

C-Series Outperforms Competition

in Gasification Reactor Dump Service

Unit Type: Refinery coke gasification process
Application: Gasification reactor dump lockhoppers
Media: Hot condensate with 17% wt slag slurry
Temperature: 550°F / 288°C
Pressure: 1095 psig / 75 barg
Service: On / Off
Requirements: Tight shutoff between cycles

Valve Design: C-Series
Trim Design: 1AS
Valve Sizes: 14 & 16-inch
Rating: ASME Class 600 RF
Ball/Seat Mt'ls: 316 SST w / spray & fused coating
Body Material: A105 CS

Actuator Type: Electro-hydraulic

Service Life: 5 years
Duty Cycle Time: Every 15 minutes
Total Cycles: >80,000

Installation: This gasification reactor on the US East coast burns petroleum coke feed, oxygen and high pressure steam at high temperatures to create syngas that is used as fuel for a gas turbine. The slag / ash from this process falls through gravity flow to the bottom of the reactor, along with condensate. This collects to a certain level in the reactor and is letdown to atmosphere to a slag pit for collection and removal.

In an attempt to reduce the erosive effects of the fluid stream the licensor designed a multi-train lockhopper system with a 14-inch valve installed at the top of the reactor, and a 16-inch valve located at the bottom.

The application requires valves with tight shut-off to maintain the pressure and temperature in the reactor, to get the most efficient operation from the gasifier. The previously installed ball valves had problems with maintaining tight shut-off. The end user selected MOGAS to examine and possibly refurbish the existing valves' trim set for this application, based on a history of success in slurry and catalyst type service.

(continued)



Shown above is the bottom, 16-inch lockhopper valve that endured several years of arduous service, cycling every 15 minutes and discharging erosive slurry.

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Installation (continued)

A discussion ensued on possible upgrades to the competitor valves to the MOGAS standard design and coating technology. MOGAS engineers determined that it was not feasible to refurbish the existing valves and new MOGAS C-Series valves were purchased. The plant consists of two trains with a gasifier reactor installed in each train. Three sets of 14-inch and 16-inch ASME Class 600 CA1-AS metal seated ball valves were purchased, one set for each train and a spare set for an emergency situation. The valves had A105 bodies with 316SS S&F coated ball and seat assemblies

The valves are required to hold pressure in the reactor until a level set point opened the valves, which occurred every 15 minutes. The C-Series endured over 80,000 cycles after approx 4.5 years of flawless service, with no detected leakage.



The lockhopper builds pressure as the reaction occurs, and then discharges the byproduct—water with 17% weight slag slurry—to a collection pit for collection and removal.