Reliable Solutions for Process Automation

Bray Valve & Automation Package Exceeds One Million Cycles

CHALLENGE

Many industries have demanding cycle-life requirements for butterfly valve and actuator packages to help maximize efficiency and eliminate unplanned down time. This means continuous operation, under process conditions, without failure. These expectations on cycle-life can sometimes exceed 1 million cycles, while meeting strict performance criteria.

As one example, a Bray customer was experiencing unreliable performance from a competitor's valve package in hydrogen pressure swing adsorption applications. Within 100,000 cycles (10% of valve life), some valves were showing signs of leakage, and even stem breakage — resulting in unplanned down time and catastrophic failures. Bray was called on to provide the solution: valve, actuator, and controls package performing one million continuous cycles (stroking under 2 seconds), without failure and with zero leakage.

BRAY AUTOMATION PACKAGE

Valve	S42 High Performance Butterfly Valve
Actuator	S98 Scotch Yoke Pneumatic Actuator
Accessories	Series 6A Positioner
Performance	Over 1 Million Cycles

SOLUTION

Bray's solution included a **S42 McCannalok High Performance Butterfly Valve** with **S98 Scotch Yoke Pneumatic Actuator** and **Series 6A Smart Positioner**. Component-level Accelerated Life Testing was conducted to determine the correct materials of construction for all critical components in the valve & actuation package. Advanced simulation techniques were used to optimize design for acceptable stress conditions. Bray's IOT solutions were deployed for real-time monitoring of component conditions and system-level performance, which includes torques, vibration, pressures, packing & bearing integrity. The Engineering Team also stepped up, to optimize the design and continuously monitor performance during the final qualification tests.

RESULT

Eight months of continuous, rigorous validation testing was conducted, requiring a minimum of 1 million cycles — with a strict success criterion on leakage rates, torques, and component wear. The Bray solution exceeded all requirements and performance criteria beyond 1 million cycles.

- 12-inch Class 300 valve recorded zero leakage bi-directionally — at low and high pressures, with helium — after the completion of 1 million cycles.
- S98 pneumatic actuator (45E2) recorded zero leakage, on both the piston seals and rod seals — at design pressure throughout the 1 million cycles.
- S6A smart positioner continued to work flawlessly, and provided full monitoring capability throughout the required 1 million cycles.

The customer witnessed the milestone of 1 million cycles, and subsequently witnessed, in real-time, the post-test disassembly and component-level analysis. The results confirmed the **reliability**, **performance**, and **confidence** in Bray's solution. All of the critical components showed minimal or no signs of wear — and in some cases, it was hard to discern cycled components from new ones. This was truly a partnership where our customer will avoid unnecessary and costly downtime — **resulting in significant cost savings**.

Test setup where the McCannalok S42 High Performance Butterfly Valve and S98 Scotch Yoke Pneumatic Actuator achieved more than 1 million cycles with zero leakage.

VALIDATION TEST REQUIREMENTS

Stroke Time	1 to 2 seconds
Cycle Media	Dry air at ambient temperature
Test Media	Nitrogen / Helium / Air

For information on our full line of flow control solutions, visit BRAY.com