vanessa®
CRYOGENIC APPLICATIONS
THE **KNOW HOW**

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

Our valve represents an important step forward in cryogenic valve applications by providing superior tightness thanks to its seating and rotational characteristics. These derive from an ingenious combination of the triple offset design with the use of an elastic metal seal ring.

**VANESSA SEAL RING**

Due to the elasticity and the radial compression of the seal ring, the contact pressure is uniformly distributed around the seating surface.

**OFFSET 1** The shaft is placed behind the plane of the sealing surface. The purpose of this offset is to have a continuous seat path.

**OFFSET 2** The shaft is placed to one side of the pipe / valve centerline. The purpose of this offset is 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.
IN ALMOST THREE DECADES, VANESSA HAS DEVELOPED 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 cryogenic valve features an extended bonnet, which meets the requirements of BS6364, and is made with materials selected carefully to match pipe specification and project requirements.

Vanessa®, The Triple Offset Valve represents an important step forward in cryogenic valve applications compared to any other valve design.
THE PRODUCT

DOUBLE FLANDED 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 provides ASME and EN flanges including designs to ASME VIII sect 2 div.1.

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

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 practises, operators tend to avoid using this body style for diameters higher than 36” due to operational difficulties in installing the valve.

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 valve remains largely unnecessary throughout the product lifecycle.
MAINTENANCE-FREE TRIM DESIGN

VANESSA’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 cryogenic triple offset 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. Their fire-safe external seals are certified to ISO 15848 part-1, EPA method 21 and TAA Luft.

RELIABLE LONG TERM SHUT-OFF PERFORMANCE

OUR STANDARD BODY SEAT HAS A WELD OVERLAY OF STELLITE® GRADE 21 AND WE EXCLUSIVELY USE FORGED ONE-PIECE METAL SEAL RINGS.

This creates the perfect combination of robust and flexible materials resulting in reliable, long term shut-off performance at cryogenic temperatures. Stellite® 21 is a cobalt alloy that coats the body seat to provide hardness, resistance to fluid abrasion and wear, while ensuring high corrosion resistance. It will last for the entire valve/plant life for gaseous as well as liquid natural gas. High tech welding robots and Vanessa IWE (International Welding Engineer) qualified personnel ensure quality and maximum reliability of these overlays.

Using polymers or other soft components for valve sealing significantly limits its ability to achieve consistent tightness over time. Vanessa employs UNS S20910 (or Nitronic® 50), an austenitic stainless steel, which is highly resistant to corrosion while keeping important mechanical features at low temperatures. It also has exceptional yield strength, approximately double that of other series 300 stainless steels at ambient temperature.

For detailed information about our products, visit our online catalog at: www.vanessavalves.it/catalog

Stellite® is a registered tradename of Deloro
Nitronic® is a registered tradename of AK Steel
‘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 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 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 100") that can handle high pressures (class 600) 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 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 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 6” to 42” in size, handling pressures of 150 class up to 900 class.

Vanessa provides improved performance and reliability, combined with compact design and lower weight, a major advantage on process equipment skids.
WHEREVER THERE’S 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 provides cryogenic valves 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 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, the Vanessa valve is also fully compatible with liquid oxygen.

The reliability and robustness of Vanessa valves, combined with their maintenance free design, makes them the ideal choice for cryogenic valve applications.
Large Scale Cryogenic Valve Manufacturing Capabilities and State-of-the-Art Facilities

What makes our plant different from many others is the ability to produce thousands of cryogenic valves every year from full vacuum to 250 bars in sizes between 3” and 140”. 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 two separate cryogenic testing facilities operating in parallel, both of which are equipped with digital instrumentation: one is for valves up to 72” with 8,000 litres liquid nitrogen tanks and a 10 ton crane. The second, a larger facility, can handle valves up to 140” with a 30,000 litres 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.