



Initial pressure	1.200 bar A	Vent device set pressure	4.00 atm
Temperature	4.407 K	Factor	10%
Quench	No Protection	Vent pressure	4.46 bar G
Insulation	Intact insulation	Vent pressure	5.47 bar A
Maximum heating	78 kW	Coil Temperature	Variable
Total Quench Energy	9.9 MJ		

HEAT LOADS	Reference Area m <sup>2</sup>	Reference Temperature K	Reference Heat Flux W / m <sup>2</sup>	Surface Temperature K	Initial Helium Temperature K
LOV - Intact MLI					
LOV - No MLI					
Magnet Quench - Assy	2.71	80.0	38000	Variable	4.4
Magnet Quench - Coil					
<b>Total</b>	<b>2.71</b>				

INITIAL CONDITIONS							INITIAL VENTING
	Real Volume	Level	Working Volume	Helium Liquid	Helium Vapour		5.47 bar A
CCR	92.2	100%	70%	92.2	64.6	27.7	litres
Chimney	15.6	100%		15.6	15.6	0.0	litres
Magnet Cryostat	128.9	100%		128.9	128.9	0.0	litres
<b>Total volumes</b>	<b>236.8</b>	<b>88.3%</b>	<b>236.8</b>	<b>209.1</b>	<b>27.7</b>	<b>236.8</b>	<b>litres</b>
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		10.60 kJ / kg
Enthalpy			37.40	25.95	11.45		274.35 kJ
Specific internal energy			0.347	0.034	14.523		5.60 kJ / kg
Internal energy			8.99	0.86	8.13		144.80 kJ

MAXIMUM VENT FLOW RATE			TIME TO REDUCE INVENTORY		
Max flow rate	2.66 kg / s		Residual inventory	10%	
	9 594 kg / hr		Contents	2.59 kg	
At the maximum flow rate:	~ Time	7.49 seconds	~ Time	15.79 seconds	
	~ Temperature	6.89 K	~ Temperature	23.08 K	
	~ Energy absorption	0.37 MJ	~ Energy absorption	0.99 MJ	

Time Increments		Venting	Start	Finish	Increment
Contained Pressure Build			0.00	10.00	0.10 secs
Energy change	135.8 kJ		10.00	15.00	0.20 secs
Node position	37		15.00	20.00	0.50 secs
Elapsed time	3.538 secs		20.00	25.00	1.00 secs
			25.00		2.00 secs

JLab Q2-Q3

Quench - No Protection

