



Performance Verification

Data Sheet

Metal Extraction and Reliability of ChemPure™ 2-Inch Valves

Furon's ChemPure™ 2-inch in-line valves have demonstrated their reliability and low metal extractables in a field test in a major US microchip fab. A valve was operated in 37—38% HCl for 36 days without leaking or increasing the metal content of the HCl.

Experimental Method

A ChemPure valve was installed in a closed loop system equipped with a needle valve port for liquid sampling and system pressurization. The system and valve were flushed with DI water and 37—38 wt% HCl. A sample of HCl was taken to determine the baseline concentrations of metals. The valve was pressurized to 50 psi and cycled 10 times/minute for 36 days. After each 100,000 cycles, the system was depressurized, shaken to mix the HCl, and a sample was withdrawn. No fresh HCl was added to the system. The test continued until 500,000 cycles had been reached. Samples were submitted for analysis for twelve metals using inductively coupled plasma-mass spectroscopy (ICP-MS).

Reliability

The valve showed no leakage or signs of wear after 500,000 cycles.

Metal Extraction

The results of the metal analyses are shown in Table 1. Metal concentrations less than or equal to the analysis detection limits are indicated by DL. Although the data were somewhat erratic, there was no upward trend in metals concentrations.

Summary

A Furon ChemPure 2" valve was field tested for reliability and metal extraction in 37% HCl. The valve did not leak or fail during the 500,000-cycle test. No significant increase in the concentration of twelve metals was detected over 36 days.

Table 1: Metal concentrations in HCl (µg/liter).

DL indicates that the metal concentrations were at or below the analysis detection limit.

Metal	Na	Al	Fe	Ca	Mg	Li	K	Zn	Cu	Ni	Cr	Ag
Detection Limit	0.15	0.15	0.25	0.20	0.10	0.05	0.20	1.00	0.50	0.10	0.25	0.05
Baseline	0.33	2.60	3.40	7.51	5.94	DL	1.79	3.19	0.54	1.10	0.53	DL
100,000 Cycles	0.69	2.98	4.36	8.09	5.34	DL	4.60	3.37	1.42	0.33	0.79	DL
200,000 Cycles	1.05	3.55	3.76	8.99	5.98	DL	0.62	2.95	DL	0.90	1.73	DL
300,000 Cycles	1.05	3.31	3.76	4.23	5.49	DL	1.42	4.01	DL	0.24	0.50	DL
400,000 Cycles	0.64	3.76	3.32	DL	5.52	DL	DL	DL	DL	DL	DL	DL
500,000 Cycles	1.07	3.50	7.52	7.19	5.91	DL	2.47	4.15	0.57	0.62	1.06	DL

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