

# RELIABILITY THROUGH FUNCTIONAL QUALIFICATION TESTS

Reliability of valve operation affects service life and maintenance. To predict reliability, a sound valve design, backed up by a stress analysis must be subjected to functional cycle testing under critical operating conditions.

To develop the Velan Torqseal Triple Offset Metal-seated Butterfly valves, it required an unusual effort

and extended period of time as many competitive valves in the same category, tested in our R&D, showed repeated leaks of seats and laminated disc gaskets. Some highlights of the tests performed in our R&D laboratory are shown here. Detailed reports are available on request.

## TYPICAL TEST PROCEDURE FOR CLASS 300 ALLOY STEEL VALVE

### A. HYDROSTATIC AND AIR TEST

NO.	TYPE	TEST FLUID	PRESSURE psi	TEMPERATURE	DURATION	VALVE SIDE
1.	Shell	Water	1100	Ambient	5 minutes	Valve open
2.	Seat low pressure	Air or Nitrogen	60–100	Ambient	2 minutes	Both sides
3.	Seat high pressure	Nitrogen	325	Ambient	2 minutes	Preferred
4.	Seat high pressure	Water	800	Ambient	2 minutes	Preferred
5.	Seat high pressure	Nitrogen	195	Ambient	2 minutes	Non preferred
6.	Seat high pressure	Water	480	Ambient	2 minutes	Non preferred

### B. COLD CYCLING TEST

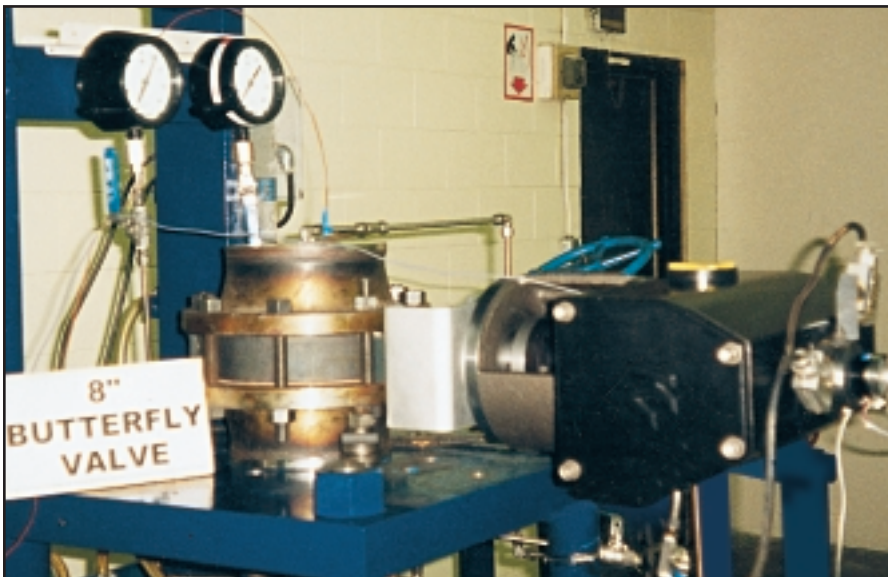
1000 Cycles 820 psi water to test preferred seat side  
490 psi water to test nonpreferred seat side

### C. HOT CYCLING TEST

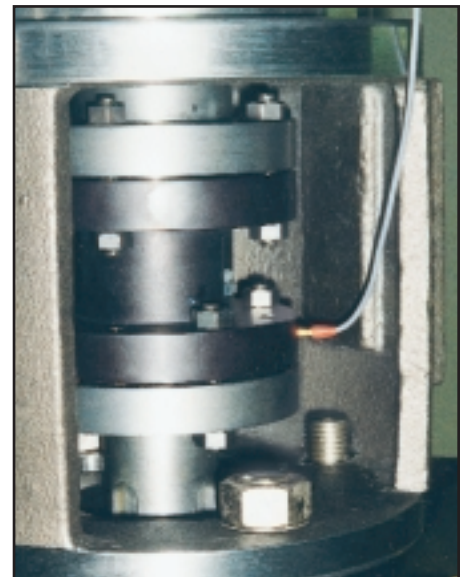
1000 Cycles 150–200 psi superheated steam at 650–900°F

### ACCEPTABLE RESULTS

0 bubble performance after and during the tests, measuring and recording the running, closing and breaking torque in ft·lbs.



8" Class 150 valve - ambient cycling



The torques are recorded with a torque sensor.

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## TYPICAL TEST RESULTS 14" CLASS 300 C12 BODY

### A. HYDROSTATIC TESTS

Valve passed testing with zero leakage.

### B. AMBIENT CYCLING TESTS

Valve passed:  
5000 Cycles with preferred flow direction,  
3000 Cycles with nonpreferred flow direction  
and zero leakage at seats and gasket

*Also tested 8" Class 300 to 30,000 cycles  
with no jamming.*

### C. HOT CYCLING TESTS

The valve under flow of steam at 150–200 psi  
superheated to 800–900°F passed 7250 cycles  
without seizing or jamming.



*Steam test on 14" Class 150 valve.*



*8" Class 300 valve hot cycled at 150 psi steam  
superheated to 800°F.*