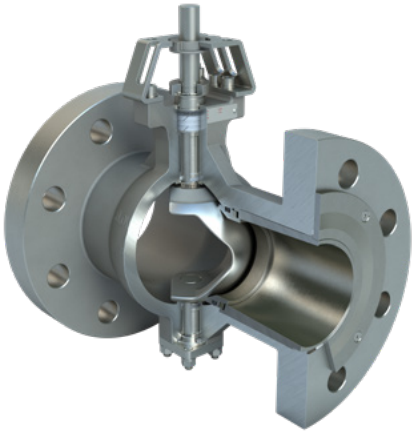
Segmented Control Valves Solve Erosion Problems in Coal Seam Gas Wells

KEY RESULTS

- The Flow-Tek S19L segmented ball control valve virtually eliminated erosion from high velocity gas flow particles.
- Valve service life was extended to 50+ weeks, eliminating costly shutdowns and maintenance costs.
- Bray's control valve solution became the customer's new standard specification, with more than 1000 units installed.

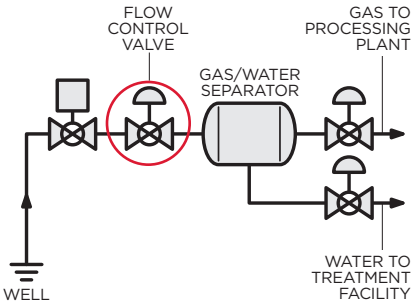


Flow-Tek S19L Segmented Ball Control Valve

APPLICATION

Modulating Flow Control Valve between the wellhead and gas/water separator on a Coal Seam Gas Well.

Coal Seam Gas exists in underground coal formations, where water pressure keeps it contained. Water must be pumped out of the coal seam to release pressure and allow the gas to escape from the coal into a well.



CHALLENGE

Abrasive media was causing accelerated erosion in a variety of control valves used in this application, resulting in unsafe conditions from loss of containment. Unplanned and costly shutdowns were required to replace the failed valves — which included plug-in seat choke valves, rotating disc choke valves, and conventional trim segmented ball control valves.

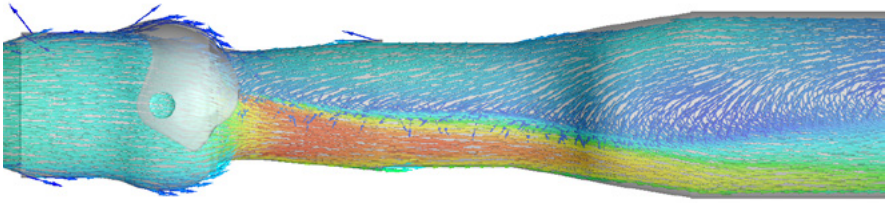
Examples of accelerated erosion in valves that required replacement.

OPERATING CONDITIONS

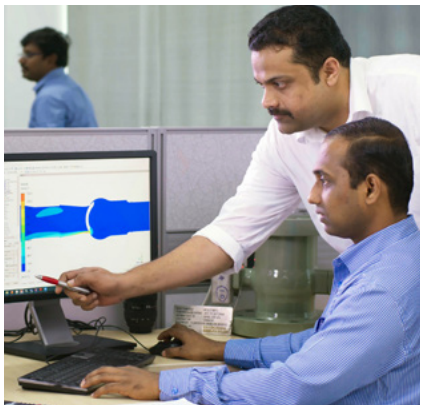
Media	Coal Seam Gas with carry over particulates, such as coal fines, silt, and sand.
Temperature	50 °C (122 °F)
ΔPressure	Pressure drop up to 5,000 kPag (725 psig)
Solids Content	300 ppm
Cycles	Continuous modulating

SOLUTION

Working closely with the customer, the Bray Global Technology Group took on the challenge. Root Cause Analysis, conducted using Computational Fluid Dynamics (CFD), showed the design deficiencies in the failed valves. Simulations were conducted to optimize the design and material selection for the application at hand.



CFD analysis of the flow highlighted design deficiencies in the failed valves, as well as an optimized solution.



The Bray Global Technology Group simulated flow solutions.

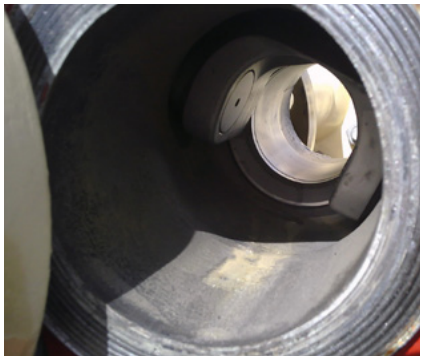
After analysis, Bray recommended the Flow-Tek Series 19L Segmented Ball Control Valve, with several modifications to enhance the lifespan of the valve.

- Selection of a characterised segment to meet flow capacity requirements, mitigate noise, and facilitate use of the customer's installed electric actuator.
- Reverse the flow direction in the valve to optimise the flow path, and minimise erosion on the valve trim and outlet bore.
- Install a replaceable wear resistant liner in the outlet bore of the valve, to allow reuse of the valve body.
- Add Bray's proprietary surface coatings, to further increase abrasion resistance for the valve trim.

RESULTS

The S19L control valve was installed into service, with reverse flow direction, for a field trial — which resulted in dramatic performance improvements.

- Periodic inspections showed no erosion to the valve liner over the course of one year — allowing the client to remove requirements for ongoing inspection.
- After more than a year in service, the Bray control valve continued to exceed the customer's expectations — compared to previous valves, which had failed in as little as 12 hours of service.
- Extended valve service life eliminated costly shutdowns for frequent valve replacement.
- Improved safety by eliminating loss of containment incidents.
- Mitigated turbulent flow during modulation in high-flow producing wells.



Inspections showed no erosion to the liner of the Bray evaluation valve.

ANNUAL SAVINGS PER VALVE CONTINUE TO GROW

Based on outstanding performance, the **S19L** control valve solution became the customer's new **standard specification** for Coal Seam Gas Well installations. They have installed **more than 1,000** S19L control valves to date, saving close to **$7,000** per valve in annual maintenance costs...and still counting.

Bray takes pride in their unique ability to rapidly deploy resources — delivering customized solutions for our customers' toughest applications. To learn more about our full line of flow control solutions, visit BRAY.com