

**Ensure total reliability in the toughest environments**



## **Vanessa Series 30,000 Triple Offset Valves**

Go forward with complete confidence using Emerson's pioneering triple offset technology.



## When you operate in demanding conditions, total reliability isn't just important, it's critical

Emerson may provide some of the world's most innovative valve solutions, but our reputation for quality, performance and safety gives you something just as valuable: total reliability.

Decades of experience have taught us what is really critical to plant operators to help them optimize their assets and deliver against their objectives. This is why we join forces with them everyday to ensure they have the support and the expertise needed to solve the most demanding challenges in plant productivity, safety systems and cost management.

The Vanessa Series 30,000 triple offset valve provides a key solution to those challenges and contributes to ensuring total reliability of their operations in the toughest environments.

Reducing the time for unscheduled maintenance can significantly impact overall plant productivity.



When your objective is to lower costs, while at the same time improving production, finding better performing products and components is a key priority.



Increasing the safety levels of your facility while lowering the overall cost of ownership of your equipment is difficult.





'We have several hundred Vanessa triple offset valves operating in molecular sieve service and these have been working very effectively since initial installation four years ago, they are now our standard valve type for this difficult duty.'

Engineering Manager Major Process Licensor

## Vanessa Series 30,000 triple offset valves set the standard for product innovation

With over 300,000 Vanessa valves successfully installed worldwide on a wide range of applications, you don't have to look further than Emerson for a proven solution to long-term positive isolation, on-off, flow control and emergency operations.

The Vanessa triple offset valve was the first to provide bidirectional zero leakage\* performance for positive isolation, creating a new industry category using a technology not previously available with other quarter turn valves.

Its triple offset design completely eliminates any rubbing action of the sealing elements during the 90 degrees of rotation and such capability, combined with other key features, have effectively positioned over time the Vanessa Series 30,000 as the ultimate process valve.

### And the innovation goes on

Thanks to our engineering expertise, state-of-the-art technology and manufacturing capabilities we continue to provide the most reliable triple offset valves across a wide range of applications.

Today's Vanessa valves are even better equipped to deliver against customer expectations with their metal-to-metal torque seating, non-rubbing quarter turn rotation. The Vanessa Series 30,000 is capable of delivering full shut-off and peace of mind operation over a wider range of temperatures and pressure classes.

You can also benefit from a virtually maintenance free valve that not only delivers uncompromising performance, but can provide a more efficient solution compared to ball, gate and plug valve designs.

\* Zero leakage means no visible leakage when tested at high pressure with water and low pressure with air according to existing international standards



A Vanessa 120" double flanged valve.



A Vanessa 96" double flanged cryogenic valve tested at Lugagnano plant (Italy).



‘We have been using Vanessa triple offset valves in our Tank Farms & Offshore facilities for the past ten years for all of our five expansion phases and have found their performance to be extremely satisfactory.’

Terminal Manager Major O&G End User

### A revolution in quarter turn valves

The Vanessa triple offset design completely eliminates any rubbing action of the sealing elements during the 90 degrees of rotation. A single, instantaneous point of contact between the metal seal ring and metal seat occurs only when closed position is reached.

Embrace the triple offset concept ► p5

### Reduce downtime for unscheduled maintenance

Vanessa valves are suitable for positive isolation providing leak free protection when undertaking unscheduled maintenance of other equipment.

Reduce unscheduled downtime ► p7

### The ultimate process valve

Vanessa valves are capable of performing several process and safety protection functions with a single product including on-off, high frequency/switching, flow control and ESD.

Combine functions ► p9

### Lighter valve minimizes your total cost of ownership

The valve's compact design makes it lighter when compared to most ball valves. This ensures a smaller footprint and a lower initial cost which, when added to the low/zero maintenance benefits, will ensure reduced total cost of ownership.

Reduce total cost of ownership ► p11

## A revolution in quarter turn valve

As the concept of triple offset technology has evolved, so has the Vanessa Series 30,000. From meeting the need to eliminate leakage, triple offset valves have evolved to become the ultimate process valve - one that's even better positioned to deliver metal-to-metal torque seating, quarter turn non-rubbing rotation and withstand the harshest service conditions.

### Triple Offset Design

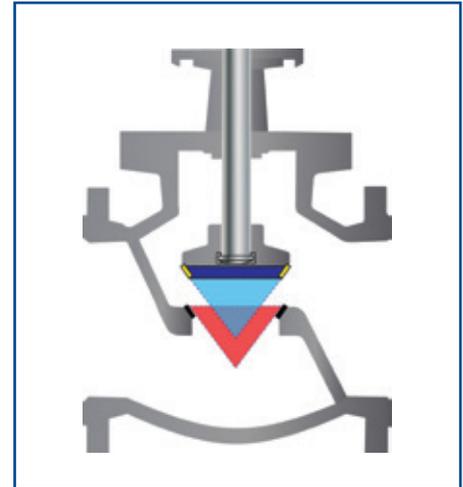
The Vanessa Series 30,000 valve shares the same cone-to-cone principle with a globe valve, but sealing is performed by quarter turn rotation. TOVs use a sealing system consisting of a stationary seat and a rotating sealing surface sharing an identical shape: an inclined conic section. When these cones overlap, closed position is reached and sealing occurs. Such 'quarter turn globe' concept is made possible by the use of three 'offsets' meant to completely eliminate rubbing. Optimized seating angles and rotational characteristics guarantee superior tightness via an ingenious combination of the triple offset design and a flexible metal seal ring across all basic, cryogenic and high temperature configurations.

### Seal Ring

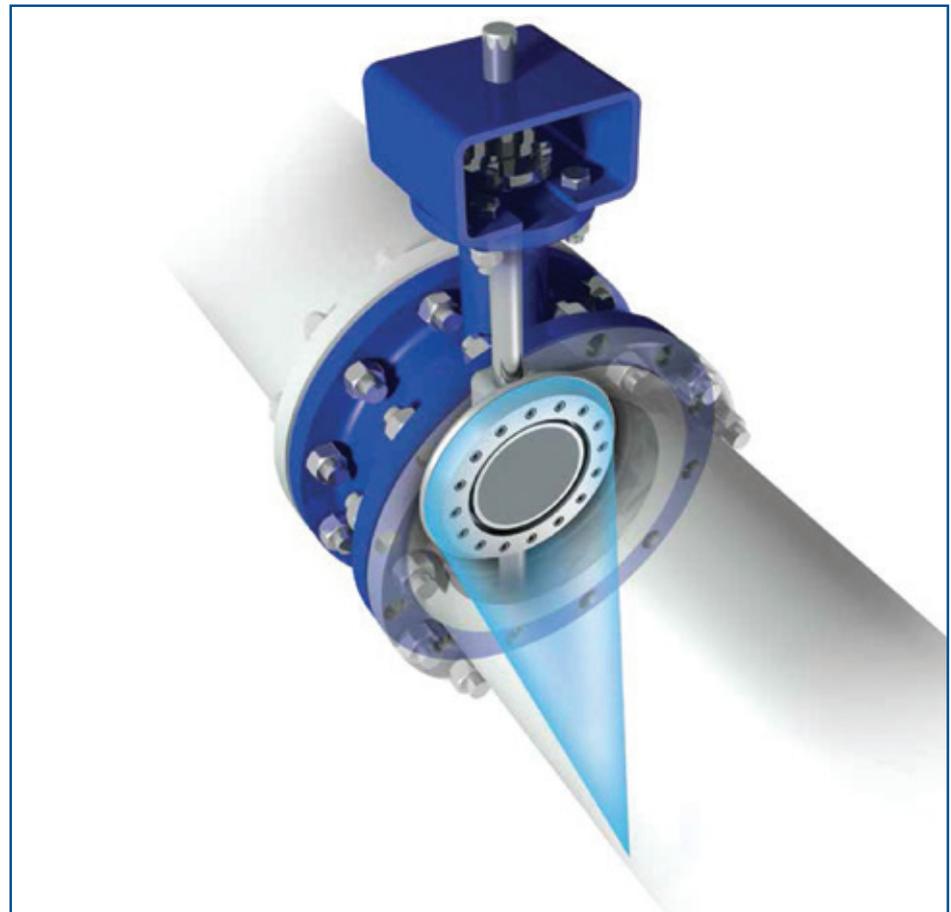
The elasticity and radial compression of the Vanessa Series 30,000's seal ring enable the contact pressure to be uniformly distributed around the seating surface - guaranteeing zero leakage.

### Seat Stellite® Grade 21

The Vanessa Series 30,000 features overlays made from Stellite® grade 21 - an incredibly robust material that is specifically designed to withstand flow generated wear and guarantee a robust surface to withstand the radial compression of the seal ring.



Cone-to-cone sealing principle in a globe valve (axial movement)



Cone-to-cone sealing principle in a triple offset valve (rotational movement)

## The Triple Offset Concept

### Offset 1

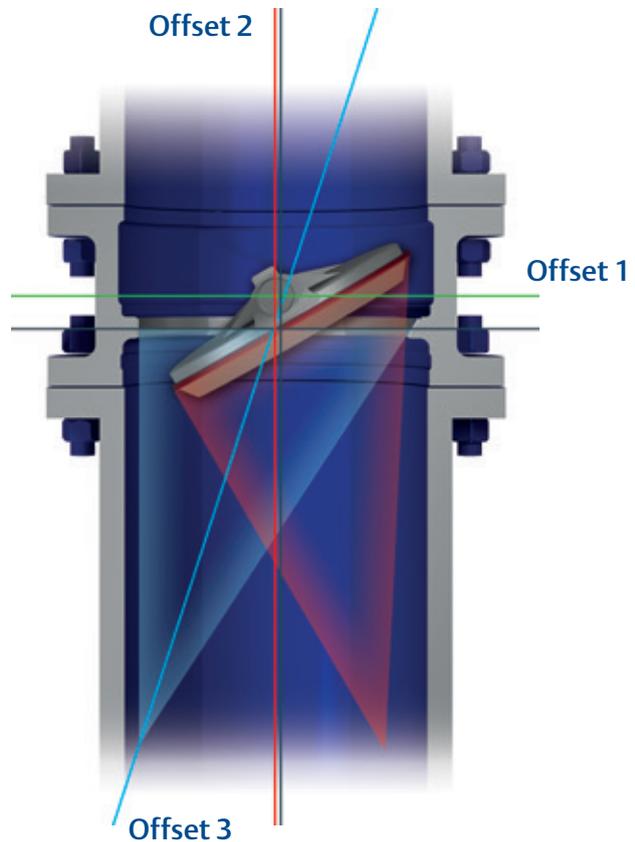
The shaft is placed behind the plane of the sealing surface to provide a continuous seat path.

### Offset 2

The shaft is placed to one side of the pipe/valve centerline to allow the displacement of the seal from the seat during the 90° opening.

### Offset 3

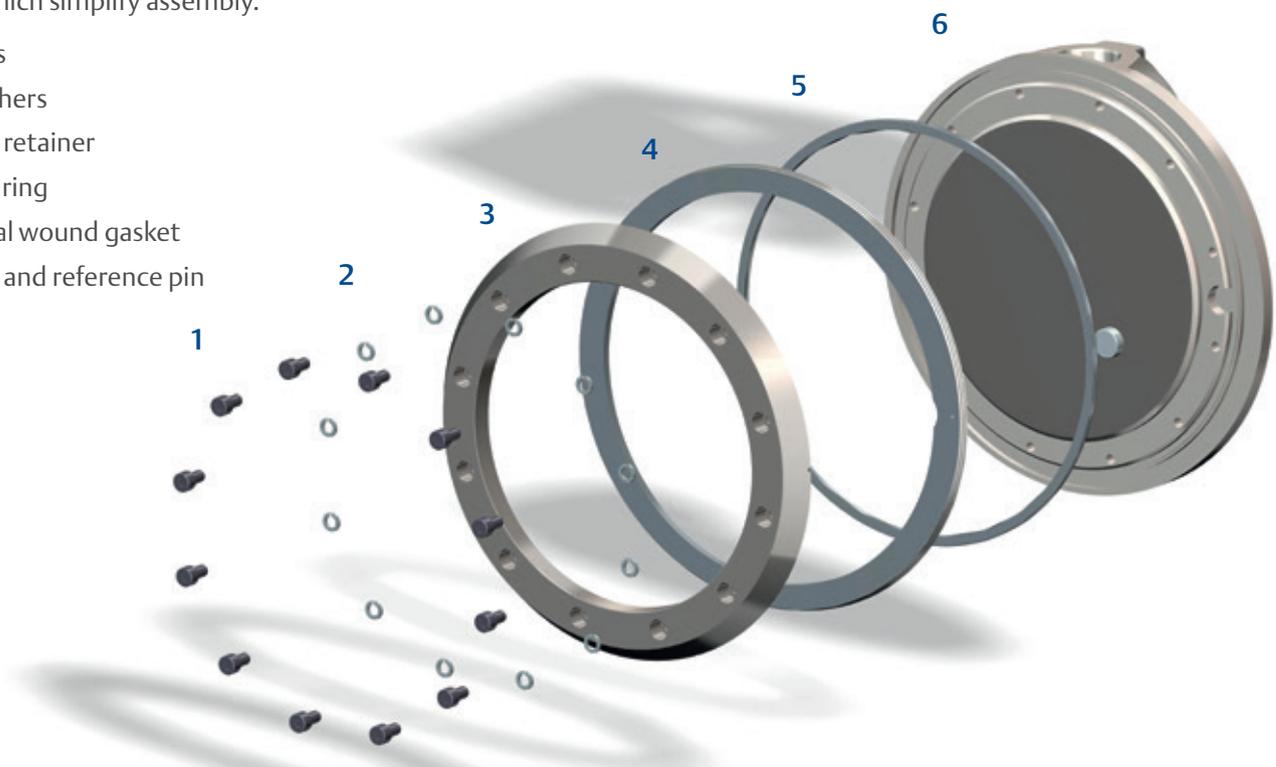
The seat and seal cone centerlines are inclined in respect to the pipe/valve centerline. This third offset completely eliminates rubbing.



## Sealing

Seal rings are easily interchangeable thanks to their self-centering ability and the presence of reference pins which simplify assembly.

1. Bolts
2. Washers
3. Disc retainer
4. Seal ring
5. Spiral wound gasket
6. Disc and reference pin





## Reduce downtime with positive isolation and zero leakage\*

At Emerson we recognize that unscheduled maintenance, process inefficiencies and unwelcome stoppages can have a major impact on production capability. What is more, as larger and more sophisticated plants drive temperatures and expectations ever higher, we know it's a problem that will only get worse. That is why Vanessa Series 30,000 triple offset valves are ideal for applications where positive or double positive isolation is required to safely carry out unscheduled maintenance. Installed in the preferred direction, the asymmetric design allows the valve to remain closed and tight even with no torque applied in case of actuator failure.

\* Zero leakage means no visible leakage when tested at high pressure with water and low pressure with air according to existing international standards

### What's your challenge?

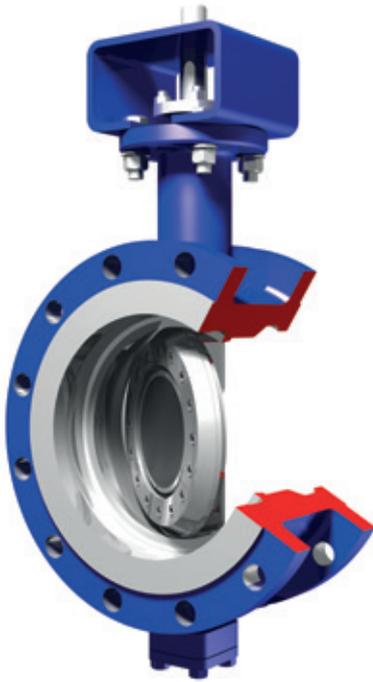
Unscheduled equipment repairs need to be undertaken as quickly and safely as possible.



### What's your opportunity?

By providing positive isolation Vanessa valves allow unscheduled equipment maintenance to be completed in the most efficient way.

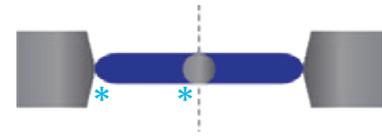




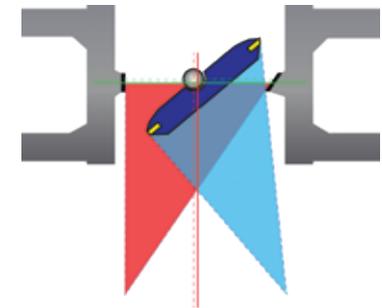
### Quarter-turn rotation

Shaft rotation around its vertical axis eliminates any negative effects on packing and allows for an extremely compact design.

### Butterfly Valve



### Triple Offset Valve



\*Rubbing points

### Non-rubbing rotation

Eliminating contact between seat and seal during opening-closing means extending the life of the sealing elements and the valve altogether.



### Metal-to-metal seating

Vanessa's cone-to-cone concept requires metal-to-metal seating in order to handle more severe applications. We use Stellite® grade 21 overlaid seats to provide resistance to abrasion, wear and corrosion caused by the fluid, and a resilient seal ring in Duplex as a minimum with high mechanical resistance.



### Torque seating and solid seal ring

The seating force is generated by externally applied torque rather than by mechanical interference. This allows Vanessa valves to handle high pressure classes and provide reliable highly controlled operating torque. The seal ring is a key feature, its elasticity and radial compression enable a contact pressure to be uniformly distributed around the seating surface, guaranteeing zero leakage. Vanessa valves achieve the same leakage performance with both laminated and solid seal rings.



## Lower your costs with a multi-function process valve solution

At Emerson we understand that in balancing demands to lower costs with the need to improve production, you also have to comply with an ever more stringent set of industry safety standards. That's why Vanessa Series 30,000 valves represent the perfect solution. With the correct material and actuator selection, combined with their quarter turn and throttling trim design, Vanessa valves are able to perform a wide range of process functions (including ON-OFF, high frequency/switching, flow control) and safety protective functions (Emergency Shut Down - ESD). Furthermore Vanessa valves can be used to replace two or more separate valves to combine tight shutoff with another function.

### What's your challenge?

When you have to lower costs whilst at the same time improve production and safety, finding better performing products is a key priority.



### What's your opportunity?

In combination with suitable actuation and controls, a single Vanessa valve is capable of performing several functions. It can even reduce capex and installation costs, making it an ideal technical solution.





### On-Off

Every Vanessa valve is designed to provide full tightness at the maximum rated pressure in both sealing directions. The valves' non-symmetric trim design provides a preferred sealing direction where tightness is achieved with lower torque demand, a key advantage in on-off applications which are typically uni-directional.



### High frequency / switching

The Vanessa triple offset, non-rubbing design completely eliminates wear between sealing components. The entire trim, including bearings and thrust bearing is designed for heavy duty use. The valve is suitable for high frequency open/close cycles such as found in the molecular sieve process, where Vanessa valves have been used effectively for many years.



### Flow Control

As a quarter turn triple offset valve with a throttling trim, the Vanessa Series 30,000 delivers top performance in flow control functions. Its extremely low running torque is constant throughout the 90° rotation, thus ensuring accurate flow and pressure control even at small opening angles.



### Emergency Shutdown (ESD)

With the correct material and actuator selection, Vanessa valves offer intrinsically higher safety integrity levels (SIL) in critical services including shut down, non return, bypass blow off/blow down and vent. In the preferred sealing direction of the valve, the pressure tends to keep the valve closed, allowing safer functioning during emergency shutdowns. Installed in the opposite sealing direction, where the pressure tends to open the valve, it improves safety whenever the function is to provide emergency blow off/vent operation.



## A lighter valve minimizes your total cost of ownership

The Vanessa Series 30,000 valve has an inherently compact design achieving substantial space and weight reductions, while benefitting immediately from lower installation costs and a smaller footprint.

Triple offset valves are up to 80% lighter than comparable trunnion mounted reduced bore ball valves thanks to lower material use. In class 1500, TOVs are more than 50% lighter, which in absolute weight terms is an outstanding difference able to generate significant cost savings. And because the laying lengths are up to 2/3 shorter, you can reduce skid envelope dimensions and multiply the design benefits.

The common use of PTFE seats in ball valves to provide tighter shut-off may increase the variability of torque demand overtime. This implies that actuation needs to be often oversized to ensure longer term reliability. Furthermore, with the presence of significant pipe stresses, ball valve trims suffer due to the bending of the body and the compression of the ball against the seat, often causing stickiness and leakage. Thanks to Vanessa TOV's single-lined sealing plane, vibrations or stress from the pipe do not get transmitted in an unequal manner between two seats as in ball valve design. Vanessa TOVs are torque-seated with an integral metal seat and no inner cavities. There is no risk of particulate buildup affecting valve torque requirement over time and jeopardizing valve operability and leakage performance.

### What's your challenge?

When equipment CAPEX and OPEX need to be reduced, you need to find the best technical solution for each application capable of minimizing acquisition, installation and operating costs.

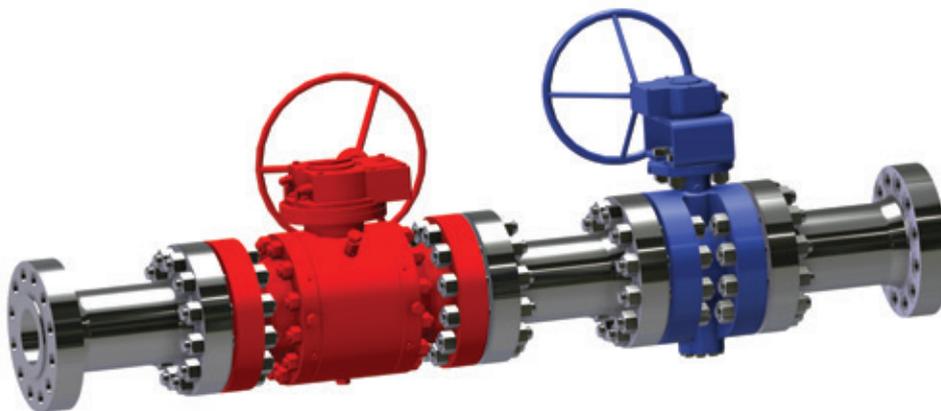
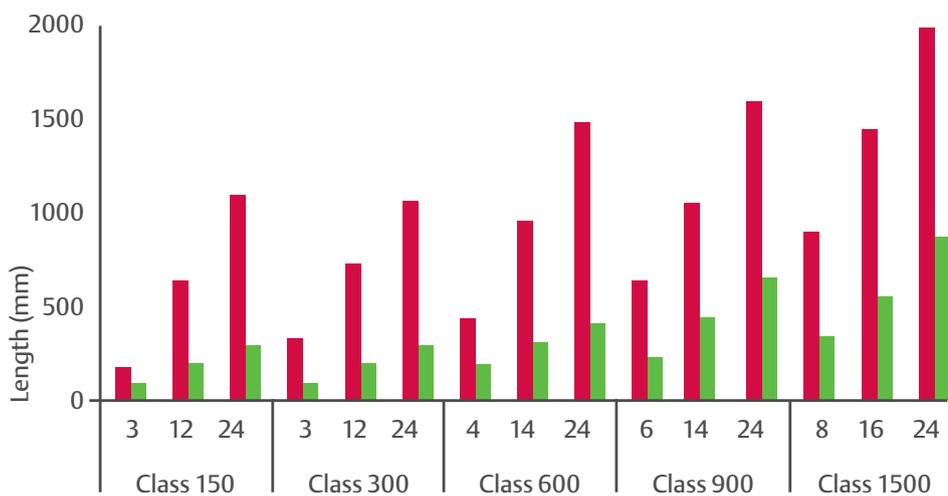
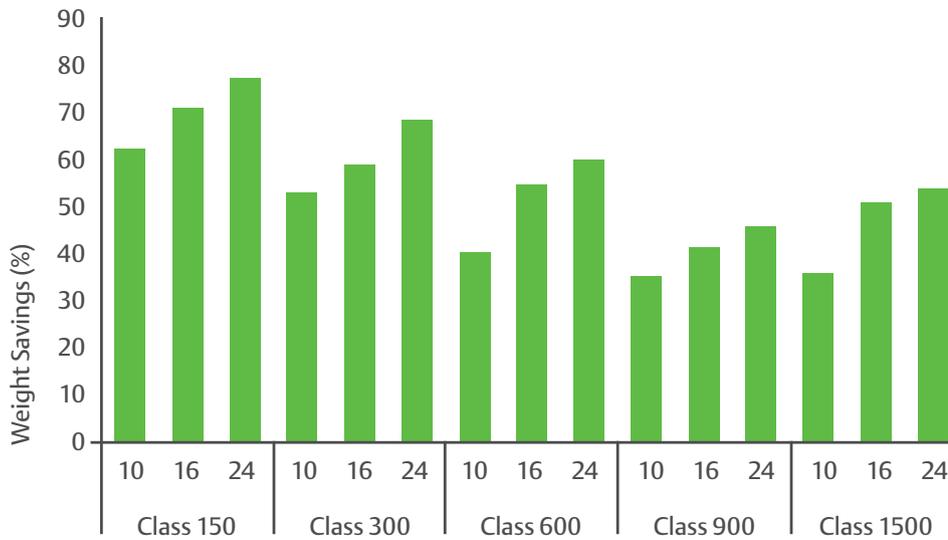


### What's your opportunity?

The Vanessa Series 30,000's innovative design delivers substantial space and weight reductions with lower installation costs.



# Weight and footprint comparisons with a trunnion mounted, reduced bore ball valve



Vanessa Series 30,000 triple offset valves provide significant savings in terms of overall cost of ownership compared to a ball valve.

Vanessa TOVs are an ideal solution and can be specified in place of ball valves and/or to replace them during plant maintenance thanks to their non-rubbing design, lower material use and smaller footprint. They are also suitable for applications where gate and plug valves are utilized, providing improved sealing performance, reliable operability and lower risk of fugitive emissions.



## Vanessa Series 30,000

### One product, hundreds of applications

Over 300,000 Vanessa valves have been successfully installed worldwide on a wide range of applications including oil & gas, chemical & petrochemical, power and many other industries

From cryogenic up to extremely high temperatures, Emerson offer solutions to critical and non-critical applications. Suitable from full vacuum to 250 bar (over 3,600 psi). Vanessa Series 30,000 valves are available in sizes between 3" and 120" and can be configured in wafer, lugged, double flanged and butt weld body styles across virtually all bills of materials. Designed to handle fluids ranging from H<sub>2</sub> gas to high viscosity liquids, from food grade to toxic and corrosive. Vanessa's seating and rotational characteristics guarantee superior tightness. These key features are at the core of our Series 30,000 and are shared across all configurations and executions including basic, class 1500, cryogenic, cryogenic top entry, high temperature and molten salt.



	Basic	Class 1500	Cryogenic	Cryogenic Top Entry	High Temperature	Molten Salt
Double Flanged Short	•	•	•		•	
Double Flanged Long	•					
Lug	•		•		•	
Wafer	•					
Buttweld	•	•	•	•		•



**Cryogenic**

Series 30,000 cryogenic valves feature an extended bonnet, which meets the requirements of BS 6364, and are constructed from materials carefully selected to match pipe specification and project requirements while also being unaffected by cryogenic conditions and severe temperature fluctuations.



**Cryogenic Butt-weld Top Entry**

When an inline maintenance capability is mandatory, this design allows for access without removing the valve body from the line. The entire valve trim can be removed from the body and individual valve parts can be accessed in total safety. This feature allows for any unpredictable and extraordinary valve repair, which would be impossible, impractical or unsafe with other valve designs.



**High Temperature**

The high temperature configuration is suitable for applications up to 815°C (1500°F). The valve is designed to compensate for the thermal expansion of components and to withstand 'material creep' at temperatures over 600°C (1112°F). The extended bonnet helps to maintain the packing operating temperature which greatly reduces the risk of fugitive emissions.



**Molten Salt**

The Vanessa Series 30,000 'molten salt' valve has been specifically designed for solar power generation applications. The butt-welded body style features an extremely compact design that fully integrates with the pipeline and significantly reduces thermal dissipation simplifying the piping insulation design. This configuration is three times more efficient in retaining heat at 600°C (1112°F) than a comparable globe valve which also translates into a significant reduction in energy demand in cold conditions.

# Consider the benefits of total reliability in the toughest environments



In applications where high temperatures and pressures can lead to damaging downtime, valve leakages and systemic failures, you can rely on Vanessa triple offset valves to deliver positive isolation. Every time.

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