

CRYOGENIC BALL VALVES



Moog produces a variety of fluid control components used in space launch vehicles as part of their cryogenic fluid control systems. These components manage both cryogenic hydrogen and oxygen, including propellant isolation valves for rocket engine propellant feed systems and venting valves for propellant tank ullage pressure management. These valves are pneumatically-operated, using nitrogen or helium to provide actuation pressure. They are

ball valves, which provide the lowest pressure drop across the valve for their flow rate capability. Position indication is incorporated in some of the valves.

FLOW AND PRESSURE CAPABILITIES INCLUDE

- Pressures up to 300 psig MEOP
- Mass flow rates up to 148 lbm/sec LOx and 22 lbm/sec LH₂



CRYOGENIC BALL VALVES

PERFORMANCE CHARACTERISTICS



Valve	Model 50-799 3" LOx Isolation Valve	Model 50-800 2" LH ₂ Isolation Valve	Model 50-900 (LOx) & 50-910 (LH ₂) 3" LOx/LH ₂ Isolation Valve
Media	Liquid Oxygen	Liquid Hydrogen	Liquid Hydrogen / Liquid Oxygen
Unit Mass	7.8 lbm	6.6 lbm	12 lbm
Dimensions (L W H)	8.0" x 4.5" x 9.0"	6.7" x 4.0" x 8.5"	11.5" x 6.5" x 11.7"
MEOP	100 psig	40 psig	280 psig
Actuation Pressure	475 psig	500 psig	715 psig
Factors of Safety	Proof: 1.5x MEOP; Burst: 2.5x MEOP	Proof: 1.5x MEOP; Burst: 2.5x MEOP	Proof: 1.5x MEOP; Burst: 2.5x MEOP
C _v	1590	880	320
Max Flowrate at ΔP	80 lbm/sec LO ₂ @ 0.1 psid	45 lbm/sec LH ₂ @ 0.1 psid	148 lbm/sec LO ₂ @ < 12 psid 22 lbm/sec LH ₂ @ < 5 psid
Internal Leakage	5 SCIM GHe @ 35 psi at ambient temp.	<31 SCIM GHe @ 50 psi during LN ₂ immersion	5 SCIM GHe @ 35 psi during LN ₂ immersion
External Leakage	0 bubbles GHe @ 270 psi at ambient temp.	0 bubbles GHe @ 50 psi during LN ₂ immersion	0 bubbles GHe @ 55 psi during LN ₂ immersion
Response Time	Open: < 100 msec; Close: < 200 msec	Open: < 100 msec; Close: < 200 msec	Open: < 100 msec; Close: < 200 msec
Operating Temperature	-423°F – 160°F	-320°F – 160°F	-423°F – 100°F
Random Vibration	20 Grms	30 Grms	36 Grms
Shock	2000 G	2000 G	1500 G
Cycle Life	50 cycles	50 cycles	1000 cycles
Wetted Materials	Aluminum, CRES, PTFE	Aluminum, CRES, PTFE	Aluminum, CRES, PTFE
Position Indication	N/A	N/A	Redundant microswitches



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