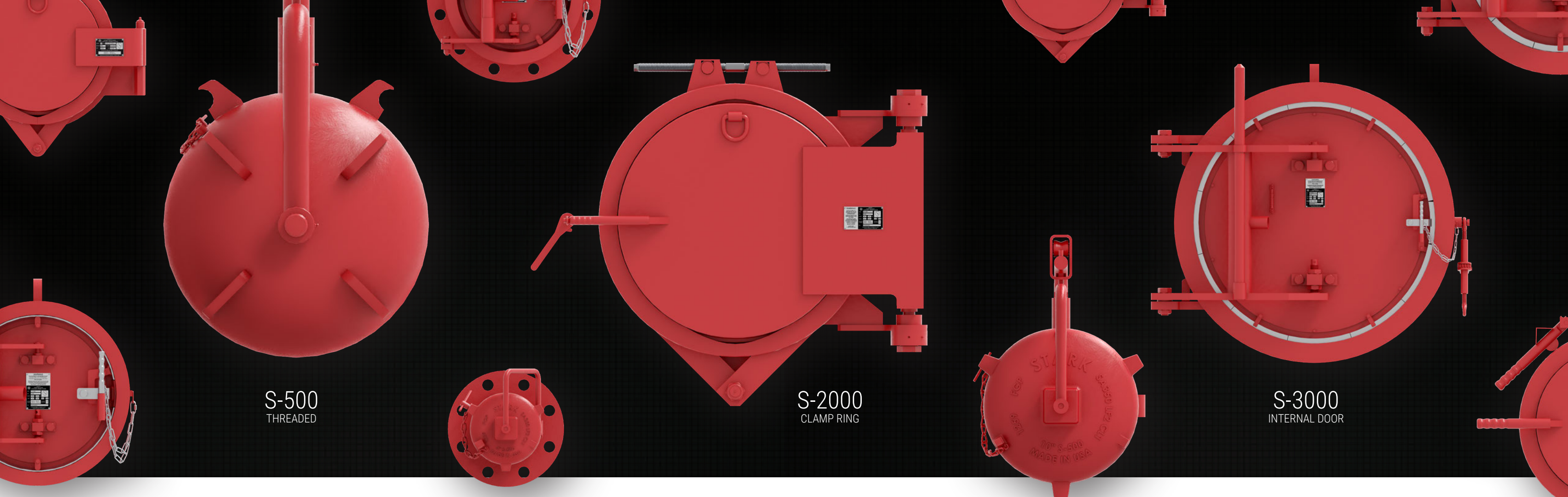




**STARK**<sup>®</sup>  
**SOLUTIONS**



**SAFE.  
STRONG.  
QUICK.**



S-500  
THREADED

S-2000  
CLAMP RING

S-3000  
INTERNAL DOOR

## CLOSURE DESIGNS

The S-500, S-2000 and S-3000 Quick Opening Closures provide customized solutions for the industry. Depending on application, location and frequency of usage, the best choice of closure style varies. Each of our three closure designs offer unique benefits, which provides flexibility to choose the right fit based on your requirements.

To keep the choice simple and effective, all closures are designed in accordance with ASME B31.3/B31.4/B31.8/CSA Z662 Cat. I and can be certified accordingly. In addition, all closures are offered as ASME Code Stamped when required and come furnished with a U-2A Partial Data Report.

We believe that closures should be designed to be reliable for decades, while remaining safe and user friendly. In the development phase of the closure concepts, we stayed true to this statement by adding safety features, quality components, operational improvements, and applied common sense to spare parts. The result of this effort are performance packages which are designed to stand the test of time, regardless of environmental factors.



### Building Reputation

At Stark Solutions it is our mission to design, engineer and manufacture high quality Quick Opening Closures in a safe, technology driven and engaging environment, while providing unmatched customer service. Integrity is at the core of all we do, and we strive to develop and maintain strong long-term relationships with you, our customer.

### Service

Our team of professionals have decades of experience in the closure industry and are committed to using their expertise to deliver safe, user friendly and reliable closure solutions. By offering the three most common closure styles; Threaded, Clamp Ring and Internal Door, we can service you on many levels and offer you a single source manufacturer option.

We understand how valuable time is, which is why our technical support team is available on demand. Should you need more extensive help, our field technicians can service you worldwide.

### Manufacturing

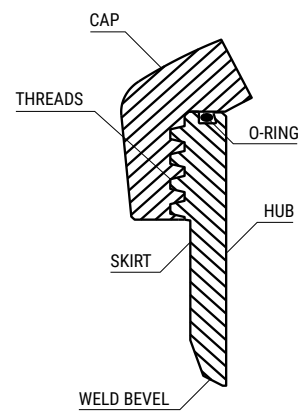
The manufacturing plant is located on a 10-acre (4.04 Hectare) complex in South-East Texas. The state-of-the-art manufacturing facility is designed exclusively to produce our diverse closure assortment. Our two on-site machine shop buildings; one for pressure parts and one for closure parts, ensures manufacturing performance and availability.

The fabrication shop is separated into three sections, each of them equipped specifically for one closure type. To demonstrate our commitment to quality we maintain the newest standards of ISO 9001 and are ASME "U" AND "R" Stamp Certified.

# S-500

## THREADED QUICK OPENING CLOSURE

The Stark S-500 threaded closure represents historically the most widely used closure style in the oil and gas sector. Based on the industry desire for robust and cost-effective solutions, Stark improved upon the standard design to bring operation to a new level. Features to avoid hammering and strengthen operator control were incorporated into the otherwise proven design. The S-500 is manufactured in diameters ranging from 2" to 52" (DN50 to DN1300) and pressure series 150 through 1500.



### BENEFITS:

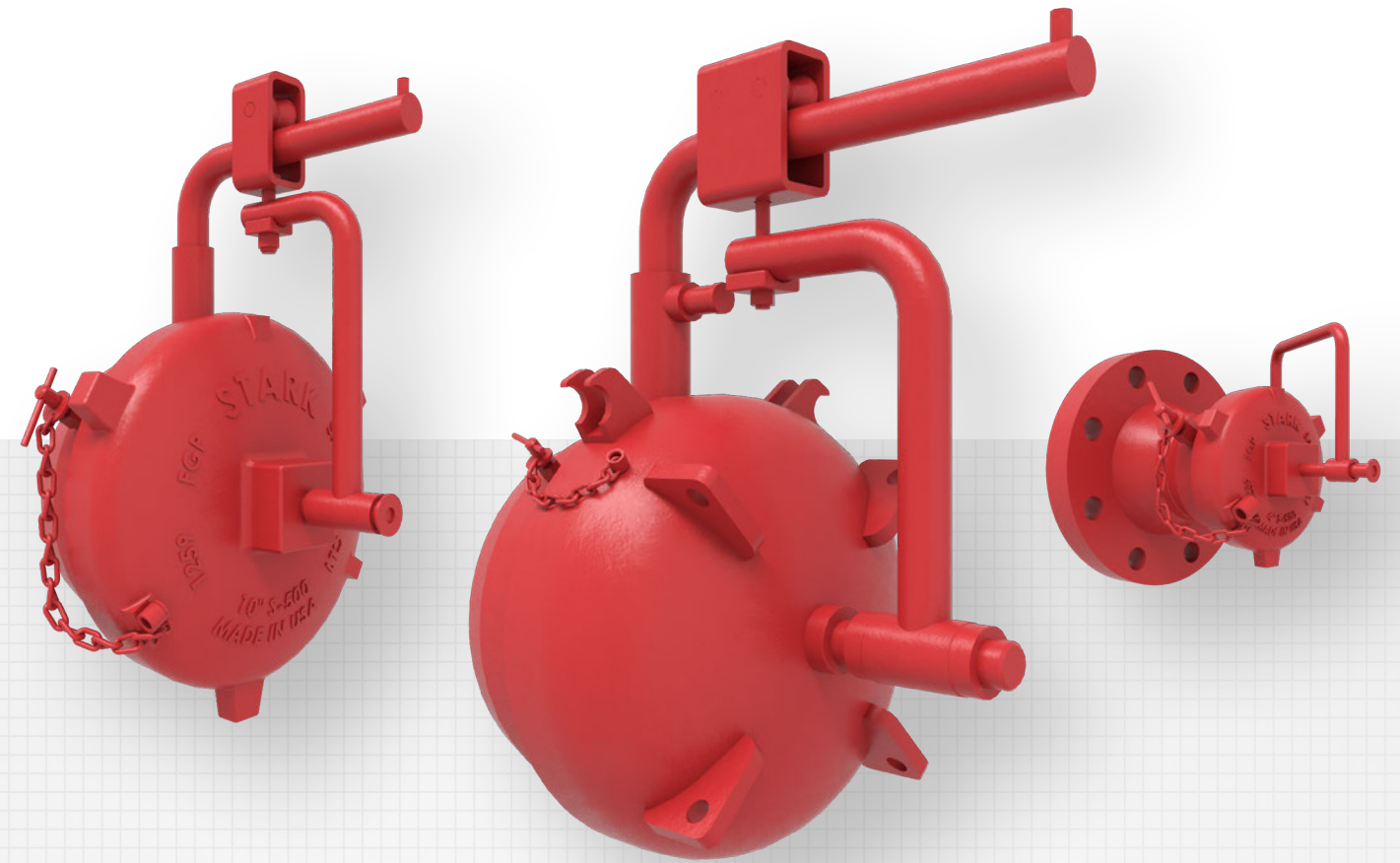
- Proven and robust design
- Economically priced
- Certified to ASME B31.3/B31.4/B31.8/CSA Z662 Cat. I
- Flat sealing surface for best seal results on all sizes
- Bidirectional Hinge design allows the cap to open to left and right side

### STANDARDS:

- 2" to 4" (DN50 to DN100) closures designed for wrench opening
- Opening tool supplied with 6" to 52" (DN150 to DN1300) closures
- PAV per UG-35.2 of ASME BPVC VIII Div. 1 on 6" and larger (2" to 4" optional)
- Cap designed per ASME BPVC VIII Div. 1, U-Stamp compliant
- Nace MR0175 compliant material
- -50° to + 400°F (-45° to 204°C)

### OPTIONS:

- Flanged Closure - welded connection or one piece
- ASME BPVC VIII Div. 1 with U-Stamp for whole closure (cap and hub)
- Opening Wrench for 2" to 4" (DN50 to DN100)
- PAV per UG-35.2 of ASME BPVC VIII Div. 1 on 2" to 4" (DN50 to DN100)
- Stainless Steel and Inconel weld overlay on sealing surfaces
- Custom Wall Thickness, vents, and other modifications
- Special Materials and O-Rings
- Horizontal, Vertical, or Inclined hinging



### SAFETY, OPERATION, SEAL:

The unique safety feature of the S-500 threaded closure is the engagement of the cap and hub due to modified ACME threads. Once the closure seal is broken, there is still over 90% thread engagement, which means there is no possibility of the cap dislodging from the hub should pressure remain in the vessel/ pipeline. Closures are equipped with a Pressure Alert Valve (PAV) which warns the operator of possible residual pressure. The PAV must be removed from the hub to rotate the cap in compliance with ASME SEC VIII DIV. 1 UG 35.2, providing another step in ensuring safety.

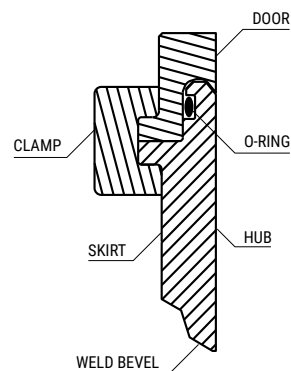
Opening tools are supplied to assist in breaking the closures seal and prevent unnecessary hammering of the closure cap lugs. On 6" to 14" closures, lug wrenches are provided which deliver optimal leverage for the operator based on the strategic placement of the closure's lugs. Should you not have the Stark provided lug wrench, the S-500 was designed with a square boss located at the center of the cap on sizes 2" to 14", which allows the use of a standard wrench. Closures 16" and larger are equipped with a ratchet tool that attaches to the hinge base on the hub, and ratchet tool lugs on the cap. In addition to opening tools, new ways to make this proven closure style even more user friendly were incorporated by including a double roller hinge design on horizontal closure sizes 16" and larger, and an integrated bearing in the hinge rollers on sizes 24" and larger. These features provide further guidance for the cap, which improves the control and ease of operation.

The threaded closure design aids in the compression of the O-Ring. The cap threads rotate and tighten down within the hub threads. Once fully tightened, there is metal to metal contact of the cap and hub's flat sealing surfaces; this means the O-Ring groove is fully sealed for optimal O-Ring performance. The use of an industry standard O-Ring makes replacement parts readily available and cost efficient.

# S-2000

## CLAMP RING QUICK OPENING CLOSURE

The S-2000 Clamp Ring Closure is manufactured primarily for pipeline applications ranging from 4" to 48" (DN100 to DN1200) in diameter. We understand the variety of needs that pipeline applications require and as a standard, all closures are certified to ASME B31.3/B31.4/B31.8/CSA Z662 Cat. I with a 0.5/0.6 design factor. High quality components placed in user-friendly locations and features that keep safety priority, and the operator in focus makes the S-2000 an appealing Clamp Style Closure option.



### BENEFITS:

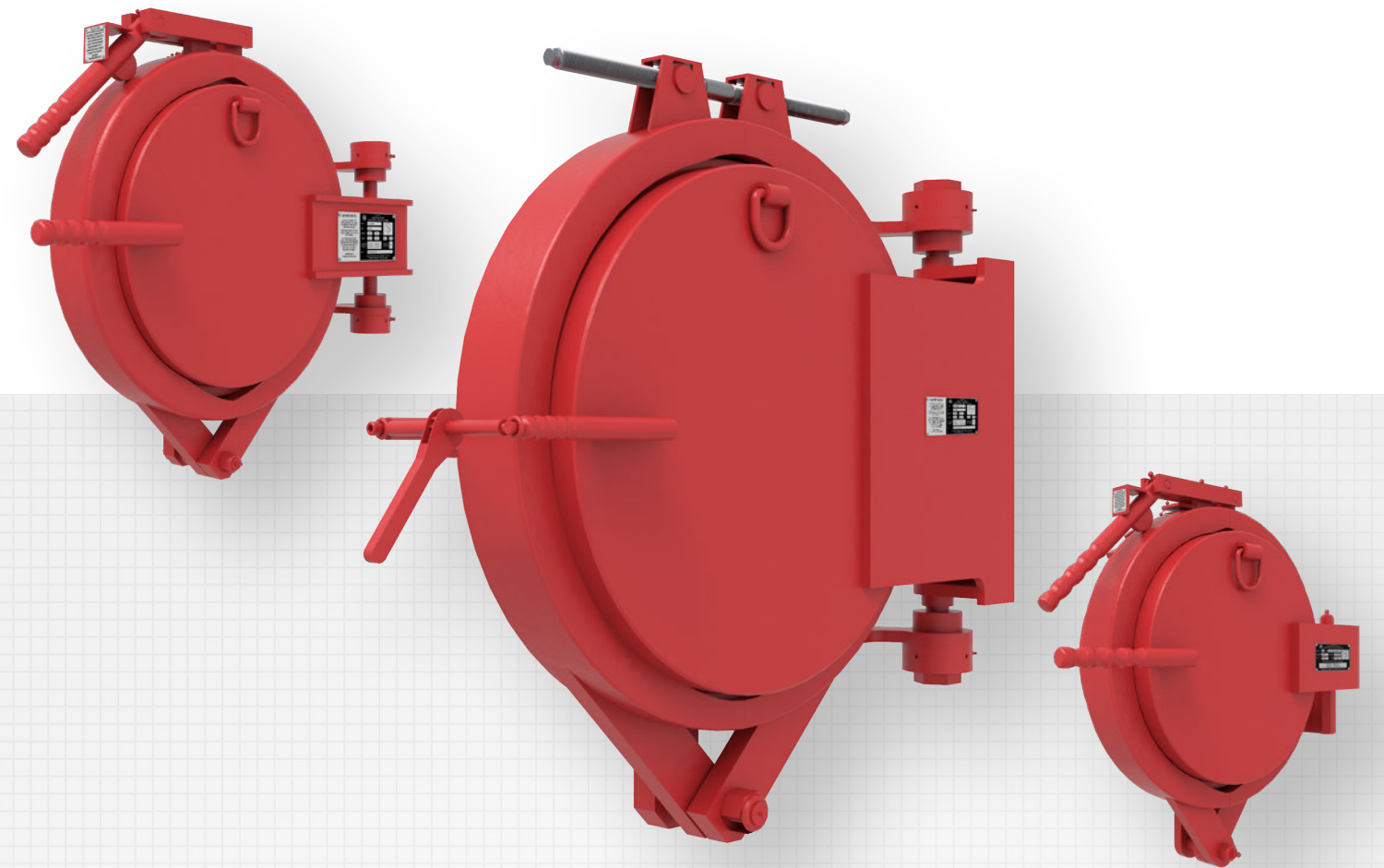
- Certified to ASME B31.3/B31.4/B31.8/CSA Z662 Cat. I
- 1480 M.A.W.P with 0.5 & 0.6 Design Factor
- Large cross section O-Ring design provides positive seal and protection from tools and debris
- Pressure Alert Valve design without need for O-Ring
- Through bores on all wall thicknesses

### STANDARDS:

- Door designed per ASME BPVC VIII Div. 1, U-Stamp compliant
- Pressure Alert Valve per UG-35.2 of ASME BPVC VIII Div. 1
- Clamp screw opening assist and door load binder assist on 32" to 48" closures
- Nace MR0175 compliant material
- -50° to + 400°F (-45° to 204°C)
- Viton O-Ring supplied with closure

### OPTIONS:

- Flanged Closure – welded connection or one piece
- ASME BPVC VIII Div. 1 with U-Stamp for door only or full closure
- Screw opening assist and load binder on 24" to 30" closures
- Custom wall thickness, vents, and other modifications
- Special Materials and O-Rings



### SAFETY, OPERATION, SEAL:

For the safety of the operator, the door swings on a horizontal axis, so one is never required to stand in front of the door. An integrated Pressure Alert Valve (PAV) provides another level of safety. For the clamp to be released, the PAV must be removed, as it secures the clamps in place when in the closed position. PAV's are installed on all closure sizes and are designed to not require an O-Ring, making this spare part more succinct.

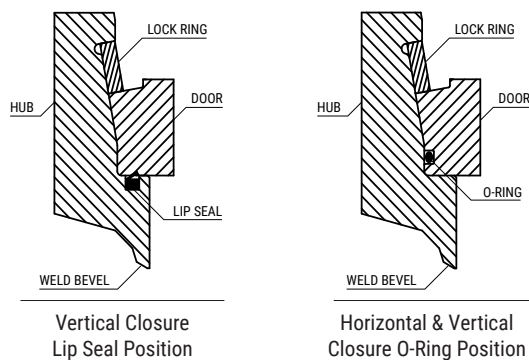
After depressurization and the PAV stem removal, the opening is performed in two rapid motions: actuating the latch to disengage the clamp from the door and hub, then pulling the door open. In both movements, the operator is standing safely to the side of the closure door. All closures come with a true through bore, providing a perfect pipe I.D. match. International codes and specifications can be incorporated into customized designs, as well as partial ASME code stamp requirements for pressure parts, like the closure door. Right- or Left-Hand hinging is available on all sizes.

A large cross section O-Ring design and its location outside the working area provides positive seal and protection from tools and debris. Optional screw opening assists for the clamp and load binder for the door on 24"-30" closures make the operation and compressing of O-Ring user friendly, especially on high durometer O-Rings. On 32"-48" closures those features come standard.

# S-3000

## INTERNAL DOOR QUICK OPENING CLOSURE

The S-3000 is Stark's Internal Door Closure, which is manufactured in diameters ranging from 6" to 84" (DN150 to DN2100) in pressure series 150 to 2500. The closure concept relies on the proven method of an internal locking ring that slides into the inner side of the closure hub. When expanded to the closed position, the locking ring assembly securely latches the door into place. Durable components are used to actuate the locking ring and are designed to withstand the demands of long-term operation. Regardless of orientation, size or pressure rating the S-3000 maintains its benefits and ease of operation, making it the broadest closure choice for Pipeline and Pressure Vessel applications.



### BENEFITS:

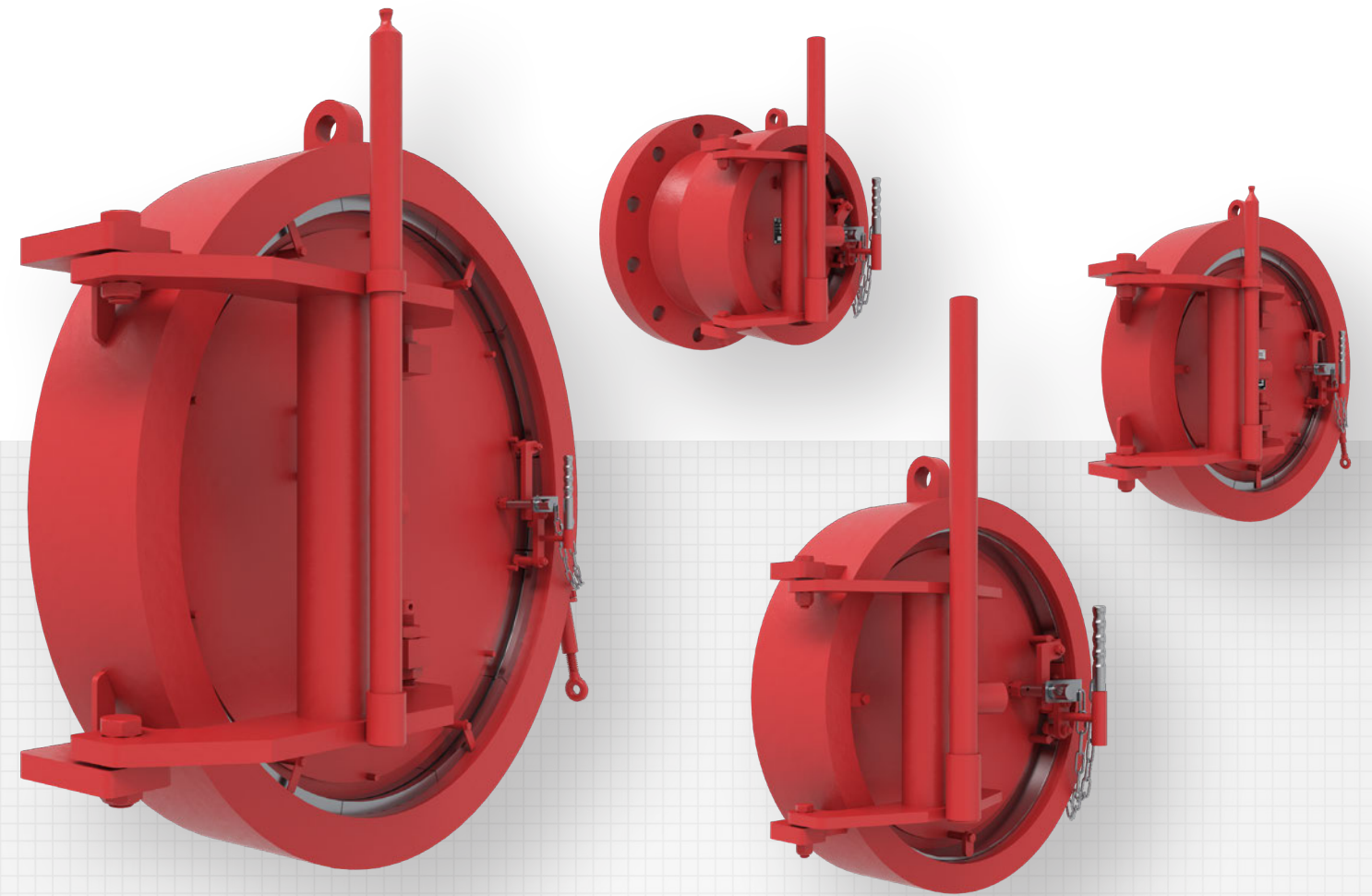
- Broad Size Range and Pressure Series
- O-Ring design with large cross section on horizontal and vertical closures, for positive seal, protection from light wear and corrosion, and cost efficiency
- Lip seal design on horizontal vertical closures
- Improved operation with load binder assist on horizontal sizes 24" (DN600) and larger
- Fail- safe Design

### STANDARDS:

- Certified to ASME B31.3/B31.4/B31.8/CSA Z662 Cat. I / ASME SEC VIII DIV. 1
- Pressure Alert Valve per UG-35.2 of ASME BPVC VIII DIV. 1
- Nace MR0175 compliant material
- -50° to + 400°F (-45° to 204°C)
- Viton O-Ring supplied with closure

### OPTIONS:

- Flanged Closure – welded connection or one piece
- ASME BPVC VIII DIV. 1 with U-Stamp for door only or whole closure (hub, door, locking ring)
- Stainless Steel, duplex, super-duplex
- Inconel or Stainless Steel weld overlay
- External hinge trim for Offshore uses
- Hydraulic lift on vertical closures
- Custom Wall Thickness, vents, and other modifications
- Special Materials and O-Rings
- Horizontal or Vertical orientation



### SAFETY, OPERATION, SEAL:

All closures come equipped with a Pressure Alert Valve (PAV) per ASME Sec VIII Div. 1 UG-35.2. The PAV is an integral part of the opening of the S-3000, as it is attached to a segment of the locking ring and must be removed before the locking ring can contract and the door can be opened. The PAV design does not require an O-Ring or metal seal ring, taking one more concern away. In addition, the S-3000 is a fail-safe design, meaning that even if the locking ring malfunctioned, the door is still wedged into the hub which maintains another level of safety.

Opening of the S-3000 begins by removing the Pressure Alert Valve (PAV) segment of the locking ring, then rotating the actuator. This then collapses the locking ring sufficiently to disengage with the hub, allowing the door with the locking ring to be pulled open. Weightbearing components are incorporated to make operation smooth regardless of size or orientation.

S-3000 closures come standard with a large cross section O-Ring allowing for positive sealing, while providing a tolerance for small surface damage and corrosion in long term use. In addition, Lip Seals are available on all closure sizes, pressure ratings and orientations. On high pressure applications greater than 2220 design pressure, lip seals become standard. Compression assists are provided based on size and closure orientation.



**THE CHOICE IS YOURS**



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