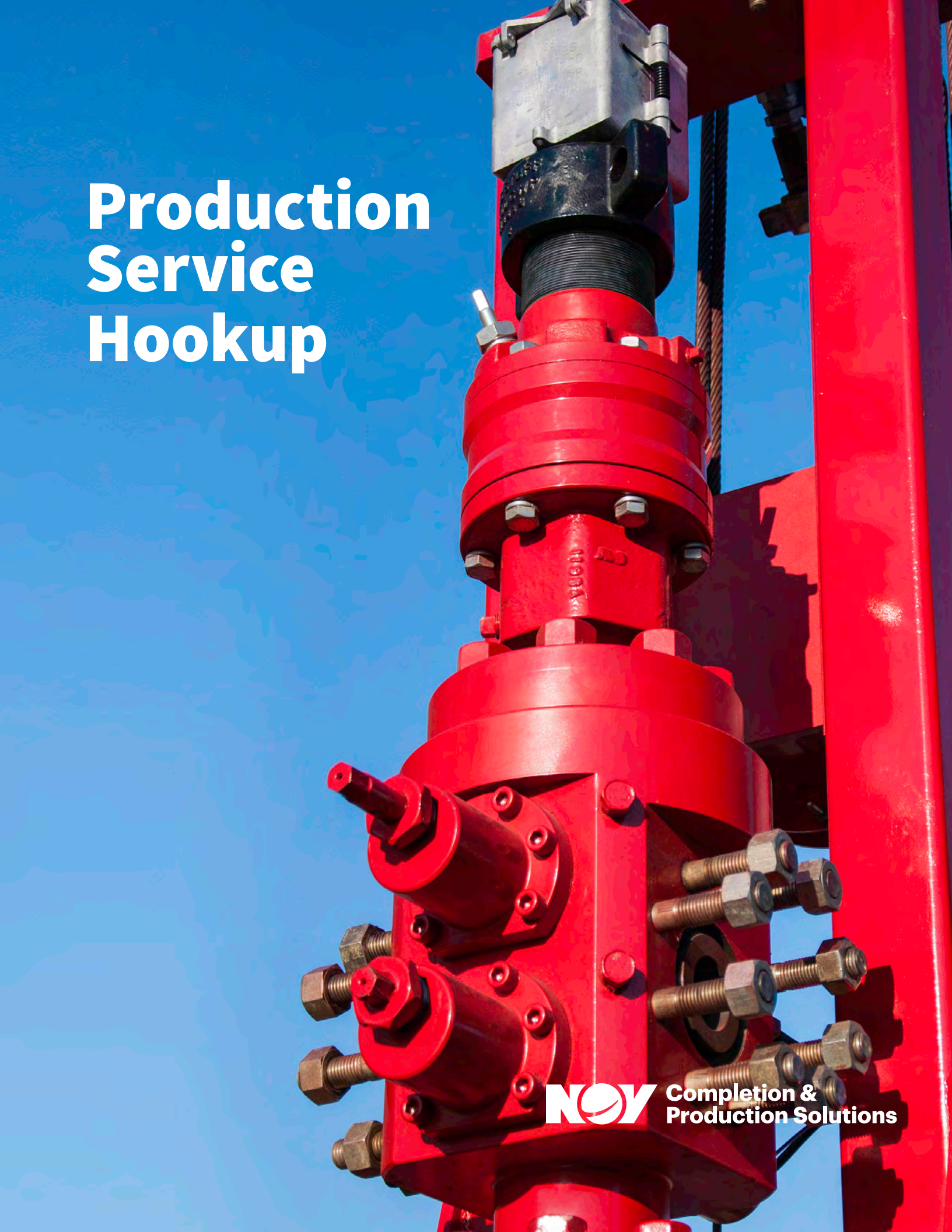
Production Service Hookup



NOV Completion & Production Solutions

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Artificial lift

We deliver a field-proven, highly engineered, comprehensive resource for artificial lift equipment and packaged solutions all over the world. Our breakthrough innovations in hydraulic rod pumping systems, progressing cavity pump systems (PCP), and automation controls and monitoring are changing the way operators view their long-term production through artificial lift. Our artificial lift professionals will collaborate with you to properly evaluate well conditions and provide customized solutions, helping you to optimize your production for the life of your wells. Let us be your new 24/7 production partner.

Production service hookup

Our products are recognized for a superior quality and design, unsurpassed in the oilfield. From the largest range of stuffing boxes and production blowout preventers to the most comprehensive line of polished rod accessories, our equipment can complete a total hookup for your progressing cavity pump and rod pumping applications.

Our products include:

- Stuffing boxes and packing
- Blowout preventers
- Tubing and rod rotators
- Polished rod accessories
- Wellheads
- Hookup accessories

With over 70 years of manufacturing experience, we offer specific designs of production service hookup configurations based on the demands of your well and type of application. Our customers are constantly seeking solutions that allow them to meet their operational goals. In order to achieve their objectives, we focus our designs on:

- Safety
- Pressure control
- Wear prevention
- Maximizing production
- Minimizing downtime
- Well monitoring

Types of configurations

Our available production service hookup can be designed as a complete system:

- Progressing cavity pump service hookup
- Low-pressure rod pump service hookup
- High-pressure rod pump service hookup

Aftermarket

Our products are backed by the reliability and responsiveness of our Services and Aftermarket group. Highly trained field service technicians are on call to handle on-site service needs 24 hours a day, seven days a week. For the long-term support of our products, we offer refurbishment services to bring your existing equipment back to original factory specification.

Our services include:

- Equipment installation and commissioning
- On-site service repair
- Remote diagnostic service
- Equipment refurbishment

Stuffing Boxes

Our range of Hercules™ stuffing boxes provides a superior seal against different types of applications. We offer classic, high-performance, pollution-control, high-temperature products, and accessories.

Classic Stuffing Boxes

Single Pack Stuffing Box (SB)

- Original design
- Superior and dependable performance
- Standard model has lube upper gland (LUG) with grease zerk
- Optional oil reservoir gland (ORG) and APA control device
- Unique misaligning feature reduces need for exact alignment with the pumping unit
- LUG and ORG have two heavy hex nuts on each bolt, which can support up to 20,000 lb when engaged during well servicing

Tee Base Stuffing Box (SBT)

- Combines SB and cross tee with 1-in. bleeder
- Eliminates one threaded connection
- Results in a shorter hookup
- Side outlets:
  - 2-in. LP with 2-in. bottom connection
  - 3-in. LP with 2½- or 3-in. bottom connection
- Standard model has LUG with grease zerk
- Optional ORG and APA control device
- LUG has two heavy hex nuts on each bolt, which can support up to 20,000 lb when engaged during well servicing

Double Packed Stuffing Box (DPSB)

- Most widely used stuffing box in the industry
- Primary packing can be changed under pressure by tightening compression bolts
- Unique misaligning feature reduces need for exact alignment with the pumping unit
- Adaptable to many accessories
- Standard model has LUG with grease zerk
- Optional ORG and APA control device
- LUG has two heavy hex nuts on each bolt, which can support up to 20,000 lb when engaged during well servicing
- Flanged bottom connection available

Regular Inverted Stuffing Box (IVSB)

- Lowest profile design
- Ideal for smaller pumping units
- Furnished with three “top cones” and one “bottom cone.” One top cone (thin cone) can be removed to reduce overall height even further without impairing pressure rating (if reduced packing life is acceptable)
- A polished rod support (PRS) is required during well servicing to prevent the transfer of rod string weight to the packing (see page 24)

Tee Base Inverted Stuffing Box (IVSBT)

- Combines IVSB and cross tee with 1-in. bleeder
- Eliminates one threaded connection
- Lower profile than classic models
- Side outlets:
  - 2-in. LP with 2-in. bottom connection
  - 3-in. LP with 2½- or 3-in. bottom connection
- Furnished with three “top cones” and one “bottom cone.” One top cone (thin cone) can be removed to reduce overall height even further without impairing pressure rating (if reduced packing life is acceptable)
- A PRS is required during well servicing to prevent the transfer of rod string weight to the packing (see page 24)

Double-Packed Inverted Stuffing Box (IVDPSB)

- Exceptionally rugged; built for performance under tough conditions
- Primary packing can be changed under pressure by tightening compression bolts
- Lower profile than classic model
- Furnished with three “top cones” and one “bottom cone.” One top cone (thin cone) can be removed to reduce overall height even further without impairing pressure rating (if reduced packing life is acceptable)
- A PRS is required during well servicing to prevent the transfer of rod string weight to the packing (see page 24)
- Flanged bottom connection available

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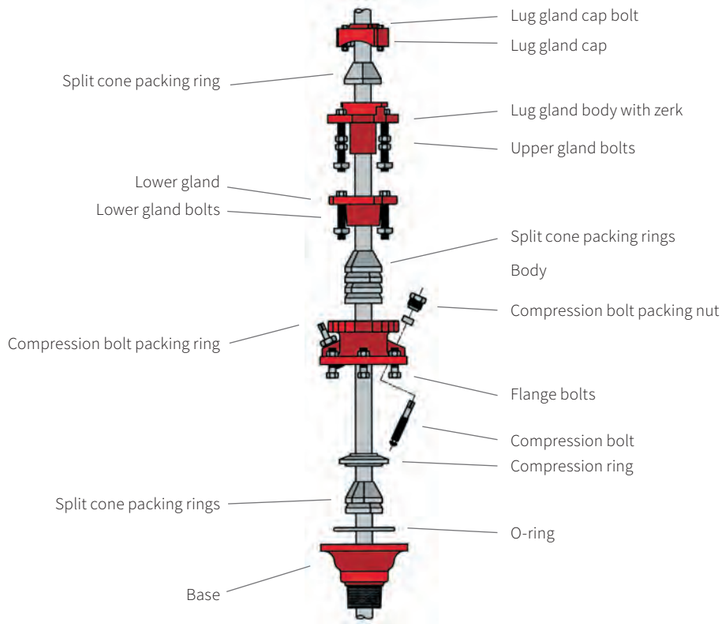
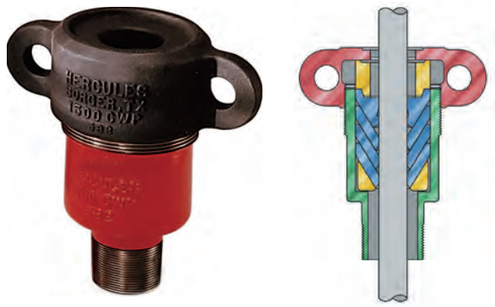
Classic Stuffing Box Specifications

Specifications	SB	SBT	DPSB	IVSB	IVSBT	IVDPSB
Working pressure	1,500 psi	1,500 psi	1,500 psi	1,500 psi	1,500 psi	1,500 psi
Bottom thread (API tubing or LP)	2, 2½, 3, 4 in.	2, 2½, 3 in.	2, 2½, 3, 4 in.	2, 2½, 3, 4 in.	2, 2½, 3 in.	2, 2½, 3, 4 in.
Bottom connection	Male	Female	Male	Male	Female	Male
Weight (w/ Std. LUG**)						
2 in.	24 lb	33 lb	50 lb	19 lb	28 lb	45 lb
2½ in.	25 lb	37 lb	51 lb	20 lb	32 lb	46 lb
3 in.	26 lb	42 lb	52 lb	21 lb	38 lb	47 lb
4 in.	29 lb	N/A	56 lb	24 lb	N/A	51 lb
Height (Includes pin or box connection)	13½ in.	16 in.	17 in.	10 in.	12 in.	14 in.
Material	Ductile iron*			Ductile iron*		
Split cone packing–rod sizes	1, 1⅛, 1¼, 1⅝, 1⅜, 1⅞, 1½, 1¾ in.			1, 1⅛, 1¼, 1⅝, 1⅜, 1⅞, 1½, 1¾ in.		
Pieces required:						
Top cones	4	4	6	3	3	5
Bottom cones	1	1	1	1	1	1

** Corrosion-resistant coatings available; contact customer service.*
***Add 11 lb if equipped with optional HPLUG.*

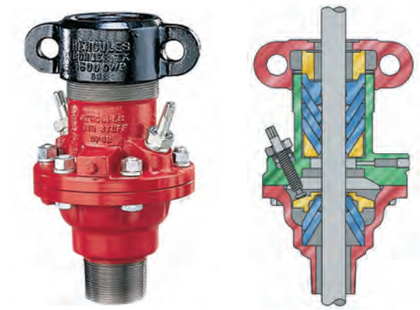


Double-packed stuffing box (DPSB)



Big Stuff™

- Easy to adjust threaded cap-no bolts to tighten
- Cone packing is inverted to achieve a pressure-assisted seal
- Reduces costly packing maintenance time
- Packing compression forces are distributed evenly
- Ideal for short stroke pumping units
- Convenient protection of packing from weight of rod string
- Polished rod lubricator is highly recommended as a grease zerk is not available due to the low profile
- Available with adapters for APA control device or Hercules stuffing box leak detector
- Flanged bottom connection available

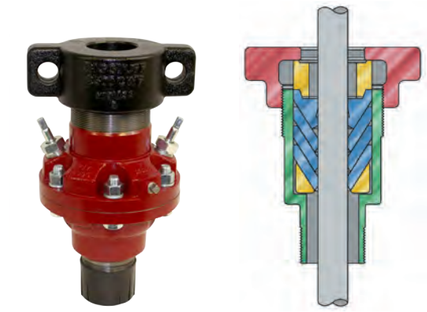


Big Stuff DPSB

- Easy to adjust threaded cap-no bolts to tighten
- Cone packing is inverted to achieve a pressure-assisted seal
- Exceptionally rugged, built for performance under tough conditions
- Primary packing can be changed under pressure by tightening compression bolts to temporarily engage secondary packing
- Two ¼-in. ports (180° apart) for installation of needle valve and grease zerk or pressure gauge, if desired by operator
- Convenient protection of packing from weight of rod string
- Available with adapters for APA control device or Hercules stuffing box leak detector
- Flanged bottom connection available

NACE Big Stuff

- Meets NACE MR0175
- High-pressure service 3,000-psi max CWP
- Cone packing is inverted to achieve a pressure-assisted seal
- Reduces costly packing maintenance time
- Packing compression forces are distributed evenly
- Ideal for short stroke pumping units
- Convenient protection of packing from weight of rod string
- A Hercules polished rod lubricator is highly recommended, as a grease zerk is not available due to the low profile
- Available with adapters for APA control device or Hercules stuffing box leak detector
- Flanged bottom connection available



NACE Big Stuff DPSB

- Meets NACE MR0175
- High-pressure service 3,000-psi max CWP
- Cone packing is inverted to achieve a pressure-assisted seal
- Exceptionally rugged; built for performance under tough conditions
- Primary packing can be changed under pressure by tightening compression bolts to temporarily engage secondary packing
- Two ¼-in. NPT ports (180° apart) for grease zerk and pressure gauge
- Available with adapters for APA control device or Hercules stuffing box leak detector
- Convenient protection of packing from weight of rod string
- Flanged bottom connection available

High-Performance Stuffing Box Specifications

Specifications	Big Stuff	Big Stuff DPSB	NACE Big Stuff	NACE Big Stuff DPSB
Working pressure	1,500 psi	1,500 psi	3,000 psi	3,000 psi
NOTE: 3,000-psi cap is not interchangeable with 2,500-psi models				
Bottom thread	2, 2½, 3, 4 in.	2, 2½, 3, 4 in.	Male	Male
Bottom connection	Male	Male	2, 2½, 3, 4 in.	2, 2½, 3, 4 in.
Weight				
2 in.	20 lb	45 lb	20 lb	47 lb
2½ in.	21 lb	45 lb	21 lb	47 lb
3 in.	21 lb	46 lb	21 lb	48 lb
4 in.	27 lb	49 lb	27 lb	51 lb
Height (Includes pin connection)	9¾ in.	15 in.	9¾ in.	15 in.
Maximum body/cap load	30,000 lb for 2 in. 11.5LV and 40,000 lb for all other sizes			
Body and cap material	Ductile iron*			
Split cone packing - rod sizes	1, 1⅛, 1¼, 1 5/16, 1⅜, 1 7/16, 1½, or 1¾ in.		1⅛, 1¼, 1 5/16, 1½, or 1¾ in.	
Pieces required:				
Top cones	3	5	3	4
Bottom cones	1	1	1	2

* *Corrosion-resistant coatings available; contact customer service.*

Classic PCSB & NACE Big Stuff PCSB

- An enhanced version of Hercules DPSB using PCSB
- Adapter unit below the BOP section and LUG is replaced with PCSB upper gland (aka Hercules HPLUG)
- If polished rod breaks below stuffing box, flapper closes automatically
- Two independently adjustable packing chambers—primary cone packing in DPSB body and V-ring packing in PCSB upper gland (V-rings contain full working pressure)
- Pollution-control adapter acceptable to -50°F (-45.5°C)
- Pollution-control adapter meets NACE MR0175
- Base has ½-in. NPT test port
- Adaptable to APA control device or Hercules SB leak detector
- Primary packing can be changed under pressure
- Unique misaligning feature in classic PCSB reduces need for exact alignment with the pumping unit
- Flanged bottom connection available
- Available with 1,500- or 3,000-psi Big Stuff DPSB top section (with or without HPLUG)
- Corrosion-resistant coating available
- Available with Dome™ primary packing

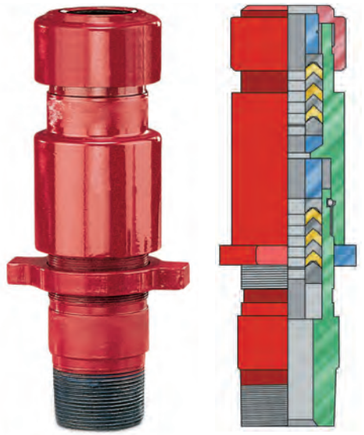
Note: V-ring packing for PCSB is not interchangeable with HTD V-ring packing.

Polution-Control Stuffing Box Specifications

Specifications	Classic PCSB	NACE Big Stuff PCSB
Working pressure	1,500 psi	3,000 psi
Bottom thread (API tubing or LP)	2, 2½, 3 in.	2, 2½, 3 in.
Bottom connection	Male or flanged	Male or flanged
Weight		
2 in.	105 lb	123 lb
2½ in.	110 lb	128 lb
3 in.	115 lb	133 lb
Height (threaded)	24½ in.	25¼ in.
Material		
Base and adapter spool	Low-temperature steel	Low-temperature steel
Flapper	Stainless steel	Stainless steel
Body and packing glands	Ductile iron*	Ductile iron body and caps carbon steel HPLUG body
Split cone packing – rod sizes	1⅛, 1¼, 1½, 1¾ in. *	1⅛, 1¼, 1½, 1¾ in. **
Pieces required:		
Top cones	5	5
Bottom cones	1	1
V-ring packing OD	2½ in.	2½ in.
V-ring stack height	3 in.	3 in.

**PCSB V-packing only available in these sizes. Classic PCSB can be ordered with LUG or ORG if 1, 1 3/16, 1⅜ or 1 7/16 in. cone packing is required.*
***Big Stuff PCSB cannot be ordered with HPLUG in 1, 1 5/16, 1⅜, or 1 7/16 in.*

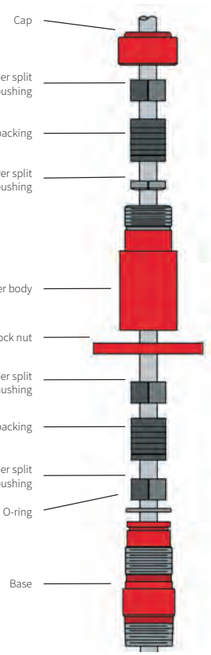
High-Temperature Stuffing Boxes



High-Temperature Double-Packed Stuffing Box (HTD)

- Designed for high-pressure and high-temperature wells
- Meets NACE MR0175
- Lower packing can be temporarily energized by loosening lock ring and tightening upper body to allow changing primary packing under pressure
- Dual packing chamber
- Primary packing can be changed under pressure
- Versatile chamber design accepts different types of packing, including V-ring, standard crown ring compression, and *Kevlar/PTFE square braid rope packing
- Can be installed on API flanged trees using a Hercules companion flange
- Single-pack version available for low-profile installations

** Kevlar is a trademark of E.I. du Pont de Nemours and Company.*



HTD packing is not interchangeable with PCSB packing.
HTD uses three upper split bushings and one lower split bushing.

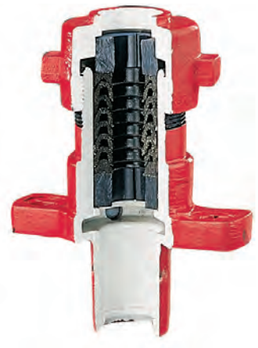
High-Temperature Stuffing Box Specifications

Specifications	HTD
Working pressure	3,000 psi
Bottom thread (API tubing or LP)	2, 2½, 3, 4 in.
Bottom connection	Male
Weight	
2 in.	31 lb
2½ in.	32 lb
3 in.	33 lb
4 in.	35 lb
Height (includes pin connection)	14 in.
Material	
Body, base and cap	Alloy steel*
Lock nut	Carbon steel*
Split bushings	Bronze*
Rod sizes	1⅛, 1¼, 1½, 1¾ in.
Packing OD	2¼ in.
Stack height (primary or secondary)	2½ in.

Packing type	Maximum temperature
NBR V-ring	250°F (121°C)
HSN V-ring	325°F (163°C)
FKM V-ring	400°F (204°C)
Kevlar/PTFE	540°F (282°C)

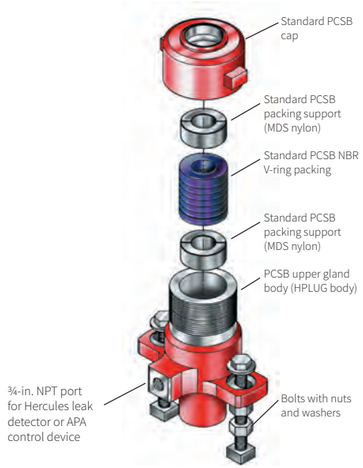
**Corrosion-resistant coatings available; contact customer service.*

Stuffing Box Accessories



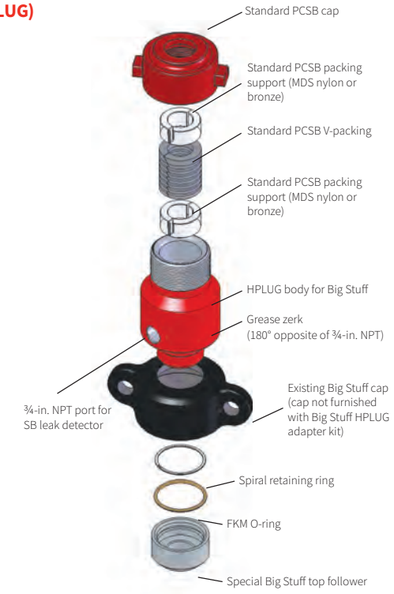
High-Performance Lubricating Upper Gland (HPLUG)

- Provides a secondary seal for stuffing boxes
- Allows installation of Hercules stuffing box leak detector or APA control device
- Fits any Hercules classic model stuffing box
- Zerk fitting for periodic greasing using ordinary NLGI-2 automotive chassis lubricant
- NBR V-ring packing standard (optional: HSN or FMK V-ring; or braided Kevlar)
- Brass packing support rings are supplied with HSN, FMK, or Kevlar packing
- Rod sizes: 1⅛, 1¼, 1½, or 1¾ in.
- Body and cap: ductile iron
- Upper/lower packing rings: MDS nylon (bronze optional)
- Uses same bolts as Hercules LUG



High-Performance Lubricating Upper Gland (Big Stuff HPLUG)

- Required accessory for installation of Hercules stuffing box leak detector on all Big Stuff and Big Stuff DPSB models
- Can also be used for installing Hercules APA control device on all Big Stuff and Big Stuff DPSB models (in place of Hercules SB leak detector)
- Provides a secondary seal for all Big Stuff and Big Stuff DPSB stuffing box models
- Zerk fitting for periodic greasing
- NBR V-ring packing standard (optional: HSN or FMK V-ring; or braided Kevlar)
- Brass packing support rings are supplied with HSN, FMK, or Kevlar packing
- Rod sizes: 1⅛, 1¼, 1½, or 1¾ in.
- Body and cap meet NACE MR0175
- Upper/lower packing support rings: MDS nylon (standard) or bronze (for high-temperature applications)
- Retrofitting existing Big Stuff models requires a special top follower
- Can also be used with models equipped with Dome packing (requires special Big Stuff Dome APA/HPLUG top follower)
- ¾-in. NPT side port allows attachment of leak detector or APA control device
- Uses same packing, packing support rings, and cap as PCSB



Standard Oil Reservoir Gland (ORG)

- Designed for use on problem wells that pump or flow off
- Holds one quart of 30W motor oil (or other viscosity as necessary for extreme high- or low-temperature applications)
- ¾-in. NPT port for installation of APA control device

Note: Cannot be used with leak detector.

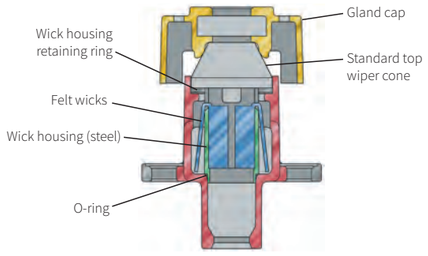
- Top split cone wiper controls oil film on polished rod
- Modified version available for Hercules IVSB, IVSBT, and IVDPSB models
- Optional for all Hercules classic models
- Rod sizes: 1, 1⅛, 1¼, 1$^{5}/_{16}$, 1⅜, 1$^{7}/_{16}$, 1½, or 1¾ in.
- Material: ductile iron
- Standard ORG cap and drain nipple capture oil that escapes past loose or worn wiper cone
- LUG gland cap option recommended to prevent water from prematurely shutting down well

High-Performance Oil Reservoir Gland (HPORG)

- Provides polished rod lubrication and extends packing life
- Wicks reduce oil consumption
- ¾-in. NPT port for installation of APA control device

Note: Cannot be used with leak detector.

- Top split cone wiper controls oil film on polished rod
- Optional for all Hercules classic models
- Rod sizes: 1, 1⅛, 1¼, 1$^{5}/_{16}$, 1⅜, 1$^{7}/_{16}$, 1½, or 1¾ in.
- Material: ductile iron



Lubricating Upper Gland (LUG)

- Standard on classic models
- Zerk fitting for periodic greasing
- Top split cone wiper controls oil film on polished rod
- Extends packing life and reduces maintenance costs
- Rod sizes: 1, 1⅛, 1¼, 1$^{5}/_{16}$, 1⅜, 1$^{7}/_{16}$, 1½, or 1¾ in.
- Material: ductile iron

Leak Detector

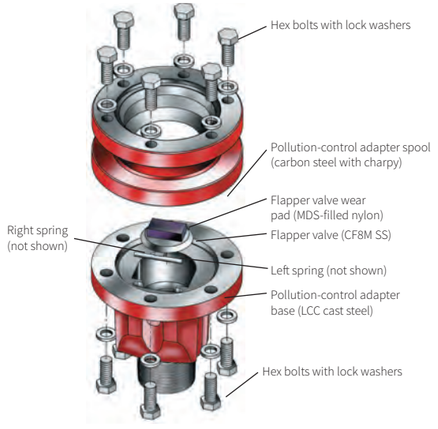
- Adapts to all Hercules classic stuffing boxes and Hercules Big Stuff stuffing boxes equipped with HPLUG
- Consists of the following:
  - Pressure-activated shutdown switch
    - Meets NEC Class 1, Div. 1 requirements
    - Provides positive shutdown of the flow
    - Easily wired to SCADA or a controller
  - Manifold connection
- Two ½-in. ports and one ¾-in. port allow custom installation
- ¾-in. end cap allows easy clean-out of blockage
- HPLUG required for installation (not included; must purchase separately)
- Set at 18 psi as standard
- Available in 1,500, 2,500, and 3,000 psi

Anti-Pollution Adapter (APA) Control Device

- The original Hercules leak detection system used to prevent costly stuffing box spills; used worldwide since 1975
- Converts Hercules ORG to APA
- Can also be used with HPORG or HPLUG
- Durable stainless steel container
- Meets NEC Class 1, Div. 1 (with explosion-proof switch)
- Switch options: Standard or explosion-proof with NEC Class 1, Div. 1, UL, FM, CSA approvals, and CE conformance mark
- Approximately 3 L capacity

Pollution-Control Adapter

- Compatible with any Hercules DPSB
- Can be retrofitted on existing double-packed stuffing box
- Comprehensive spill protection from polished rod breaks
- Suitable for cold weather service, -50°F (-45.5°C)
- Meets NACE MR0175
- ½-in. NPT test port
- Base options:
  - 2-in. EUE Male — 2 $^{1}/_{16}$-in. 2,000-psi API flange
  - 2½-in. EUE Male — 2 $^{9}/_{16}$-in. 2,000-psi API flange
  - 3-in. 8V LP Male — 3 $^{1}/_{16}$-in. 2,000-psi API flange
  - 3-in. EUE Male — 2 $^{9}/_{16}$-in. 5,000-psi API flange



Stuffing Box Packing

We offer a broad range of sizes, materials, and designs to best fit your stuffing box configuration. Our Hercules packing is compatible with various models of stuffing boxes. Whether you have a mild or extreme application, our various packing compounds will match your well conditions.

Dome Packing

- Rod sizes: 1⅛, 1¼, 1$^{5}/_{16}$, 1⅜, 1½, or 1¾ in.
- Dramatically reduces stuffing box failures and maintenance costs
- Rubber packing with unique PTFE seal ring
- PTFE seal ring minimizes contact between rubber and polished rod
- Low coefficient of friction
- Less heat buildup
- Lower drag on polished rod
- Unique bowl shape converts vertical compression forces into radial forces for a tight seal around polished rod
- Automatically compensates for changes in flowline pressure
- One-time conversion kit to retrofit most cone-packed stuffing boxes
- Designed for easy replacement using packing pullers (available from National Oilwell Varco—P/N 99756K14)
- U.S. patent number: 5622371

Packing pullers

Sure-Pak™ Packing

- Soft+ handles temperatures to 160°F (71°C)
- Pressure-handling capabilities to 2,500 psi
- Rubber packing with unique PTFE seal ring
- Effectively dissipates heat
- Enhances fluid sealing control
- Longer packing service life
- Fewer packing gland adjustments required
- U.S. patent number: 5845909

H_2S and Conversion CO_2 Table

1,000 PPM	0.1%
2,000 PPM	0.2%
10,000 PPM	1.0%
20,000 PPM	2.0%
50,000 PPM	5.0%
100,000 PPM	10.0%
150,000 PPM	15.0%
200,000 PPM	20.0%
350,000 PPM	35.0%

PPM = Parts per million

Packing Material Table

Material	Maximum % H_2S	Maximum % CO_2	Maximum temperature
NBR Dome	2%	Not recommended	250°F (121°C)
HSN Dome	10%	20%	325°F (163°C)
TFEP (Aflas) Dome	35%	15%	450°F (232°C)
Sure-Pak Soft +	2%	Not recommended	160°F (71°C)
Sure-Pak "G"	10%	20%	325°F (163°C)

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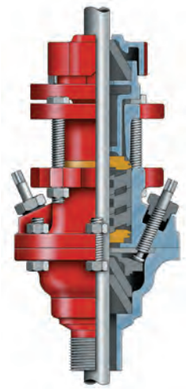
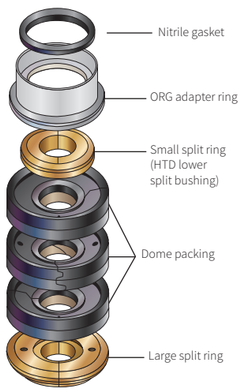
Dome Packing Configurations

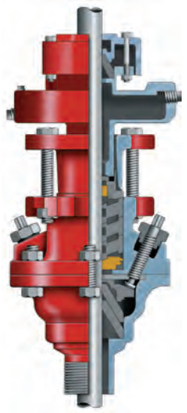
Conversion kit for Dome packing and lub upper gland



Lub upper gland with Dome packing



ORG adapter with Dome packing



Hercules DPSB with ORG and Dome packing

Selection Criteria for Rubber Compounds in Stuffing Boxes and BOPs

Rubber compound		Maximum service temperature with concentrations of H_2S and CO_2 below 1%		Maximum service temperature with concentrations of H_2S and CO_2 at maximum tolerance levels		Maximum tolerances for H_2S	Maximum tolerances for CO_2	Resistance to explosive decompression in CO_2 concentrations up to 20%	Performance in steam environments	Mechanical, tear, and abrasive resistance
Name	ASTM Type	°F	°C	°F	°C					
Soft, Hard, Special lubricated, Heavy duty, PTFE Filled, Hercules gold	SBR	160	71	160	71	2%	NR	Poor	Poor	Good
Compound C Compound D	NBR	300	149	250	121	2%	10%	Good	Good	Excellent
Compound G	HNBR	325	163	300	149	10%	20%	Good to excellent	Very good	Excellent
Compound H	EPDM	425	218	35 0	177	5%	NR	Poor	Good	Fair
Compound S™ Compound ST	SBR	160	71	160	71	2%	2%	Poor	Poor	Good
Nitrile Dome	NBR	250	121	150	65	2%	5%	Fair	Poor	Good
HSN Dome	HNBR	325	163	300	149	10%	20%	Good to excellent	Very good	Excellent
*Aflas Dome	TFEP	450	232	350	177	35%	15%	Fair	Excellent	Fair

Note: Above temperatures are suggested "Maximum short-term" ratings and should not be considered as a "Continuous operating temperature."

NR–Not recommended
SBR–Styrene butadiene rubber
NBR–Nitrile rubber
HSN–Highly saturated nitrile or hydrogenated nitrile
EPDM–Ethylene propylene
** Aflas is a registered trademark of Aashi Glass Co. Ltd.*

Cone and V-ring Packing

The most important feature of stuffing box packing is long-lasting performance. NOV continually tests new and better materials to meet the demands for ever-changing well conditions. Extensive field tests make certain new packing stands up to stringent durability and performance standards. Cone packing is available in sizes for all polished rods 1 through 1¾-in. in sets of four (three top cones and one bottom cone) and five (four top cones and one bottom cone).

Packing type	Description
Hercules Gold	For sweet crudes with high oil-to-water ratios, low sand content, and where salt or corrosion buildups on polished rod have caused premature wear of other packings
Soft cone packing	For sweet crudes with high oil-to-water ratios and low sand content
Hard cone packing	For sweet crudes with low oil-to-water ratios
Slick Pack™ (Compound S™)	For reducing polished rod noise "squeaking" in noise-sensitive locations on crudes with high oil-to-water ratios and low sand content
Special lubricated	For sweet crudes with high oil-to-water ratios and low sand content
Heavy-duty	For prolonged service on sweet crudes and wells without constant flow
PTFE filled	For sweet crudes and wells with long stroke and fast pumping cycles
Compound C	For steam injection wells producing sweet crudes
Compound G	For H_2S and CO_2 wells
Slick pack with Teflon flakes (Compound ST)	For reducing polished rod noise ("squeaking") in noise-sensitive locations on sweet crudes that pump off or have long stroke and fast pumping cycles
Compound D	For steam injection wells where polished rod scoring is a concern
Compound H	For steam injection wells

Note: The guidelines on this page are for general reference purposes only and should not be used as the sole determining factor for packing material selection. Each downhole condition is different and must be addressed on a case-by-case basis to determine the best material solution for each particular well.

Cone Packing

Material	Maximum % H_2S	Maximum Temperature
Soft+	2%	160°F (71°C)
Hard	2%	160°F (71°C)
Compound S	2%	160°F (71°C)
Special lubricated	2%	160°F (71°C)
Heavy-duty	2%	160°F (71°C)
PTFE filled	2%	160°F (71°C)
Compound ST	2%	160°F (71°C)
Compound C	2%	300°F (149°C)
Compound D	2%	300°F (149°C)
Compound H	5%	350°F (177°C)
Compound G*	10%	325°F (163°C)
Hercules Gold	2%	160°F (71°C)

* *Recommended for CO_2 in concentrations up to 20%.*

Other Packing

Material	Product	Maximum % H_2S	Maximum temperature
NBR V-ring	PCSB and HTD	2%	250°F (121°C)
HSN V-ring	PCSB and HTD	10%	325°F (163°C)
FKM V-ring	PCSB and HTD	20%	400°F (204°C)
Kevlar/PTFE	HTD	20%	540°F (282°C)

PCSB and HTD V-ring are not interchangeable.
HTD packing OD is 2¼ in., PCSB HPLUG OD is 2½ in.

V-ring packing

Blowout Preventers

We provide an extensive offering of blowout preventers for well control and monitoring. Our various designs of BOPs can handle a wide range of pressures and extreme applications.

150H Single Ram BOP

- Caps have hammer lugs and ACME threads for fast removal and replacement (ACME threads eliminate cross-threading)
- Cap with internal threads protected from the environment
- Lugless cap option for installation on API flanged bonnets
- Blowout-proof ram screw
- Full opening
- Reinforced ram block reduces extrusion
- Cap O-ring provides reliable, pressure-tight seal

200P Single Ram BOP

- Taper-threaded end caps with blowout-proof ram screw
- Reinforced ram block reduces extrusion
- Higher working pressure than 150H
- Full opening
- 2 to 3 in. EUE thread connections (3-in. EUE is 3.5-in. OD 8RD EUE)
- Optional NACE trim
- Optional low-temperature carbon steel (200 PS model)
- Carbon steel models available with welded flanges in API flanged x flanged or flanged x threaded (200 PF model)

150H and 200P BOPs

Specifications	150H			200P		
Sizes available	2 in.	2½ in.	3 in.	2 in.	2½ in.	3 in.
Vertical bore	1.975 in.	2.560 in.	2.970 in.	2.120 in.	2.440 in.	3.000 in.
Working pressure	1,500 psi			2,000 psi		
Body and cap material	Ductile iron*			Ductile iron,* carbon steel		
Ram material	See page 20					
Ram screw and packing gland	Carbon steel**			Alloy steel		
Ram sizes	Blind, ⅝, 1, 1⅛, 1¼, 1½, 1¾ in.			Blind, ⅝, 1, 1⅛, 1¼,1½, 1¾ in.		
Ram screw packing	Acrylic braided PTFE			NBR, HSN, and FKM		
Connection	Male x female thread			Male x female thread or flange		
Optional flange connections	N/A			2⁵⁄₁₆-in. 2,000, 2⁵⁄₁₆-in. 2,000, 3⅛-in. 2,000***		
Height	9½ in.			10 in.		
Weight	43 lb			52 lb		
Width (rams open)	20 in.			26 in.		
Handles	Optional			Optional		

Note: 150H and 200P rams are not interchangeable. Also, they are "directional" due to the internal reinforcement plate. Always install with "THIS SIDE UP" sticker facing up.

* *Corrosion-resistant materials and coatings available; contact customer service.*

** *NACE stainless steel optional*

*** *Other flange sizes available*

150H and 200P Ram Materials

	NBR	Compound C	HSN	FKM	AFLAS
Maximum temperature	250°F (121°C)	300°F (149°C)	325°F (163°C)	400°F (204°C)	450°F (232°C)
Maximum H_2S	2%	2%	10%	20%	35%
Maximum CO_2	NR	10%	20%	5%	15%

Always install with yellow "THIS SIDE UP" lettering facing up to minimize extrusion under pressure.

Note: Above temperatures are suggested Maximum short-term ratings and should not be considered as a "Continuous operating temperature."

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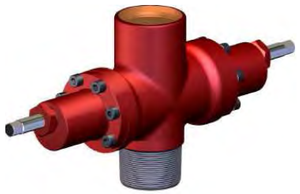
Blowout Preventers



3K Single Ram BOP

- 3,000-psi MWP
- Connections: 2⅜, 2⅞, and 3½ in. EUE female x male (standard)
- Rams: Blind, 1¼, 1½ in.
- Standard models NACE-compliant
- All-steel construction eliminates risk of casting porosity
- ¼-in. NPT ports above and below rams for bleeding pressure

3K Single Ram ITBOP (Integral Tee BOP)

- 3,000-psi MWP
- Standard models NACE-compliant
- Integral flow tee reduces stack height
- Connections: 3⅛, 7 1/16, and 11 in. (see spec table)
- Rams: Blind, 1¼, 1½ in.
- Integral tee outlets are 2 or 3 in.
- All-steel construction eliminates risk of casting porosity

5K Single Ram BOP

- 5,000-psi MWP
- Standard models NACE-compliant
- Connections: 2 9/16 -in. 5,000 API bottom x top
- Rams: Blind, 1¼, 1½ in.
- All-steel construction eliminates risk of casting porosity

5K Dual Ram ITBOP

- 5,000-psi MWP
- Standard models NACE-compliant
- Integral flow tee reduces stack height
- Connections: 2 9/16-in. 5,000 API bottom x studded top
- Rams: Blind, 1¼, 1½ in.
- Integral tee outlets:
  - Standard models have two 2-in. line pipe outlets
  - Flanged models have two 2 1/16-in. 5,000 studded outlets

10K Dual Ram ITBOP

- 10,000-psi MWP
- Standard models NACE-compliant
- Integral flow tee reduces stack height
- Connections: 2 9/16-in. 10,000 API bottom x studded top
- Rams: Blind, 1¼, 1½ in.
- Integral tee outlets are 2 1/16-in. 10,000 studded
- All-steel construction eliminates risk of casting porosity

Blowout Preventer Specifications

3K Single BOP and 3K Single ITBOP

Specifications	3K BOP			3K Single ITBOP		
Top connections	2⅜ in. EUE	2⅞ in. EUE	3½ in. EUE	3⅛ in. 3K API flanged	3⅛ in. 3K API studded	3⅛ in. 3K API studded
Bottom connections	2⅜ in. EUE	2⅞in. EUE	3½ in. EUE	3⅛ in. 3K API flanged	7 1/16 in. 3K API flanged	11 in. 3K API studded
Vertical bore	1.975 in.	2.56 in.	2.97 in.	3 in.		4 in.
Working pressure	3,000 psi			3,000 psi		
Body and cap material	Alloy steel			Alloy steel		
Ram material	Alloy steel			Alloy steel		
Ram screw and packing gland	Alloy steel			Alloy steel		
Ram size options	Blind, 1¼, and 1½ in.			Blind, 1¼, and 1½ in.		
Ram screw packing ring	HSN (HNBR)			HSN (HNBR)		
Side outlet connections	N/A			2- x 3-in. LP or 2- x 2-in. LP		
Height	10¼ in.			14 in.	9 11/16 in.	15.88 in.
Weight	70 lb			220 lb	235 lb	680 lb
Width (Rams open/closed)	23.625/ 20.5 in.			20.53/ 17.63 in.		24.78/28.06 in.

Note: Rams are directional. Rams cannot be removed and turned upside down to change top X bottom connection orientation.

5K Single, 5K Dual ITBOP, and 10K Dual ITBOP

Specifications	5K Single BOP	5K Dual ITBOP	10K Dual ITBOP
Top connection	2 9/16 in. 5K API studded		2 9/16 in. 10K API studded
Bottom connection	2 9/16 in. 5K API flanged		2 9/16 in. 10K API flanged
Vertical bore	2.56 in.		2.59 in.
Working pressure	5,000 psi		10,000 psi
Body and cap material	Alloy steel		Alloy steel
Ram material	Alloy steel		Alloy steel
Ram screw and packing gland	Alloy steel		Alloy steel
Ram size options	Blind, 1¼, and 1½ in.		Blind, 1¼, and 1½ in.
Ram screw packing ring	HSN (HNBR)		HSN (HNBR)
Side outlet connections	N/A	2-in. LP (standard) or optional 21/16 in. 5K API studded	2 1/16 in. 10K API studded
Height	13 in.	16½ in.	18½ in.
Weight	153 lb	260 lb	334 lb
Width (Rams open/closed)	23.625/20.5 in.		23.45/20.64 in.

Note: Rams are directional. Rams cannot be removed and turned upside down to change top X bottom connection orientation.

3K, 5K, and 10K Ram Materials

Ram material	AISI 4130
Ram seal	HSN
Maximum temperature	325°F (163°C)
Maximum H_2S	10%
Maximum CO_2	20%

Note: Above temperatures are suggested Maximum short-term ratings and should not be considered as a "Continuous operating temperature."

Polished Rod Accessories

We manufacture Hercules polished rod accessories to assist with maintenance and prolong the life of your polished rod. Throughout years of field-proven experience, our products have been engineered to meet your quality expectations.

Figure Clamps

- Indention style
- Rugged, yet light and easy to handle
- Lower stress concentrations in polished rods
- Highest clamping capacity at any bolt torque
- Independent clamping segments on a common hinge
- Bolts have to be tightened only once
- Ends are precision machined perpendicular to axis of polished rod
- Streamlined design
- Small rotating diameter for use with rod rotators
- Zinc phosphate coating for better corrosion resistance
- Most economical design in the industry

Caution: All models can only be used on piston steel polished rods. Rod clamps are not capable of gripping the spray-metal section of "hard-faced" or "hard-coated" polished rods. Installation of rod clamps on the spray-metal portion of a hard-faced/hard-coated polished rod may also crack the hard coating.

Figure Clamp 1 *Figure Clamp 2* *Figure Clamp 3*

Rod Boss and Rod Boss Jr. clamps

- Friction style–Rod Boss
- Indention style–Rod Boss Jr.
- Zinc phosphate coating for better corrosion resistance

Rod Boss *Rod Boss Jr.*

Polished Rod Clamps

Specifications	Figure Clamp 1	Figure Clamp 2	Figure Clamp 3	Rod Boss	Rod Boss Jr.
Rated load	13,000 lb	26,000 lb	40,000 lb	40,000 lb	25,000 lb
Maximum test load	32,000 lb	64,000 lb	76,000 lb	55,000 lb	35,000 lb
Polished rod size	1, 1⅛, 1¼, 1⅜, 1½ in.	1, 1⅛, 1¼, 1⅜, 1½ in.	1, 1⅛, 1¼, 1⅜, 1½ in.	1¼ or 1½ in. (1⅛ in. not available)	1⅛, 1¼, 1½ in.
Recommended maximum bolt torque	250 ft-lb	250 ft-lb	250 ft-lb	550 ft-lb	250 ft-lb
Weight	3¾ lb	7½ lb	11¼ lb	25 lb	10½ lb
Height	2½ in.	5 in.	7½ in.	6¾ in.	4⅛ in.
Rotating diameter	5¾ in.	5¾ in.	5¾ in.	9 in.	9 in.
Body material	Forged steel	Forged steel	Forged steel	Forged steel	Forged steel
Nut hex size	1¼ in.	1¼ in.	1¼ in.	1⅜ in.	1⅜ in.

Caution: Do not exceed the bolt torque values specified above; otherwise, galling of bolt threads may occur.

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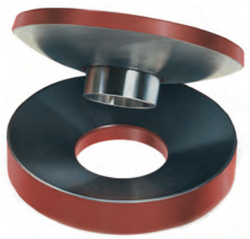
Polished Rod Accessories



Leveling Plate

- Minimizes polished rod breaks
- Compensates for carrier bar misalignment up to 2°
- Installed under rod rotator, or under polished rod clamp if rotators are not used
- Available for all polished rod sizes
- Ensures uniform engagement between polished rod clamp and carrier bar

Note: Mating convex and concave surfaces should be lubricated with grease prior to installation.

Polished Rod Support

- Prevents crushing of packing by transferring rod load to stuffing box body
- Designed for use with Hercules SB, SBT, and DPSB stuffing boxes equipped with standard LUG
- Constructed of lightweight, high-strength aluminum alloy
- Weight: 25 lb
- Maximum load: 50,000 lb

Lubricator

- Provides convenient polished rod lubrication
- Easy installation–use with any style of stuffing box
- Lubrication extends stuffing box packing life
- Uses one quart of ordinary motor oil
- Uses replaceable felt wicks (specify rod size when ordering)
- Available for all polished rod sizes
- 5½-in. height

Stuffing Box Clamp

- Assists operator in safely changing out primary packing in double-packed stuffing box
- Holds top portion of stuffing box on the polished rod to allow access to the primary packing
- Can be used on polished rod sizes from 1¼ to 1¾ in.

Hercules Bullet

- Used to assist in the installation of a polished rod through a stuffing box
- Reduces risk of damaging polished rod threads, stuffing box packing, and flapper valve on PCSB stuffing boxes
- Includes cross-hole to assist removal from polished rod
- Available part numbers and sizes:
  - 150B–1.5 x 1-in. bullet
  - 875B–1.5 x ⅞-in. bullet
  - 100036–1.25 x ⅞-in. bullet

Rod Rotators

Rod rotation is the most effective means of removing paraffin from inside the tubing and distributing wear evenly. Our Hercules rod rotators are field-proven leaders in the industry.

Rod Rotators

Specifications	T-164	T-164SG	T-252	T-253[1]	T-302	T-302SG	T303[1]	T303SG[1]
Max output torque	106 ft-lb	106 ft-lb	120 ft-lb	280 ft-lb	240 ft-lb	240 ft-lb	240 ft-lb	240 ft-lb
Max recommended load	13,000 lb	13,000 lb	33,000 lb	33,000 lb	40,000 lb	40,000 lb	40,000 lb	40,000 lb
Required opening between bridle lines	4 in.	4 in.	6 in.	6 in.	7 in.	7 in.	7 in.	7 in.
Polished rod sizes	1⅛ to 1¼ in.	1⅛ to 1¼ in.	1⅛ to 1½ in.	1⅛ to 1½ in.	1⅛ to 1¾ in.	1⅛ to 1¾ in.	1⅛ to 1¾ in.	1⅛ to 1¾ in.
Shipping weight	18 lb	18 lb	35 lb	36 lb	47 lb	47 lb	48 lb	48 lb
Height	4¼ in.	4¼ in.	5½ in.	5¾ in.	6½ in.	6½ in.	6½ in.	6½ in.
Rotation type	Helical gear	Helical gear	Ratchet table	Helical gear	Helical gear	Helical gear	Helical gear	Helical gear
Body material	Ductile iron	Ductile iron	Ductile iron	Ductile iron	Ductile iron	Ductile iron	Ductile iron	Ductile iron
Actuator cable length*	16 ft	16 ft	16 ft	16 ft	25 ft	25 ft	25 ft	25 ft
90° lever pulls per revolution	28	42	24	35	77	154	77	154
Actuator type	Ratchet	Ratchet	Ratchet	Clutch	Ratchet	Ratchet	Clutch	Clutch
Identifying colors	Body: Red Cap: Red Nut: Unpainted	Body: Yellow Cap: Yellow Nut: Unpainted	Body: Red Cap: Red Nut: Unpainted	Body: Red Cap: Red Nut: Gray	Body: Red Cap: Red Nut: Unpainted	Body: Yellow Cap: Yellow Nut: Unpainted	Body: Red Cap: Gray Nut: Gray	Body: Yellow Cap: Gray Nut: Gray

** Cable lengths available upon request: 10, 16, and 25 in.*
Note: Rotators must be under load to operate (except for no-slip models). "Bench testing" to verify functionality is not recommended.
[1] Patent pending

Tubing Rotators

We have been providing effective tubing wear solutions for over 70 years. Whether using rod pumping units or progressing cavity downhole pumps, we offer the most complete package of wear prevention solutions, including tubing rotators. Our RODEC™ tubing rotators and swivels cover a wide range of products designed to effectively distribute wear evenly around the entire internal circumference of the production tubing. The application of these products can dramatically increase tubing life span and reduce operating costs proportionately.

RODEC “C” Low-Profile Rotator/RODEC “C” Integral Rotator (3 in 1)

Field-proven with years of effective service performance, the RODEC “C” models significantly decrease production costs per barrel. The RODEC “C” tubing rotators’ patented technology radically slows tubing wear resulting in savings of service rig costs and downtime. The compact design allows for easy installation on any existing well or new completion.

- Uses separate rotating hanger that sits in the customer tubing head. Hanger and rotator are coupled through a spline connection.
- Split rotating hanger option (J-slot) for setting tubing in tension is available.
- Rotating elements and mechanism are isolated from the wellbore, annular fluid, and gases, preventing corrosion damage.
- Overall height for the RODEC “C” low-profile rotator is 5 in., while the RODEC “C” integral rotator is about 12 in.

RODEC "C" low-profile rotator

RODEC "C" integral rotator

RODEC “C” Low-Profile Rotator

Tubing string hung from rotating hanger landed on customer wellhead

Tubing string hung from split rotating hanger landed on customer wellhead

RODEC “C” Integral Rotator

Tubing string hung from rotating hanger landed on customer wellhead

Tubing string hung from split rotating hanger landed on customer wellhead

RODEC RII Tubing Rotator

Featuring a modular design, the RODEC RII tubing rotator is the most versatile unit in the market due to its ability to adapt to flanged and threaded cap wellheads. The main body or spool is the same for all configurations having a wide variety of top and bottom connectors.

Depending on customer needs, the following tubing hanger options are available:

- Tubing string hung directly from the tubing rotator inner mandrel (separate hanger not required)
- Tubing string hung from a double box bushing that connects to the tubing rotator (separate hanger not required) This option allows for landing an anchor catcher and setting the tubing string in tension
- Tubing string hung from a rotating hanger landed in the tubing head body
- Tubing string hung from a split rotating hanger landed in the tubing head body; this option incorporates a J-slot connection enabling for landing an anchor catcher and setting the tubing string in tension
- Low-profile design
- Compatible with a wide range of wellhead configurations (either threaded cap style or flanged)
- Top-end connections can be either API male threads or stud-thru flanges
- Top-end connections can be either API male threads, stud-thru flanges, or ITBOP

Top Connection

ITBOP on top (standard/swivelling)

Pin-up top connection

Flanged top connection

Body + Wellhead Connection

Threaded Cap Wellhead Connection

Tubing string hung from tubing rotator gear mandrel

Tubing string hung from tubing rotator double-box bushing

Flanged Wellhead Connection

Tubing string hung from tubing rotator gear mandrel

Tubing string hung from tubing rotator double-box bushing

Tubing string hung from split rotating hanger landed on customer wellhead

Tubing string hung from rotating hanger landed on customer wellhead

RODEC High-Temperature Tubing Rotator

Capable of operating in temperatures up to 650°F (343°C) and pressures up to 3,000 psi, the RODEC high-temperature tubing rotator can be installed on any wellhead configuration that complies with API specifications. In addition, it can rotate any size of production tubing with an API thread connection.

The RODEC high-temperature tubing rotator has a patented, self-energized sealing mechanism that does not require service or adjustment.

- Low-profile design
- Does not require a separate tubing hanger

RODEC Ultimate Tubing Rotator

By only adding 9 to 10½ in. of height to the wellhead, the RODEC Ultimate tubing rotator is one of the most compact rotators in the market. As a fixed component of the wellhead, it remains in place during well servicing, having the BOP installed on top. The unit acts as a tubing head, complete with lockdown screws. It is studded down to fit any existing API tubing head and flanged up to rigidly support other components. The tubing hanger is landed in the tubing rotator spool and replaces the need for a conventional tubing hanger.

- Retrofits any well with an existing tubing head
- Compatible with rotating and reciprocating applications
- Minimum maintenance and field repairable

RODEC Dual String Hanger and Tubing Rotator

Including a side-entry access for chemical injection or coiled tubing jobs, the RODEC dual string hanger and tubing rotator is a powerful solution for complex applications. Two tubing strings can be independently hung from the custom-built spool furnished with lockdown screws, but only the production tubing is rotated.

- Separate connections for hanging each tubing string
- Secondary hold-down mechanism included for the production tubing hanger
- ITBOP included

Tubing Rotator Specifications

		RII	C low-profile	C integral	Ultimate	Dual string hanger	High temperature
Wellhead connection	Flange	7 1/16 in. 9 in. 11 in.	7 1/16 in. 9 in.	7 1/16 in. 9 in.	7 1/16 in. 9 in. 11 in.	11 in.	7 1/16 in. 11 in.
	"Threaded cap"	7⅝ in. 8⅝ in.	————	————	————	————	————
Pressure rating		2,000 psi 3,000 psi	2,000 psi 3,000 psi	2,000 psi	2,000 psi 3,000 psi	2,000 psi	3,000 psi
Top connection	Flange	2 9/16 in. 3⅛ in. 7 1/16 in.	7 1/16 in. 9 in.	————	7 1/16 in. 9 in. 11 in.	————	————
	Thread	2⅞ in. EUE 3½ in. EUE 4½ in. LP	————	————	————	————	2⅞ in. EUE 3½ in. EUE 4½ in. NUE 5½ in. CSG
	ITBOP	3⅛ in.	————	3⅛ in.	————	3⅛ in.	————
ITBOP	Polished rod	1¼ in. 1½ in.	————	1¼ in.	————	1¼ in. 1½ in.	————
	Pipeline outlets	2 in. LP 3 in. LP	————	2 in. LP 3 in. LP	————	2 in. LP 3 in. LP	————
	Pressure rating	3,000 psi	————	2,000 psi	————	3,000 psi	————
Tubing sizes		2⅜ in. EUE 2⅞ in. EUE 3½ in. EUE 4½ in. NUE	2⅞ in. EUE 3½ in. EUE		2⅜ in. EUE 2⅞ in. EUE 3½ in. EUE 4½ in. EUE 5½ in. CSG	2⅜ in. EUE 3½ in. EUE	2⅞ in. EUE 3½ in. EUE 4½ in. NUE 5½ in. CSG
Torque rating		2,400 ft-lbf	2,200 ft-lbf		1,800 ft-lbf. (7 1/16 in.) 2,250 ft-lbf (9 in.) 1,200 ft-lbf(11 in.)	2,200 ft-lbf	2,400 ft-lbf
Temperature rating	Standard seals*	320°F (160°C)	320°F (160°C)		320°F (160°C)	320°F (160°C)	————
	High temp. seals	————	450°F (232°C)		————	————	650°F (343°C)
Thrust-bearing load rating (rotator or hanger as applicable)**		60,000 lbf (standard) 128,750 lbf (heavy-duty) 162,000 lbf (custom)			60,000 lbf (standard) 128,750 lbf (HD)	60,000 lbf	132,840 lbf (7 1/16 in.) 204,370 lbf (11 in.)
Drive system		Manual BPU				————	BPU
	Electric motor	12 volt 110 volt 240/460 volt					

** Standard seals are highly saturated nitrile (HSN).*

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Tubing and Anchor Catch Swivels

RODEC Slimline Tubing Swivel

Engineered to meet demanding applications requiring a tubing swivel, the RODEC downhole tubing swivel allows for installing and removing mechanically set tools. Working in conjunction with a RODEC tubing rotator, it enables the tubing string to be rotated during production while keeping the downhole pump anchored.

- Mechanical clockwise rotation setting/counterclockwise rotation unsetting
- Reduced outside diameter
- Redundant seals to protect against wellbore fluids
- Extended length on the pin thread for applying power tongs

RODEC Anchor Catcher Swivel

The RODEC anchor catcher swivel has been engineered to be used in conjunction with a right-hand set anchor catcher in applications where the production tubing is installed in tension. The AC swivel allows for mechanically setting the anchor in a clockwise direction upon installation; the tubing can then be pulled into tension and rotated during production.

- Mechanical clockwise rotation setting/counterclockwise rotation unsetting
- Redundant seals to protect against wellbore fluids

Downhole Tubing Swivel Specifications

		Slimline			Anchor Catcher	
Connections		2⅜ in. EUE	2⅞ in. EUE	3½ in. EUE	2⅞ in. EUE	3½ in. EUE
Pressure rating		6,000 psi	6,000 psi	6,000 psi	6,000 psi	6,000 psi
Dimensions	Max. OD	3.84 in. (97.54 mm)	3.84 in. (97.54 mm)	4.50 in. (114.30 mm)	4.63 in. (117.48 mm)	5.13 in. (130.18 mm)
	Drift	2.38 in. (60.33 mm)	2.38 in. (60.33 mm)	2.90 in. (73.66 mm)	2.50 in. (63.50 mm)	3.00 in. (76.20 mm)
	Overall length	23.3 in. (593 mm)	27.8 in. (706 mm)	29.1 in. (738 mm)	20.9 in. (530 mm)	20.9 in. (530 mm)
Shear torque (shear pins)**		576 ft-lbf	576 ft-lbf	684 ft-lbf	600 ft-lbf	700 ft-lbf
Continuous torque rating		2,000 ft-lbf	2,000 ft-lbf	2,000 ft-lbf	2,000 ft-lbf	2,000 ft-lbf
Thrust-bearing load rating		55,285 lbf	55,285 lbf	67,800 lbf	66,300 lbf	77,400 lbf
Temperature rating	Standard seals*	320°F (160°C)	320°F (160°C)	320°F (160°C)	320°F (160°C)	320°F (160°C)

** Standard seals are highly saturated nitrile (HSN).*

***For higher shear torque requirements, please consult your sales representative.*

Wellheads

Our wellheads are dependable on the design excellence of Hercules casing and tubing heads, which are unmatched in the industry.

Wellheads

Our Hercules patented slip design with positive mechanical stop limits slip travel and reduces stress in the wellhead body. The advanced top metal ring design reduces the gap between the top metal ring halves, preventing packing extrusion and minimizing water and dirt entrapment. Pressure-assisted contoured packing assures positive pack-off with minimum compression. The slip design allows as much weight as the threaded connection will withstand without crushing the casing ID below API drift diameter.

- Patented positive mechanical stop slip design is nonrestrictive to side outlet flow, limits slip travel, reduces hoop stress in wellhead body, slip load capacity equals thread joint capacity and will not crush pipe ID below API drift
- Contoured packing design for improved seal
- Improved top metal ring design prevents packing extrusion
- Interchangeable internal casing head parts on 1,500, 2,000, and 3,000 psi

Options

- Casing head sizes: 7-, 8⅝-, 9⅝-, and 10¾-in. bottom connections
- Tubing head sizes: 2-, 2½-, 3-, 4½-, 5½-, and 7-in. bottom connections
- MWP up to 3,000 psi
- Submergible designs available
- Accessories include: flange adaptors, belled nipples, couplings, and tubing clamps

Hookup Accessories

In order to achieve a complete and tailored configuration for the production service hookup, we offer a range of products to suit the needs of your application: valves, unions, flow tees, chokes, and pressure regulators.

Well King™ Back Pressure Regulators

- Liquid or gas service
- Reduces paraffin by keeping gas in solution
- Less free gas and better lubrication at the stuffing box
- Increases pump efficiency by keeping bottomhole pressure above the bubble point
- Differential pressure type–recommended for systems where downstream pressure is less than 10% of set pressure
- All models have ¼-in. NPT pressure port for upstream pressure gauge installation
- Connections:
  - Standard: 2-in. male LP inlet x single 2-in. female LP outlet
  - Four-way cross: 2-in. male LP inlet x dual 2-in. female LP outlet
  - In-line: 2-in. female LP inlet x single 2-in. female LP outlet
- External body shell components for all assemblies have a 2,000-psi “shell test pressure” capability

Standard 2-in. back pressure regulator

Four-way cross

In-line 2-in. back pressure regulator

2-in. Back Pressure Regulator

Pressure Range	Orifice	Ball Size	Spring Material
5 to 200 psi	.875 in.	1.125 in.	Monel
10 to 500 psi	.875 in.	1.125 in.	302 SS
10 to 900 psi	.875 in.	1.125 in.	Carbon steel
10 to 1,000 psi	.683 in.	1.000 in.	Elgiloy
10 to 1,500 psi	.683 in.	1.000 in.	Carbon steel*

** Same spring used in 10-900-psi model*

Optional Sand Trim

- Carbide-tipped plunger and carbide seat, which replaces ball and seat and lower spring keeper
- Available in 200, 500, 900 and 1,000 psi (not available in 1,500 psi)
- 10- to 1,000-psi model fully meets NACE MR0175
- Less vibration
- Smoother flow
- More abrasion resistance
- Greater control sensitivity

Adjustable Choke B-29

- Thumb screw secures stem-setting position
- Stem can be lubricated with standard grease gun
- Available carbide trim for increased abrasion resistance
- Stainless steel model available by special order for NACE applications

Specifications	B-29
Size	2- x 2-in. LP
Working pressure	2,000 psi
Maximum orifice size	¾ in.
Height	
Open	17⅝ in.
Closed	16⅜ in.
Weight	20 lb

Note: Adjustable chokes are not intended to be used as shutoff valves.

Hookup Accessories

Pumping Flow Tees

- Ductile iron construction
- Most precise alignment in the industry
- Hundreds of thread combinations
- 2-, 2½-, and 3-in. cast steel tees meeting NACE MR0175 available
- Corrosion-resistant coatings available
- Four-way cross configuration available in 2- and 4-in. LP
- 1-in. NPT standard (or smaller) bleeder port
- 2-in. bleeder available in some sizes (bleeder port can be left blank by request)

Pumping flow tees 3,000-psi WP

3,000-psi Working Pressure Heavy-Duty Tees

Model no.	Bottom thread (tubing or LP)	Top thread (tubing or LP)	Major side outlet (LP)	Height	Weight
CT-7	2 in.	2 in.	2 in.	6 in.	9 lb
CT-13	2 in. male	2 in.	2 in.	7¼ in.	7 lb
CT-8	2 in.	2½ in.	2 in.	7¼ in.	13 lb
CT-17	2 in.	3 in.	2 in.	8 in.	21 lb
CT-1	2 in.	3 in.	3 in.	8 in.	18 lb
CT-18	2½ in.	2 in.	2 in.	7¼ in.	13 lb
CT-11	2½ in.	2½ in.	2 in.	7¼ in.	13 lb
CT-14	2½ in. male	2½ in.	2 to 2½ in.	8 in.	10 lb
CT-9	2½ in.	2½ in.	2½ in.	7¼ in.	12 lb
CT-19	2½ in.	2½ in.	3 in.	8 in.	20 lb
CT-12	2½ in.	3 in.	2 in.	8 in.	20 lb
CT-10	2½ in.	3 in.	2½ in.	8 in.	20 lb
CT-16	2½ in. male	3 in.	2 in.	8 in.	10 lb
CT-2	2½ in.	3 in.	3 in.	8 in.	18 lb
CT-20	3 in.	2½ in.	2 in.	8 in.	20 lb
CT-21	3 in.	2½ in.	2½ in.	8 in.	20 lb
CT-22	3 in.	2½ in.	3 in.	8 in.	20 lb
CT-23	3 in.	3 in.	2 in.	8 in.	20 lb
CT-3	3 in.	3 in.	3 in.	8 in.	18 lb
CT-25	3 in. male	3" in.	2 to 3 in.	9½ in.	19 lb
CT-4	4 in.	3 in.	3 in.	7¾ in.	22 lb
CT-24	4 in.	4 in.	3 in.	7¾ in.	21 lb
CT-6	4 in.	4 in.	4 in.	7¾ in.	18 lb

Other models available.
Note: Pumping tee test pressure > 1.5 x working pressure (male threads) and 2 x working pressure (female threads).
** Corrosion-resistant coatings available; contact customer service.*
*** CT-1, CT-2, and CT-3 available in carbon steel with welded 3.12-in. 2M or 3M API top flange for attachment of PCP drive head.*

Hookup Accessories

Valves

All Hercules and Magnum™ valves provide trouble-free service and are constructed of only the highest-quality materials. Our valves are available in a variety of body styles and materials to meet or exceed applicable industry standards.

Hercules Ball Valves

Material options

- Carbon steel
- Stainless steel
- Bronze
- Ductile iron
- Cast steel

Specifications

- Pressure range 200- to 1,200-psi MWP
- Temperature up to 500°F (260°C)
- Size range ¼ to 3 in.

Magnum Valves

Our valves have a 316SS construction that is NACE-compliant.

Configuration options

- Straight pattern
- Angle pattern
- Gauge valves
- Mini valves
- Bleed valves
- Needle valves

Specifications

- Pressure up to 10,000-psi MWP
- Temperature up to 1,000°F (538°C)
- Size range ⅛ to 1 in.

Unions

Our Yale™ union design allows valves and other fittings to be removed easily from the production line. This feature offers special advantages when the fitting is installed in a short section of line, since it is not necessary to “spread” or bend the line when removing the fitting.

Configurations

- Figure 110 “Insulating Unions”
- Figure 210 “Blanking Union”
- Figure 300I “Insulating Unions”
- Figure 300 “Flat Face”
- Figure 310 “Threaded Choke”
- Figure 800 “Quick Stab”
- Figure 800R “Quick Stab”

Material options

- Carbon steel
- Alloy steel
- Ductile iron

Specifications

- Pressure ranges from 500- to 12,500-psi MWP
- Temperature up to 500°F (260°C)
- Size ranges from ¼ to 8 in.

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