



msg_corner																200 mbar	
Fluid	Helium	NRV pressure drop												1.17 bar		2328.4 mbar	
Mass flow rate	17896.4 g / s	64427.0 kg / hr														200 mbar	
Pressure	4.140 bar G	Valve Kv												270		Pressure drop Calculated	
	5.153 bar A	Cf												0.7		Convergence error	
Vent temperature	6.62 K															0.03%	
Superheat	0.00 K															Successful Convergence	
Gas temperature	6.62 K																
Description	Entry	Pipe Run	Riser	Divertor	Pipe Run	Pipe Run	Pipe Run	Tee as Elbow	Pipe Run	Tee as Run	Pipe Run	Elbow LR	Pipe Run	Burst Disc	Null		
	Loss			Valve Reducer										Fike Axis			
Pressure	5.153	5.037	5.036	5.036	3.868	3.863	3.862	3.858	3.582	3.581	3.483	3.482	3.400	3.397	3.194	2.825 bar A	
Temperature	6.620	6.587	6.588	6.588	6.184	6.187	6.190	6.188	6.066	6.069	6.030	6.032	6.001	6.010	5.920	5.704 K	
Vapour density	75.603	74.552	74.485	74.485	62.727	62.408	62.181	62.137	58.988	58.795	57.149	56.959	55.407	54.804	51.315	kg / m³	
Vapour viscosity	2.6E-06	2.6E-06	2.6E-06	2.6E-06	2.3E-06	2.3E-06	2.3E-06	2.3E-06	2.2E-06	2.2E-06	2.2E-06	2.2E-06	2.1E-06	2.1E-06	2.1E-06	kg / m.s	
Speed of sound	146.5	145.1	145.1	145.1	129.9	129.8	129.8	129.7	125.7	125.7	124.3	124.3	123.2	123.3	120.6		
	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	in²	
Pipe nominal bore	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.	n.b.		
Outside diameter	114.30	114.30	114.30	120.00	114.30	114.30	114.30	114.30	114.30	114.30	114.30	114.30	114.30	250.00	114.30	mm	
Wall	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	mm	
Inside diameter	108.20	108.20	108.20	30.00	108.20	108.20	108.20	108.20	108.20	108.20	108.20	108.20	108.20	102.14	108.20	mm	
Length	0.0	127.0	0.0	90.0	576.0	88.9	433.4	200.0	76.2	200.0	76.2	240.0	247.7	200.0	0.0	mm	
Flow area	9195.5	9195.5	9195.5	706.9	9195.5	9195.5	9195.5	9195.5	9195.5	9195.5	9195.5	9195.5	9195.5	8193.5	9195.5	mm²	
Parallel paths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Mass flow	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	17896.4	g / s	
Mass velocity	1946	1946	1946	25318	1946	1946	1946	1946	1946	1946	1946	1946	1946	2184	1946	kg / m².s	
Velocity	25.74	26.11	26.13	339.91	31.03	31.19	31.30	31.32	32.99	33.10	34.05	34.17	35.13	39.86	37.93		
Mach number	0.176	0.180	0.180	2.34	0.239	0.240	0.241	0.241	0.262	0.263	0.274	0.275	0.285	0.323	0.314		
Reynolds number	8.2E+07		8.2E+07		9.2E+07		9.2E+07		9.2E+07		9.5E+07		9.5E+07		9.8E+07		
Friction coefficient	0.00332		0.00332		0.00323		0.00323		0.00323		0.00320		0.00319		0.00318		
Pressure drop per unit length	7.79		7.80		9.01		9.05		9.08		9.50		9.53		9.77		
Pressure drop	0.99		0.00		5.19		0.80		3.94		1.82		1.91		0.74		
Sudden contraction	Large ID	Large															
	Small ID	108.20															
	Diameter ratio	0.000															
	Resistance coefficient	0.464															
	Pressure loss	116.31														mbar	
Sudden Expansion	Small ID															108.20	
	Large ID															Large	
	Pressure loss															369.1	
Pipe Fitting	Fitting	n-a															
	Velocity head loss index															8	
	Velocity head loss															0.90	
	Pressure loss															274.31	
Divertor valve	Kv															270	
Reference 01-033.tif	Cf															0.7	
	Estimated Pressure drop															1.1679	
	Gf															12.0718	
	Pressure drop at choked conditions															2.090	
Maximum mass flow rate at choked conditions																19552	
	Factor y															1.1214	
	Pressure drop factor															0.9127	
	Mass flow rate															17896.39	
	Error in mass flow															0.00%	
	Absolute error in mass flow															0.00%	
	New estimate in pressure drop															1.168	
	Calculated pressure drop															1168	
	Damping (100% no convergence)															-200%	
	Next iteration															1.1679	
Burst disc	Resistance coefficient Kr															0.45	
	Loss factor Cd															1.49	
	Estimated pressure drop															0.204	
	Isentropic coefficient															2.451	
	Critical pressure ratio															0.398	
	Actual pressure ratio															0.940	
	Used pressure ratio															0.940	
	Mass velocity															2185	
	Mass flow rate															17901	
	Error in mass flow															0.03%	
	Absolute error in mass flow															0.03%	
	Next estimate in pressure drop															0.203	
	Pressure loss - Incompressible flow															203	
																0.196	
Convergence Calculation	First Estimate	lock														4.0000	
	New calculation															1.1679	
	Next iteration	Calc_Numbers														1.1679	
	Next estimate	Est_numbers														1.1679	
Hydrostatic Loss	Vertical rise																
	Pressure loss																
Heating	External Surface area	0	45604	0	33929	206832	31923	155627	71817	27362	71817	27362	86180	88945	157080	0	mm³
	Heat Flux + contingency	7000	7000	7000	7000	7000	38000	2	2	38000	38000	38000	38000	38000	38000	38000	W / m²
	Heat Load	0.00	319.23	0.00	237.50	1447.83	1213.06	0.31	0.14	1039.76	2729.04	1039.76	3274.85	3379.91	5969.03	0.00	W
	Node outlet pressure	5.037	5.036	5.036	3.868	3.863	3.862	3.858	3.582	3.581	3.483	3.482	3.400	3.397	3.194	2.825	
	Inlet specific enthalpy	18.823	18.823	18.841	18.841	18.854	18.854	19.003	19.003	19.003	19.061	19.214	19.272	19.455	19.643	19.977	kJ / kg
	Specific enthalpy increment	0.000	0.018	0.000	0.013	0.081	0.068	0.000	0.000	0.058	0.152	0.058	0.183	0.189	0.334	0.000	kJ / kg
	Outlet specific enthalpy	18.823	18.841	18.841	18.854	18.935	19.003	19.003	19.003	19.061	19.214	19.272	19.455	19.643	19.977	19.977	kJ / kg
	Outlet temperature	6.587	6.588	6.588	6.184	6.187	6.190	6.188	6.066	6.069	6.030	6.032	6.001	6.010	5.920	5.704	K
	Temperature rise	-0.033	0.001	0.000	-0.404	0.002	0.004	-0.002	-0.122	0.003	-0.039	0.003	-0.031	0.009	-0.090	-0.216	K
Total pressure drop	Pipe friction															0.99	
	Sudden contraction	116.31															
	Standard reducer																
	Trumpet shaped entry																
	Sudden expansion																
	Standard enlarger															369.06	
	Pipe Fitting																
	Divertor valve															1167.94	
	Burst disc																
	Hydrostatic loss															203.44	
	TOTAL	116.31	0.99	0.00	1167.94	5.19	0.80	3.94	276.13	0.72	98.54	0.74	82.15	2.49	203.44	369.06	mbar
	Node outlet pressure	5.04	5.04	5.04	3.87	3.86	3.86	3.86	3.58	3.58	3.48	3.48	3.40	3.40	3.19	2.82	bar A
	Node outlet temperature	6.59	6.59	6.59	6.18	6.19	6.19	6.19	6.07	6.07	6.03	6.03	6.00	6.01	5.92	5.70	K