

Project:	P100331 Virgo	Customer: NIKHEF	Line ID:	LN2 supply line to Alu vessel				
Date:	29-11-2010	Rev0	Type :	Start	VIP	Valve	VIP	Outlet
Made by:	ML		Start point ID:	Phase separator outlet				Alu vessel inlet
1) INPUT	CONSTANTS	001	Fluid :	[-]	nitrogen	nitrogen	nitrogen	nitrogen
		002	Critical point	[bara]	34	34	34	34
		003		[K]	126	126	126	126
		004	Ambient pressure :	[bara]	1,00000	1,00000	1,00000	1,00000
		005	Ambient temperature :	[K]	293	293	293	293
		006	Normal pressure :	[bara]	1,01325	1,01325	1,01325	1,01325
		007	Normal temperature :	[K]	273	273	273	273
		008	Gravity :	[m/s2]	9,81	9,81	9,81	9,81
	VARIABLES	009	p :	[bara]	1,00	1,000	1,040	1,039
		010	Gas fraction * :	[mass%]	0%	0,0%	0,8%	1,3%
		011	Φ_m :	[g/s]	1,350	1,350	1,350	1,350
		012	DN (or ID valve)	[- / mm]		DN25	6	DN10
		013	DN vacuum jacket :	[-]		Ø63,5		Ø63,5
		014	L :	[m]		2,000		0,500
		015	ΔH :	[m]		-0,500		0,000
		016	k :	[-]		0,05		0,05
		017	number of elbows :	[-]		1		1
		018	λ (reducer) :	[-]				
		019	Number of bridges :	[-]		1		1
		020	Number of Johnston coupling halves :	[-]		0		0
		021	p out :	[bara]				
		022	Kv :	[m3/hr]			1,20	
		023	Nozzle outlet dia :	[-]				
		024	Safety margin on Δp :	[%]	25	25	25	25
		025	Safety margin on heat leak :	[%]	10	10	10	10
		026	Power input :	[W]				
2) SUMMARY OF RESULTS		101	v :	[m/s]		0,0032	0,1	0,051
		102	Particular pressure loss (dyn) :	[mbar]		0,0006	0,0585	0,0135
		103	Sum of pressure loss (dyn) :	[mbar]		0,0	0,1	0,1
		104	Sum of pressure loss (dyn+stat) :	[mbar]		-39,6	-39,5	-39,5
		105	Particular heat leak + friction :	[W]		3,0	0,2	1,4
		106	Sum of heat leak + friction :	[W]		3,0	3,1	4,5
		107	Sum of Gas fraction :	[mass%]		0,8%	0,8%	1,3%
		108	Φ_v liquid :	[l/hr]		6,0	6,0	6,0

ml:
0,9 g/s is 4 l/hour LN2 normale operation
1,35 g/s is 6 l/hour LN2 maximum operation