

Statement of Performance

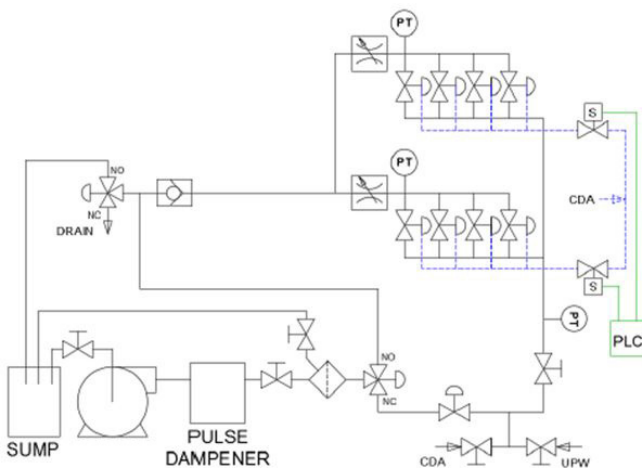
Furon[®] HGVM Reliability in 49%wt Hydrofluoric Acid (HF)

Furon HGVM valves have been tested for reliability in 49 wt% hydrofluoric acid (HF) by an independent test lab¹ using the protocol of a major US OEM manufacturer.

Accelerated Life Test Method

Eight Furon HGVM 2" valves were assembled in a manifold allowing two parallel flow paths through each set of 4 valves. Each set was cycled 3.5 seconds open and 3.5 seconds closed at room temperature with an actuator pressure of 80 psig. One set was opened as the other set was closed to maintain a constant flow of acid through the system at 74-80 psig. Flow was provided by a double diaphragm pump. Valves were inspected every workday for leaks.

Figure 1 - Hydrofluoric Acid Exposure System Schematic



The accelerated life test was performed on a set of eight valves in 49% HF. Cleanroom grade HF was used. The acid was replaced halfway through the test to ensure that full chemical strength was maintained.

Valves were tested for cracking pressure internal leakage and external leakage port-to-port leakage throughout the test. Internal leak testing was conducted by positioning the valve in a vertical orientation with the test port down. Degassed ultrapure water then flowed upward through the valve. The valve was opened and closed several times and agitated to evacuate air bubbles. The valve was then left closed. The downward facing test port was drained of water and pressurized with 80 psi Clean Dry Air (CDA). The upward facing port was plumbed to a scale attached to logging software. Any air leaks past the seat would displace water from the upward facing port to the scale for measurement. This procedure was repeated for both the inlet and outlet ports of each valve.

External leak testing was conducted by opening the valve, capping one port, and pressurizing the valve with the other port using 80 psi CDA. The same degassed ultrapure water system and scale were plumbed to the weep port of the test valve to measure any leakage past the diaphragm.

Crack pressure testing was conducted by plumbing a variable pressure CDA supply to the test port of a closed valve, and a pressure gage to the other port. CDA pressure was slowly increased to a maximum of 90 psi, or until the pressure gage at the other port increased, indicating bypass. The CDA pressure required to cause bypass was then recorded.

Results

Table 1 - Inlet Internal Leak Testing Results (10⁻³ scc/s CDA)

Valve ID	Actuation Cycles		
	0	150k	300k
6282004	0.07	0.08	0.05
6282011	0.03	0.08	0.05
6282015	0.13	0.03	0.03
6282016	0.03	0.07	0.08
6282017	0.05	0.03	0.10
6282018	0.05	0.08	0.08
6282019	0.03	0.05	0.07
6282020	0.03	0.07	0.05

Table 2 - Outlet Internal Leak Testing Results (10⁻³ scc/s CDA)

Valve ID	Actuation Cycles		
	0	150k	300k
6282004	0.07	0.03	0.00
6282011	0.00	0.02	0.08
6282015	0.05	0.05	0.00
6282016	0.02	0.12	0.55
6282017	0.00	0.40	0.32
6282018	0.00	0.03	0.10
6282019	0.03	0.00	0.00
6282020	0.05	0.07	0.03

Table 3 - External Leak Testing Results (10⁻³ scc/s CDA)

Valve ID	Actuation Cycles		
	0	150k	300k
6282004	0.08	0.03	0.00
6282011	0.03	0.15	0.02
6282015	0.03	0.03	0.05
6282016	0.03	0.07	0.02
6282017	0.03	0.02	0.00
6282018	0.05	0.02	0.03
6282019	0.03	0.05	0.00
6282020	0.07	0.02	0.02

Summary

Eight Furon HGVM 2" valves were exposed to 300,000 cycles accelerated life cycle test in 49 wt% HF. Internal leak rates at all completed intervals were acceptable.

References

¹CT Associates, Inc., 10777 Hampshire Ave. S., Bloomington, MN 55438.

The data provided here were obtained under defined test conditions. The tests were designed to mimic use or worst case conditions. However, Saint-Gobain Performance Plastics makes no specific claims about the performance of the components in other chemicals or systems.



**Saint-Gobain
Performance Plastics**
7301 Orangetown Avenue
Garden Grove, CA 92841
1-800-833-5661
Tel: (714) 630-5818
Fax: (714) 688-2614

www.processsystems.saint-gobain.com

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