

DOUBLE POSITIVE ISOLATION* APPLICATIONS

USING TRIPLE OFFSET VALVES

Critical isolation is required by a number of industry applications (i.e. natural gas industrial processes, refined products transportation and storage) to ensure that leakage does not occur. While double isolation and bleed (DIB) is reached, as per API 6D, with a "single valve with two seating surfaces, each of which, in the closed position, provides a seal against pressure from a single source, with a means of venting/bleeding the cavity between the seating surfaces.", double positive isolation (DPI) requires two independent obturators (with a bleeder in between) and two separate actuating mechanisms (i.e. independent stems).

Two consecutive Vanessa Triple Offset Valves TOVs, with a bleed connection between them (Figure 1) may be used as a safe and valid substitute for ball valves in a DPI valve arrangement.

FIGURE 1

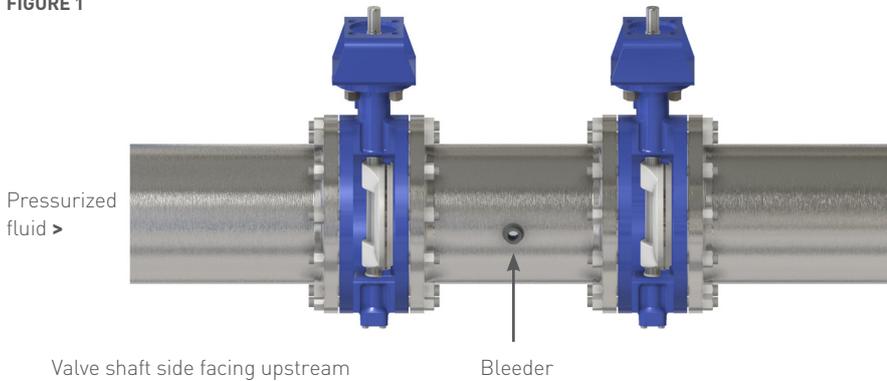
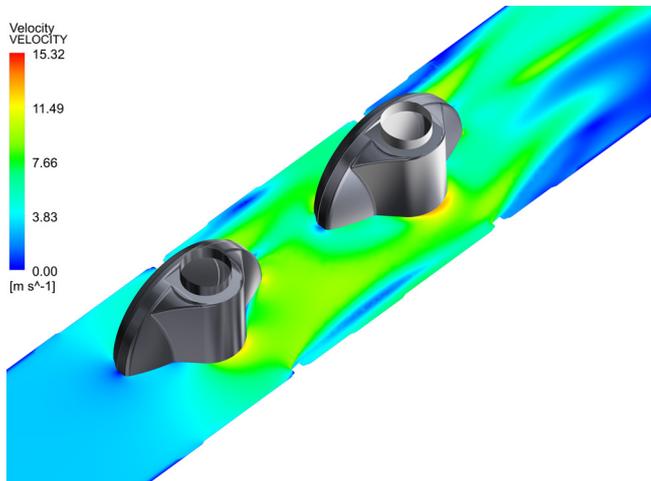


FIGURE 2



In 2013, a technical team, including engineers from a major Oil & Gas end user, was formed to validate Vanessa Series 30,000 TOV suitability for use in double positive isolation (DPI) applications. Their thorough review included examination of the valve technology, finite element analysis (FEA) evaluations, video review of the TOV performance and operating experience from the users.

Upon completion of the evaluation the technical team deemed the Vanessa Series 30,000 TOV a suitable alternative to trunnion mounted ball valves in applications through Class 900 and temperature ranges from cryogenic levels up to the maximum published temperature ratings.

* Valve Magazine (2010) 'True meaning of Double Block and Bleed'.

THE KEY RESULTS FROM ASSESSING VANESSA SERIES 30,000 TOV:

- Passed closure test for positive isolation.
- When installed in the preferred sealing direction, the asymmetric design allows the valve to remain closed and tight even with no torque applied.
- With two valves installed in series at a minimum distance, analysis using computational fluid dynamics shows no negative effects on the downstream valve (Figure 2).
- The closer the two valves are installed, the lower the total ΔP .



VANESSA SERIES 30,000 TRIPLE OFFSET VALVES

PRODUCT INFORMATION

WHAT IS A TRIPLE OFFSET VALVE (TOV)?

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

The Vanessa Series 30,000 TOV shares the same cone-to-cone principle with a globe valve, but sealing is performed by quarter turn rotation. Its 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:

- **Non-rubbing rotation.** This feature makes operation quick and easy, enabling modulation even at extremely low angles and extends the life of the sealing elements.
- **Quarter turn rotation.** The valve relies on low, consistent running torque enabling quick stroke times; shaft rotation around its vertical axis also eliminates any negative effects on packing and allows for an extremely compact design.
- **Torque seating.** The valve can handle from vacuum to high pressures with reliable and highly controlled seating/unseating torque. This is achieved by applying contact pressure with no seat/seal deformation.
- **Metal-to-metal seating.** The valve is capable of functioning at virtually all temperatures, pressure levels and with any fluid types while keeping its sealing performance unaffected.

WHAT TYPES OF VALVES CAN BE REPLACED?

Vanessa TOVs enable the easy replacement of gate, ball and globe valves, achieving substantial space and weight reductions and significantly lowering transportation and installation costs. Long body face-to-face valves (designed in compliance with ASME B16.10) ensure that several existing class 150, 300 and 600 valves can be replaced without any piping modification.

WHAT FUNCTIONS CAN A TOV PERFORM?

Isolation: 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.

Control: Extremely low running torque is constant throughout the 90° rotation, ensuring accurate flow and pressure control even at small opening angles.

ESD: With the correct material and actuator selection, Vanessa Series 30,000 valves offer intrinsically higher safety integrity levels (SIL) in critical services including shutdown, non-return, bypass blowoff/blowdown and vent.

Combined functions: With the right actuation and controls, Series 30,000 can perform multiple functions including isolation and control, ESD and control, etc. in a single product.

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

To learn more, please visit the [Vanessa page](#) in Emerson.com.

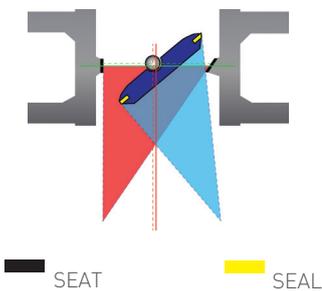
VCBUL-03058-EN © 2017, 2024 Emerson Electric Co. All rights reserved 07/24. Vanessa is a mark owned by one of the companies of Emerson Electric Co. The Emerson logo is a trademark and service mark of Emerson Electric Co. All other marks are the property of their prospective owners.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

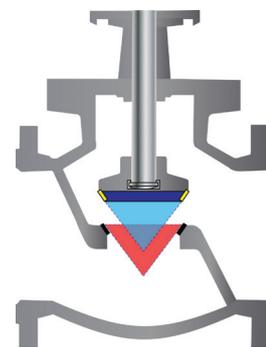
Emerson Electric Co. does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any Emerson Electric Co. product remains solely with the purchaser.

Emerson.com

TOV - ROTATIONAL MOVEMENT



GLOBE VALVE - AXIAL MOVEMENT



ADDITIONAL TECHNICAL ADVANTAGES OF VANESSA TOVs:

- **No cavities in the valve body** which can accumulate particulate and negatively affect seats and operability.
- **Inherently firesafe** through 100% metal construction.
- **Balanced operating torque** enables opening against full ΔP without any pressure equalization.
- **Improved operability** with extremely low 90° running torque allowing for quick stroke.
- **Lower material usage** (especially on larger diameters & pressure classes) means a drastically reduced weight and footprint.
- **No jamming risk** through optimized seating angles, consistent material selection and single seating line.
- **No modification required** to the piping system when replacing most existing gate or ball valves utilized in DPI by using short face-to-face TOVs and a small spool piece as standard.