VALVE SOLUTIONS FOR

MOLECULAR SIEVE PROCESSES

Bray®

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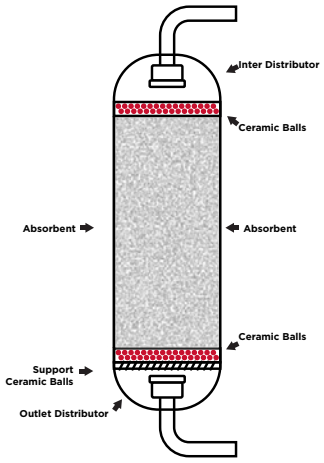
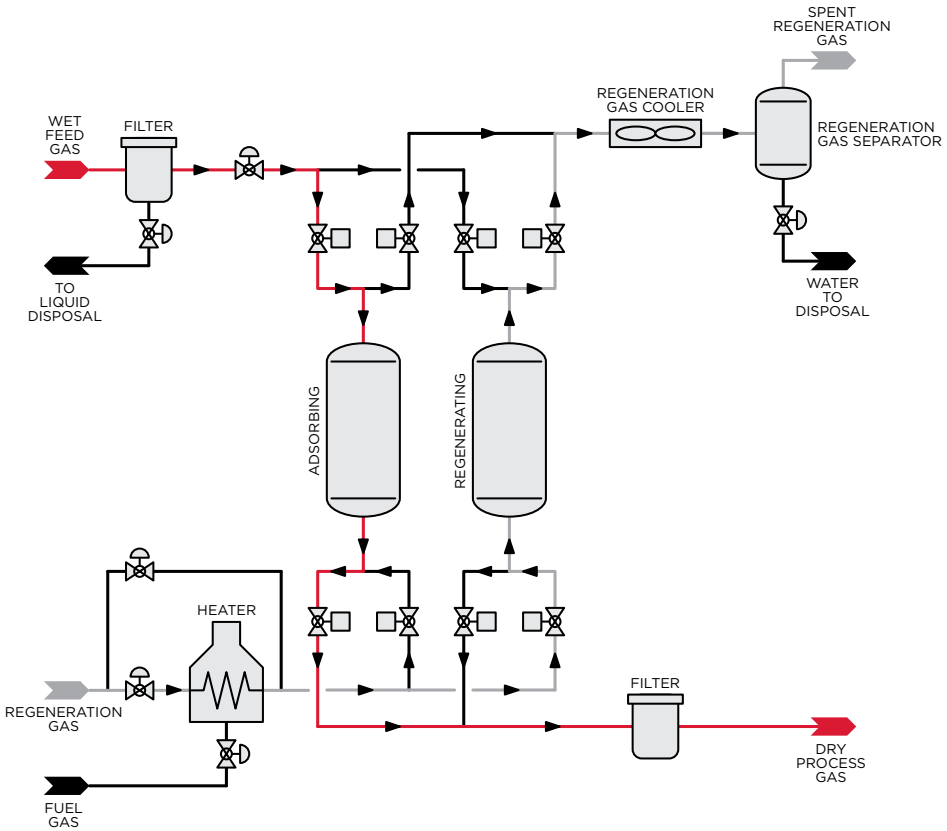
THE HIGH PERFORMANCE COMPANY

Molecular sieving is an integral process in many gas applications. Switching/isolation valves associated with these systems are critical to safe, reliable, and efficient operation of many O&G facilities.

Molecular Sieving is a process to remove water and contaminates from gaseous hydrocarbon streams. Proper function of a mol sieve system is extremely important as any moisture or contaminates can have an adverse effect on the downstream processes. A molecular sieve is typicavlly a porous aluminosilicate like Zeolite. Mol sieve vessels consist of desiccant spheres with ceramic balls and mesh above and below to maintain the integrity of the bed. The desiccant micropores retain water and other larger molecules while allowing smaller molecules to pass through.



Once the mol sieve is saturated, it needs to be regenerated by removing the accumulated moisture. A typical dehydration unit consists of two or more vessels in-tandem. Operation is sequenced such that while one vessel is absorbing moisture from the process stream, the other is in regeneration mode. Many systems utilize three vessels, adding a cool-down mode. Regeneration is accomplished by recirculating heated process gas to drive-off moisture and impurities, restoring the mol sieve. The entire process requires several switching valves which can function reliably under extreme conditions.



Sequencing must be timed properly. Cycling too quickly during changeover can shock the bed and result in premature degrading of the desiccant. Thus, switching from one vessel to another generally takes several minutes and it is critical that the valves unseat smoothly. Extreme conditions include:

- Thermal transients – Valves need to remain operable through large temperature swings
- High cycling – 4-6 times/day, equating to over 5000 cycles/ year
- Abrasion – from the process and degradation of the mol sieve desiccant and ceramic balls
- Corrosion – due to the presence of H2S and moisture

FEATURES AND BENEFITS

Bray has addressed these challenges with two valves designed to provide years of reliable service. For larger diameters, our Tri Lok triple offset valves have several features which enable superior performance.

TRIPLE OFFSET BUTTERFLY VALVE

1. **OVERALL DESIGN:** Hot, abrasive services challenge any valve. Tri Lok design weighs less that other valve types, and the use of materials with similar rates of thermal expansion reduces temperature-induced geometry changes. Thus, the valve maintains tight shutoff through the entire mol sieve cycle.

2. **METAL TO METAL NON-RUBBING SEAT:** Wear is caused by rubbing. The seat and seal don't rub so wear is minimized.

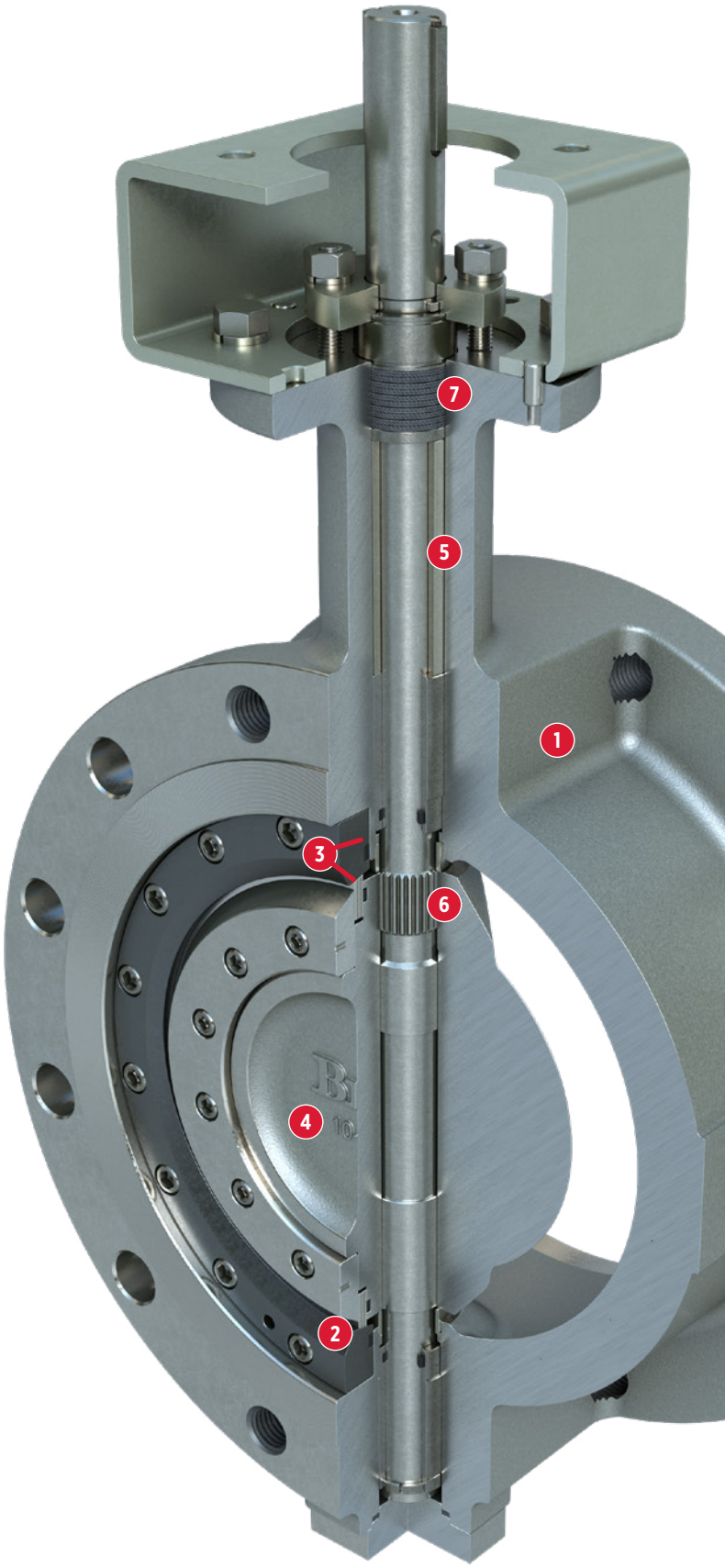
3. **FIELD REPLACEABLE SEAT AND SEAL:** Most other TOVs are not easily repairable. Our design allows us to use harder more durable seat and seal materials, and NACE trim provides enhanced corrosion resistance.

4. **ZERO LEAKAGE:** Any leakage across the valve can result in inefficient drying and cooling phases which can reduce the efficiency of the system. Leakage in the sieving phase can cost energy, and if enough moisture gets through the dryers, it can form hydrates which foul the downstream process.

5. **SHAFT/BEARINGS:** Our superior shaft design has elongated bearings and bearing protectors to prevent media intrusion and ensure smooth operation.

6. **SPLINED SHAFT/DISC CONNECTION:** Is protected from the flow, provides superior strength, compensates for thermal expansion and contraction, and eliminates potential for hysteresis- so no 'play' which can cause leakage and popping off the seat.

7. **PACKING/STUFFING BOX:** Design provides long life and exceeds industry fugitive emissions standards, API 641, ISO 15848-1 and TA-Luft.



FEATURES AND BENEFITS

For smaller diameters our M1 severe service ball valve can do the same.

M1 SEVERE SERVICE BALL VALVE

1. **ZERO LEAKAGE:** Seat and seal are 360° lapped to provide the tightest shutoff possible. A large spring washer stabilizes and locks the seat in place. These springs uniformly produce a consistent load around the entire seat ring and maintain a seal by loading the primary seat ring to the valve body.

2. **BALL-TO-SEAT INTERFACE:** The ball and seat use the same material; the wide sealing surface and low stress are maintained throughout the thermal cycle, extending valve life.

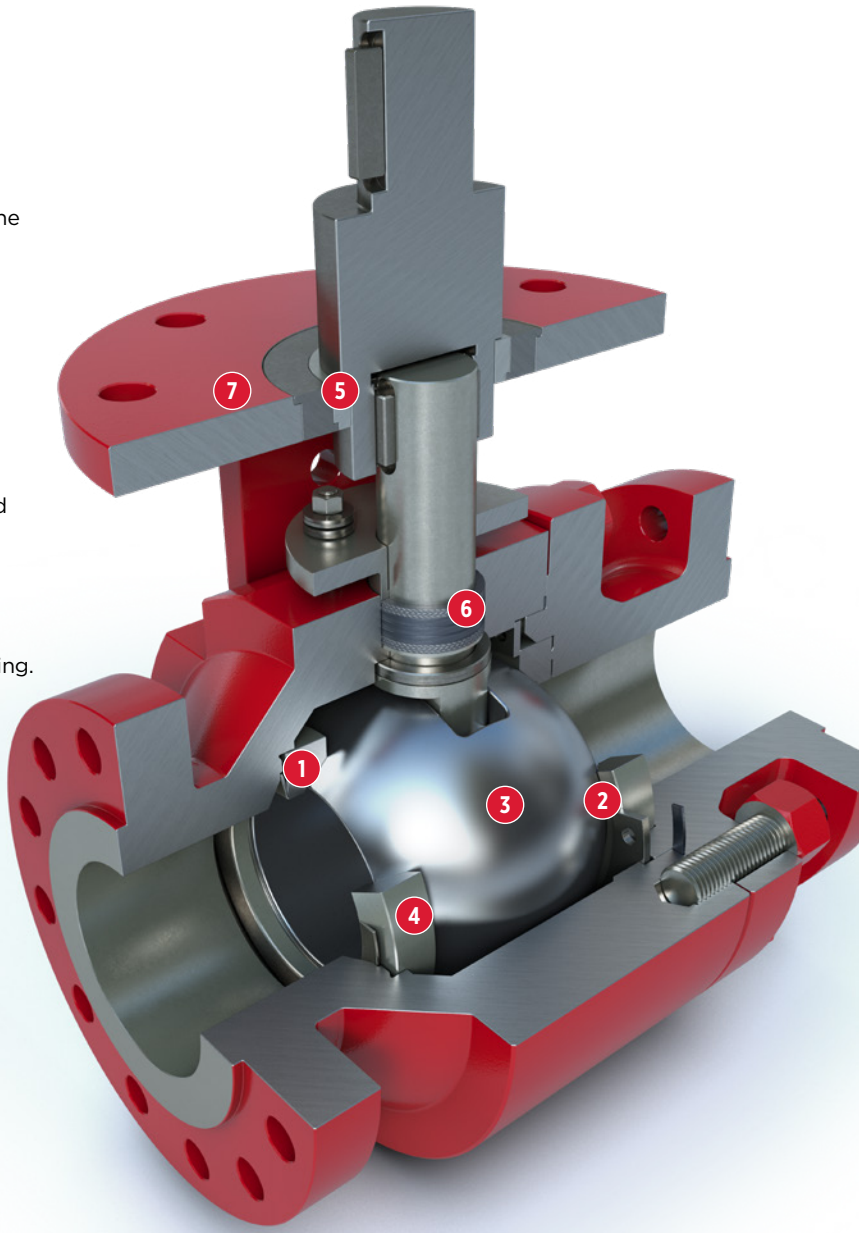
3. **SUPERIOR COATING TECHNOLOGY:** High density, low porosity spray and fused coating on the ball and seat surfaces have superior performance in abrasive services.

4. **SELF-CLEANING:** The self-cleaning seats wipe away any deposits with each cycle for long-term tight sealing.

5. **OUTER STEM BUSHINGS:** Supports the stem, counteracting side load caused by orientation or cycling, and maintain concentric alignment of the stem drive train.

6. **PACKING/EMISSIONS:** Live loaded design provides long life and exceeds industry fugitive emissions standards; API 622, API 641, and ISO 15848-1.

7. **PRECISION INTEGRAL MOUNTING:** And dual inner bearings ensure accurate alignment which limits hysteresis and enables easy direct-mount actuation.



ACTUATION AND CONTROLS

S98 Actuators provide a rugged modular design to handle tough environmental and process conditions. For critical isolation valves the automation package is just as vital as the valve. Bray offers a full package solution including the actuator, positioner, valve status monitor, solenoids and filter regulators.

FEATURES

SERIES 98

1 **TORQUE MODULE:**
- > integral single piece cast housing for rigidity
- > Replaceable self-lubricating metal backed PTFE bearings for enhanced service life
- > Guide drive supports side loads
- > Relief vent prevents ingress and over pressurization

2 **PRESSURE MODULE:**
- > Corrosion protected external tie rods designed for long seal life and reliability
- > Honed and hard chrome plated cylinder barrel for wear and corrosion protection and enhanced seal performance
- > Quad ring and U-cup seals for dynamic sealing
- > Dual wear bands for better guidance of piston

3 **SPRING MODULE:**
- > Tectyl coated springs for corrosion protection.

4 **FAST ACTING:** Provide quick response when speed is critical in reducing the escalation of a hazard. The Bray Series 98 is capable of full-open to full-close in less than one second.

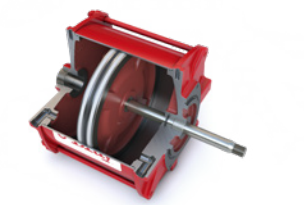
5 **CUSTOMIZABLE CONFIGURATIONS:** Bray offers application solutions to meet specific requirements with accessories like the Bray Valve Status Monitor, proximity sensors, smart positioners and solenoid valves. Easy to maintain with field replaceable components.

6 **MANUAL AND AUTOMATIC RELEASE OPTIONS:** Provide flexibility on resumption of system operation after shutdown.

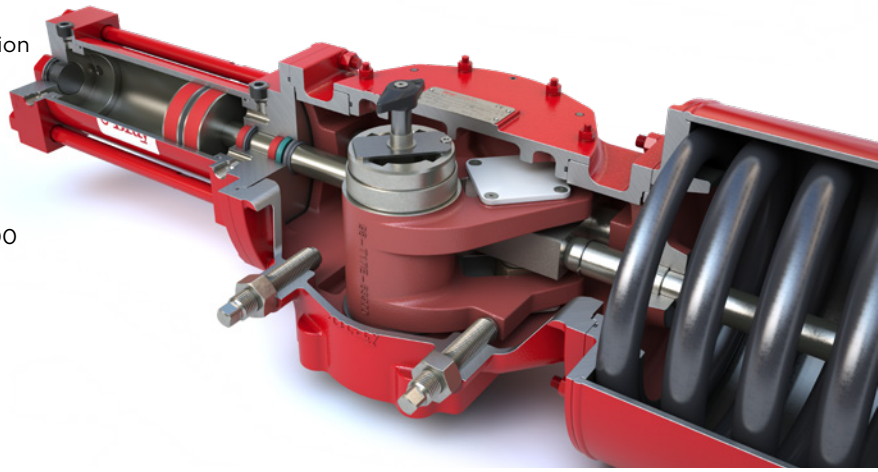
7 **CERTIFIED SAFETY INTEGRITY LEVEL (SIL) PER IEC 61508:** Bray Series 98 scotch yoke actuators are certified to SIL Level 3, including accessories. Independently tested and field proven to 1,000,000 cycles under full load.

Torque Module

Pressure Module

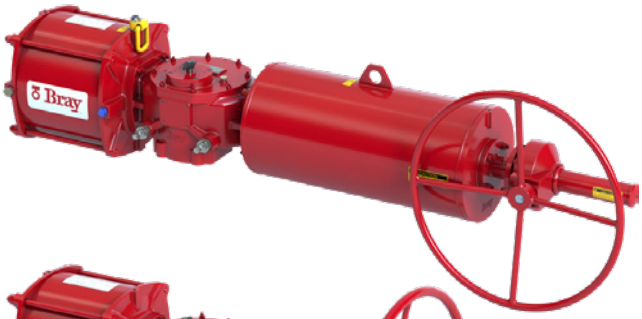


Spring Module

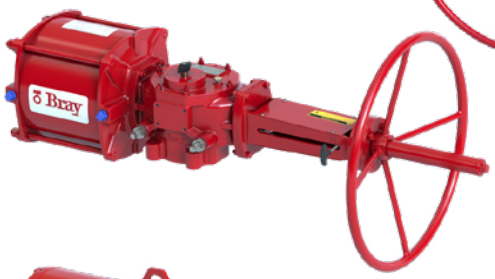


Failsafe Spring Return

Double Acting

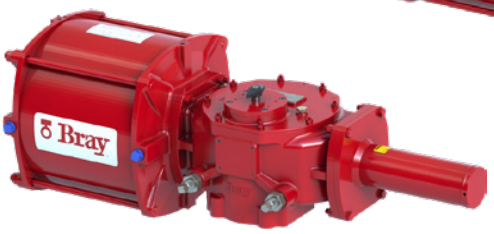


Failsafe Spring Return with Geared Manual Override



Double Acting with Handwell Manual Override

Failsafe Spring Return with Hydraulic Manual Override

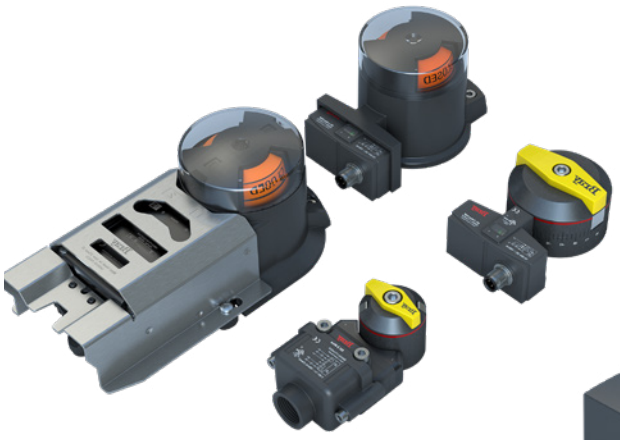


Double Acting with Integral Mechanical Partial Stroke Testing Device

Spring Return with Extended End Travel Stops

ACCESSORIES

Add to the versatility of the S98 by choosing the applicable accessories from Bray's complete line of positioners, status monitors and solenoids. The combination of actuators and accessories offer the best compatibility, economy and quality performance in the flow control industry.



Series 54

Serie 6A

EXPERIENCE AND BEST OPERATIONAL PRACTICES

There are additional considerations which, depending on the process, should be considered to enhance valve service life and reliability:

- Insulate the valve
- Solid seal ring
- Horizontal shaft orientation (TOV)
- Proper alignment and robust disc-stem connection
- Sufficient air supply to actuator so it doesn't have to build up pressure to come off the seat
- Speed controls to match operation with system spec
- Intelligent topworks to monitor changes in valve performance

SINCE 1986, BRAY HAS PROVIDED FLOW CONTROL SOLUTIONS FOR A VARIETY OF INDUSTRIES AROUND THE WORLD.

VISIT **BRAY.COM** TO LEARN MORE ABOUT BRAY PRODUCTS AND LOCATIONS NEAR YOU.

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