Coke Drum Bottom Unheading Valve

Low Maintenance

Small Footprint, Lighter Design

Ultra Low Steam Consumption

Hydraulic and Electric Actuation

DeltaValve

Delayed Coking Products and Services

Bottom and Top Unheading Valves

Retractable Center Feed Injection Devices

Auto-Switch Boring/Cutting Tools

Isolation Valves

Aftermarket / Field Services

EPC Management

The Value of a Trusted Partner

DeltaValve

DeltaValve's extensive experience in designing and building engineered severe-service industrial valves and equipment for delayed cokers has made us a world-recognized industry leader. In 2001, DeltaValve designed, engineered, and installed the world's first fully automated, fully enclosed coke drum unheading valve at the Chevron refinery in Salt Lake City, Utah. This valve revolutionized coke drum unheading by replacing traditionally unsafe and unreliable manual or semi-manual unheading equipment, with a fully automated system. The result has been a safer working environment, reduced downtime, and increased productivity.

Today we offer a full range of products for delayed coking including bottom and top coke drum unheading valves, isolation valves, hydraulic and electric actuation, controls and interlocks, auto-switch coke cutting tools and enclosures, and the retractable center feed injection device. We listen to our customers and strive to provide innovative products that are designed and engineered to meet the critical service requirements of delayed coking.

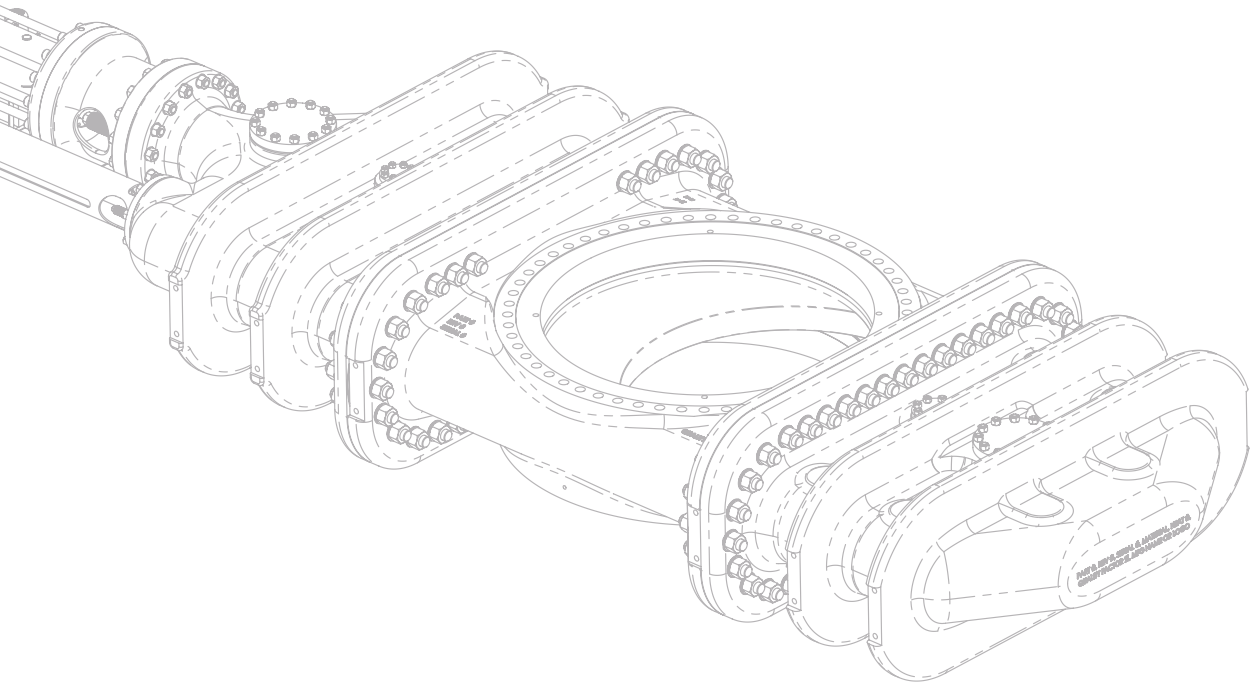
DeltaValve is a trusted partner; delivering safe, reliable products while providing the best value for our customers. From the moment a customer contacts us, through delivery, installation, and beyond, we are there to provide unparalleled products, service, and support. We continually strive to make our products and services "Best in Class."

Coke Drum Bottom Unheading Valve

Redesigned with smaller body and bonnet components, the new bottom unheading valve is lighter than earlier versions, maintaining its reputation as the smallest and lightest fully automated bottom unheading valve in the industry. The small footprint of this bottom unheading valve makes it ideal for both space-constrained retrofit and new installation applications.

The new bottom unheading valve is available with traditional hydraulic actuation or with our “planetary roller screw” electric actuation system. With a fully sealed housing to prevent contamination and optimize lubrication, the electric actuator requires only minimal maintenance. Furthermore, the electric actuator can dramatically reduce the overall installated cost when compared to installing an unheading system that utilizes hydraulics.

The bottom unheading valve is part of a fully enclosed system from the top of the coke drum to the coke accumulation pit. The bottom unheading valve is designed for fully automated, safe and reliable operation and now bottom unheading can be achieved with the push of a button from a remote location.



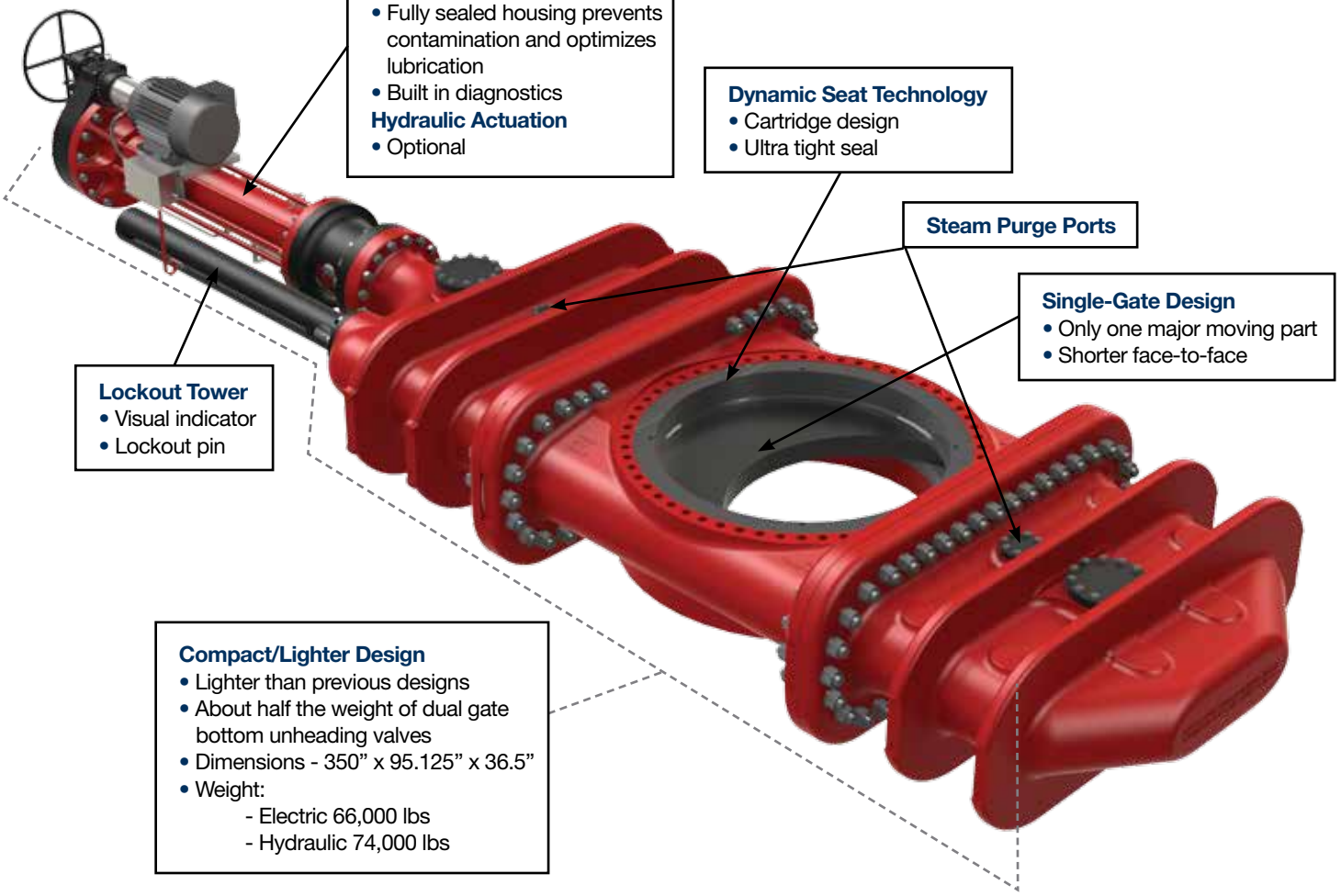
Engineering and Design

Single Gate Versus Double Gate Design

The single gate design of DeltaValve's bottom unheading valve has only one major moving part. The simplicity of this design significantly reduces the possibility of failure, less potential down-time and more production. Additionally, DeltaValve's single gate design has a shorter face-to-face and a smaller overall footprint as compared to the larger, heavier, and more complicated double gate design.

Seat Seal

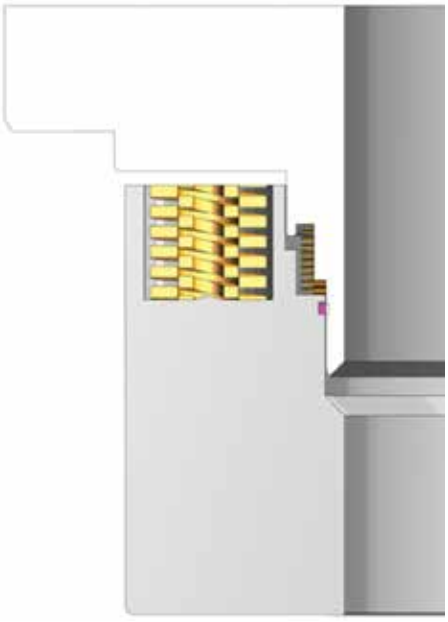
Improved upper and lower seats allow for the use of longer Inconel coil springs, which hold a lower stress state than shorter springs. This provides for an extended spring life. These features, in addition to more robust packing, combine to provide ultra-low steam consumption.



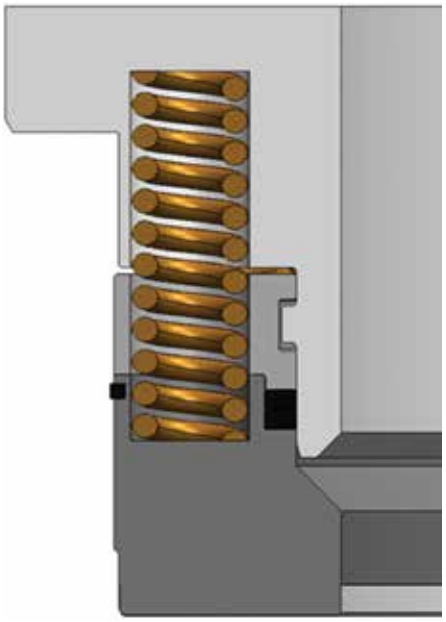
Seat Design

Compared to previous bottom unheading valve seats, the upgraded seat design provides up to 60 percent more springs. Tighter spacing and a more even load distribution results in a consistent seal against the valve gate. Inconel coil springs have also been implemented in the new seat design and maintain a lower overall stress state due to their longer length. The lower spring stress results in extended spring life and long-term performance.

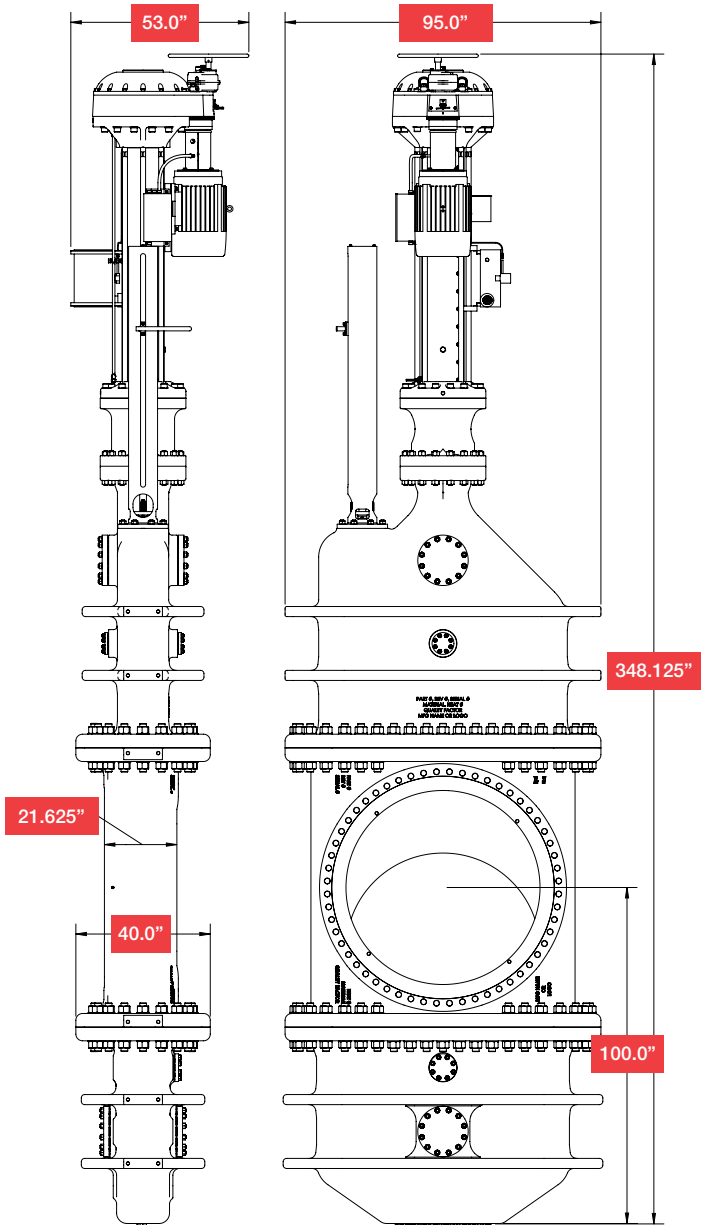
Original Seat Design



Upgraded Seat Design

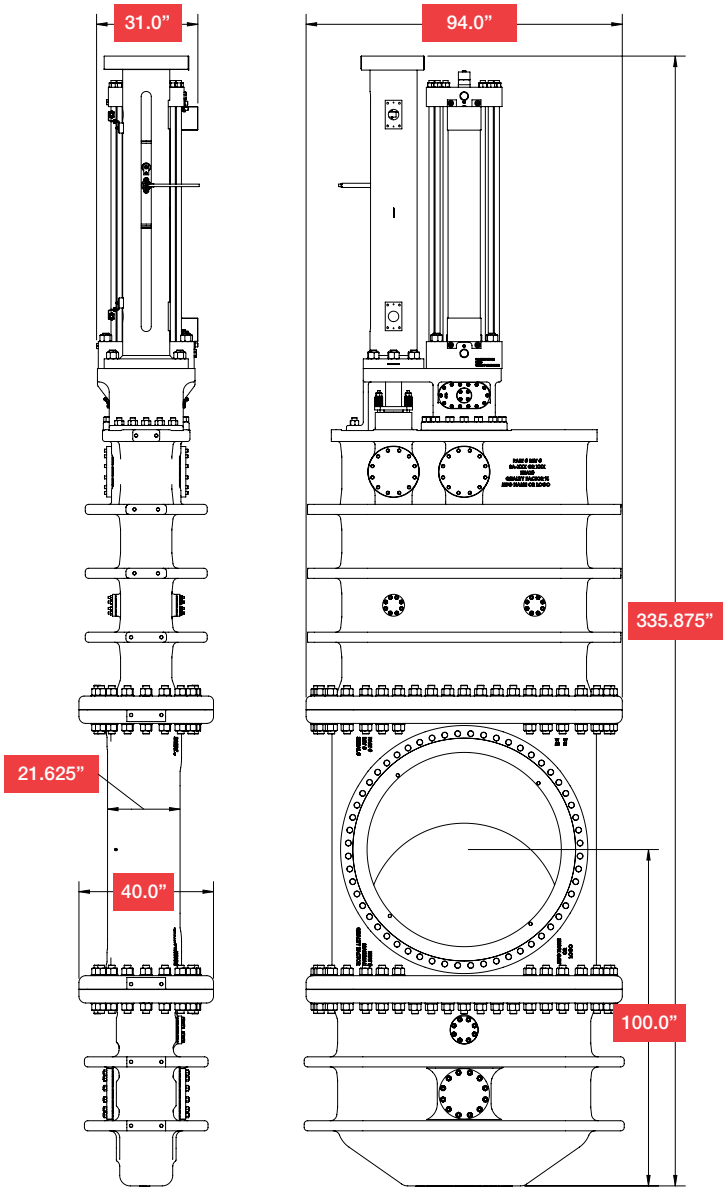


Dimensions and Weights



Bottom Unheading Valve with Electric Actuator

Dimensions	348.125” x 95.0” x 40.0”
Weight	66,000 lbs.



Bottom Unheading Valve with Hydraulic Actuator

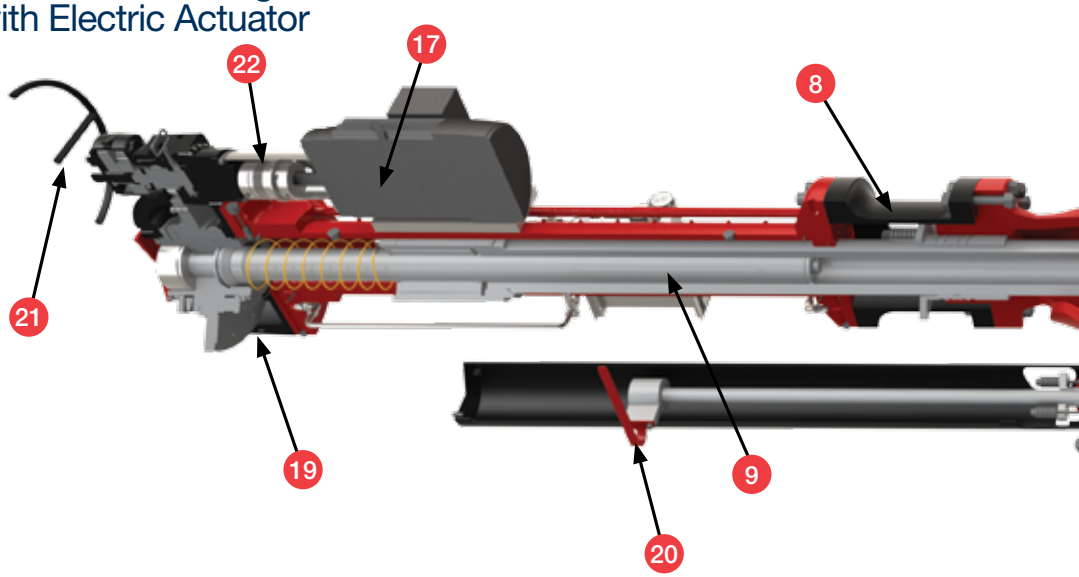
Dimensions	335.875” x 95.0” x 40.0”
Weight	74,000 lbs.

Technical Specifications

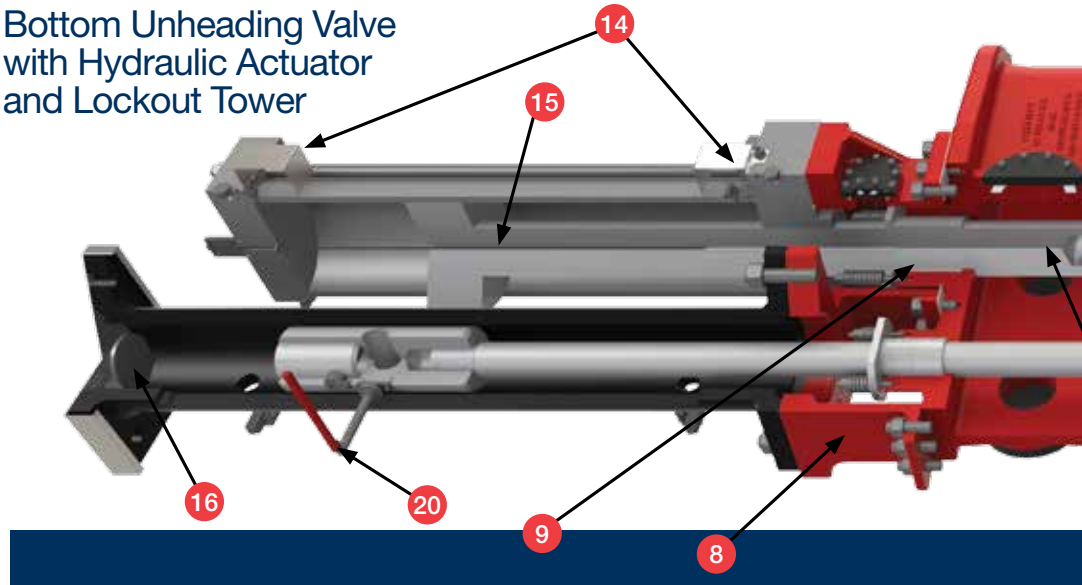
Parts and Materials

Design	Per ASME section VIII Div. 1, 2
Body Material	ASME SA217 Gr5
Bonnet Material	ASME SA217 WC9 or ASTM SA216 WCC ASME SA387 Gr22 CL2 or SA516 Gr70
Interlocks/Controls/HPU	Engineered to plant specifications
Purge Media	Steam
Shut-off	Double block and purge with 100% verifiable process isolation
Drum Flange	57.75” (1467mm) Standard
Maximum Design Pressure	154 PSIG (1062 kPa) @ 940°F (505°C)

Bottom Unheading Valve with Electric Actuator

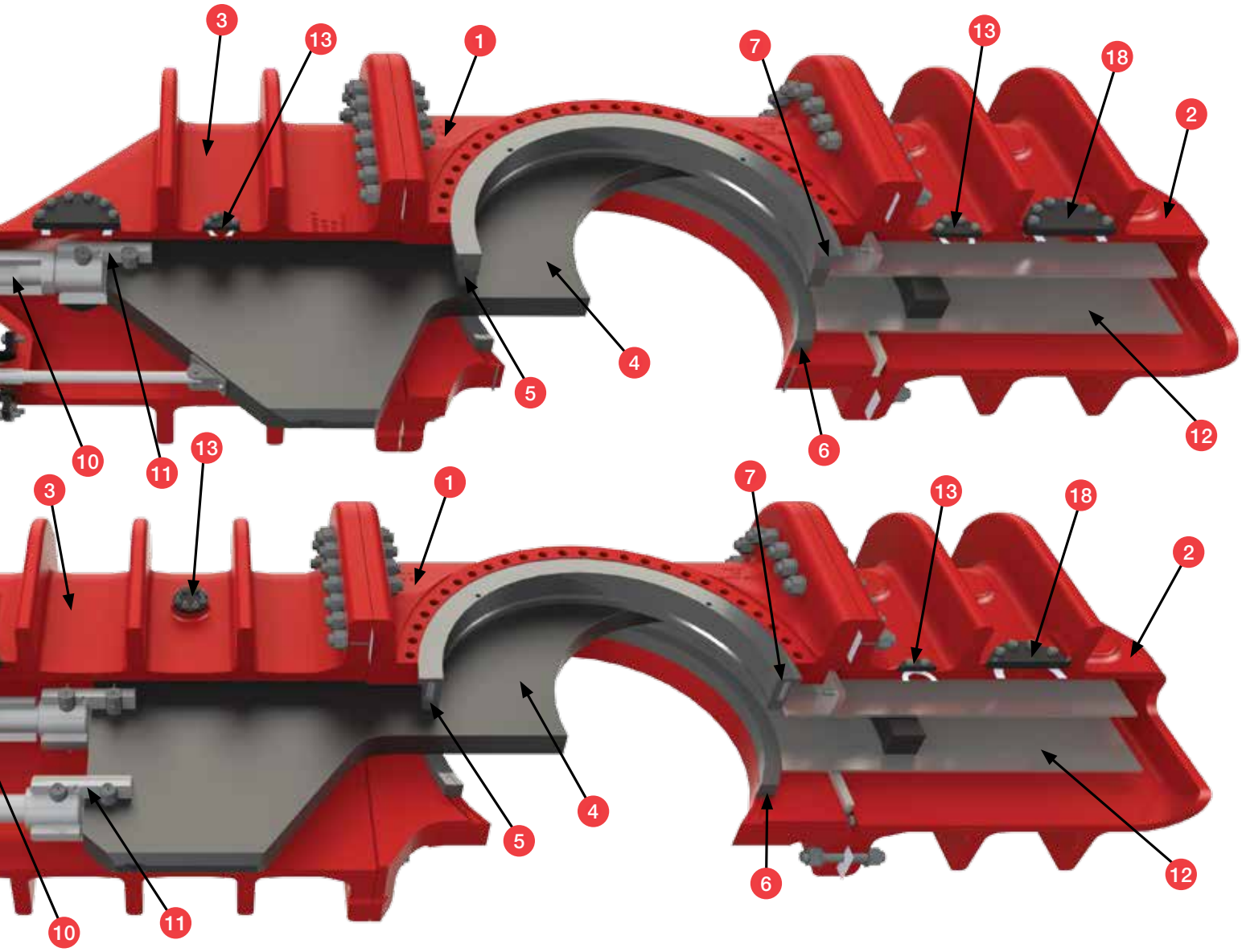


Bottom Unheading Valve with Hydraulic Actuator and Lockout Tower



Item	Description
1	Body
2	Lower Bonnet
3	Upper Bonnet
4	Gate
5	Dynamic Upper Seat
6	Static Lower Seat
7	Seat Retainer
8	Actuator Standoff/Packing Access
9	Actuator Stem
10	Adjustment Rod
11	Actuator Clevis

Item	Description
12	Shroud
13	Steam Purge Connection
14	Actuator Proximity Switch
15	Actuator Cylinder Assembly
16	Linear Variable Differential Transformer
17	Electric Motor
18	Lower Bonnet Access Cover
19	Actuator Gear Box
20	Visual Position Indicator
21	Auxiliary HandWheel
22	Torque Limiting Coupler

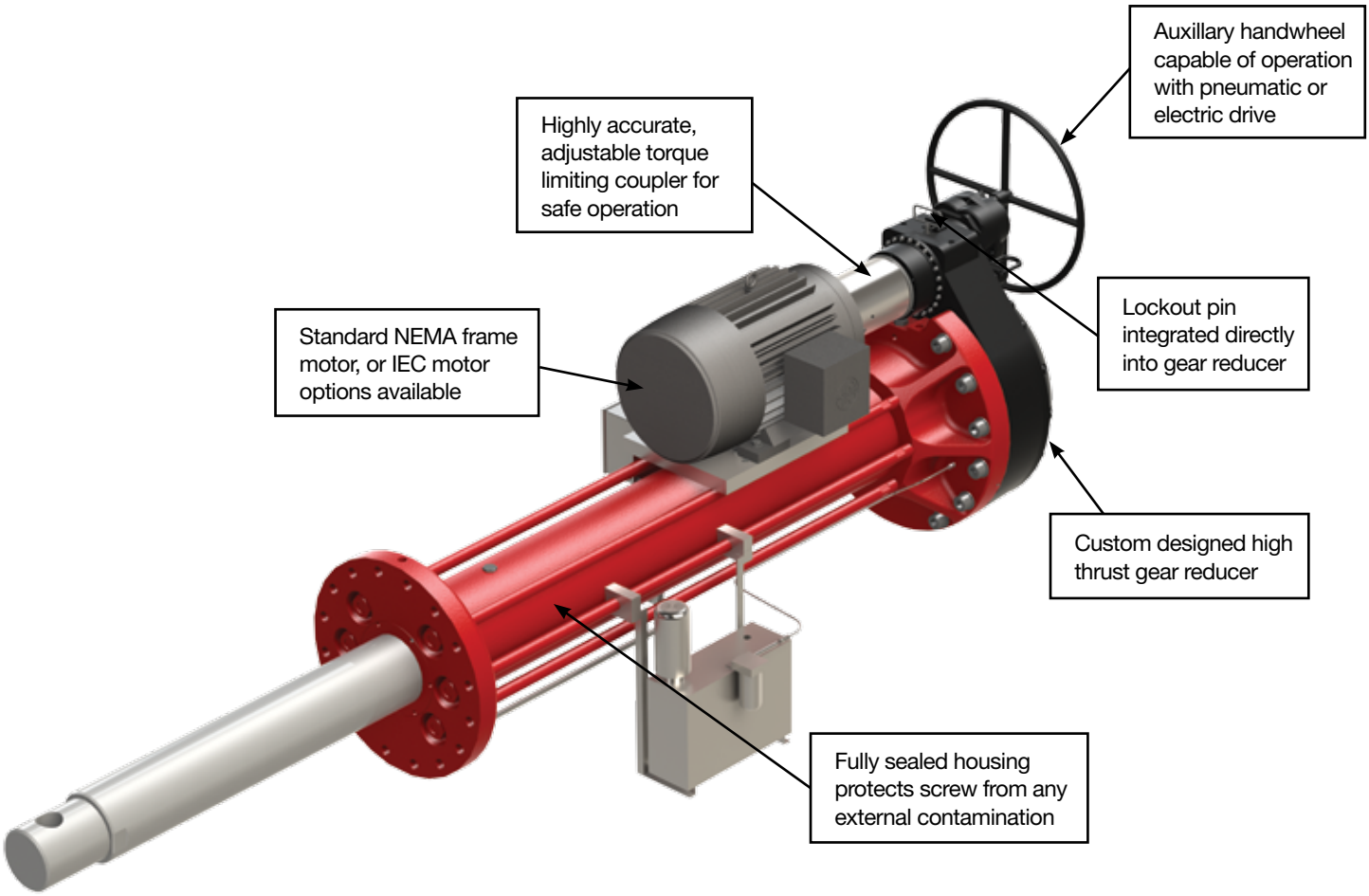


Actuation

The bottom unheading valve is available with a planetary roller-screw electric actuator, or traditional hydraulic actuation. Intended for reliable and dependable service, the planetary roller-screw design has been optimized through extensive load testing by DeltaValve and includes a minimum life-expectancy on the screw and gear reducer of fourteen years.

Actuator maintenance is simple, requiring a lube oil change once per year. The fully sealed housing prevents contamination and optimizes lubrication. Full-featured diagnostic systems are also available to monitor the condition of the roller-screw and nut, so that any preventative maintenance can be scheduled and performed with zero down-time.

In addition to reduced maintenance expenses, this electric actuator can dramatically reduce costs of installation and related controls when compared to hydraulic actuation systems. To meet specific zone and safety regulations of the various regulatory and code requirements found around the world, each actuator is custom built with numerous position and end-of-stroke sensor options.



Control Systems

DeltaValve's programmable logic controller (PLC) provides unparalleled safety, performance and reliability. The custom-built PLC can be manufactured with simplex or redundant hardware configurations, configurable function blocks, internal sequence controls, interlocks, permissives, and more. For hydraulic systems, the PLC logic manages the hydraulic power unit circuits to only allow hydraulic pressure to the appropriate unheading device when the process is verified safe. Additionally our high-performance Hydraulic Power Unit (HPU) incorporates redundant equipment such as pump trains, and filters to maximize reliability. The hydraulic circuit is fully instrumented to provide real time status and includes alarms to facilitate preventative maintenance for a longer lasting robust system.

Quality

Customer satisfaction is critical to our success. DeltaValve provides its customers with the highest level of quality in products and services by complying with, and continually improving all aspects of our ISO 9001:2008 certified quality management system.

Design Standards

DeltaValve unheading valves are designed per ASME and the Boiler and Pressure Vessel Code, Section VIII Div. I and II.

DeltaValve maintains the following stamps/design certifications:

- ASME
- “U” Stamp, Division I
- “R” Stamp
- National Board Registration

Unheading valves include but are not limited to the following certifications per international requirements:

- Pressure Equipment Directive (PED) (97/23/EC)
- Canadian Registration Number (CRN)
- GOST-R
- KHK

DeltaValve has experience installing equipment in Flameproof/Explosion Proof, Non-Incendive, Intrinsically Safe hazardous areas utilizing the following standards:

- IECEx
- NEMA
- UL
- ATEX
- CSA
- GOST
- InMetro
- PESO
- TIIS
- KOSHA
- JIS
- NEPSI

DeltaValve complies with international certifications and standards, and has unheading valves installed in over 100 refineries in approximately 20 countries around the world.

Quality Assurance Documentation

- Quality assurance manual
- ISO 9001:2008 certificate
- Additional international certifications as required

Complementary Products

Top Unheading Valve

The DeltaValve top unheading valve mounts directly to the drum to create a permanent top head connection. Just like the DeltaValve bottom unheading valve, the top unheading valve uses patented dynamic seating technology that is tight-sealing, robust, and highly reliable.

Cutting Tool Enclosure/Blowout Diverter

The cutting tool enclosure/blowout diverter is designed to protect personnel and equipment by diverting coke, steam, and water from drum eruptions up and away from the cutting deck. The built-in drill stem guide controls and stabilizes the drill stem during coke boring and cutting. The enclosure mounts directly to the DeltaValve top unheading valve and houses the cutting tool when it is not in the drum.

Additional Specialized Equipment

Retractable Center Feed Injection Device

DeltaValve's innovative center feed injection device addresses the issues of uneven thermal distribution and severe thermal transients experienced when using side or dual side feed configurations. The center feed device accomplishes this by simply returning feed streams to the center of the coke drum, resulting in more consistent operation during feed, steam strip, and quench cycles, all of which contribute to reduced drum stresses and longer calculated drum life. The center feed can be configured with electric, electro-hydraulic, or hydraulic actuation, and can be integrated with any safety interlock system.

Auto-Switch Coke Cutting Tool

DeltaValve's auto-switch coke cutting tool provides a high level of safety and reliability during de-coking operations by allowing the tool to remain in the drum during switching between cutting/boring modes. The auto-switch tool and enclosure, in combination with the DeltaValve top unheading valve, provides maximum coker safety on the top unheading deck by allowing personnel to be removed from the area.

Isolation Valves and Controls

DeltaValve's reliable, low-maintenance, tight shut-off isolation valves are designed for extreme temperatures and harsh applications. Steam purge is capable of operating continuously in the partially open (throttling) position, while isolating body internals from the process. These valves are available with a complete suite of electric and hydraulic actuator options and complete PLC-based control systems with safety interlocks and sequence controls. This design provides for quick and efficient in-line removal of all internal components.

Safety Instrumented Systems

Designed in compliance with IEC 61508 to provide an independent layer of protection to mitigate coker safety risks.

Contact Sales

Toll free in USA/Canada: 1.888.DELTAVALVE (1.888.335.8282)
Phone: 801.984.1000
Email: sales@deltavalve.com
Web: www.deltavalve.com

Field Services

Our field service technicians provide a superior level of service, providing 24-7 coverage to reduce downtime by responding to our customers' needs in a timely and efficient manner. DeltaValve's network of technicians are highly trained to evaluate, troubleshoot, and resolves issues. They are backed by our engineering group allowing for quick access to technical expertise, drawings, bills of material, and other relevant data to expedite practical and reliable solutions.

Core services of the DeltaValve field service team are:

- DeltaValve equipment installations
- Site acceptance tests
- Commissioning supervision
- Site audits
- Turnaround service
- Maintenance and repair
- Equipment rebuilds
- Equipment storage
- Hydraulic flush services
- Electrical loop checks
- On-site training
- Bolt tensioning/torquing
- General valve/equipment maintenance and service
- Engineering, Procurement and Construction Management Services

In order to respond to our customers' requirements, DeltaValve has service facilities staffed with our certified, dedicated technicians to meet the demands of our growing list of worldwide customers.

Contact Field Services

Toll free in USA/Canada: 1.888.DELTAVALVE (1.888.335.8282)
Phone: 281.247.8100
Email: fieldservices@deltavalve.com
Web: www.deltavalve.com

Contact Customer Care

Toll free in USA/Canada: 1.888.DELTAVALVE (1.888.335.8282)
Phone: 801.984.1000
Email: customercare@deltavalve.com
Web: www.deltavalve.com

DeltaValve

9890 Jordan Gateway
Sandy, Utah 84070
Phone: 801.984.1000
www.deltavalve.com

Certified System™
Quality
ISO 9001

Printed in USA 04/16 VO2