

Case Studies

Metal Seated Ball Valve Solutions
for the Autoclave Industry

MOGAS[®]
SEVERE SERVICE BALL VALVES

MOGAS Supplies Replacement Valves for Pressure Oxidation Autoclave



Large Asian mining complex maintains operational reliability in its autoclave utilizing MOGAS severe service ball valves. MOGAS' patented coating is a critical component to dependability of valve performance.

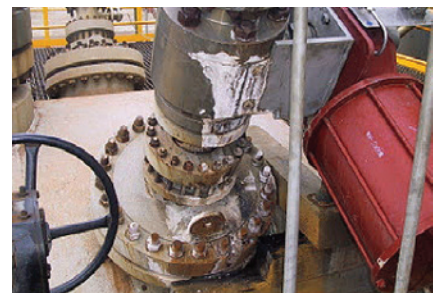
MOGAS has once again taken over the valve supply and service contracts for an operating autoclave. The previously installed pressure oxidation (POX) valves at a major Asian mining complex failed rapidly after commissioning. The first failures occurred in the competitor Super Duplex valves. The belleville springs dissolved, resulting in the ball dropping in body of the valve. The second failures (Super Duplex and Titanium valves) came from inadequate coating. The coating quality and performance were not sufficient for the application, resulting in the coating wearing off completely.

Another major failure in the competitor valves occurred when the small peek inner stem seal was severely damaged due to the actuator bracket twisting and distorting (therefore the stem doing likewise) when the valve was opened or closed. This resulted in acidic slurry leaking out through the packing area, which also caused corrosion in the stem packing area.

Due to **proven valve performance** and **after-sales support** at other autoclave sites, MOGAS / Optimum Control were chosen to supply replacement valves and spare parts. The initial replacement order included over 20, 1–6 inch Ferralium and Titanium valves. MOGAS' quick response, POX autoclave experience, and service and repair knowledge has allowed this plant to continue operating with a focus on profitability.



These pieces are all that remain after the belleville springs dissolved in a competitor's Super Duplex valve.



Competitor's valve leaking acidic slurry.

Electraulic Actuator for HPAL Autoclave Service

Challenge

Slurry isolation valves on and around High Pressure Acid Leach (HPAL) or Pressure Oxidation (POX) Autoclaves endure the most critical and arduous service, and as a result, scaling often occurs. Should scaling prevent the movement of a valve, the pneumatic actuator will exhaust all of its air and result in failure to close during an emergency. In this application, a spring return (fail close) is often fitted. However, if the scaling should release, the valve will slam shut. This creates the potential for damage to the actuator and valve. Additionally, a water hammer may occur that can cause severe damage and / or potential safety issues. This can lead to unexpected and costly shutdowns.

Another concern with pneumatic actuators on autoclave discharge valves is their large size and weight. This can create limits on design configurations and piping integrity.

Operating Conditions

Typical operating conditions for this application are 500° F / 260° C at 740 psi / 5100 kPa. To maintain the effectiveness of the process, these valves must operate repeatedly at the exact design requirements.

Solution

MOGAS researched different automation products that would dependably resolve these concerns. The result was MOGAS Industries and Koso REXA working together to recommend the REXA electraulic actuator for HPAL and POX isolation valve applications. These actuators provide enough reliable power and repeatability of high pressure hydraulics over most air operated actuators. The sophisticated electronics will also allow complex diagnostics and partial stroking, which will further enhance the operation and service life of the valve. This actuation package supports both HART and Foundation Fieldbus control system protocols.

Significant added benefits of this electraulic actuator system for HPAL and POX applications are its fast close time, compact size, low power use and very light weight on the valve and pipework. This actuator design eliminates the need for a separate HPU servicing a cluster of actuators with the potential of a failure affecting the whole cluster. The REXA approach also eliminates the hydraulic piping from and back to the HPU, and associated maintenance necessary with centralized HPU-based systems.



10-inch MOGAS valve / REXA electraulic actuator during testing.



10-inch MOGAS valves / REXA electraulic actuators installed at a nickel HPAL operation.

Increase Autoclave Profitability

with Metal Seated Severe Service Ball Valves

Valve Features	Operational Benefits	Value to Plant Performance
Forged body & ends	Greater wall thickness in critical areas	Valve integrity under severe conditions
	Corrosion allowance	Longer valve life
Inner stem seal / bearing	Pressure-energized stem seal	Prevents solids access to stuffing box
	Coated thrust bearing with low friction coefficient minimizes overall valve torque	Prevents galling, binding and side-loading of stem
Valve stem bushing	Secures true positioning for valve stem in packing chamber during actuation	Eliminates side-loading & prevents stem packing leaks
Blowout-proof stem	Can be designed in accordance to API 6D drive train	Withstands severe service torques and maximum working pressures
	One-piece design with corrosion allowance	Ensures packing integrity is maintained
Heavy-duty mounting flange (non-removeable bracket)	Patent-pending design minimizes stresses	Supports actuators
		Reduces overall valve cost
Belleville spring	Constant loading pressurizes seal on seat to floating ball	Ensures correct position, seal and proper loads at all times
Independent replaceable seats	Seats are mate-lapped to ball for 100% contact	Reliable isolation
		Easy to repair, when needed
		Reduces repair costs
Floating ball with bi-directional sealing capability	Locked-in downstream seat	Prevents slurry build-up behind downstream seat
		Upstream seat configuration ensures evacuation of solids during cycling
Proven application-specific coating	Patented coating (Patent number 6,835,449)	Corrosion tested against H ₂ SO ₄ acid slurry
		High bond strength with 10,000 psi minimum
		Reduces refurbishment costs
Investment in superior design & quality MOGAS valves	Greater return on investment	Increased valve life cycle / operation time
	Reduces maintenance	Reduces operating and maintenance costs
	Eliminates valve-related downtime	Greater efficiency / increased profitability

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