



Initial pressure	1.200 bar A	Vent device set pressure	5.00 atm
Temperature	4.407 K	Factor	10%
Quench	No Protection	Vent pressure	5.57 bar G
Insulation	Loss of Vacuum	Vent pressure	6.59 bar A
Maximum heating	155 kW	Coil Temperature	Variable
Total Quench Energy	9.9 MJ		

HEAT LOADS	Reference Area m ²	Reference temperature K	Reference Heat Flux W / m ²	Surface Temperature K	Initial Helium Temperature K
LOV - Intact MLI	16.50	63.0	7000	63.0	4.4
LOV - No MLI					
Magnet Quench - Assy					
Magnet Quench - Coil	2.71	80.0	38000	Variable	4.4
Total	19.20				

INITIAL CONDITIONS							INITIAL VENTING
	Real Volume	Level	Working Volume	Helium Liquid	Helium Vapour		6.59 bar A
CCR	92.2	100%	70%	92.2	64.6	27.7	litres
Chimney	15.6	100%	100%	15.6	15.6	0.0	litres
Magnet Cryostat	128.9	100%	100%	128.9	128.9	0.0	litres
Total volumes	236.8	88.3%	236.8	209.1	27.7		236.8 litres
Density			109.28	121.1	20.24		109.28 g / litre
Mass		97.8%	25.87	25.31	0.56		25.87 kg
Specific enthalpy			1.446	1.03	20.45		12.52 kJ / kg
Enthalpy			37.40	25.95	11.45		324.06 kJ
Specific internal energy			0.347	0.034	14.523		6.50 kJ / kg
Internal energy			8.99	0.86	8.13		168.13 kJ

MAXIMUM VENT FLOW RATE			TIME TO REDUCE INVENTORY		
Max flow rate	5.49 kg / s		Residual inventory	10%	
	19 779 kg / hr		Contents	2.59 kg	
At the maximum flow rate:	~ Time	2.28 seconds	~ Time	8.08 seconds	
	~ Temperature	7.03 K	~ Temperature	27.97 K	
	~ Energy absorption	0.33 MJ	~ Energy absorption	1.17 MJ	

Time Increments		Venting	Start	Finish	Increment
Contained Pressure Build			0.00	10.00	0.10 secs
Energy change	159.1 kJ		10.00	15.00	0.20 secs
Node position	13		15.00	20.00	0.50 secs
Elapsed time	1.132 secs		20.00	25.00	1.00 secs
			25.00		2.00 secs

JLab Q2-Q3

LOV & Quench - No Protection

