HYDRONGEN RELIEF VALVE SIZING FOR THE MUCOOL LH2 TOTAL LOOP
Anderson, Greenwood data base

Absorber volume (liter)	25	liter
Pressure of the system, MAWP	25	psia
Required mass flow rate		
q, heat flux to vessel	3500	BTU/hr-ft^2
LH2 total surface area	10.197	ft^2
Delta-H	206.72	BTU/lb
	88.8896	Joule/g
		0
Q, Heat transfer rate to vessel = qS	35689.5	BTU/hr-ft^2
	10457.02	watt
Qbeam,	1706.485	BTU/hr-ft^2
	500	watt
Total Q, adding the beam heat load	37395.98	BTU/hr-ft^2
	10957.02	watt
m, Mass-flow rate = Q/Delta_H	**180.9016**	**lb/hr**
	22.79361	**g/s**

$$V = \frac{W * 6.32}{M}$$

M (hydrogen)	2.02	
W, flow capacity (lbs/hr)	180.9016	
V (SCFM)	565.9893	

$$A = \frac{W\sqrt{TZ}}{CKP_1\sqrt{M}}$$

Required Relief valve orifice		
Mass-flow rate	180.9016	lb/hr
	22.79361	g/s
T, absolute temperature	530	R
M, Molecular weight of H2	2.02	
Z, compressibility	1	
K, valve discharge coefficient	0.816	
DP, pressure drop absorber to valve	0.2	psi
P1, pressure at valve inlet	25.2	psia
C, gas constant	356	
A, required area of orifice	**0.40028**	**in^2**

Actual flow capacity of relief device (subsonic formula)			
P1, Pressure inlet	25	psia	
P2, pressure outlet	15	psia	
M,	2.02		
T	530	R	
Z, compressibility	1		
A, commercial valve	0.503	in^2	serie G
K, valve discharge coefficient	0.816		
k, ratio of specific heat	1.41		
m, actual mass-flow rate	**414.1045**	**lb/hr**	
	52.17717	**g/s**	

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