Acid Valves

CASE STUDY

Valve Expertise, Industry Knowledge

In nickel-cobalt high pressure acid leaching (HPAL) operations, MOGAS valves are used to control concentrated sulfuric acid levels. They have to maintain absolute isolation at high temperatures and high pressure at long, uninterrupted run times for optimized performance, and be reliable during plant upsets to prevent sulfuric acid leaking to the autoclave or environment. The MOGAS PL-AV valve is the valve of choice because of its proven performance.

Conditions	
Service:	Outboard and Inboard Acid Injection (HPAL)
Media:	98.5% concentrated sulphuric acid
Operating Temperature:	480° F (250° C)
Pressure:	667 psi (46 bar)

Valve Specifications	
Size:	3.5 inch
Class:	ASME 600
Model:	PL-AV
Temperature:	518° F (270°)
Pressure:	1500 psi (103 bar)
Construction:	Alloy 20 body and flange
	Non-welded Tantalum alloy liner
	Patented nano TiO2 coating ball (60 HRC)
	Ceramic seat (68 HRC)
	Bi-directional track seat design

Challenges

In addition to the harsh corrosive and erosive environment expected in a high pressure acid leaching (HPAL) system, other challenges include:

- **Heat Transfer.** An immediate and significant temperature increase occurs when concentrated H_2SO_4 reacts with the slurry water (heat of dilution) in the autoclave. Also, during operational pauses an autoclave is 'hot parked' (or 'boxed in') while steam continues to be injected into the autoclave. This heat is transferred to the piping and isolation valves, causing rapid thermal expansion of components.
- **Hydrogen Embrittlement.** Especially in high temperature applications, hydrogen permeates metals to cause fractures.
- **Absolute Isolation.** The inboard acid valve in an HPAL autoclave must provide absolute isolation while subjected to abrasive, solid particles.

Solution

MOGAS acid valves are application-specific and designed to operate and seal in very aggressive HPAL environments. Valve material selection is optimized to resist corrosive attack, but still retain mechanical properties in high temperatures. A platinum electro-spotted Tantalum alloy liner prevents hydrogen embrittlement through galvanic effect. The Tantalum ball with patented nano TiO2 coating is matched in hardness with the ceramic seat, and are ideal for corrosive environments at elevated temperatures. The MOGAS acid valve has no leakage under upset conditions of 518° F (270° C) and 780 psi (5,400 kPa).

MOGAS primary and secondary acid injection valve designs, material selections and proprietary coatings have been proven effective for autoclave processes.

14330 East Hardy Street Houston, TX, USA 77039-1405 **www.mogas.com**
ph +1.281.449.0291 **fax** +1.281.590.3412 **email** mogas@mogas.com

MOGAS® SEVERE SERVICE BALL VALVES

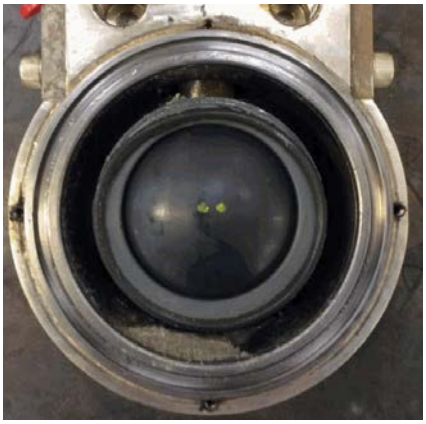
Acid Valves

Valve Expertise, Industry Knowledge

MOGAS understands the problems of HPAL plants because many of their employees are tenured industry experts and engineers with extensive field experience and valve knowledge. They have years of operational and maintenance experience in the field, not only with valves, but also with controls, instrumentation, processes and systems.

Results

Since 1999 the majority of all autoclaves worldwide use MOGAS severe service ball valves. This includes over 1000 valves specifically in HPAL installations. MOGAS has increased the number of days installed and continuous run times in acid injection applications. And, by being on site to support and monitor the performance of MOGAS valves, problems not often anticipated by the plant's maintenance team can be foreseen and avoided.



After 641 days and 225 cycles, inspection showed the body in good condition with all critical dimensions within tolerances.

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