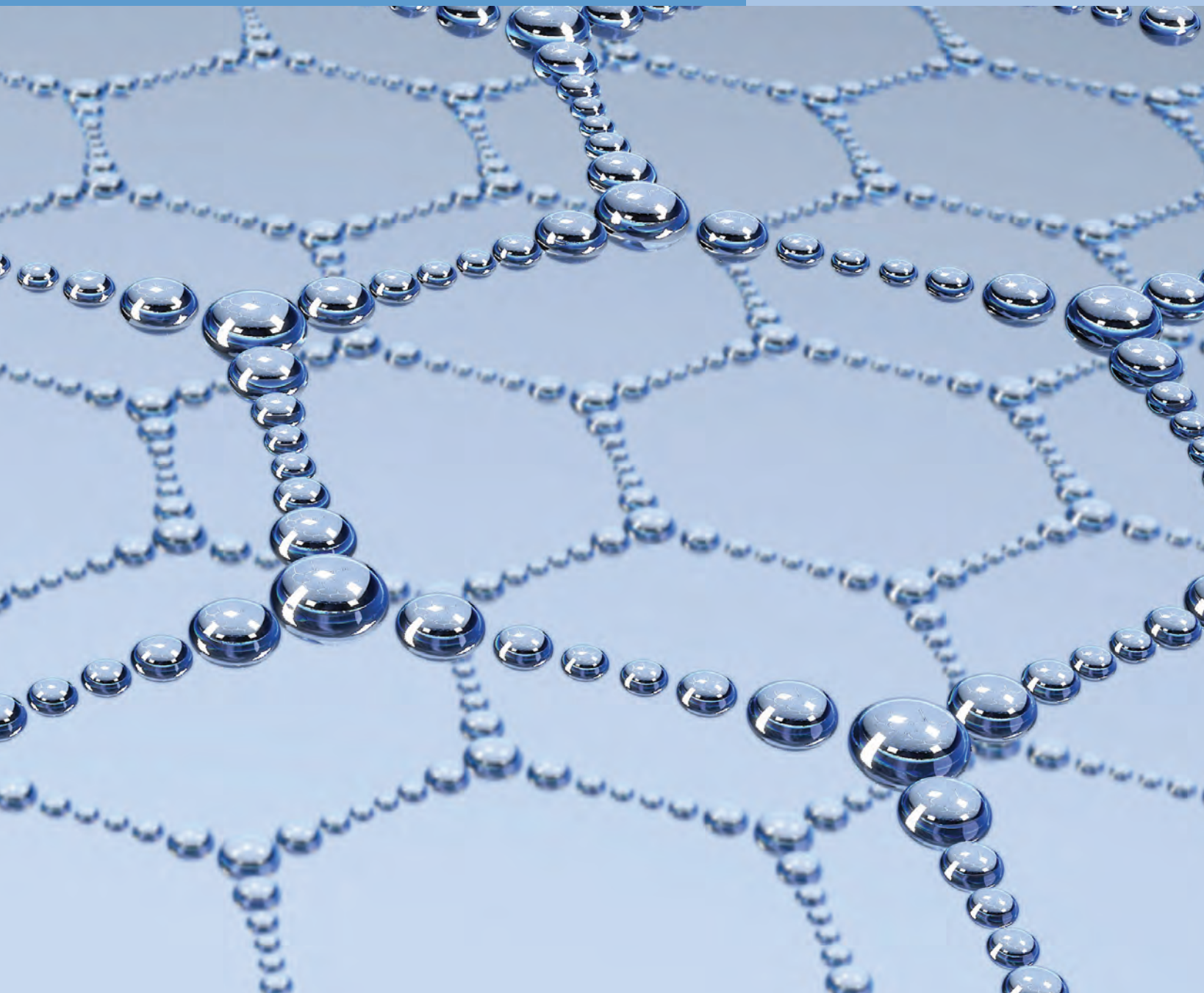


Valves for Molecular Sieve Applications



C.G. Industrial Specialties Ltd.





Valvtechnologies Metal Seated Ball Valves arriving at Molecular Sieve Gas plant.

A Sweet Solution for Sour Gas

Molecular Sieves are often utilized in the Oil & Gas Industry, especially for the purification of gas streams. Inlet and Outlet Switching valves cycle frequently and leakage in these critical areas can make it difficult or impossible to meet product purification requirements.

Dehydration of sour natural gas is of particular interest due to the corrosive nature of H₂S and CO₂ along with chlorides. A valve that fails to isolate and/or operate due to wear caused by abrasion or corrosion leads to inefficient operation of the system. A single, carefully selected valve can answer a large number of concerns.

CG Industrial Specialties Ltd (CGIS) provides Severe Service products to process industry companies around the globe.

We've teamed up with best-in-class valve manufacturers to provide a wide range of valves suited for natural gas processing applications. For example, Valvtechnologies (VTI) is an established company with a worldwide reputation for superior quality and dependability.

Valvtechnologies' carbide coated integral metal seated ball valves are built to withstand the most severe applications while providing repeatable ZERO Leakage.



The best valve is the correct valve

The VTI metal seated ball valve is a true quarter turn valve design, where the stem turns within the packing during opening and closing. As a result, foreign debris or contaminants are not pulled into the stem sealing area which can cause premature wear and leakage. The packing set is live loaded by six bellville springs which are arranged in three sets of two opposing each other. The live loaded packing ensures there is constant load during thermal cycling phases found in Molecular Sieve applications.

An Integral Downstream Seat is standard in the VTI design, which eliminates 50% of the potential leak paths in ball valve designs.

The two potential leak paths that exist in loose seat ball valve designs are between the seat and ball and around and behind the loose seat. In addition, debris cannot build up behind the seat that can affect alignment between the ball and seat. A loose Upstream Seat along with a bellville spring allow for variable rates of expansion and contraction during thermal cycling conditions; thus ensuring the ball is in constant contact with the seat. This is known as a Fixed Floating Ball valve design. The internal bellville spring and upstream seat also prevent debris from becoming trapped or pulled between the ball and seat during operation.

All VTI metal seated ball valves feature a RAM™ (Rocket Applied Metallic) hard coating on the ball and seat, which results in a high surface hardness to provide enhanced abrasion and erosion resistance. The ball and seat coatings are mate lapped with diamond paste to ensure an exact surface match. The standard coating is RAM™ 31, which is Chrome Carbide and provides a hardness rating of between 66 and 68 on the Rockwell C scale. In this range of hardness, cold welding or galling does not occur as the metals will burnish.

The design features metal and graphite based components and is inherently fire safe.

There is no need for lubrication or injection of sealant products for the valve to operate or isolate.

VTI valves are manufactured and tested in accordance with accepted industry standards. Further, each and every valve manufactured is tested according to VTI's Quality Procedure VQP-010 for seat isolation.

The isolation test consists of cycling the valve and testing at low pressures with Nitrogen Gas for a period of three minutes where the performance criteria are ZERO Leakage or ZERO Bubbles during the entire test.

Valvtechnologies valves are built and tested to ZERO Leakage performance and are supported with a ZERO Leakage guarantee of up to four years based on the application.

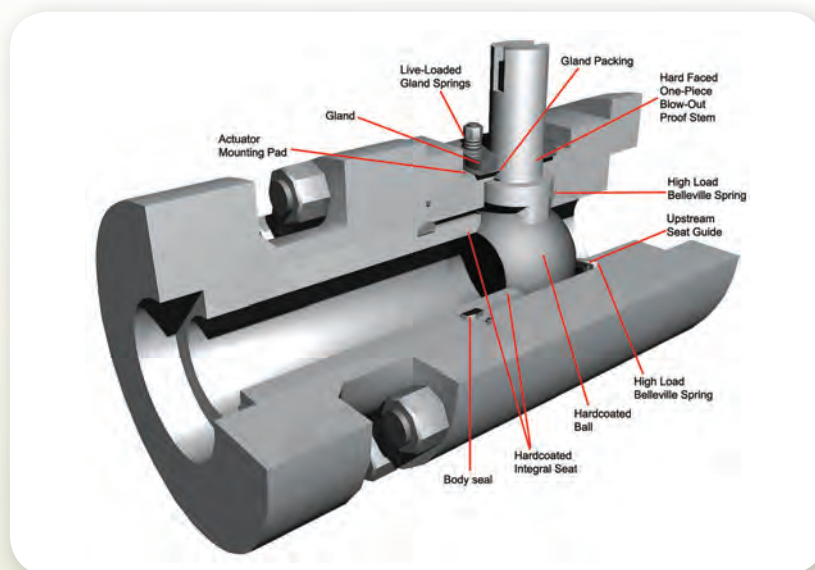


Figure 6: V1-1 internal design.

CGIS is a leader in providing ZERO Leakage valves for the molecular sieve application with an undeniable success rate.

CGIS' Valvtechnologies ZERO Leakage carbide coated metal seated ball valves are specifically designed to perform in molecular sieve switching applications. A valve that fails to isolate and/or operate due to the abrasive wear leads to inefficient operation of the molecular sieve process.

In larger switching valve applications, we can offer Adams rotary tight shutoff valves. Adams manufactures triple offset metal seated butterfly valves along with check and combination valve designs. As the inventor of triple offset valves, they have over 50 years of manufacturing experience and adhere to a design philosophy that has remained constant through the decades: ZERO Friction, ZERO Maintenance and ZERO Leakage.

Adams valves feature true quarter turn operation with a fully supported metal laminated seal ring in a body protected from erosive flow. The inclined conical seating system of the disc and seat are machined to exacting tolerances. This insistence on quality provides true torque seating and ZERO Leakage performance in high cycle applications. A robust engineered mounting bracket also provides the level of support required in a high cycle or high temperature application; torque is directly transmitted from the operator to the disc through the bracket that is registered to the valve body. A large diameter shaft ensures integrity of the sealing system in high temperature or thermal cycling applications. Whether it's the WAK-A9, MAK-B6 or the high performance MAK-16 design; Adams valves are built to withstand severe service applications.



Adams MAK-16 Features

1. Automation: Manual gear, electric, pneumatic, hydraulic
2. Robust oversized drive shaft and disc combined with precision fit keys
3. Heavy duty cast operator mounting bracket pinned and registered to body
4. Emission tight packing system (live loading available)
5. Robust top and bottom shaft bearings
6. Unique seat geometry provides zero leakage shut off in gases and liquids even if particles are present
7. Rigid disc design minimizes deflection
8. Unique field replacement seal system in body



Our Expertise

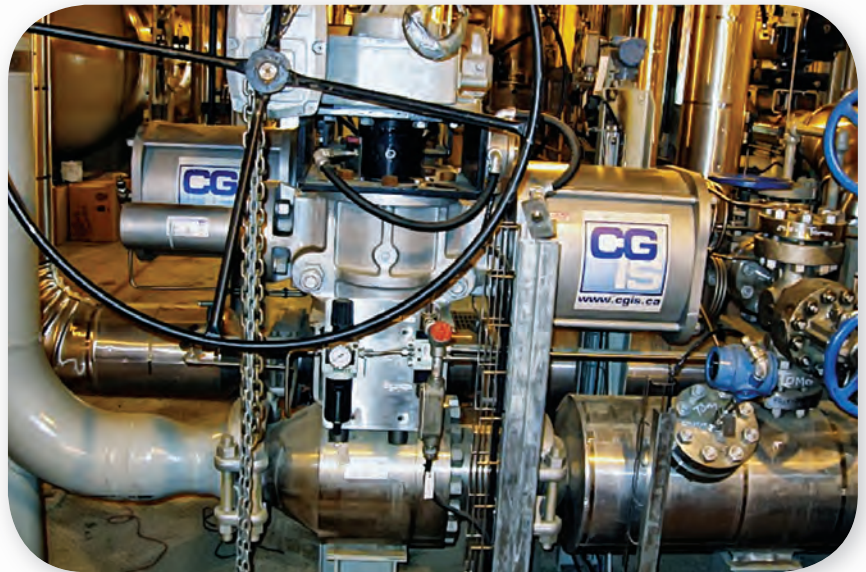
With businesses feeling the pressure to do more with less, valve experts are a rare breed. As a result, the world's leading EPCs and largest valve end-users have turned to CGIS for their valve expertise and consulting services.

Choosing the valve that is appropriate for your application will ensure reduced maintenance, the lowest cost of ownership and highest reliability.

CGIS works with engineering companies to determine which valve is most suited for an application. A detailed process review is completed to determine exactly what type of valve will best suit the job.

Our expertise allows us to offer customized consulting services in key areas such as:

- valve specifications for new projects
- valve specification review
- expert witness testimony
- valve failure analysis
- valve cost comparison
- cost of ownership analysis



Valvtechnologies metal seated ball valves with hub connectors and manual override installed in Western Canada Molecular Sieve Gas Plant.



VTI metal seated ball valve in use at gas plant in Northern BC

Success Stories



Up and running continuously for seven years.

In 2001, an Oil & Gas company purchased a 3" Class 900 VTI metal seated ball valve for their Molecular Sieve regeneration switching isolation valve to replace a competitors' valve that required annual repair or replacement. The VTI valve was installed in July 2002. To date, the valve has not required any maintenance and no leakage has been detected.

Based on the success of the above first installation, another twelve 3" Class 900 VTI valves have been installed at other plants as Regeneration switching isolation valves. In addition, six 6" Class 900 VTI Nextech valves have been installed as Adsorption switching isolation valves.

In 2006, a large Oil & Gas company in Western BC purchased 30 VTI metal seated ball valves sizes ranging from 3" to 6" ASME Class 1500. To date, the valves are still in use at the plant without any leakage incident.

In 2008, an Oil & Gas company in Alberta purchased a 2" Class 600 VTI metal seated ball valve for an Acid Gas Dehydration system for trial. The client required the VTI valve to provide more than one year of reliable service. We offered a Performance Guarantee and the VTI valve was put to the test; 15 months later the valve continues to provide repeatable ZERO Leakage and reliable service.



These are just a few examples of CGIS' highest performance valves. We have supplied a large number of valves to the Oil & Gas industry with an exceptional success rate. Our track record proves that our valves are the most reliable in the business.

Benefits

Benefits of Valvtechnologies

- True quarter turn operation, stem turns within packing during open and close cycles
- Fixed floating ball design
- Ball is preloaded into the integral downstream seat via upstream seat and spring, which ensures the ball is in constant contact with the downstream seat
- Prevents media from being trapped between ball and seat
- During the heating and cooling phase this design allows all components to expand and contract independently while keeping the ball and seat in constant contact.
- Integral seat eliminates 50% of the potential downstream leakage path and ensures seat is in static position

- Live loaded packing which allows for wear and thermal cycling
- RAM 31 (Chrome Carbide) coating of seat and ball protect the surfaces from erosion and abrasion

Benefits of Adams MAK-16

- Unique seat geometry allows for disc to move without any jamming event at high temperature differential and under full rated pressure
- Solid metal sealing ring provides positive shut-off capability at high temperatures and with abrasive media
- ZERO Leakage, bi-directional shut-off gases, steam and liquids even when particulates are present
- Bi-directional shut off for most aggressive and challenging applications



VTI valves arriving at gas plant.

- Patented L2 design provides class VI shut-off, while reducing the operating valve torque
- Robust engineered mounting bracket provides level of support required in a high cycle applications

Our Locations

★ Offices



Our Guarantee

We stand behind our products

CGIS, on behalf of Valvtechnologies, provides a 4-Year absolute ZERO Leakage Guarantee on all of its ZERO Leakage valves.

All valves have a specific lifetime beyond which they need to be repaired or replaced. At the time of replacing the valve, CGIS will not only refurbish the valve for you (by relapping and adding new packing) so that it is essentially brand new, we will also sell it back to you at a fraction of the original cost. Post repair these valves have the capacity to work for an additional number of years equal to or exceeding the original duration. Repairs and refurbishment are carried out at our certified repair facility in Edmonton. We are equipped to handle repairs of any size.

Loss of production due to damaged or leaking valves raises costs and wastes manpower. By choosing the Valvtechnologies' superior metal seated ball valves, or the Adams triple offset metal seated butterfly valve specific to your application, you are ensured a lower cost of ownership and minimum valve maintenance.

No worries, no constant repairs and no loss of production.



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