

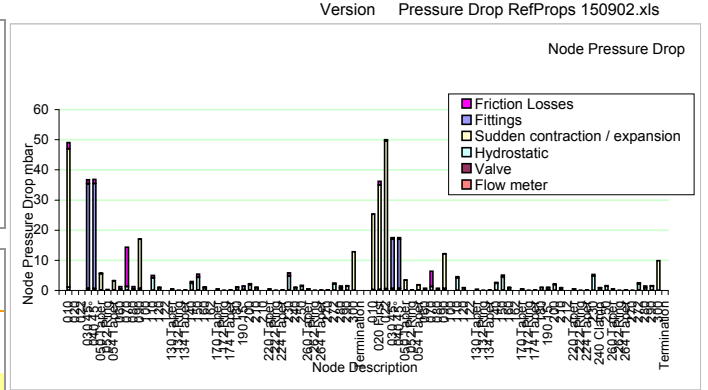
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CONVERGENCE ANALYSIS		Pressure	Flow
Calculation method	Converge		Distribution
Convergence at 100%	0.5	Absolute error	0.00%
Error_Converge	0.001%	Error threshold for convergence	2.0%
Error_Target	0.002%	Damping (No convergence at 100%)	40%
Counter	9	New calculated value	5.870
Max_Count	10	Initial estimate	30.000
Successful Convergence		Used Estimate	5.870
		Next estimate	5.870
Heat Transfer	Error		37.74%

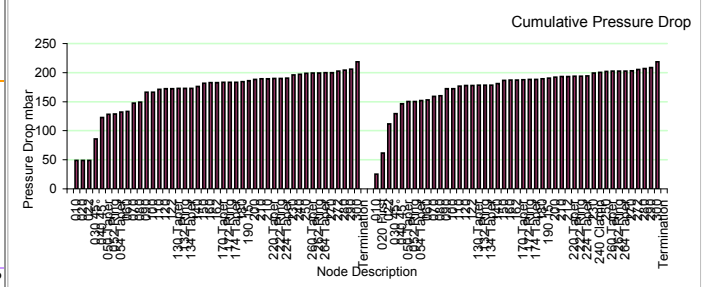
CALCULATE

Initial calculation
 Convergence

Heat Transfer Error #DIV/0! Design Analysis Worksheet

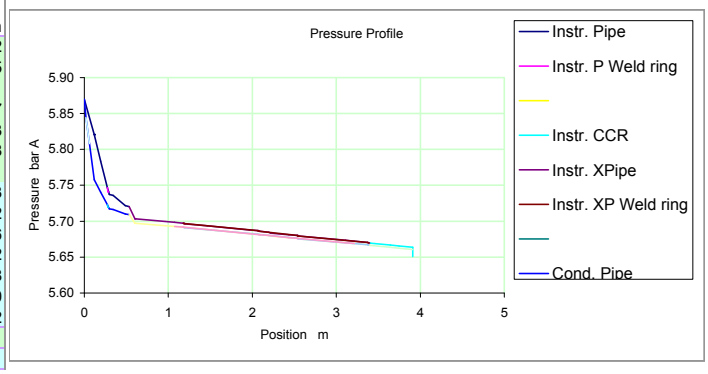


PRESSURE DROP ANALYSIS		Fluid	Fluid	Ambient
Drawing	317111-JLA-700-001-cross-section-for-charles-23.09.2015.PDC	Helium	Helium	24.00 °C
Inlet pressure	5.870 bar A	SA	Heat Flux	0 W / m²
Inlet temperature	6.58 K	Helium vessel	17.81 m²	0 W / m²
Outlet pressure	Target 5.651 bar A	Helium vessel - ID	7.95 m²	0 W / m²
Calculated	5.651 bar A	Oil Assy - Quench SA	4.37 m²	38000 W / m²
Error	0.00%	Coil Assy	19.74 m²	0 W / m²
Outlet temperature	6.54 K	Chimney	3.53 m²	0 W / m²
Instrument wire	Include	CCR	0.98 m²	0 W / m²
		Total	54.38 m²	166.1 W



Large Pipe		Total	Inst Conductor
Area	1068.61 mm²	37.74%	62.26%
Perimeter	140.67 mm	Flow rate	23800 kg / hr
Large diameter	37.58 mm	6.611	8981 kg / hr
Small diameter	7.195 mm	Flow rate	2.495 kg / s
Width - Large piece	75.0 mm	Outlet pressure	5.651 bar A
Width small piece	36.0 mm	Pressure drop	0.219 bar A
Thickness	1.0 mm	Error	0.00%

Geometry & Pressure Drop	Section	Diam Inner or width or depth	Flow Paths	Heat Load per path	Length	Vertical Rise / -Fall	Change on Losses	Fittings	Section Change hydrostatic	Valve Flowmeter	Total	Unit DP
Instr. Pipe Smooth	52.20	1	0.0	0.518	0.499	20.02	69.57	49.02	4.38	143.01	38.62	
Instr. P Weld ring Smooth	48.20	1	0.0	0.016	0.016	0.47	5.41	0.14	6.02	30.25		
Instr. CCR Smooth	82.80	1	0.0	0.513	0.507	1.22	13.11	4.40	18.73	2.37		
Instr. XPipe Smooth	77.90	1	0.0	2.801	2.787	5.41	1.22	17.24	24.28	48.15	1.93	
Instr. XP Weld ring Smooth	73.90	1	0.0	0.062	0.062	0.15	1.97	0.54	2.66	2.48		
Cond. Pipe Smooth	52.50	2	0.0	0.478	0.459	7.58	32.75	75.96	4.02	120.30	15.83	
Cond. P Weld Ring Smooth	48.50	2	0.0	0.016	0.016	0.17	3.34	0.14	3.65	11.02		
Cond. P Clamp Coaxial	37.58	2	0.0	0.040	0.040	1.27	34.55	0.35	36.17	31.76		
Cond. CCR Smooth	82.80	2	0.0	0.513	0.507	1.14	10.16	4.40	15.70	2.22		
Cond. XPipe Smooth	77.90	2	0.0	2.395	2.383	2.59	0.79	12.38	20.75	36.51	1.08	
Cond. XP Weld ring Smooth	73.90	2	0.0	0.062	0.062	0.08	1.64	0.54	2.26	1.30		
Cond. XP Clamp Smooth	82.80	2	0.0	0.406	0.405	0.45	3.52	3.98	1.12			
Total Instr. Path				3.910	3.870	27.28	70.79	86.75	33.74	218.57		
Total Cond. Path				3.910	3.870	13.29	33.54	138.02	33.72	218.57		





Line number (Typical)	Cryostat	Instr. Pipe 010	Instr. Pipe 020	Instr. Pipe 022	Instr. Pipe 030 45° Elbow	Instr. Pipe 040 45° Elbow	Instr. P Wt 050 Taper	Instr. P Wt 052 Ring	Instr. Pipe 054 Taper	Instr. Pipe 060	Instr. Pipe 070 Bellows	Instr. Pipe 080	Instr. Pipe 090 Divergent	Instr. Pipe 100	Instr. Pipe 110	
Description																
Conditions "Two phase" or "gas"	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	
Inlet pressure	bar A 5.870	5.870	5.820	5.820	5.820	5.784	5.747	5.741	5.741	5.737	5.736	5.722	5.721	5.703	5.703	
Outlet pressure	bar A 5.870	5.820	5.820	5.820	5.784	5.747	5.741	5.741	5.737	5.736	5.722	5.721	5.703	5.703	5.698	
Inlet temperature	°C K 6.58	6.58	6.57	6.57	6.57	6.56	6.56	6.56	6.56	6.55	6.55	6.55	6.55	6.55	6.55	
Heat (imposed at outlet)	W 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Checking data entry	Mixture Temperature Temperature Gas flow rate Liquid flow rate Mass flows Section Change	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK	OK OK OK OK OK OK OK
Flow rate	Gas kg / hr Liquid kg / hr Gas g / s Liquid g / s Gas used g / s Liquid used g / s	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	
Inlet temperature	°C K 6.58	-266.57 6.58	-266.57 6.58	-266.58 6.57	-266.58 6.57	-266.58 6.57	-266.59 6.56	-266.59 6.56	-266.59 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	
Outlet temperature	°C K 6.58	-266.57 6.58	-266.58 6.57	-266.58 6.57	-266.58 6.57	-266.59 6.56	-266.59 6.56	-266.59 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	-266.60 6.55	
GEOMETRY	Length m Vertical rise m Type Number of flow paths Maximum diameter / depth mm Minimum diameter / Width	0.0000 0.0000 Smooth 1 1000.00	0.1179 0.0000 Smooth 1	0.0000 0.0000 Smooth 1	0.0783 0.0686 Smooth 1	0.0783 0.0686 Smooth 1	0.0075 0.0075 Smooth 1	0.0081 0.0081 Smooth 1	0.0075 0.0075 Smooth 1	0.0473 0.0473 Smooth 1	0.1419 0.0473 Smooth 1	0.0473 0.0690 Smooth 1	0.0690 0.0690 Smooth 1	0.0000 0.0000 Smooth 1	0.4730 0.4730 Smooth 1	
Obstruction	Instr 1 Diam Instr 2 Diam Instr 3 Diam Weld Strip Width - Pair Weld Strip Depth - Pair Conductor width Conductor depth Conductor Support width Conductor Support depth Conductor Support recess	mm mm mm mm mm mm mm mm mm mm	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	11.00 12.00 9.00	
Obstructed area	mm²	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75	
Obstruction perimeter	mm	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53	
Free flow area	mm²	2140.08	2140.08	2140.08	2140.08	2140.08	1824.67	1824.67	2140.08	2140.08	2140.08	2140.08	4766.12	4766.12	4766.12	
Free flow perimeter	mm	163.99	163.99	163.99	163.99	163.99	151.42	151.42	163.99	163.99	163.99	163.99	244.73	244.73	244.73	
Flow area mm²	785398.2	1868.3	1868.3	1868.3	1868.3	1868.3	1552.9	1552.9	1868.3	1868.3	1868.3	1868.3	4494.4	4494.4	4494.4	
Perimeter mm	3141.59	264.52	264.52	264.52	264.52	264.52	251.96	251.96	264.52	264.52	264.52	264.52	345.26	345.26	345.26	
Hydraulic diameter mm	1000.0	28.3	28.3	28.3	28.3	28.3	24.7	24.7	28.3	28.3	28.3	28.3	52.1	52.1	52.1	
FITTINGS	Description	Elbow 45° - Std v 45° - Std														
CONTRACTION / EXPANSION LOSSES - NODE INLET	Node upstream effective diameter mm Node effective diameter mm Section Change	1000.00 1000.00 Contract - Sudden	48.77 48.77 48.77	48.77 48.77 48.77	48.77 48.77 48.77	48.77 48.77 48.77	48.77 48.77 48.77	44.47 44.47 Contract - Converge	44.47 44.47 Expand - Divergent	48.77 48.77 48.77	48.77 48.77 48.77	48.77 48.77 48.77	48.77 48.77 Expand - Divergent	75.65 75.65 75.65	75.65 75.65 75.65	
NODE PRESSURE DROP	Friction Losses mbar Fittings mbar Sudden contraction / expansion mbar Hydrostatic mbar Valve mbar Flow meter mbar	0.00 0.00 0.00 0.00 0.00 0.00	2.16 0.00 45.89 1.04 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.60 0.00 0.00	1.44 34.73 0.00 0.60 0.00 0.00	1.44 34.84 0.00 0.60 0.00 0.00	0.23 0.00 5.41 0.07 0.00 0.00	0.24 0.00 3.13 0.07 0.00 0.00	0.14 0.00 3.13 0.41 0.00 0.00	0.87 0.00 0.00 1.24 0.00 0.00	13.10 0.00 0.00 0.41 0.00 0.00	0.87 0.00 16.36 0.60 0.00 0.00	0.13 0.00 0.00 0.60 0.00 0.00	0.00 0.00 0.00 4.13 0.00 0.00	0.88 0.00 0.00 4.13 0.00 0.00
TOTAL NODE PRESSURE DROP (mbar)	bar	0.000	49.09	0.000	36.77	36.89	5.70	3.34	1.29	14.34	1.29	17.09	0.000	5.00	5.00	
GAS FLOW REGIME	Viscosity kg / m.s Density kg / m³ G kg / m².s Velocity m / s Re No f regime	2.8E-06 90.231 3.18 0.04 ##### 0.0097 Turbulent	2.8E-06 90.231 1335.31 14.80 ##### 0.0052 Turbulent	2.8E-06 89.844 1335.31 14.86 ##### 0.0052 Turbulent	2.8E-06 89.844 1335.31 14.86 ##### 0.0052 Turbulent	2.8E-06 89.844 1335.31 14.86 ##### 0.0052 Turbulent	2.8E-06 89.553 1335.31 14.91 ##### 0.0052 Turbulent	2.8E-06 89.258 1606.53 18.01 ##### 0.0052 Turbulent	2.8E-06 89.213 1606.53 18.01 ##### 0.0052 Turbulent	2.8E-06 89.210 1335.31 14.97 ##### 0.0052 Turbulent	2.8E-06 89.183 1335.31 14.97 ##### 0.0052 Turbulent	2.8E-06 89.173 1335.31 14.99 ##### 0.0261 Turbulent	2.8E-06 89.058 1335.31 6.23 ##### 0.0056 Turbulent	2.8E-06 89.048 1335.31 6.24 ##### 0.0056 Turbulent	2.8E-06 88.910 1335.31 6.24 ##### 0.0056 Turbulent	
Pressure drop per unit length	mbar per	0.000	18.294	18.357	18.357	18.405	30.239	30.252	18.461	18.466	92.337	18.487	1.853	1.855	1.855	
FRICCTION PRESSURE	regime	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	Gas Turbulent	
Unit length pressure drop	mbar per	0.000	18.294	18.357	18.357	18.405	30.239	30.252	18.461	18.466	92.337	18.487	1.853	1.855	1.855	
Total pressure drop	bar A mbar	0.000 0.000	0.002 2.157	0.000 0.000	0.000 1.437	0.001 1.441	0.000 0.226	0.000 0.244	0.000 0.138	0.000 0.873	0.001 13.103	0.013 0.874	0.000 0.128	0.000 0.000	0.001 0.878	
HOMOGENOUS MIXTURE PROPERTIES	Mass fraction Volume fraction Mixture viscosity kg / m.s Mixture density kg / m³	100.0% 100.0% 2.8E-06 90.23	100.0% 100.0% 2.8E-06 90.23	100.0% 100.0% 2.8E-06 89.84	100.0% 100.0% 2.8E-06 89.84	100.0% 100.0% 2.8E-06 89.55	100.0% 100.0% 2.8E-06 89.26	100.0% 100.0% 2.8E-06 89.21	100.0% 100.0% 2.8E-06 89.21	100.0% 100.0% 2.8E-06 89.18	100.0% 100.0% 2.8E-06 89.17	100.0% 100.0% 2.8E-06 89.06	100.0% 100.0% 2.8E-06 89.05	100.0% 100.0% 2.8E-06 88.91	100.0% 100.0% 2.8E-06 88.91	
HYDROSTATIC PRESSURE LOSS	Mixture density Vertical rise Pressure bar A mbar	90.23 0.00 0.00 0.00	90.23 0.12 0.00 1.04	89.84 0.00 0.00 0.00	89.84 0.07 0.00 0.60	89.55 0.07 0.00 0.60	89.26 0.01 0.00 0.07	89.21 0.01 0.00 0.07	89.21 0.01 0.00 0.07	89.18 0.05 0.00 0.41	89.17 0.14 0.00 1.24	89.06 0.05 0.00 0.41	89.05 0.07 0.00 0.60	88.91 0.00 0.00 0.41	88.91 0.00 0.00 4.13	
CONTRACTION / EXPANSION LOSSES - NODE INLET	Node upstream effective diameter mm Node effective diameter mm Node upstream flow area mm² Node flow area mm² Inlet fluid mass velocity kg / m².s Effective diameter ratio Convergent section angle Contraction loss coefficient Contraction loss mbar Divergent section angle Expansion loss coefficient Expansion loss mbar Total section change losses mbar	1000.00 1000.00 785398.2 785398.2 3.2 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1335.3 1.000 Sudden 0.464 45.89 n-a n-a n-a 45.89	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1606.5 1.000 n-a n-a n-a n-a n-a n-a 5.41	44.47 44.47 1552.9 1552.9 1606.5 1.000 n-a n-a n-a n-a n-a n-a 5.41	44.47 44.47 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 3.13	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	48.77 48.77 1868.3 1868.3 1335.3 1.000 n-a n-a n-a n-a n-a n-a 0.00	75.65 75.65 4494.4 4494.4 555.1 1.000 n-a n-a n-a n-a n-a n-a 16.36	75.65 75.65 4494.4 4494.4 555.1 1.000 n-a n-a n-a n-a n-a n-a 0.00	
FITTINGS - VELOCITY HEAD LOSS (Fitting at the node outlet)	Velocity Head Loss Index Velocity head loss Average velocity m / s Additional frictional loss mbar bar					2 0.35 14.9 34.73 0.03	2 0.35 14.9 34.84 0.03									

Line number (Typical)	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip	Instr. XPip
	120	122	130 Taper	132 Ring	134 Taper	140	150	160	162	170 Taper	172 Ring	174 Taper	180	190 15°	200					
Description																				
Conditions "Two phase" or "gas"	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Inlet pressure	bar A	5.698	5.697	5.697	5.697	5.697	5.696	5.693	5.688	5.687	5.687	5.686	5.686	5.686	5.685	5.683	5.683	5.683	5.683	5.683
Outlet pressure	bar A	5.697	5.697	5.697	5.697	5.696	5.693	5.688	5.687	5.687	5.686	5.686	5.686	5.685	5.683	5.683	5.683	5.683	5.683	5.683
Inlet temperature	°C	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
Heat (imposed at outlet)	W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Checking data entry	Mixture	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Gas flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Liquid flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Mass flows	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Section Change	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Flow rate																				
	Gas kg / hr																			
	Liquid kg / hr																			
	Gas g / s																			
	Gas used g / s	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8	2494.8
	Liquid used g / s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inlet temperature	°C	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61
	K	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
Outlet temperature	°C	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61
	K	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
GEOMETRY																				
	Length m	0.1000	0.0000	0.0075	0.0081	0.0075	0.2627	0.5000	0.1033	0.0000	0.0075	0.0081	0.0075	0.1061	0.0241	0.2162				
	Vertical rise m	0.1000	0.0000	0.0075	0.0081	0.0075	0.2627	0.5000	0.1033	0.0000	0.0075	0.0081	0.0075	0.1061	0.0240	0.2138				
	Type	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth				
	Number of flow paths	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
	Maximum diameter / depth mm	77.90	77.90	73.90	73.90	77.90	77.90	77.90	77.90	73.90	73.90	77.90	77.90	77.90	77.90	77.90				
	Minimum diameter / Width																			
Obstruction																				
	Instr 1 Diam mm	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00				
	Instr 2 Diam mm	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00				
	Instr 3 Diam mm	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00				
	Weld Strip Width - Pair mm						10.00	10.00	10.00											
	Weld Strip Depth - Pair mm						2.00	2.00	2.00											
	Conductor width mm																			
	Conductor depth mm																			
	Conductor Support width mm																			
	Conductor Support depth mm																			
	Conductor Support recess mm																			
	Obstructed area mm²	271.75	271.75	271.75	271.75	271.75	311.75	311.75	311.75	271.75	271.75	271.75	271.75	271.75	271.75	271.75				
	Obstruction perimeter mm	100.53	100.53	100.53	100.53	100.53	128.53	128.53	128.53	100.53	100.53	100.53	100.53	100.53	100.53	100.53				
	Free flow area mm²	4766.12	4766.12	4289.22	4289.22	4766.12	4766.12	4766.12	4766.12	4289.22	4289.22	4766.12	4766.12	4766.12	4766.12	4766.12				
	Free flow perimeter mm	244.73	244.73	232.16	232.16	244.73	244.73	244.73	244.73	232.16	232.16	244.73	244.73	244.73	244.73	244.73				
	Flow area mm²	4494.4	4494.4	4017.5	4017.5	4494.4	4454.4	4454.4	4454.4	4017.5	4017.5	4494.4	4494.4	4494.4	4494.4	4494.4				
	Perimeter mm	345.26	345.26	332.69	332.69	345.26	373.26	373.26	373.26	345.26	332.69	345.26	345.26	345.26	345.26	345.26				
	Hydraulic diameter mm	52.1	52.1	48.3	48.3	52.1	47.7	47.7	47.7	52.1	48.3	48.3	52.1	52.1	52.1	52.1				
FITTINGS																				
	Description																			Mitre 15°
CONTRACTION / EXPANSION LOSSES -																				
	Node upstream effective diameter mm	75.65	75.65	75.65	71.52	71.52	75.65	75.31	75.31	75.31	75.65	71.52	71.52	75.65	75.65	75.65				
	Node effective diameter mm	75.65	75.65	71.52	71.52	75.65	75.31	75.31	75.31	75.65	71.52	71.52	75.65	75.65	75.65	75.65				
	Section Change			Contract - Converge		Expand - Divergent	Contract - Sudden			Expand - Sudden	Contract - Converge		Expand - Divergent							
NODE PRESSURE DROP																				
	Friction Losses mbar	0.19	0.00	0.02	0.02	0.01	0.55	1.05	0.22	0.00	0.02	0.02	0.01	0.20	0.04	0.40				
	Fittings mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00				
	Sudden contraction / expansion mbar	0.00	0.00	0.49	0.00	0.18	0.17	0.00	0.00	0.00	0.49	0.00	0.18	0.00	0.00	0.00				
	Hydrostatic mbar	0.87	0.00	0.07	0.07	0.07	2.29	4.36	0.90	0.00	0.07	0.07	0.07	0.92	0.21	1.86				
	Valve mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Flow meter mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	TOTAL NODE PRESSURE DROP mbar	1.06	0.00	0.57	0.09	0.26	3.01	5.41	1.12	0.00	0.57	0.09	0.26	1.12	1.47	2.26				
	bar	0.001	0.000	0.001	0.000	0.000	0.003	0.005	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.002				
GAS FLOW REGIME																				
	Viscosity kg / m.s	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06				
	Density kg / m³	88.870	88.861	88.861	88.857	88.856	88.854	88.830	88.796	88.777	88.777	88.772	88.772	88.770	88.761	88.749				
	G kg / m².s	555.10	555.10	620.99	620.99	555.10	560.08	560.08	555.10	620.99	620.99	555.10	555.10	555.10	555.10	555.10				
	Velocity m / s	6.25	6.25	6.99	6.99	6.25	6.30	6.31	6.31	6.25	6.99	7.00	6.25	6.25	6.25	6.25				
	Re No	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####				
	f	0.0056	0.0056	0.0055	0.0055	0.0056	0.0057	0.0057	0.0057	0.0056	0.0055	0.0055	0.0056	0.0056	0.0056	0.0056				
	regime	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent				
	Pressure drop per unit length mbar per	1.856	1.856	2.481	2.481	1.856														



Line number (Typical)	Cryostat	Cond. Pipe 010	Cond. Pipe 020	Cond. Pipe 022	Cond. Pipe 030	Cond. Pipe 040	Cond. Pipe 050	Cond. Pipe 052	Cond. Pipe 054	Cond. Pipe 060	Cond. Pipe 070	Cond. Pipe 080	Cond. Pipe 090	Cond. Pipe 100	Cond. Pipe 110	Cond. Pipe 120	
		010	020	022	030	040	050	052	054	060	070	080	090	100	110	120	
		010	020	022	030	040	050	052	054	060	070	080	090	100	110	120	
Description																	
Conditions "Two phase" or "gas"	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	
Inlet pressure	bar A	5.870	5.870	5.844	5.808	5.758	5.740	5.723	5.719	5.719	5.717	5.717	5.710	5.709	5.697	5.697	5.693
	mbar A	5870	5870	5844	5808	5758	5740	5723	5719	5719	5717	5717	5710	5709	5697	5697	5693
Outlet pressure	bar A	5.870	5.844	5.808	5.758	5.740	5.723	5.719	5.719	5.717	5.717	5.710	5.709	5.697	5.697	5.693	5.692
	mbar A	5870	5844	5808	5758	5740	5723	5719	5719	5717	5717	5710	5709	5697	5697	5693	5692
Inlet temperature	°C																
	K	6.58	6.58	6.58	6.57	6.56	6.56	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55
Heat (imposed at outlet)	W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Checking data entry	Mixture	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Gas flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Liquid flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Mass flows	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Section Change	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	Error
Flow rate	Gas kg / hr																
	Liquid kg / hr																
	Gas g / s	4116.3															
	Liquid g / s																
	Gas used g / s	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3
	Liquid used g / s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inlet temperature	°C	-266.57	-266.57	-266.57	-266.58	-266.59	-266.59	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60
	K	6.58	6.58	6.58	6.57	6.56	6.56	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55
Outlet temperature	°C	-266.57	-266.57	-266.58	-266.59	-266.59	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.60
	K	6.58	6.58	6.57	6.56	6.56	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55
GEOMETRY	Length m	0.000	0.0200	0.0400	0.0579	0.0783	0.0783	0.0075	0.0081	0.0075	0.0473	0.1419	0.0473	0.0690	0.0000	0.4730	0.1000
	Vertical rise m	0.000	0.0200	0.0400	0.0579	0.0686	0.0686	0.0075	0.0081	0.0075	0.0473	0.1419	0.0473	0.0690	0.0000	0.4730	0.1000
	Type	Smooth	Smooth	Coaxial	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth
	Number of flow paths	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Maximum diameter / depth mm	1000.00	52.50	37.58	52.50	52.50	52.50	48.50	48.50	52.50	52.50	52.50	77.90	77.90	77.90	82.80	
	Minimum diameter / Width			7.20													
Obstruction	Instr 1 Diam mm																
	Instr 2 Diam mm																
	Instr 3 Diam mm																
	Weld Strip Width - Pair mm																
	Weld Strip Depth - Pair mm																
	Conductor width mm		20.00		20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	
	Conductor depth mm		4.00		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
	Conductor Support width mm																
	Conductor Support depth mm																
	Conductor Support recess mm																
	Obstructed area mm²		160.00	0.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	255.00
	Obstruction perimeter mm		96.00	0.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	324.00
	Free flow area mm²		4329.51	2137.22	4329.51	4329.51	4329.51	3694.91	3694.91	4329.51	4329.51	4329.51	9532.24	9532.24	9532.24	10769.13	
	Free flow perimeter mm		329.87	281.34	329.87	329.87	329.87	304.73	304.73	329.87	329.87	329.87	489.46	489.46	489.46	520.25	
	Flow area mm²	785398.2	4169.5	2137.2	4169.5	4169.5	4169.5	3534.9	3534.9	4169.5	4169.5	4169.5	9372.2	9372.2	9372.2	10514.1	
	Perimeter mm	3141.59	425.87	281.34	425.87	425.87	425.87	400.73	400.73	425.87	425.87	425.87	585.46	585.46	585.46	844.25	
	Hydraulic diameter mm	1000.0	39.2	30.4	39.2	39.2	39.2	35.3	35.3	39.2	39.2	39.2	64.0	64.0	64.0	49.8	
FITTINGS	Description				Elbow 45° - Std v 45° - Std												
CONTRACTION / EXPANSION LOSSES	ode upstream effective diameter mm	1000.00	1000.00	72.86	52.17	72.86	72.86	72.86	67.09	67.09	72.86	72.86	72.86	72.86	109.24	109.24	109.24
	Node effective diameter mm	1000.00	72.86	52.17	72.86	72.86	72.86	67.09	67.09	72.86	72.86	72.86	72.86	109.24	109.24	109.24	115.70
	Section Change		Contract - Sudden	Contract - Sudden	Expand - Sudden		Contract - Converge	Contract - Converge	Expand - Divergent				Expand - Divergent				Contract - Sudden
NODE PRESSURE DROP	Friction Losses mbar	0.00	0.14	1.27	0.42	0.57	0.57	0.08	0.09	0.05	0.34	5.14	0.34	0.07	0.00	0.45	0.11
	Fittings mbar	0.00	0.00	0.00	0.00	16.36	16.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sudden contraction / expansion mbar	0.00	25.09	34.55	49.10	0.00	0.00	3.34	0.00	1.76	0.00	0.00	0.00	11.55	0.00	0.00	0.00
	Hydrostatic mbar	0.00	0.18	0.35	0.51	0.60	0.60	0.07	0.07	0.07	0.41	1.24	0.41	0.60	0.00	4.12	0.87
	Valve mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Flow meter mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL NODE PRESSURE DROP	mbar	0.00	25.41	36.17	50.03	17.53	17.56	3.49	0.16	1.88	0.76	6.38	0.76	12.22	0.00	4.57	0.98
	bar	0.000	0.025	0.036	0.050	0.018	0.018	0.003	0.000	0.002	0.001	0.006	0.001	0.012	0.000	0.005	0.01
GAS FLOW REGIME	Viscosity kg / m.s	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06
	Density kg / m³	90.231	90.231	90.031	89.745	89.347	89.207	89.066	89.038	89.037	89.022	89.016	88.965	88.959	88.860	88.860	88.823
	G kg / m².s	5.24	987.24	1926.01	987.24	987.24	987.24	1164.47	1164.47	987.24	987.24	987.24	987.24	439.20	439.20	439.20	391.50
	Velocity m / s	0.06	10.94	21.39	11.00	11.05	11.07	13.07	13.08	11.09	11.09	11.09	11.10	4.94	4.94	4.94	4.41
	Re No	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
	f	0.0086	0.0052	0.0047	0.0052	0.0052	0.0052	0.0051	0.0051	0.0052	0.0052	0.0259	0.0052	0.0056	0.0056	0.0056	0.0061
	regime	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent
	Pressure drop per unit length mbar per	0.000	7.170	31.763	7.201	7.226	7.236	11.018	11.021	7.247	7.248	36.240	7.251	0.950	0.951	0.951	1.065
FRICITION PRESSURE	regime	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
	Unit length pressure drop mbar per	0.000	7.170	31.763	7.201	7.226	7.236	11.018	11.021	7.247	7.248	36.240	7.251	0.950	0.951	0.951	1.065
Total pressure drop	bar A	0.000	0.000	0.001	0.000	0.001	0.001	0.000	0.000	0.00							



Line number (Typical)	Cond. XPi 122	Cond. XP 130 Taper	Cond. XP 132 Ring	Cond. XPi 134 Taper	Cond. XPi 140	Cond. XPi 150	Cond. XPi 160	Cond. XPi 162	Cond. XP 170 Taper	Cond. XP 172 Ring	Cond. XPi 174 Taper	Cond. XP 180	Cond. XPi 190 15° Mitre	Cond. XPi 200	Cond. XP 210	Cond. XPi 212
Description																
Conditions "Two phase" or "gas"	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Inlet pressure	bar A 5.692	5.692	5.691	5.691	5.691	5.688	5.683	5.682	5.682	5.682	5.681	5.681	5.680	5.679	5.677	5.676
Outlet pressure	mbar A 5692	5692	5691	5691	5691	5688	5683	5682	5682	5682	5681	5681	5680	5679	5677	5676
Inlet temperature	°C 6.55	6.55	6.55	6.55	6.55	6.55	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
Heat (imposed at outlet)	W 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Checking data entry	Mixture OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Gas flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Liquid flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Mass flows	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Section Change	Error	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	Error	Error	OK	Error	Error
Flow rate	Gas kg / hr															
	Liquid kg / hr															
	Gas g / s															
	Gas used g / s	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3	4116.3
	Liquid used g / s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inlet temperature	°C -268.60	-266.60	-266.60	-266.60	-266.60	-266.60	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61
	K 6.55	6.55	6.55	6.55	6.55	6.55	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
Outlet temperature	°C -266.60	-266.60	-266.60	-266.60	-266.60	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61	-266.61
	K 6.55	6.55	6.55	6.55	6.55	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54	6.54
GEOMETRY	Length m	0.0000	0.0075	0.0081	0.0075	0.2627	0.5000	0.1033	0.0000	0.0075	0.0081	0.0075	0.1061	0.0241	0.2162	0.1000
	Vertical rise m	0.0000	0.0075	0.0081	0.0075	0.2627	0.5000	0.1033	0.0000	0.0075	0.0081	0.0075	0.1061	0.0240	0.2138	0.0997
	Type	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth
	Number of flow paths	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Maximum diameter / depth mm	77.90	73.90	73.90	77.90	77.90	77.90	77.90	73.90	73.90	77.90	82.80	77.90	77.90	82.80	77.90
	Minimum diameter / Width															
Obstruction	Instr 1 Diam mm															
	Instr 2 Diam mm															
	Instr 3 Diam mm															
	Weld Strip Width - Pair mm					10.00	10.00	10.00								
	Weld Strip Depth - Pair mm					2.00	2.00	2.00								
	Conductor width mm	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
	Conductor depth mm	4.00	4.00	4.00	4.00	4.00	12.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
	Conductor Support width mm															
	Conductor Support depth mm															
	Conductor Support recess mm															
	Obstructed area mm²	160.00	160.00	160.00	160.00	240.00	560.00	400.00	320.00	320.00	320.00	320.00	399.00	320.00	320.00	399.00
	Obstruction perimeter mm	96.00	96.00	96.00	96.00	152.00	184.00	168.00	112.00	112.00	112.00	112.00	340.00	112.00	112.00	340.00
	Free flow area mm²	9532.24	8578.45	8578.45	9532.24	9532.24	9532.24	9532.24	9532.24	8578.45	8578.45	9532.24	10769.13	9532.24	10769.13	9532.24
	Free flow perimeter mm	489.46	464.33	464.33	489.46	489.46	489.46	489.46	489.46	464.33	464.33	489.46	520.25	489.46	489.46	489.46
	Flow area mm²	9372.2	8418.4	8418.4	9372.2	9292.2	8972.2	9132.2	9212.2	8258.4	8258.4	9212.2	10370.1	9212.2	9212.2	10370.1
	Perimeter mm	585.46	560.33	560.33	585.46	641.46	673.46	657.46	601.46	576.33	576.33	601.46	860.25	601.46	601.46	860.25
	Hydraulic diameter mm	64.0	60.1	60.1	64.0	57.9	53.3	55.6	61.3	57.3	57.3	61.3	48.2	61.3	61.3	48.2
FITTINGS	Description	Mitre 15°														
CONTRACTION / EXPANSION LOSSES -	ode upstream effective diameter mm	115.70	109.24	103.53	103.53	109.24	108.77	106.88	107.83	108.30	102.54	102.54	108.30	114.91	108.30	108.30
	Node effective diameter mm	109.24	103.53	103.53	109.24	108.77	106.88	107.83	108.30	102.54	102.54	108.30	114.91	108.30	108.30	114.91
	Section Change	Expand - Sudden	Contract - Converge	Contract - Divergent	Expand - Sudden	Contract - Sudden	Contract - Sudden	Contract - Sudden	Expand - Sudden	Contract - Sudden	Contract - Sudden	Expand - Divergent	Contract - Sudden	Expand - Sudden	Contract - Sudden	Expand - Sudden
NODE PRESSURE DROP	Friction Losses mbar	0.00	0.01	0.01	0.01	0.29	0.65	0.12	0.00	0.01	0.01	0.01	0.12	0.03	0.22	0.11
	Fittings mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.00
	Sudden contraction / expansion mbar	0.00	0.39	0.00	0.14	0.11	0.12	0.00	0.00	0.42	0.00	0.15	0.00	0.00	0.00	0.00
	Hydrostatic mbar	0.00	0.07	0.07	0.07	2.29	4.36	0.90	0.00	0.06	0.07	0.06	0.92	0.21	1.86	0.87
	Valve mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Flow meter mbar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL NODE PRESSURE DROP	DR(mbar)	0.00	0.47	0.08	0.21	2.68	5.12	1.03	0.00	0.49	0.08	0.22	1.04	1.02	2.08	0.98
	bar	0.000	0.000	0.000	0.000	0.003	0.005	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.001
GAS FLOW REGIME	Viscosity kg / m.s	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06
	Density kg / m³	88.815	88.815	88.812	88.811	88.809	88.788	88.774	88.738	88.738	88.734	88.733	88.732	88.723	88.715	88.698
	G kg / m².s	439.20	488.96	488.96	439.20	442.98	458.78	450.74	446.83	498.43	498.43	446.83	396.94	446.83	396.94	446.83
	Velocity m / s	4.95	5.51	5.51	4.95	4.99	5.17	5.08	5.04	5.62	5.62	5.04	4.47	5.04	5.04	4.48
	Re No	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
	f	0.0056	0.0056	0.0056	0.0056	0.0057	0.0058	0.0058	0.0056	0.0056	0.0056	0.0056	0.0062	0.0056	0.0056	0.0062
	regime	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent
	Pressure drop per unit length	0.952	1.243	1.243	0.952	1.095	1.293	1.190	1.037	1.365	1.365	1.037	1.137	1.037	1.138	1.038
FRICITION PRESSURE	regime	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent	Turbulent
	Unit length pressure drop	0.952	1.243	1.243	0.952	1.095	1.293	1.190	1.037	1.365	1.365	1.037	1.137	1.037	1.138	1.038
	Total pressure drop	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	bar A	0.000	0.009	0.010	0.007	0.288	0.646	0.123	0.000	0.010	0.011	0.008	0.121	0.025	0.224	0.114
	mbar	0.000	0.009	0.010	0.007	0.288	0.646	0.123	0.000	0.010	0.011	0.008	0.121	0.025	0.224	0.114
HOMOGENOUS MIXTURE PROPERTIES	Mass fraction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Volume fraction	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Mixture viscosity kg / m.s	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06
	Mixture density kg / m³	88.82	88.82	88.81	88.81	88.81	88.79	88.75	88.74	88.74	88.73	88.73	88.73	88.72	88.71	88.70
HYDROSTATIC PRESSURE LOSS	Mixture density	88.82	88.82	88.81	88.81	88.81	88.79	88.75	88.74	88.73	88.73					

Line number (Typical)	Cond. XP 220 Taper	Cond. XP 222 Ring	Cond. XP 224 Taper	Cond. XP 230	Cond. XP 240 Clamp	Cond. XP 250	Cond. XP 260 Taper	Cond. XP 262 Ring	Cond. XP 264 Taper	Cond. CCI 270	Cond. CCI 272	Cond. CCI 280	Cond. CCI 290	Cond. CCI 300	CCR Termination
Description															
Conditions "Two phase" or "gas"	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Inlet pressure	bar A 5.676	bar A 5.676	bar A 5.676	bar A 5.676	bar A 5.676	bar A 5.670	bar A 5.669	bar A 5.667	bar A 5.667	bar A 5.667	bar A 5.667	bar A 5.667	bar A 5.664	bar A 5.662	bar A 5.661
Outlet pressure	mbar A 5.676	mbar A 5.676	mbar A 5.675	mbar A 5.670	mbar A 5.669	mbar A 5.669	mbar A 5.667	mbar A 5.667	mbar A 5.667	mbar A 5.667	mbar A 5.667	mbar A 5.664	mbar A 5.662	mbar A 5.661	mbar A 5.651
Inlet temperature	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54	°C 6.54
Heat (imposed at outlet)	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000	W 0.000
Checking data entry	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Temperature	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Gas flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Liquid flow rate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Mass flows	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Section Change	OK	OK	OK	OK	Error	Error	OK	OK	OK	OK	OK	OK	OK	OK	OK
Flow rate	Gas kg / hr														
	Liquid kg / hr														
	Gas g / s														
	Gas used g / s														
	Liquid used g / s														
Inlet temperature	°C -268.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61
Outlet temperature	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61	°C -266.61
GEOMETRY	Length m														
	Vertical rise m														
	Type														
	Number of flow paths														
	Maximum diameter / depth mm														
	Minimum diameter / Width														
Obstruction	Instr 1 Diam mm														
	Instr 2 Diam mm														
	Instr 3 Diam mm														
	Weld Strip Width - Pair mm														
	Weld Strip Depth - Pair mm														
	Conductor width mm														
	Conductor depth mm														
	Conductor Support width mm														
	Conductor Support depth mm														
	Conductor Support recess mm														
Obstructed area	mm² 320.00	mm² 320.00	mm² 320.00	mm² 320.00	mm² 399.00	mm² 320.00	mm² 320.00	mm² 320.00	mm² 320.00	mm² 320.00	mm² 1125.20	mm² 1125.20	mm² 1125.20	mm² 1125.20	mm² 1125.20
Obstruction perimeter	mm 112.00	mm 112.00	mm 112.00	mm 112.00	mm 340.00	mm 112.00	mm 112.00	mm 112.00	mm 32.00	mm 32.00	mm 32.00	mm 257.20	mm 257.20	mm 257.20	mm 257.20
Free flow area	mm² 8578.45	mm² 8578.45	mm² 9532.24	mm² 10769.13	mm² 10769.13	mm² 9532.24	mm² 8578.45	mm² 8578.45	mm² 9532.24	mm² 10769.13	mm² 10769.13	mm² 10769.13	mm² 10769.13	mm² 10769.13	mm² 10769.13
Free flow perimeter	mm 464.33	mm 464.33	mm 489.46	mm 489.46	mm 520.25	mm 489.46	mm 464.33	mm 464.33	mm 489.46	mm 520.25	mm 520.25	mm 520.25	mm 520.25	mm 520.25	mm 3424.34
Flow area	mm² 8258.4	mm² 8258.4	mm² 9212.2	mm² 9212.2	mm² 10370.1	mm² 9212.2	mm² 8258.4	mm² 8258.4	mm² 9212.2	mm² 10449.1	mm² 9643.9	mm² 9643.9	mm² 9643.9	mm² 9643.9	mm² 465440.6
Perimeter	mm 576.33	mm 576.33	mm 601.46	mm 601.46	mm 860.25	mm 601.46	mm 576.33	mm 576.33	mm 496.33	mm 521.46	mm 552.25	mm 777.45	mm 777.45	mm 777.45	mm 3681.54
Hydraulic diameter	mm 57.3	mm 57.3	mm 61.3	mm 61.3	mm 48.2	mm 61.3	mm 57.3	mm 66.6	mm 70.7	mm 75.7	mm 49.6	mm 49.6	mm 49.6	mm 49.6	mm 505.7
FITTINGS	Description														
CONTRACTION / EXPANSION LOSSES -	Node upstream effective diameter mm														
	Node effective diameter mm														
	Section Change														
NODE PRESSURE DROP	Friction Losses mbar														
	Fittings mbar														
	Sudden contraction / expansion mbar														
	Hydrostatic mbar														
	Valve mbar														
	Flow meter mbar														
TOTAL NODE PRESSURE DROP	mbar 0.49	mbar 0.08	mbar 0.22	mbar 0.53	mbar 0.97	mbar 1.56	mbar 0.49	mbar 0.08	mbar 0.22	mbar 0.16	mbar 2.57	mbar 1.48	mbar 1.62	mbar 9.86	mbar 9.86
GAS FLOW REGIME	Viscosity kg / m.s														
	Density kg / m³														
	G kg / m².s														
	Velocity m / s														
	Re No														
	f														
	regime														
Pressure drop per unit length	mbar per 1.366	mbar per 1.366	mbar per 1.038	mbar per 1.038	mbar per 1.138	mbar per 1.038	mbar per 1.366	mbar per 1.134	mbar per 0.869	mbar per 0.640	mbar per 1.248	mbar per 6.239	mbar per 1.248	mbar per 0.000	mbar per 0.000
FRICCIÓN PRESSURE	regime														
Unit length pressure drop	mbar per 1.366	mbar per 1.366	mbar per 1.038	mbar per 1.038	mbar per 1.138	mbar per 1.038	mbar per 1.366	mbar per 1.134	mbar per 0.869	mbar per 0.640	mbar per 1.248	mbar per 6.239	mbar per 1.248	mbar per 0.000	mbar per 0.000
Total pressure drop	bar A 0.000	bar A 0.010	bar A 0.008	bar A 0.0575	bar A 0.114	bar A 0.169	bar A 0.010	bar A 0.009	bar A 0.006	bar A 0.000	bar A 0.309	bar A 0.624	bar A 0.206	bar A 0.000	bar A 0.000
HOMOGENEOUS MIXTURE PROPERTIES	Mass fraction														
	Volume fraction														
	Mixture viscosity kg / m.s														
	Mixture density kg / m³														
HYDROSTATIC PRESSURE LOSS	Mixture density														
	Vertical rise														
	Pressure bar A														
	mbar														
CONTRACTION / EXPANSION LOSSES -	Node upstream effective diameter mm														
	Node effective diameter mm														
	Node upstream flow area mm²														
	Node flow area mm²														
	Inlet fluid mass velocity kg / m².s														
	Effective diameter ratio														
	Convergent section angle														
	Contraction loss coefficient														
	Contraction loss mbar														
	Divergent section angle														
	Expansion loss coefficient														
	Expansion loss mbar														
	Total section change losses mbar														
FITTINGS - VELOCITY HEAD LOSS (Fittin	Velocity Head Loss Index														
	Velocity head loss														
	Average velocity m / s														
	Additional frictional loss mbar														
	bar														