



Proven in cryogenic applications
worldwide

Vanessa Series 30,000
Triple offset valves for cryogenic applications



EMERSON

EMERSON

A GLOBAL NETWORK OF INTERNATIONAL BRANDS

Emerson is the name behind the world's most comprehensive range of valves, actuators and associated flow control products.

Supplying a host of leading global brands, we work closely with the oil & gas, power generation, mining, chemical, food & beverage and marine industries, to anticipate their needs and exceed their expectations.

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. There are now over 300,000 Vanessa valves operating around the world.

A strong commitment to maintaining and improving the quality of both product performance and customer service is inherent within our management policy.

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





VANESSA SERIES 30,000 THE MARKET LEADER IN CRYOGENIC APPLICATIONS

IN ALMOST THREE DECADES, VANESSA SERIES 30,000 HAS BECOME A MARKET LEADER WITH THE LARGEST WORLDWIDE INSTALLATION BASE OF CRYOGENIC TRIPLE OFFSET VALVES.

At the core of our success is a continuous commitment to learn, test and fine-tune our product design to create the most reliable solution for virtually all cryogenic applications. Our trim is our unique key component. Continuously developed to meet and exceed the most stringent specification requirements concerning operability, tightness, fugitive emissions and safety, its proven outstanding performance in a wide range of scenarios confirms its perfect suitability for critical and non-critical cryogenic applications across all body styles.

It is through this ability to acquire the necessary knowledge and skills that we have gained a worldwide reputation for producing one of the finest products in the valve market. Our fully metal seated, triple offset design and expertise in material selection, ensure that tightness and operability are unaffected by severe fluctuations at cryogenic temperatures providing the ultimate solution to long-term isolation, flow control and emergency operations.

Our Series 30,000 cryogenic valves feature an extended bonnet, which meets the requirements of BS6364, and are made with materials selected carefully to match pipe specification and project requirements.

Vanessa Series 30,000 represents an important step forward in cryogenic valve applications compared to any other valve design.

TECHNICAL SPECIFICATION

MATERIALS

Austenitic stainless steels

CONFIGURATIONS

Cryogenic

SIZES

DN 80 to DN 2800
(NPS 3 to NPS 112) and larger

CONNECTIONS

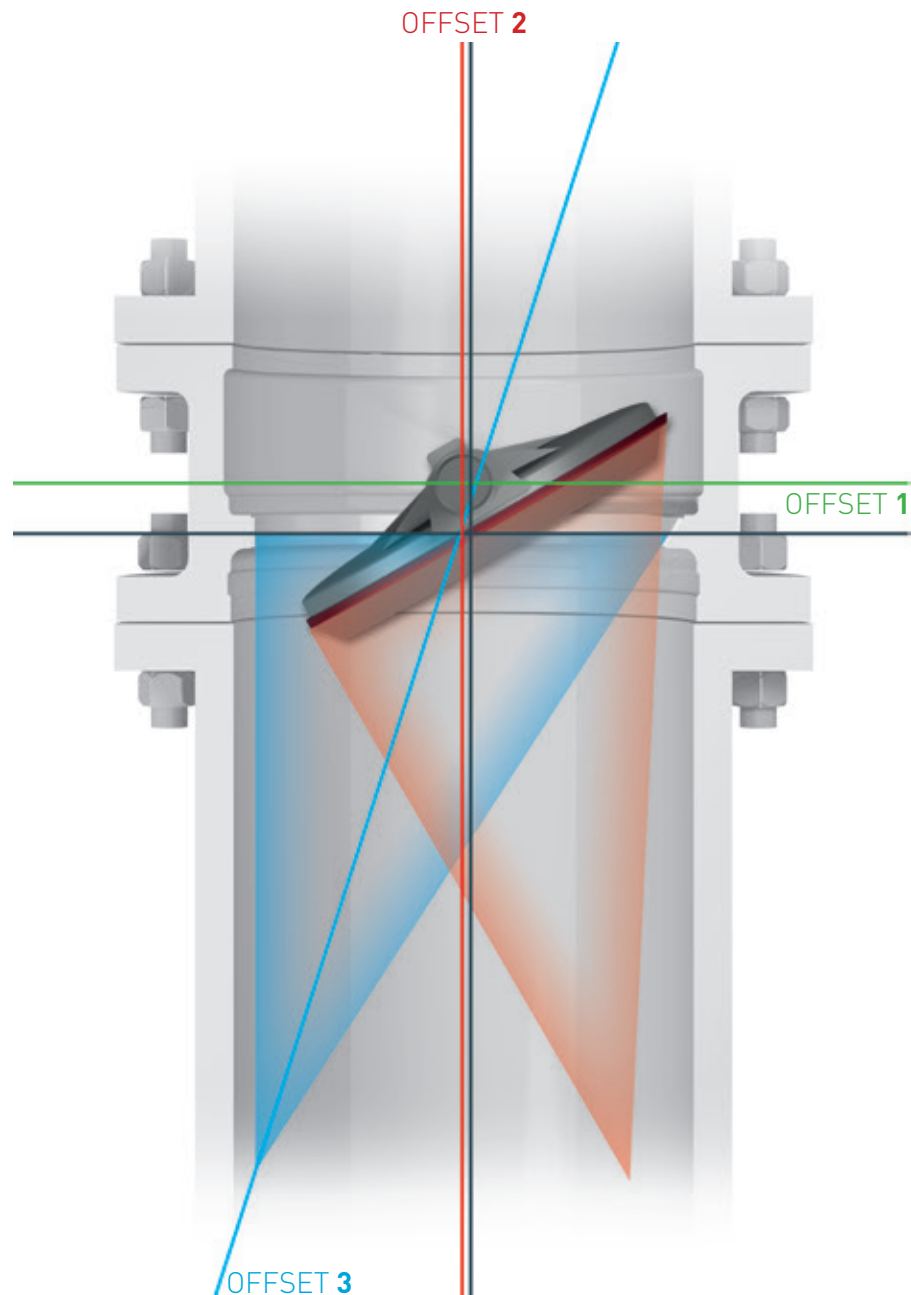
Double flanged, lug, butt weld,
butt weld top entry

PRESSURE CLASS

ASME 150-1500; EN PN 10-160

TEMPERATURE RANGE

-254°C to 250°C (-425°F to +482°F)



TRIPLE OFFSET THE CONCEPT

VANESSA TRIPLE OFFSET VALVE: METAL-TO-METAL TORQUE SEATED, QUARTER TURN NON-RUBBING ROTATION

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.

SERIES 30,000

MAINTENANCE-FREE TRIM DESIGN

VANESSA SERIES 30,000'S TRIM HAS BEEN DESIGNED TO BE COMPLETELY MAINTENANCE-FREE ON MOST CRYOGENIC FLUID APPLICATIONS.

The elimination of any soft components in the sealing mechanism removes the risks of material embrittlement, premature wear and consequent need for early replacement.

The chemical and mechanical properties of our sealing elements, combined with the triple offset non-rubbing design, ensure extremely long valve life. With proper valve handling, installation, use and sufficient pre-installation equipment cleaning, valve maintenance can be completely eliminated.

All Vanessa Series 30,000 cryogenic valves are Type Approval Tested (TAT) against stringent criteria simulating either inline/offline tightness after repeated open/close cycles under maximum design pressure with helium in cryogenic conditions as well as ambient conditions.

VALVE BODY STYLES

DOUBLE FLANGED BODY



The most widely used pipe connection - it enables the best gasket load distribution and short bolting reduces the risk of stretching. The standardized flange design also ensures safe pipe jointing and ease of assembly/disassembly from the line. Vanessa Series 30,000 is provided with ASME and EN flanges including designs to ASME VIII sect 2 div.1.

LUG BODY



A single flange design and more economical than double flanged, as it requires less material. With threaded inserts on both sides, it is installed using two sets of bolts and no nuts. According to common industry practices, operators tend to avoid using this body style for diameters higher than NPS 36 due to operational difficulties in installing the valve.

BUTTWELD BODY

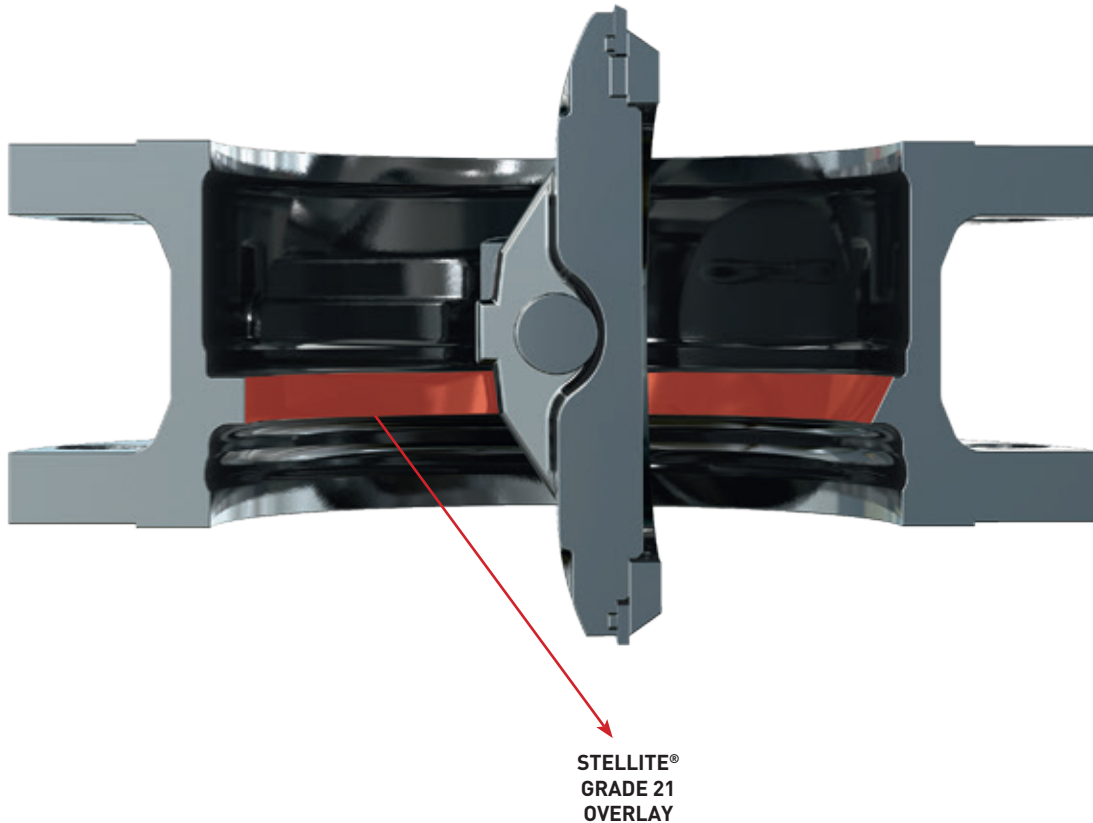


The ideal choice whenever flanged connections need to be reduced, this design provides significant initial cost savings. The buttweld body completely eliminates the possibility of fugitive emissions through flanged joints induced by the adjacent pipe stresses. As for all Vanessa Series 30,000 valves, ongoing maintenance is not required.

BUTTWELD TOP ENTRY BODY



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 different valve designs. Overall, the maintenance of a Vanessa Series 30,000 remains largely unnecessary throughout the product lifecycle.



SERIES 30,000

A HISTORY OF OUTSTANDING RESULTS
WITH STELLITE® GRADE 21 SEAT OVERLAYS

SERIES 30,000 USES A ROBUST INTEGRAL-TO-BODY SEAT WHICH REPRESENTS AN OPTIMAL SOLUTION FOR POSITIVE ISOLATION, ELIMINATING ANY POSSIBILITY OF MECHANICAL FAILURE AND LEAKAGE

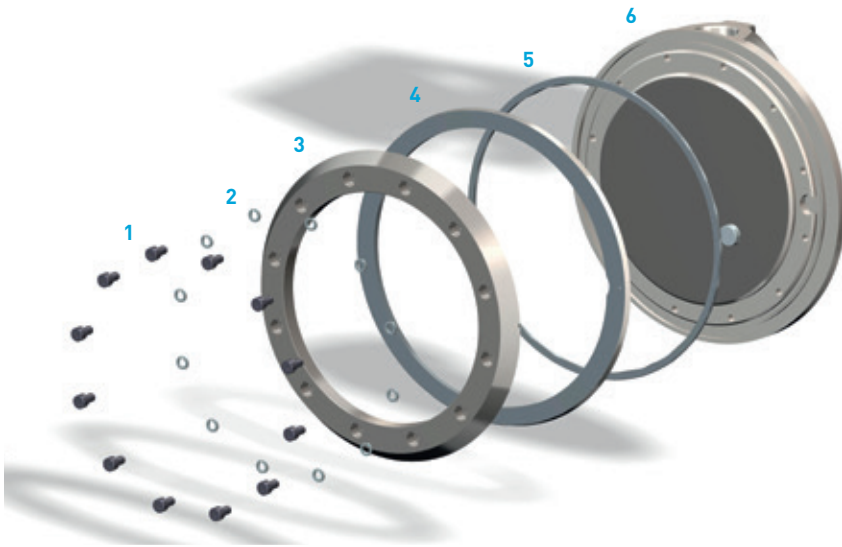
WEAR-RESISTANT WELD SEAT OVERLAYS ENSURE FLAWLESS CRYOGENIC PLANT COMMISSIONING AND START-UPS

Stellite® grade 21 is specifically designed to withstand wear produced by metal-to-metal contact

- Due to its higher elasticity, grade 21 is a better choice for metal-to-metal seating compared to grade 6
- High quality weld overlays are obtained with welding robots and are designed to be maintenance free for the entire life of the valve

Stellite® grade 21 overlays contribute to achieving higher reliability on heavy duty applications, including high cycling and quick stroking time.

Stellite® is a registered tradename of Deloro



KEY

- 1 Bolts
- 2 Washers
- 3 Disc retainer
- 4 Solid seal ring
- 5 Spiral wound gasket
- 6 Disc and reference pin

CRYOGENIC CONFIGURATION - SOLID SEAL RING

AS FOR ALL VANESSA TRIPLE OFFSET VALVES, SEAL RINGS ARE EASILY INTERCHANGEABLE THANKS TO THEIR SELF-CENTERING ABILITY AND THE PRESENCE OF REFERENCE PINS THAT SIMPLIFY ASSEMBLY.

Series 30,000 cryogenic configuration features a **one-piece Solid Seal Ring (SSR)** in UNS S20910 (or Nitronic® 50) eliminating soft parts which would prove unsuitable at cryogenic conditions. Indeed, using polymers or other soft components (such as graphite) for sealing parts limits the valve's ability to achieve tightness over time and increase the risk

of damage during commissioning and start-up. A material highly resistant to corrosion, Nitronic® 50 is able to preserve important mechanical features at extremely low temperatures. It is also known for its exceptional yield strength, approximately double that of other series 300 stainless steels at ambient temperature.

Nitronic® is a registered tradename of AK Steel

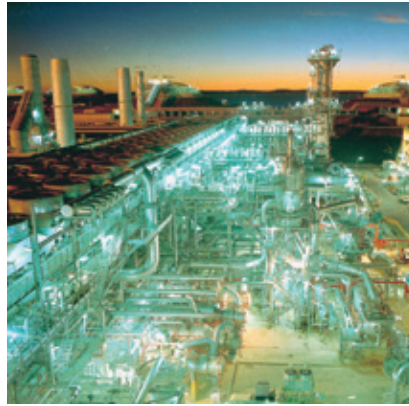


FEATURES

1. Open/close indicators facilitate quick installation of actuators when the valve is already inline.
2. The Series 30,000 does not feature pins that would reduce the shaft resistant section.
3. The one-piece shaft ensures high pressure containment safety/ maximum torque seating integrity.
4. The Series 30,000 is designed to handle the risk of shaft extrusion both internally and externally in total compliance with API 609.
5. External emissions are minimized with a two-piece packing gland - our proprietary packing design is qualified according to ISO 15848-1, EPA method 21, TÜV TA luft/ VDI 2440 certifications.
6. Robust bearings and thrust bearing are designed to withstand high pressure and minimize galling.
7. Flange spot facing maximizes the integrity of the connection to the pipe, thus limiting the possibility of leakage over time.







THE SOLUTIONS FOR OIL & GAS RESPONDING TO THE NEEDS OF THE LNG INDUSTRY

REDUCING RISKS RELATED TO HIGH FLUID FLAMMABILITY, PROVIDING HIGHLY RELIABLE SHUT-DOWN PRODUCTS, MINIMIZING MAINTENANCE, VANESSA SERIES 30,000 FULFILLS ALL THESE CRITERIA THROUGHOUT THE LNG SUPPLY CHAIN.

LNG PLANT

Although LNG plants were first developed in the 1930s, liquefaction trains are now being built with significantly larger capacity to generate higher outputs in response to growing worldwide demand. The key challenge for valve manufacturers is to produce large sizes (up to NPS 100) that can handle high pressures (class 900) in pressure control, isolation, emergency operations and major equipment protective functions. Whether methane, ethane, propane or butane, liquefied gas creates critical safety risks due to its high flammability. Vanessa provides a highly robust 100% fire safe solution that has

been proven in LNG plants for more than 25 years across applications traditionally handled by ball, gate and globe valves. In comparison, Vanessa Series 30,000 ensures improved performance and reliability combined with compact design and lower weight, a major advantage on process equipment skids.

LNG TERMINALS

Suitable for both liquid and vapor LNG services, Vanessa Series 30,000 valves are used for isolation and, most importantly, as plant shutdown valves. The latter is a critical area, requiring products capable of highly reliable tight shut-off, that meet both customer specifications and government regulations. Vanessa has built a strong reputation in this field over many years, with valves in service at LNG terminals located around the globe. Typical specifications for LNG terminals include valves ranging from NPS 6 to NPS 42 in size, handling pressures of 150 class up to 900 class.

‘Triple offset valves are very established in LNG applications, and we are using them extensively in our LNG plant where such valves would not have even been contemplated 10 years ago.’

Technical team leader

Major oil & gas end user





THE SOLUTIONS FOR PROCESS AND OTHER INDUSTRIES

SUITABLE FOR VIRTUALLY ALL CRYOGENIC VALVE APPLICATIONS

WHEREVER THERE IS A NEED FOR OUTSTANDING VALVE PERFORMANCE IN CRYOGENIC PROCESSES, VANESSA CAN PROVIDE THE SOLUTION.

AIR SEPARATION UNITS

In a typical air separation unit (ASU) the air is subject to five main processes: filtration, compression, purification, cooling and distillation. After purification, the air is flown in the cold box and cooled down to liquefaction temperature. At this point the air is introduced into the first of several distillation columns. The whole process is extremely cold, so a key feature of cryogenic distillation is effective cold box insulation which is typically achieved using perlite. The entire cold box is filled with fine granules of perlite to insulate the process vessels and piping from ambient heat. This requires extremely reliable cryogenic equipment including valves able to control and isolate cryogenic liquids and gases while installed and sealed in the cold box's core. Vanessa Series 30,000 cryogenic

valves are designed to meet cold box requirements to BS6364 or individual customer specifications. The product's reliability and robustness, combined with its maintenance-free design, makes it the ideal choice for this application.

AEROSPACE

It is vital that propellant systems on rocket engine test stands operate in total safety. In addition to basic cryogenic valve requirements, Vanessa Series 30,000 is able to fulfill the need for critical cleaning, elimination of any trace of flammable hydrocarbons and use of qualified materials like virgin Teflon for stem seals. Our valve is capable of delivering consistent operation after repeated thermal cycling, usually ranging from 38°C (100°F) to -253°C (-423°F) with a leak rate requirement of no more than one sccm per inch of nominal valve size. Using suitable material specifications, Vanessa Series 30,000 is also fully compatible with liquid oxygen.

'We are entirely satisfied with the performance of the Vanessa valves in cryogenic service, including those used as control valves.'

Facility engineering leader
Major end user



SERIES 30,000 LARGE SCALE CRYOGENIC VALVE MANUFACTURING CAPABILITIES AND STATE-OF-THE-ART FACILITIES

WHAT MAKES THE VANESSA SERIES 30,000 MANUFACTURING PLANT DIFFERENT FROM MANY OTHERS IS THE ABILITY TO PRODUCE THOUSANDS OF CRYOGENIC VALVES EVERY YEAR FROM FULL VACUUM TO 250 BAR (OVER 3,600 PSI) IN SIZES BETWEEN NPS 3 AND NPS 112.

This is coupled with vast in-house infrastructure which is necessary to deliver reliable, robust and durable cryogenic valves. In fact, such large-scale output requires state-of-the-art stainless pickling and passivation, cleaning (including drying), assembling, testing, protection and packaging capabilities, ensuring that all our products are delivered to the highest standards of integrity and quality.

We have several cryogenic testing facilities operating in parallel, all equipped with digital instrumentation. The largest facility can handle valves up to NPS 140 with a 30,000 liter liquid nitrogen tank and a 20 ton crane. Testing is observed via close circuit TV for total safety.

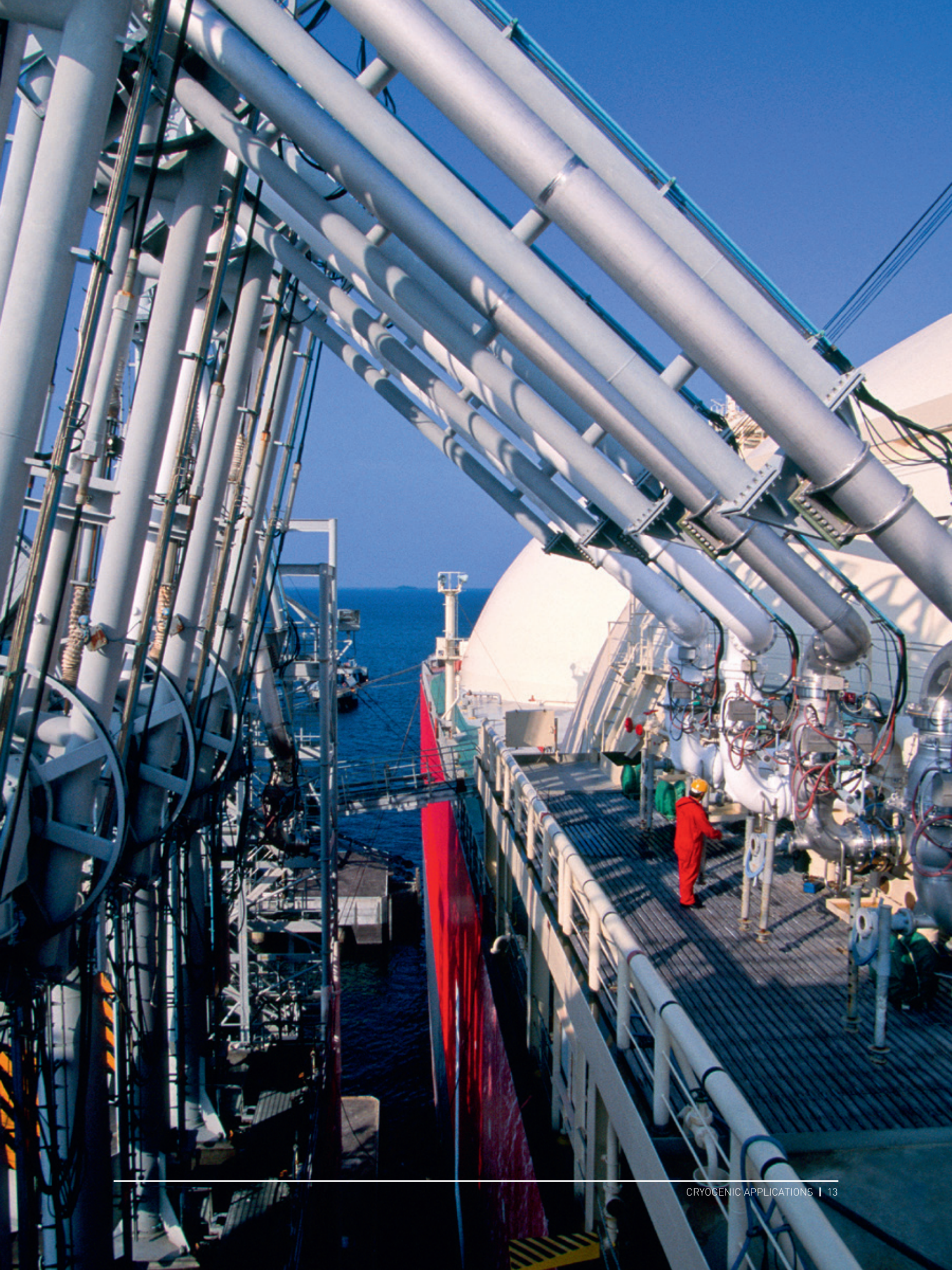
Our valves fulfill the requirements of internationally recognized standards, and are tested through the use of a mass spectrometer helium tester for fugitive emission detection. These tests are often critical as fugitive emissions are not only linked to loss of product/plant output but their reduction can significantly minimize pipe system risks related to personnel and the environment.

Our cryogenic valves are carefully protected against moisture and dust prior to shipping. Whenever critical oxygen/hydrogen fluids are involved, the whole cleaning and assembly of the valves takes place in a dedicated cleaning room, remote from manufacturing and machining operations.

For detailed technical information about our products, visit our online catalog at:

www.Emerson.com/FinalControl





The Vanessa TOV was the worlds first bi-directional zero leakage performance.

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