Head | Use Alloy Steel(AISI 4130) unless exposed to well flow | | |
| Adpt, Tee, Tree Cap | HH-NL, any fittings are Inconel | Adpt, Tee, Tree Cap | HH-NL, any fittings are Inconel | | |
| Valves(all) | HH-NL | Valves(all) | HH-NL | | |
| Tbg Hgr | HH-NL (Inconel 718) | Tbg Hgr | HH-NL (Inconel 718) | | |

Non-Nace Carbon or Low-Alloy
Non-Nace Stainless Steel
AISI 4130 (UNS-G41300)
AISI 410 (UNS-S41000)
INCONEL 718 (UNS-N07718)

