



DELAYED COKING

Bottom Unheading Valve

INNOVATIVE TECHNOLOGY





World class
products and services
for delayed coking

Leadership and Experience

DeltaValve's extensive experience in designing and building engineered severe-service industrial valves and equipment for delayed coking 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 new valve technology revolutionized coke drum unheading by replacing traditionally unsafe and unreliable manual or semi-automated unheading equipment, with a fully automated system. The result has been a safer working environment, reduced downtime, and increased productivity.

In 2016, DeltaValve was acquired by CIRCOR and is a key brand within its energy group.

Today DeltaValve continues to develop new and innovative products to address some of the most challenging applications in delayed coking.

DeltaValve offers a full range of delayed coking products including:

- Top and bottom unheading valves
- CenterFeed™ injection devices
- Isolation valves
- Auto-switch boring/cutting tools
- Cutting tool enclosures/blowout diverters
- Aftermarket, spare parts, and field services
- Installation services

At DeltaValve we strive to deliver safe and reliable products at the very best value for our customers. Our goal is to be "Best in Class" in all we do.





Bottom Unheading Valves



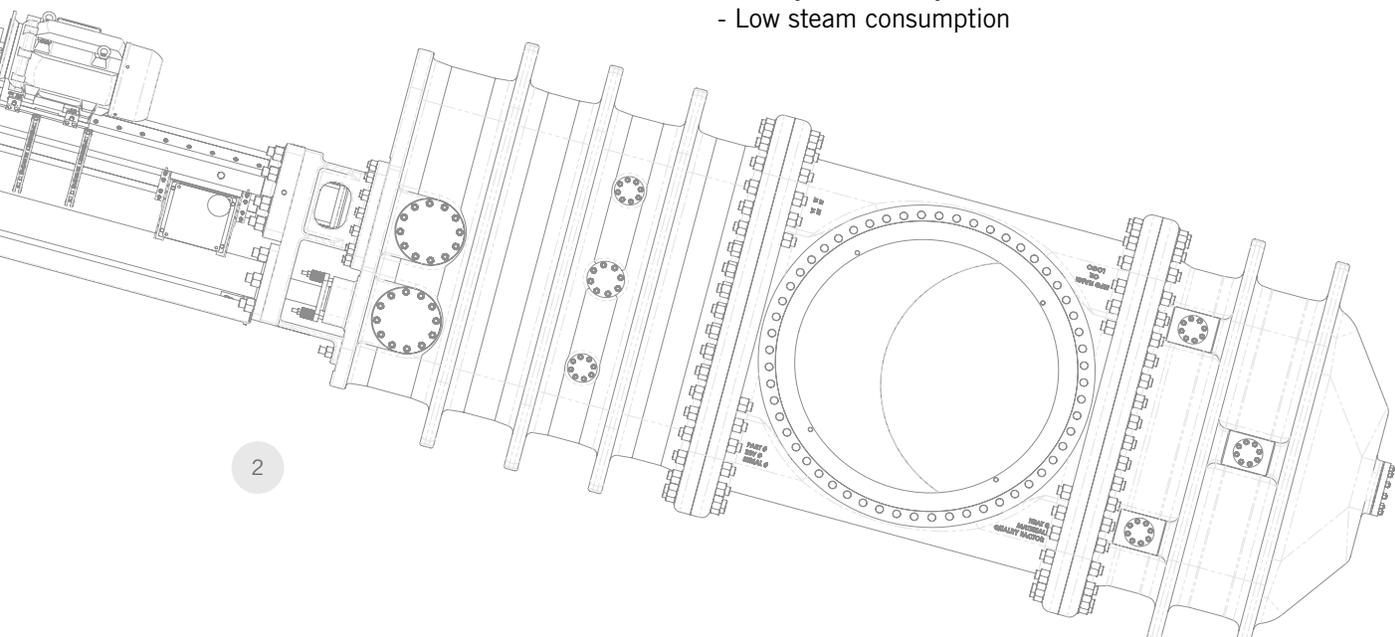
DeltaValve's bottom unheading valves are the lightest, most compact, fully automated unheading valves in the industry. The small footprint of this bottom unheading valve makes it ideal for both space constrained retrofit installations as well as new construction.

The bottom unheading valve is available with traditional hydraulic actuation or with DeltaValve's proprietary Planetary Roller Screw (PRS) 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 reduce the overall installation cost when compared to installing an unheading system which 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 or crusher. The bottom unheading valve is designed for fully automated, safe and reliable operation and can be used in either on/off or throttling applications. This technology has made remote unheading a reality.

Key Advantages:

- Safe unheading
- Fully automated
- Low maintenance
- Totally enclosed system
- Low steam consumption





Valve Design

Single Gate

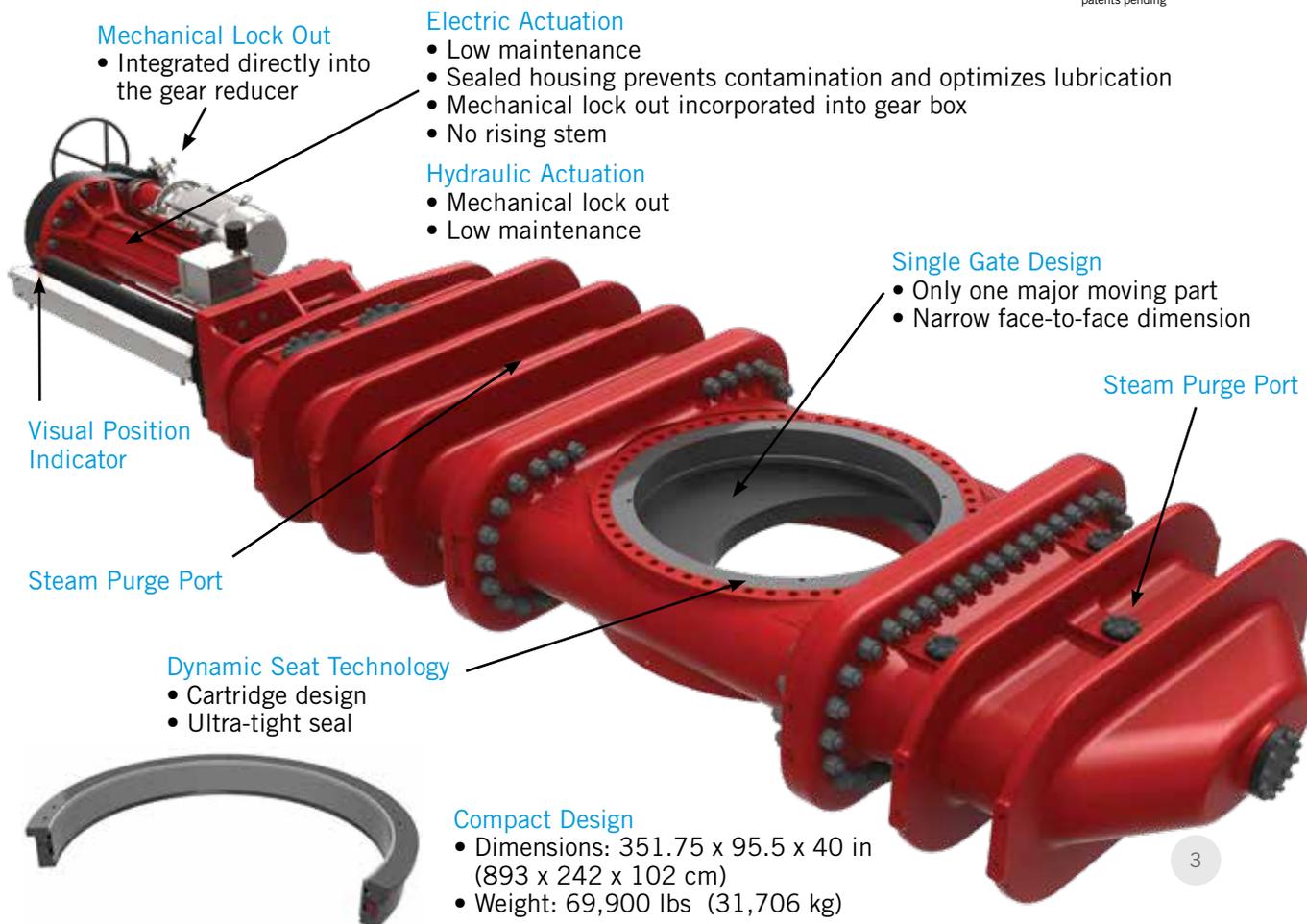
DeltaValve's bottom unheading valve incorporates a single gate. This simple design reduces potential failures and consequently reduces down-time and maximizes production. The single gate design also has a significantly narrower face-to-face dimension, smaller overall footprint, and reduced weight when compared to a dual gate design.

Seat Configuration

Through a combination of high-cycle springs and a bellows seal with actively compressed packing, our dynamic seat design forms an ultra-tight radial seal, providing lower steam consumption and optimal operational life.

United States Patents

6,565,714; 6,660,131; 6,964,727;
6,964,727 C1; 6,989,081; 7,357,848;
7,459,063; 7,578,907; 7,632,381;
7,931,044; 8,459,608; 8,512,525;
8,679,299; 8,936,701; 9,505,982;
and other domestic and international
patents pending





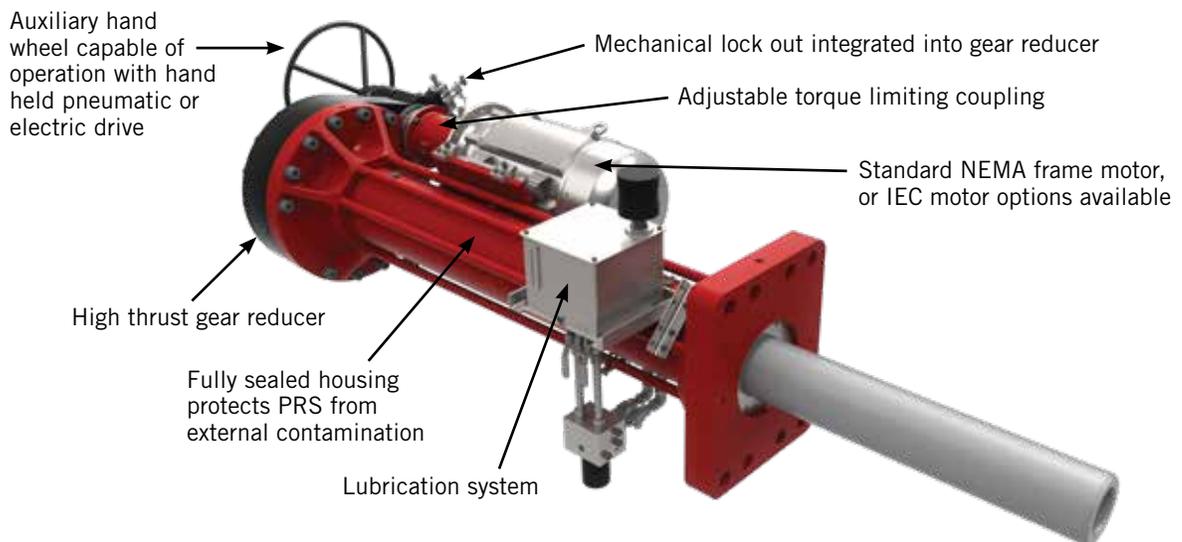
Designed for reliable
and dependable service

Valve Actuation

Our bottom unheading valve can be configured with DeltaValve's Planetary Roller Screw (PRS) electric actuator or traditional hydraulic actuation system. The PRS electric actuator is a patented design specifically engineered for use on delayed coker unheading valves and is capable of achieving cycle times on a 60" bottom unheading valve of approximately 3 minutes. Since its introduction into the market in 2013, it has become the new global standard for unheading valve actuation.

Actuator maintenance is simple and 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 any preventative maintenance can be scheduled and performed with zero down-time.

In addition to reduced maintenance expense, this electric actuator can reduce costs of installation and related controls when compared to hydraulic actuation systems. This actuation system is easily configurable to comply with international zone and safety regulations.



*First oil change is recommended 6 months after commissioning, then once per year thereafter.

United States Patents
8,851,451; 9,388,342 and
other domestic and international
patents pending

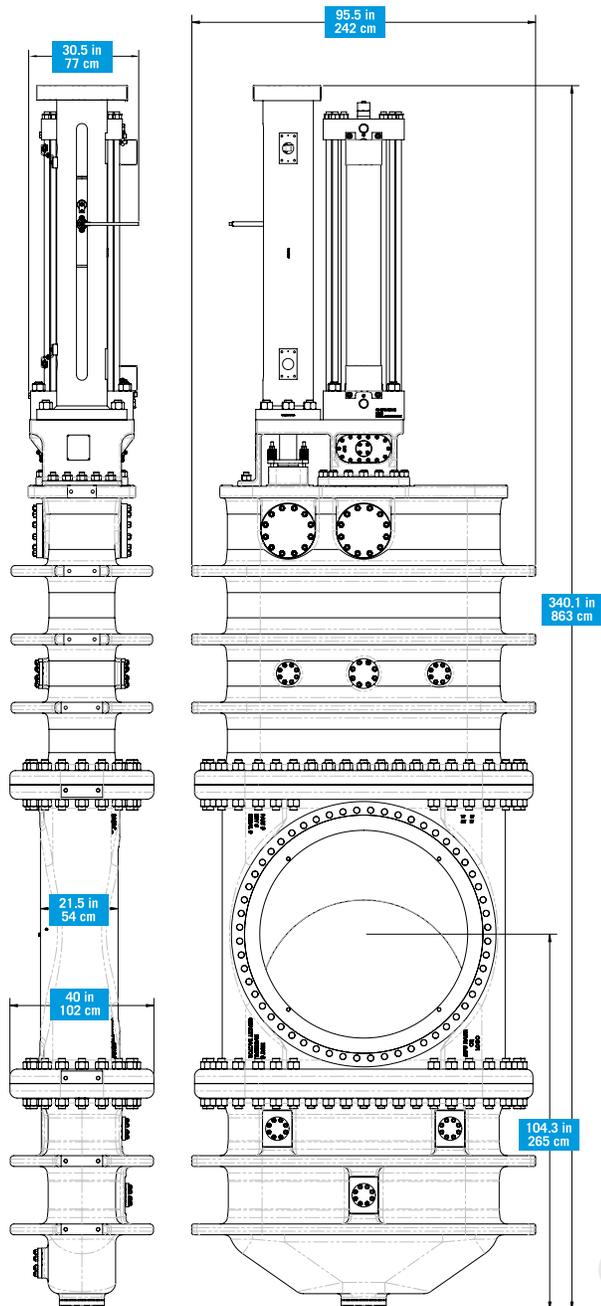
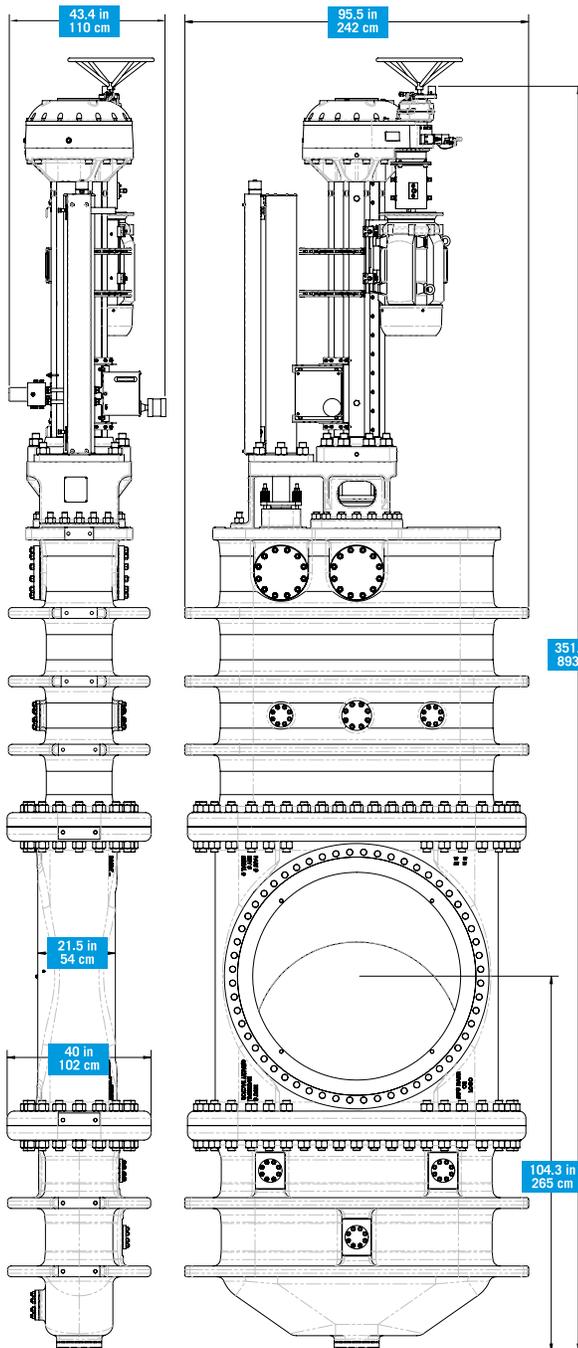
Weights and Dimensions

Bottom Unheading Valve with Electric Actuation

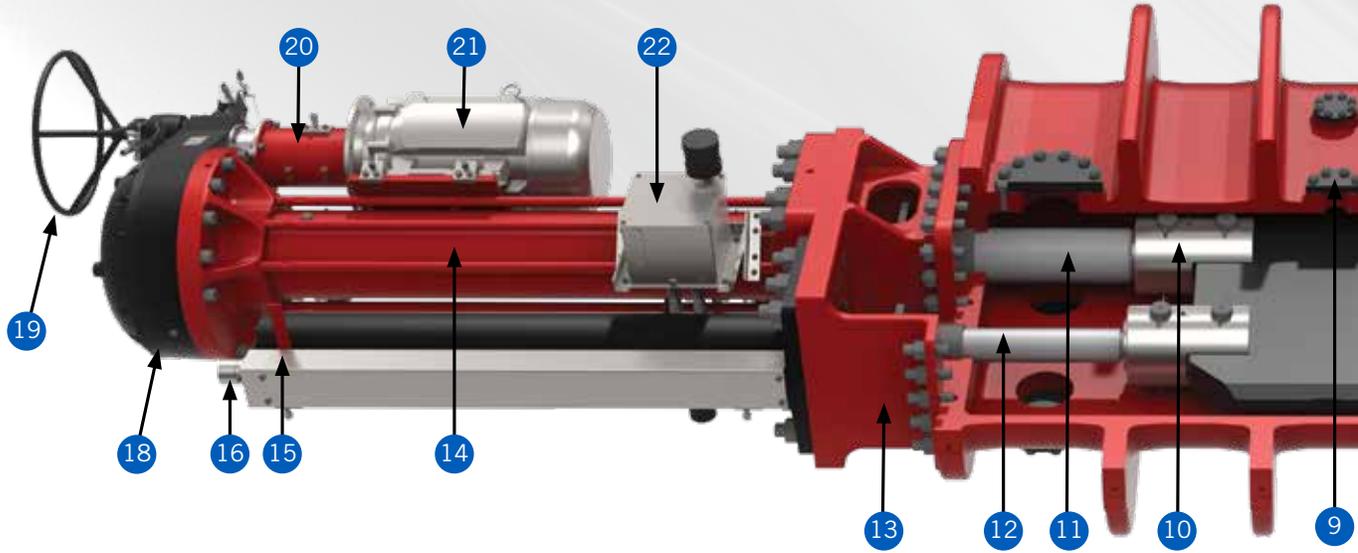
Dimensions	351.75 x 95.5 x 40.0 in (893 x 242 x 102 cm)
Weight	69,900 lbs (31,706 kg)

Bottom Unheading Valve with Hydraulic Actuation

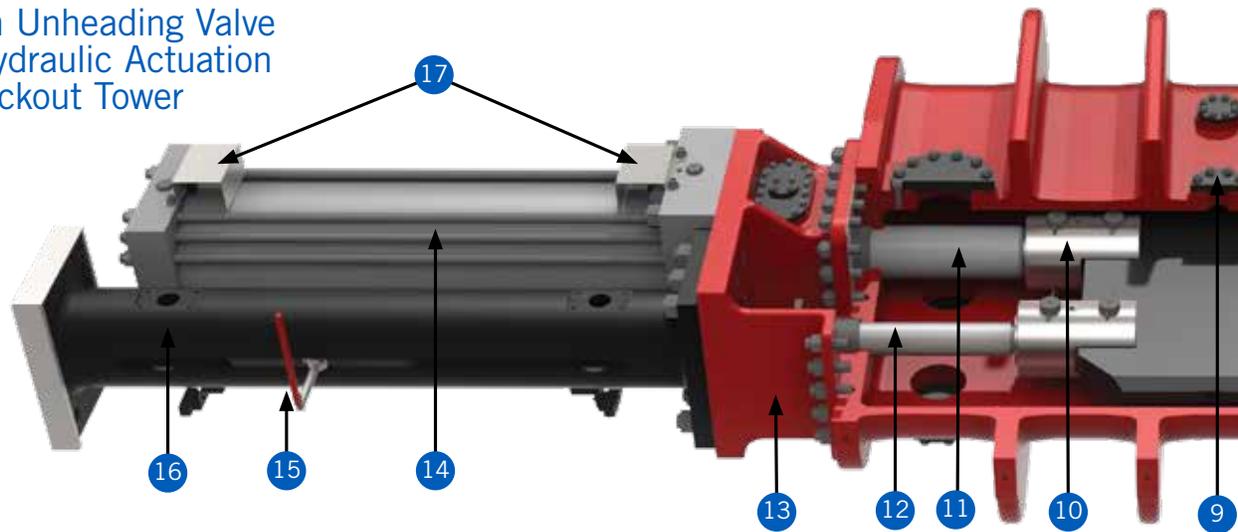
Dimensions	340.187 x 95.5 x 40.0 in (863 x 242 x 102 cm)
Weight	70,300 lbs (31,887 kg)



Bottom Unheading Valve with Electric Actuation



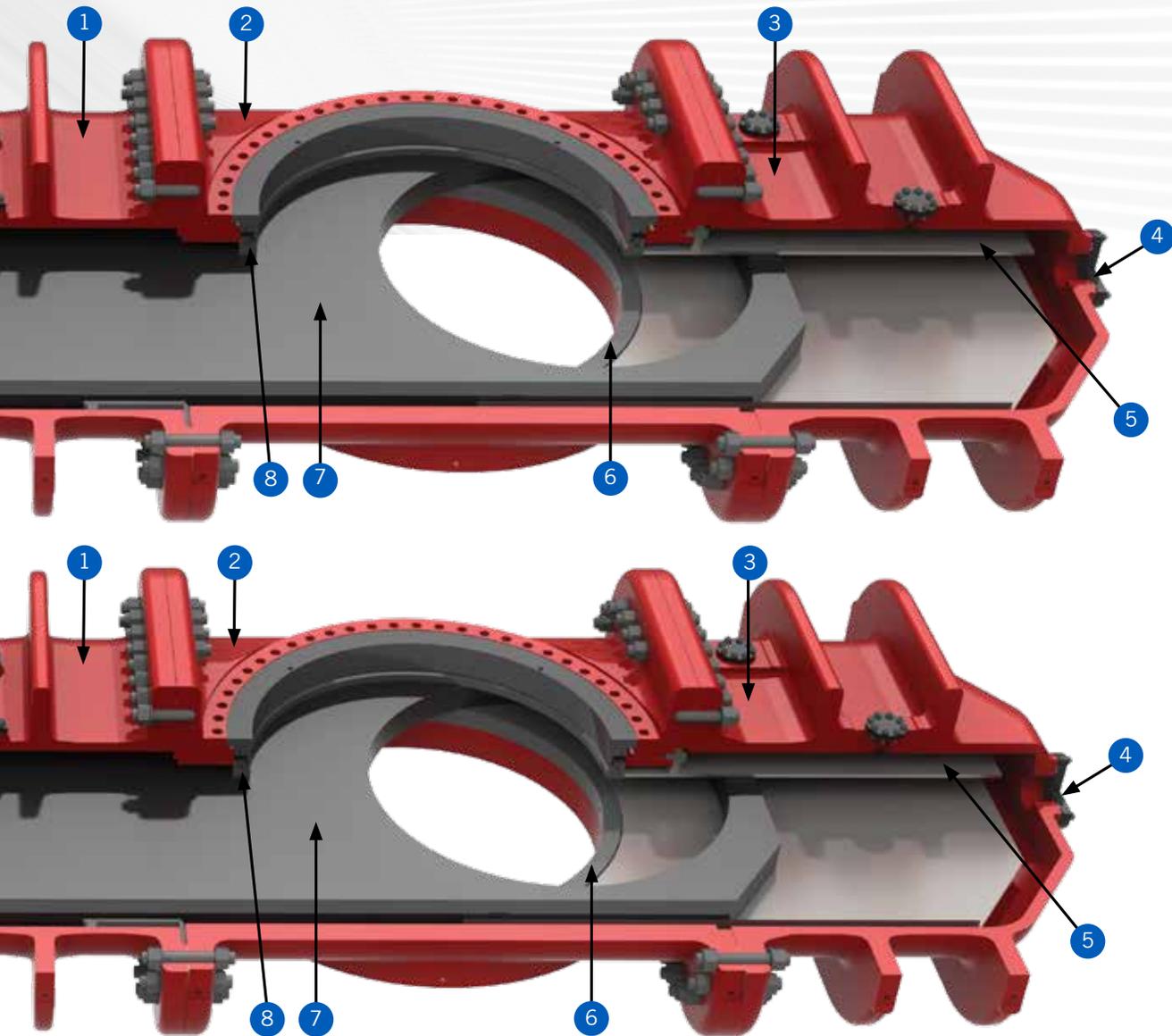
Bottom Unheading Valve with Hydraulic Actuation and Lockout Tower



Technical Specifications

Parts and Materials

Design Standard	Per ASME BPVC Section VIII Div. 1 & 2
Body Material	ASME SA217 C5
Cast Bonnet Material	ASME SA217 WC9 or ASME SA216 WCC
Fabricated Bonnet Material	ASME SA387 Gr22 CL2 or SA516 GR70
Purge Media	Steam
Shut-off	Zero leakage with differential steam purge
Drum Flange	57.75" (1467mm) Standard
Maximum Design Pressure	154 PSIG (1062 kPa) @ 940°F (505°C)



Item	Description	Item	Description
1	Upper Bonnet	13	Standoff/Yoke
2	Body	14	Actuator/Cylinder Assembly
3	Lower Bonnet	15	Visual Indicator
4	Lower Bonnet Access Cover	16	Linear Transducer
5	Shroud	17	Actuator Proximity Switch Assembly
6	Static Seat	18	Electric Actuator Gear Box
7	Gate	19	Auxiliary Hand Wheel
8	Dynamic Seat Cartridge	20	Torque Limiting Coupler Access Cover
9	Steam Port	21	Electric Motor
10	Actuator Clevis	22	Lubrication System
11	Actuator Stem		
12	Lockout/Indicator Rod		



State of the art
control systems

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 valve when the process is verified safe. Additionally our high-performance hydraulic power unit 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.

Safety Instrumented Systems

DeltaValve offers equipment and systems that are designed in compliance with customer specifications and IEC 61508, and readily integrate into plant safety systems.



Additional Delayed Coker Equipment

CenterFeed™ Injection Device

DeltaValve's innovative CenterFeed™ injection device addresses the issues of uneven thermal distribution and severe thermal transients experienced when using single or dual side feed configurations. The CenterFeed 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 can contribute to reduced drum stresses and longer drum life. The CenterFeed can be configured with electric, electro-hydraulic, or hydraulic actuation, and can be integrated with any safety interlock system.



Top Unheading Valve

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



Cutting Tool Enclosure

The cutting tool enclosure mounts directly to the top unheading valve and is designed to protect personnel and equipment by containing the cutting tool when not in the drum, and also diverting coke, steam, and water away from the cutting deck in the event of a drum eruption. The built-in drill stem guide controls and stabilizes the drill stem during coke boring and cutting.



Auto-Switch Boring/Cutting Tool

DeltaValve's auto-switch boring/cutting tool provides a high level of safety and reliability during de-coking operations by allowing the tool to remain in the drum when switching between boring/cutting modes. Contact with the tool is not required to switch between boring/cutting modes.



Isolation Valves and Controls

DeltaValve's line of isolation valves are designed for on/off as well as continuous operation 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 or replacement of all internal components.



World-class
installation services

Installation Services

By managing the engineering, procurement, and construction work associated with the installation of our unheading valves and other equipment, we provide strategic value added services to our clients.

DeltaValve partners with engineering and construction companies who specialize in coker revamps. Together we have successfully managed numerous projects. Please contact us for references.



We offer the following:

- Project management
- Detailed engineering management
- Installation engineering management
- Procurement management
- Construction management
- Commissioning supervision
- Training



OEM Parts and Service

DeltaValve offers a full line of OEM spare parts for its entire product line. Additionally, DeltaValve's service technicians are available to respond to our customers' needs in a timely and efficient manner. Our 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 materials, and other relevant data to expedite practical and reliable solutions.

Core services provided by the DeltaValve 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
- Valve/equipment maintenance and service

DeltaValve's network of global facilities offer support and technical assistance to our large and growing base of worldwide customers.





Quality control,
quality assurance

Quality

DeltaValve complies with all aspects of the ISO 9001:2015 certified quality management system, and provides customers with the highest level of quality.

DeltaValve Design Standards

Unheading valves

- ASME and BPVC, Section VIII Div. I and II

Isolation valves

- ASME B16.34, API 598 and API 600

Center feed devices

- ASME B31.3

DeltaValve maintains the following stamps and design certifications:

- ASME
- “U” Stamp, Division I
- “R” Stamp
- National Board Registration
- Pressure Equipment Directive (PED) (2014/68/EU)

DeltaValve manufactures to the following certifications per international requirements:

- Canadian Registration Number (CRN)
- TR CU (formerly GOST-R)
- KHK
- Others as required

DeltaValve has experience installing equipment in flameproof/explosion proof, non-incendiary, intrinsically-safe hazardous areas utilizing the following standards:

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

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

Quality Assurance Documentation

- ISO 9001:2015 certificate
- Quality assurance manual
- Additional international certifications as required.



Final Assembly and Testing

Our equipment is assembled and tested at our facilities in Houston, Texas, Salt Lake City, Utah, and Coimbatore, India. As part of our quality control protocol, each critical component is inspected and reviewed before installation for proper functionality and product quality.



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