# CCR Lift Engager Isolation

CASE STUDY

## Improved Continuous Run Time by 1400%



### CHALLENGE

Needed to extend service life and eliminate repeated packing leaks that could lead to disastrous fire events caused by hydrogen leakage.

### SOLUTION

MOGAS ball valves installed with a heavy-duty mounting bracket to support heavy actuators and reduce risk of damaging side loads to stem.

### RESULTS

Improved valve reliability and reduction of required maintenance from every two – six weeks to 60 weeks (and counting).

***This MOGAS valve — with a sturdy mounting bracket, spring-loaded packing along with proper stem bushing alignment — provided a record 25,000 cycles, greatly improving runtime.***

### Downtime and Safety Drive Need for Change

This southwest United States refinery — an 85,000 bpsd capacity plant that processes several sour (high sulfur) crude oils — needed to replace isolation valves used in catalyst transfer (regen tower-to-reactor). Located between the lockhopper and lift engager, these valves repeatedly caused interruptions in production and increased safety risks to equipment and personnel.

These inferior valves malfunctioned routinely, locking up during normal service and leaking hydrogen through the valve packing. All too frequent valve repairs — that occurred as often as every two weeks — reduced the refinery's premium gasoline production rates. This lost productivity resulted in revenue losses that **far exceeded** the value of the valves themselves.

A close inspection of these poor performing valves found a number of problems. The issues identified with these valves included:

- Weak valve stems subjected to excessive pressure
- Deformation of valve packing
- Improper or incomplete valve sealing during isolation
- Hydrogen leakage to atmosphere

In fact, these hydrogen leaks to atmosphere resulted in an actual fire event (prior to MOGAS valve installation), a serious situation that places personnel and equipment in danger.





MOGAS®
SEVERE SERVICE BALL VALVES

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| Conditions | |
|---|---|
| **Application:** | Isolation valve, UOP catalyst transfer (regen tower-reactor) |
| **Service:** | On / off |
| **Location:** | Between lockhopper and lift engager |
| **Media:** | UOP catalyst |
| **Temperature:** | 500 F (260 C) |
| **Pressure:** | 400 psig (28 bar g) |
| **Requirements:** | Perform tight shutoff and packing-free leakage over a 30,000-cycle lifespan |
| **Valve Model:** | CA-1AS |
| **Valve Size:** | 3-in. (80 dn) |
| **Rating:** | ASME Class 300 RFF |
| **Installed:** | 2007 |
| **Duty Cycle Time:** | Every 20 minutes |
| **Total Cycles:** | Over 25,000 |

### Unique Features Provide Reliable Solutions

These malfunctioning valves were replaced with MOGAS severe service ball valves. By using thermal spray and fuse coatings and a wide seat design, the MOGAS replacement valves provide exceptional performance under the difficult conditions associated with the CCR process (high temperature, high pressure, catalyst handling, continuous service / high cycle count). Other unique MOGAS valve features include:

**Live-Loaded Packing Design**

- Spring-loaded packing eliminates hydrogen leaks to atmosphere and associated fire risks
- Meets EPA volatile organic compounds (VOC) emission standards

**Oversized Stems**

- A638 Gr. 660 composition
- Work in unison with inner bearing
- Designed to accommodate torque amounts that can increase over time

**Stem Support Bushing**

- Secondary stem bearing guide prevents lateral movement and possible packing deformation
- Combines with standard double inner stem seals to provide a dual stem guiding system

**Sturdy Actuator Mounting Bracket**

- Welded or bolted into place and machined
- Centered surface helps maintain proper stem and stem bushing alignment — and extends valve cycle life in the process

### Over 25,000 Consecutive Valve Cycles

Since its installation in 2007, the MOGAS valves have not developed stem misalignment or side load problems that can result from actuator movement — problems that plagued the non-MOGAS valves in the past. The overall performance of these severe service valves has met or surpassed all expectations — over 60 weeks of continuous service, zero lost time incidents due to valve malfunction and cycle counts **over 25,000** (and counting).





MOGAS® SEVERE SERVICE BALL VALVES