TABLE 226: T-JUNCTION RESULTS - C

Flow Node Results			
Flashing/cavitating	**Enthalpy (kJ/kg)**	**Energy source (kW)**	**Liquid phase volume fraction**
False	104.8777372	0	0
False	104.56193	0	0
False	104.56193	0	0
False	104.56193	0	0
False	104.56193	0	0
False	104.5623661	0	0
False	104.5621976	0	0
False	104.56193	0	0
False	104.9503016	0	0
False	104.562275	0	0
False	132.949417	0	0
False	121.8251039	0	0
False	104.9759452	0	0
False	133.8799726	0	0
False	104.9759452	0	0
False	104.56204	0	0
False	134.7081966	0	0
False	134.3395911	0	0
False	105.8858978	0	0
False	132.949417	0	0
False	134.0686904	0	0
False	134.0686904	0	0
False	132.910193	0	0
False	104.9633014	0	0
False	104.9612362	0	0
False	105.8103625	0	0
False	134.069671	0	0
False	126.0903873	0	0
False	104.8777372	0	0
False	104.9503016	0	0
False	104.9503016	0	0
False	122.4101274	0	0
False	108.4416423	0	0
False	108.4334297	0	0
False	104.56193	0	0
False	105.794331	0	0
False	105.0948745	0	0
False	105.8766203	0	0

TABLE 227: T-JUNCTION RESULTS - D

Flow Node Results				
Density (kg/m^3)	**Conductivity (W/m.K)**	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
997.0020972	0.606999441	0.000898716	4.181232997	6.190685252
996.9585164	0.607005873	0.000899211	4.181696736	6.194714059
996.9589332	0.607005873	0.000899211	4.181693451	6.194709192
996.9590813	0.607005873	0.000899211	4.181692267	6.194707438
996.9592983	0.607005873	0.000899211	4.181690502	6.194704824
996.9628517	0.607005873	0.000899211	4.181666541	6.194669328
996.9624872	0.607005873	0.000899211	4.181669233	6.194673316
996.9608655	0.607005873	0.000899211	4.181681007	6.194690758
997.0371749	0.607001405	0.000899018	4.180991047	6.192385323
996.9627642	0.607005873	0.000899211	4.1816672	6.194670304
995.170928	0.607004025	0.000899209	4.179633831	6.191663087
995.924823	0.607001413	0.000899019	4.180069224	6.191028371
997.0248449	0.607005873	0.000899211	4.181052404	6.193759554
995.0845823	0.607001626	0.000899052	4.179621653	6.190587898
997.0248337	0.607005873	0.000899211	4.181052099	6.193759102
996.9619275	0.607005873	0.000899211	4.181673328	6.194679382
995.016057	0.607001626	0.000899052	4.179588666	6.190539039
995.0485402	0.607001626	0.000899052	4.179598073	6.190552972
996.9533759	0.607002961	0.00089912	4.180979582	6.193055336
995.1714162	0.607005873	0.000899211	4.179632949	6.19165679
995.0897186	0.607003214	0.000899128	4.179563044	6.191008935
995.0891977	0.607003214	0.000899128	4.179564402	6.191010947
995.1609222	0.607001626	0.000899052	4.179670975	6.19066095
997.022313	0.607003974	0.000899152	4.181072354	6.193400187
997.0208075	0.607003974	0.000899152	4.181082789	6.193415643
996.9585575	0.607002961	0.00089912	4.180989773	6.19307043
995.0955952	0.607003341	0.000899132	4.179549897	6.191015382
995.6137139	0.606999309	0.000898696	4.180078498	6.188836852
997.0036801	0.606999441	0.000898716	4.181222948	6.190670373
997.0368983	0.607001405	0.000899018	4.180993192	6.1923885
997.0367192	0.607001405	0.000899018	4.180994514	6.192390458
995.8867377	0.607001405	0.000899018	4.180052707	6.190995567
996.7740596	0.607001405	0.000899018	4.180656771	6.191890234
996.7744226	0.607001405	0.000899018	4.180659023	6.191893569
996.9591844	0.607005873	0.000899211	4.181691389	6.194706137
996.9628775	0.607003467	0.000899136	4.180973654	6.193150269
996.9899252	0.606999441	0.000898716	4.181187032	6.190617196
996.9520943	0.607002074	0.000899092	4.180991719	6.192891808

TABLE 228: T-JUNCTION RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
35.41003412	35.62895499	0	-7.57027E-13
11.34464817	11.51966376	-5.68434E-14	-1.29428E-14
11.43074594	11.5199605	2.84217E-14	-1.7953E-14
11.4616518	11.51744567	2.84217E-14	-2.43548E-14
11.50754638	11.50929632	0	-3.187E-14
12.16149197	12.1787389	0	-1.67004E-15
12.08978498	12.13354661	-5.68434E-14	-3.89676E-15
11.77476632	11.94995929	1.13687E-13	-6.40183E-15
35.86590933	35.89054229	0	-4.78777E-13
12.1440308	12.16469034	-2.84217E-14	-2.64423E-15
25.09719702	25.22437168	0	-5.59313E-13
27.62037146	27.64505886	0	-1.14229E-12
28.88360656	29.20333913	5.68434E-14	-2.65737E-13
27.35693028	27.69849372	0	-3.18255E-13
28.89020772	29.13838758	2.84217E-14	-3.70812E-13
11.98044528	12.06838445	0	-4.87096E-15
27.62060305	27.88545657	0	-2.76545E-13
27.95769818	28.05364365	-5.68434E-14	-2.76654E-13
28.52978258	28.52981303	0	-3.55257E-13
25.17302378	25.45916701	0	-5.28228E-13
29.92319693	30.11618182	-4.44089E-16	-6.8207E-13
29.8071372	30.03467196	0	-6.82504E-13
26.21438904	26.66518475	0	-4.65319E-13
29.75219975	29.85726847	-5.68434E-14	-1.33924E-13
29.41087559	29.66701921	-1.13687E-13	-1.53475E-13
28.60553862	28.60555681	-2.84217E-14	-4.38578E-13
30.97004435	31.80708283	1.77636E-15	-6.51023E-13
27.73384075	27.75160277	-1.77636E-15	-1.08461E-12
35.74687189	35.76458442	0	-5.74153E-13
35.80869491	35.84627076	0	-5.24533E-13
35.77299591	35.80808123	0	-5.71676E-13
27.40695723	27.69861868	0	-5.13792E-13
27.65760916	27.69271297	0	-1.02079E-12
27.62559015	27.66318576	0	-1.00919E-12
11.48424155	11.5074915	1.77636E-15	-6.23483E-14
28.85923252	28.85924778	0	-4.80872E-13
35.75428247	35.75428247	-1.84891E-14	0
28.85915734	28.85918234	0	-4.8256E-13

NODES

TABLE 229: NODE RESULTS - A

General	Flow Node Results			
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)	Static temperature (°C)
Node - 1	236.0058344	31.36387184	233.5172601	31.36380947
Node - 10	240.6974977	31.90887645	240.6974977	31.90887645
Node - 100	272.7734012	24.96863468	272.7734012	24.96863468
Node - 101	143.77	31.67232212	142.8496975	31.67229902
Node - 102	145.8453111	31.67187517	145.2135024	31.67185931
Node - 103	143.77	31.67232212	142.8496975	31.67229902
Node - 104	400.5	45	400.5	44.99999748
Node - 105	382.6041007	37.4818859	382.6041007	37.4818859
Node - 106	104.3684242	24.91133262	104.2645458	24.91133067
Node - 107	216.2280322	29.15945836	215.1319506	29.15943252
Node - 108	104.3518036	24.91133629	104.2479252	24.91133434
Node - 109	264.3980952	29.20430757	263.8032954	29.20429352
Node - 11	76.9315163	24.91736522	76.9315163	24.91736522
Node - 110	85.11964874	24.91595709	84.93164933	24.91595347
Node - 112	104.3387525	24.91133918	104.0392684	24.91133355
Node - 113	104.2908351	24.91134977	103.991351	24.91134414
Node - 114	143.9172483	31.67229041	143.2854395	31.67227455
Node - 115	266.812096	24.97405512	266.3293256	24.97404532
Node - 116	85.11270784	24.91595862	84.92470842	24.91595
Node - 117	112.0152674	24.91313628	111.9393376	24.91313485
Node - 118	143.77	31.67232212	142.8496983	31.67229902
Node - 119	84.26911924	24.91614477	83.0370418	24.91612107
Node - 12	223.5730217	25.8131828	222.8246487	25.81316711
Node - 120	99.29539562	24.91296973	99.21946531	24.91296827
Node - 121	84.11509271	24.91617876	82.88301518	24.91615505
Node - 122	143.9172483	31.67229041	143.2854395	31.67227455
Node - 123	256.4636434	31.93943813	255.3049028	31.93940904
Node - 124	143.77	31.67232212	142.8496983	31.67229902
Node - 125	257.1936468	31.93928092	256.3739551	31.93926033
Node - 126	263.5820619	31.93884369	262.8615943	31.9388256
Node - 127	275.2750084	24.97266573	271.1230206	24.97258137
Node - 128	272.7734012	24.97321511	268.6214081	24.97313075
Node - 129	272.7734012	24.9686272	272.7734012	24.9686272
Node - 13	281.2335874	24.97124384	280.3726492	24.97122635
Node - 130	252.8335734	31.93857737	251.8773776	31.93855336
Node - 131	227.4858176	31.90098955	226.3267354	31.90096045
Node - 132	485.4457903	25.06718416	484.8517055	25.06717288
Node - 133	216.0468369	29.15949761	215.7000305	29.15948944
Node - 134	485.4156563	25.06719082	483.0393191	25.06714571
Node - 135	99.30370949	24.9129679	99.22777918	24.91296644

TABLE 229 CONTINUED: NODE RESULTS - A

General	Flow Node Results			
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)	Static temperature (°C)
Node - 136	484.7912595	25.06732879	482.4149214	25.06728368
Node - 137	97.97843213	24.91326034	97.03995924	24.91324228
Node - 138	91.71476013	24.91464251	90.77628427	24.91462445
Node - 139	255.3341681	31.90203155	252.7450607	31.90196654
Node - 14	280.3950436	24.97142799	276.9512937	24.97135802
Node - 140	327.4966892	24.96400604	327.4207661	24.96400462
Node - 141	484.3995181	25.06741536	483.805433	25.06740408
Node - 142	103.9397551	24.91133972	103.413273	24.91132982
Node - 143	146.7511023	25.06162936	146.7511023	25.06162936
Node - 144	482.8002988	25.06776875	482.2062132	25.06775747
Node - 145	95.13719372	24.91334787	93.99739785	24.91332593
Node - 146	335.7224691	31.9230727	332.0964562	31.92298168
Node - 147	103.8555179	24.91135835	103.3290358	24.91134845
Node - 148	317.7663543	31.92928627	314.1403043	31.92919524
Node - 149	103.3534476	24.91146936	102.3262328	24.91145004
Node - 15	229.8806095	24.96266135	229.8373173	24.96266048
Node - 150	239.7612908	24.97576247	239.7612908	24.97576247
Node - 151	263.0408521	29.20436695	260.6616531	29.20431074
Node - 152	103.1890932	24.9115057	102.1618783	24.91148638
Node - 153	94.95482638	24.91338811	94.66987728	24.91338262
Node - 154	270.9758357	31.93631275	270.0196478	31.93628874
Node - 155	252.9865647	31.93854442	252.030369	31.93852041
Node - 156	207.7035257	31.67387068	207.2599002	31.67385954
Node - 157	209.6316587	31.67345543	209.1880334	31.6734443
Node - 158	269.8470613	31.9363212	268.8908729	31.93629719
Node - 159	210.8768977	24.97614325	210.8768977	24.97614325
Node - 16	279.8440436	24.971549	276.4002927	24.97147903
Node - 160	229.2929996	31.6744064	228.4687756	31.67438572
Node - 161	231.2211528	31.67399114	230.396929	31.67397046
Node - 162	232.4811171	24.9731297	232.4811171	24.9731297
Node - 163	75.75264076	24.91762535	75.75264076	24.91762535
Node - 168	146.576078	30.05484108	146.4026676	30.05483691
Node - 17	279.4735552	24.97163036	278.6126163	24.97161287
Node - 170	230.1692489	24.96259796	229.9960802	24.96259445
Node - 173	74.86943622	24.91782024	74.86943622	24.91782024
Node - 176	260.9260078	24.97464406	260.3440966	24.97463223
Node - 177	281.7487423	24.9723319	280.8482277	24.9723136
Node - 179	280.8716517	24.97252452	277.2695961	24.97245133
Node - 18	278.0629962	24.97194013	277.9514187	24.97193786
Node - 184	280.2953228	24.97265108	276.6932661	24.97257789
Node - 185	261.4203326	24.9745355	260.9303086	24.97452554
Node - 19	112.5042974	24.91302815	112.4826453	24.91302775

TABLE 229 CONTINUED: NODE RESULTS - A

General	Flow Node Results			
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)	Static temperature (°C)
Node - 190	279.6342479	24.97279626	278.7337323	24.97277796
Node - 191	285.5960374	24.97391775	285.0422016	24.9739065
Node - 192	285.5534158	24.97392711	284.7092818	24.97390996
Node - 193	279.6888748	24.97404214	278.0210533	24.97400825
Node - 194	446.5404158	25.07280175	445.9463197	25.07279048
Node - 2	112.5164697	24.91302546	112.5121928	24.91302538
Node - 20	171.3511984	30.0535431	171.2172446	30.05353987
Node - 200	271.6207171	24.97417196	271.1685936	24.97416278
Node - 205	236.0569725	31.9091719	235.5408114	31.90915894
Node - 207	233.0181929	32.09798522	232.1191164	32.09796263
Node - 208	232.9901611	32.09799126	232.4002775	32.09797644
Node - 209	243.6947678	32.11275195	243.2145162	32.11273988
Node - 21	235.7024701	24.96372839	235.1673957	24.96371753
Node - 212	237.3564811	31.90912668	236.8403202	31.90911372
Node - 227	447.8326795	25.07298541	444.8250469	25.07292834
Node - 228	268.2752377	31.93689436	267.554772	31.93687627
Node - 229	263.6973367	31.93881886	262.9768692	31.93880077
Node - 23	98.19378256	24.9130721	98.19378256	24.9130721
Node - 230	267.18418	31.93689468	266.463714	31.93687659
Node - 24	488.2756847	25.06655882	485.2681121	25.06650173
Node - 246	266.9348101	31.93718304	266.1151222	31.93716245
Node - 247	257.3247975	31.93925267	256.5051058	31.93923209
Node - 248	265.8278775	31.93718678	265.0081893	31.9371662
Node - 25	487.7871938	25.06666676	484.7796205	25.06660967
Node - 257	270.0985281	31.93650169	268.9397952	31.93647259
Node - 258	256.6490419	31.93939821	255.4903014	31.93936911
Node - 259	268.937347	31.93651712	267.7786135	31.93648802
Node - 26	248.7312651	31.67373986	243.7670521	31.67361531
Node - 268	350.4957739	31.92223758	346.7969043	31.92214473
Node - 271	254.9199109	31.90212076	254.2726335	31.90210451
Node - 273	350.496006	31.92223753	350.4956434	31.92223752
Node - 275	222.230354	31.90212138	218.070271	31.90201692
Node - 279	315.2587418	31.92982631	300.754592	31.92946217
Node - 28	296.6389223	24.97258053	296.6389223	24.97258053
Node - 280	223.1259329	31.90192851	222.0859113	31.90190239
Node - 284	222.1568767	31.90213721	217.9967937	31.90203274
Node - 29	296.1138845	24.97149463	296.1138845	24.97149463
Node - 290	214.6754237	29.15979468	213.2881981	29.15976197
Node - 3	116.7129303	24.91209762	114.3232211	24.91205267
Node - 30	418	44.5	418	44.49999756
Node - 303	278.1588468	24.97312027	278.0421402	24.9731179
Node - 31	229.9847542	25.01459303	229.9847542	25.01459303

TABLE 229 CONTINUED: NODE RESULTS - A

General	Flow Node Results			
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)	Static temperature (°C)
Node - 32	397.3236463	37.4467417	397.3236463	37.4467417
Node - 327	286.4413029	24.97373212	282.2893354	24.97364775
Node - 33	289.7827191	25.10836512	277.751263	25.10811935
Node - 34	242.0097814	24.99762288	242.0097814	24.99762288
Node - 340	256.1068423	25.80605743	253.5562227	25.80600396
Node - 342	256.5279989	25.80596519	253.9773798	25.80591172
Node - 344	262.8801557	25.80457398	262.2625835	25.80456103
Node - 351	256.2840038	25.81277567	253.7743199	25.81272304
Node - 352	256.6984011	25.81268492	254.1887177	25.81263229
Node - 353	262.949887	25.81131578	262.3422264	25.81130304
Node - 36	146.7511023	24.98004657	146.7511023	24.98004657
Node - 362	256.0449511	25.80356987	253.4789248	25.80351608
Node - 363	256.4686516	25.80347707	253.9026258	25.80342328
Node - 364	262.8586938	25.80207755	262.2373913	25.80206452
Node - 37	112.4836723	24.91303272	112.4821708	24.91303269
Node - 38	312.9380778	31.9303261	298.4339112	31.92996195
Node - 39	279.1355921	25.11070226	276.1276992	25.11064082
Node - 4	222.1711699	24.97068774	222.0374004	24.97068502
Node - 40	242.0814703	32.27011713	241.5601981	32.27010402
Node - 41	237.8452274	32.27009086	235.7601362	32.27003844
Node - 414	270.2891428	24.97114498	267.7391071	24.97109317
Node - 416	269.8680826	24.97123745	267.3180462	24.97118564
Node - 417	270.2412729	24.97115549	267.7321677	24.97110451
Node - 418	269.8269711	24.97124647	267.3178654	24.9711955
Node - 42	424.5	45	424.5	44.99999763
Node - 426	270.3119384	24.97113997	267.7464979	24.97108785
Node - 427	269.8883345	24.971233	267.3228935	24.97118088
Node - 43	392.616917	39.02402203	392.616917	39.02402203
Node - 434	263.5143368	24.9726328	262.8969017	24.97262026
Node - 435	263.5738894	24.97261972	262.9663648	24.97260738
Node - 436	263.4967058	24.97263667	262.8755408	24.97262405
Node - 45	97.82416242	24.91329438	96.88568945	24.91327632
Node - 455	146.8311125	30.05478595	146.7877599	30.05478491
Node - 456	147.7736857	30.05458219	147.2378633	30.05456929
Node - 46	96.86081073	24.91296752	95.71071175	24.91294539
Node - 469	167.6633195	30.05380084	167.1275026	30.05378794
Node - 47	293.9285354	24.97111521	293.9285354	24.97111521
Node - 471	186.3131362	30.05375674	186.1791834	30.05375352
Node - 472	256.3814528	24.97211247	256.3814528	24.97211247
Node - 478	229.4758633	24.96275025	228.9407875	24.96273938
Node - 48	96.67679489	24.91300813	96.38927001	24.9130026
Node - 480	256.3814528	24.98648197	256.3814528	24.98648197

TABLE 229 CONTINUED: NODE RESULTS - A

General	Flow Node Results			
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)	Static temperature (°C)
Node - 487	229.9847542	24.99132574	229.9847542	24.99132574
Node - 488	242.009787	24.98619559	242.009787	24.98619559
Node - 49	278.1555332	25.11068282	277.5613858	25.11067069
Node - 493	208.684996	24.97020151	208.5512257	24.9701988
Node - 5	96.26332197	24.91309937	95.17361912	24.9130784
Node - 50	77.29146733	24.91728579	77.29146733	24.91728579
Node - 52	76.40027904	24.91748244	76.40027904	24.91748244
Node - 53	287.4386514	24.96529192	287.4386514	24.96529192
Node - 54	279.0363347	24.97086706	278.1276784	24.97084859
Node - 55	278.1513142	24.97106142	274.5166917	24.97098757
Node - 56	147.0589865	24.98936755	147.0589865	24.98936755
Node - 57	277.5697746	24.97118913	273.935151	24.97111528
Node - 58	277.1792128	24.9712749	276.2705556	24.97125644
Node - 59	275.6904726	24.97160184	275.5727108	24.97159945
Node - 6	240.3078809	31.36388394	239.6857379	31.36386835
Node - 61	98.69985601	24.91296042	98.51185789	24.91295681
Node - 62	91.86903013	24.91460846	90.93055435	24.91459041
Node - 64	229.9847542	25.01459303	229.9847542	25.01459303
Node - 65	87.18	25.00173058	87.18	25.00173058
Node - 66	444.9651819	25.07268063	442.5887978	25.07263554
Node - 67	341.3767627	24.96368171	340.438386	24.96366404
Node - 68	336.2982279	24.96370205	335.3598491	24.96368438
Node - 69	333.6698042	24.96404863	333.5938813	24.9640472
Node - 7	96.08896951	24.91313784	95.81654368	24.9131326
Node - 71	331.7060773	24.96401365	331.4023857	24.96400793
Node - 72	330.6487306	24.96401285	330.3450388	24.96400714
Node - 73	219	33	219	33
Node - 74	328.6787724	24.96397926	328.6028494	24.96397783
Node - 75	147.0589865	24.98936755	147.0589865	24.98936755
Node - 76	247.914699	32.11254708	247.914699	32.11254708
Node - 77	87.18	25.00173058	87.18	25.00173058
Node - 78	403	44.5	403	44.49999748
Node - 79	379.5547656	37.95299517	379.5547656	37.95299517
Node - 8	302.8363137	24.963993	302.0881371	24.96397892
Node - 80	247.1460731	24.97164017	247.1460731	24.97164017
Node - 81	209.7969407	28.50959042	209.7969407	28.50959042
Node - 82	154.3794182	30.05432694	152.2361377	30.05427536
Node - 83	99.50810675	24.91292279	99.43217645	24.91292133
Node - 84	239.7612964	24.98613728	239.7612964	24.98613728
Node - 85	431.4052062	25.0709146	429.0288086	25.07086952
Node - 86	277.1477538	25.11066947	276.5536061	25.11065733
Node - 87	97.83584323	25.00707329	97.83584323	25.00707329

TABLE 229 CONTINUED: NODE RESULTS - A

General	Flow Node Results			
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)	Static temperature (°C)
Node - 88	104.6913333	24.91134184	104.5017949	24.91133828
Node - 89	97.83584323	25.00707329	97.83584323	25.00707329
Node - 9	77.77590441	24.91717889	77.77590441	24.91717889
Node - 90	104.6610071	24.91134855	104.4714687	24.91134499
Node - 91	97.83584323	25.00707329	97.83584323	25.00707329
Node - 92	104.6914873	24.91134181	104.5029637	24.91133827
Node - 93	97.83584323	25.00707329	97.83584323	25.00707329
Node - 94	104.6613235	24.91134848	104.4727999	24.91134494
Node - 95	272.7734012	24.96851259	272.7734012	24.96851259
Node - 96	272.7734012	24.96851259	272.7734012	24.96851259
Node - 97	145.8453111	31.67187517	145.2135024	31.67185931
Node - 98	272.7734012	24.96851259	272.7734012	24.96851259
Node - 99	272.7734012	24.96851259	272.7734012	24.96851259

TABLE 230: NODE RESULTS - B

Flow Node Results				
Total mass (kg)	Mass source (kg/s)	Mach number	Heat transfer (kW)	Flashing/cavitating
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	-154.2975305	0	0	False
0	0	0	0	False
0	-154.2975305	0	0	False
0	127.8732516	0	0	False
0	-127.8732516	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	-154.2974695	0	0	False
0	0	0	0	False
0	0	0	0	False

TABLE 230 CONTINUED: NODE RESULTS - B

Flow Node Results				
Total mass (kg)	Mass source (kg/s)	Mach number	Heat transfer (kW)	Flashing/cavitating
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	-154.2974695	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False

TABLE 230 CONTINUED: NODE RESULTS - B

Flow Node Results				
Total mass (kg)	**Mass source (kg/s)**	**Mach number**	**Heat transfer (kW)**	**Flashing/cavitating**
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False

TABLE 230 CONTINUED: NODE RESULTS - B

Flow Node Results				
Total mass (kg)	Mass source (kg/s)	Mach number	Heat transfer (kW)	Flashing/cavitating
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	137.4566659	0	0	False
0	0	0	0	False
0	0	0	0	False
0	-137.4566659	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	170.6525755	0	0	False

TABLE 230 CONTINUED: NODE RESULTS - B

Flow Node Results				
Total mass (kg)	Mass source (kg/s)	Mach number	Heat transfer (kW)	Flashing/cavitating
0	0	0	0	False
0	0	0	0	False
0	-170.6525755	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False

TABLE 230 CONTINUED: NODE RESULTS - B

Flow Node Results				
Total mass (kg)	**Mass source (kg/s)**	**Mach number**	**Heat transfer (kW)**	**Flashing/cavitating**
0	0	0	0	False
0	35.04	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	146.3630861	0	0	False
0	-146.3630861	0	0	False
0	0	0	0	False
0	0	0	0	False
0	-35.04	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False
0	0	0	0	False

TABLE 231: NODE RESULTS - C

Flow Node Results			
Enthalpy (kJ/kg)	**Energy source (kW)**	**Liquid phase volume fraction**	**Density (kg/m^3)**
131.6430257	0	0	995.2754679
133.9248224	0	0	995.0867244
104.9420883	0	0	997.0218104
132.8490271	0	0	995.1251598
132.8490271	0	0	995.1264804
132.8490271	0	0	995.1251598
188.77844	10723.86208	0	990.2602011
157.3421448	0	0	993.1893527
104.54732	0	0	996.9556296
122.4101274	0	0	995.8840817
104.54732	0	0	996.9556204
122.6412349	0	0	995.8925293
104.547221	0	0	996.9416456
104.548888	0	0	996.9455753
104.54732	0	0	996.9555162
104.54732	0	0	996.9554895
132.8490271	0	0	995.1253834
104.959275	0	0	997.0174067
104.548888	0	0	996.9455718
104.56193	0	0	996.9589889
132.8490271	0	0	995.1251598
104.548888	0	0	996.9446888
108.4275757	0	0	996.7748245
104.5494764	0	0	996.9527165
104.548888	0	0	996.9446114
132.8490271	0	0	995.1253834
134.0667292	0	0	995.0819695
132.8490271	0	0	995.1251598
134.0667292	0	0	995.0824594
134.0706516	0	0	995.0852682
104.9612362	0	0	997.020002
104.9612362	0	0	997.0187046
104.942057	0	0	997.0218124
104.9607624	0	0	997.0246196
134.059865	0	0	995.0808671
133.8799726	0	0	995.0836298
105.5503544	0	0	997.0913153
122.4101274	0	0	995.8843043
105.5503544	0	0	997.0905069
104.5494764	0	0	996.9527207
105.5503544	0	0	997.0901893
104.5494764	0	0	996.9516752

TABLE 231 CONTINUED: NODE RESULTS - C

Flow Node Results			
Enthalpy (kJ/kg)	**Energy source (kW)**	**Liquid phase volume fraction**	**Density (kg/m^3)**
104.5494764	0	0	996.9485251
133.9093906	0	0	995.0940815
104.9607624	0	0	997.0230098
104.9731496	0	0	997.0479141
105.5503544	0	0	997.090783
104.5469534	0	0	996.9552042
105.2148611	0	0	996.9370438
105.5503544	0	0	997.0899693
104.547221	0	0	996.9503008
134.069671	0	0	995.1203287
104.5469534	0	0	996.9551572
134.079477	0	0	995.1101499
104.5469534	0	0	996.9546289
104.8777372	0	0	997.0036313
104.9415779	0	0	997.0047228
122.6402543	0	0	995.8912116
104.5469534	0	0	996.954537
104.547221	0	0	996.9505847
134.0667292	0	0	995.0890898
134.059865	0	0	995.0809413
132.9130387	0	0	995.1557543
132.9130387	0	0	995.1566847
134.0657486	0	0	995.0886248
104.9166509	0	0	996.991328
104.9607624	0	0	997.022724
132.934708	0	0	995.1641957
132.934708	0	0	995.165126
104.9238878	0	0	997.0020707
104.547221	0	0	996.9410527
126.0903873	0	0	995.6136696
104.9607624	0	0	997.0237067
104.8777372	0	0	997.0037219
104.547221	0	0	996.9406085
104.9563332	0	0	997.0144961
104.9657839	0	0	997.0245495
104.9657839	0	0	997.0228657
104.9607624	0	0	997.023316
104.9657839	0	0	997.0225668
104.9563332	0	0	997.0147942
104.56193	0	0	996.959289
104.9657839	0	0	997.0234528
104.9759452	0	0	997.0260564

TABLE 231 CONTINUED: NODE RESULTS - C

Flow Node Results			
Enthalpy (kJ/kg)	**Energy source (kW)**	**Liquid phase volume fraction**	**Density (kg/m^3)**
104.9759452	0	0	997.0259022
104.9710422	0	0	997.0227978
105.5379008	0	0	997.0723136
104.56193	0	0	996.9593044
126.1073517	0	0	995.6264206
104.964178	0	0	997.0196028
133.9218806	0	0	995.0845155
134.7081966	0	0	995.0167175
134.7081966	0	0	995.0168282
134.7795157	0	0	995.0160822
104.8875432	0	0	997.0058046
133.9228612	0	0	995.085063
105.539862	0	0	997.0717723
134.0667292	0	0	995.0878744
134.0706516	0	0	995.0853241
104.548888	0	0	996.9522331
134.0657486	0	0	995.0874276
105.5503544	0	0	997.0916812
134.0667292	0	0	995.0871845
134.0667292	0	0	995.0825231
134.0657486	0	0	995.08673
105.5503544	0	0	997.0914327
134.0667292	0	0	995.0885832
134.0667292	0	0	995.0820595
134.0657486	0	0	995.0881024
132.949417	0	0	995.1706891
134.079477	0	0	995.12717
133.9093906	0	0	995.0946579
134.079477	0	0	995.1287848
133.8799726	0	0	995.0798812
134.079477	0	0	995.1040948
104.9804929	0	0	997.0317466
133.8799726	0	0	995.0815639
133.8799726	0	0	995.0798455
104.9754714	0	0	997.0317937
122.4101274	0	0	995.8832229
104.56193	0	0	996.9604677
186.704135	11242.43097	0	990.479701
104.9657839	0	0	997.0230441
105.0949337	0	0	996.9899215
157.2085248	0	0	993.2078522
104.9759452	0	0	997.0248581

TABLE 231 CONTINUED: NODE RESULTS - C

Flow Node Results			
Enthalpy (kJ/kg)	**Energy source (kW)**	**Liquid phase volume fraction**	**Density (kg/m^3)**
105.5418232	0	0	996.9870299
105.0350291	0	0	996.9999554
108.4275757	0	0	996.7906131
108.4275757	0	0	996.790828
108.4275757	0	0	996.7949312
108.4558231	0	0	996.7889275
108.4558231	0	0	996.7891389
108.4558231	0	0	996.7931763
104.8737786	0	0	996.9586632
108.41712	0	0	996.7912388
108.41712	0	0	996.791455
108.41712	0	0	996.7955829
104.56193	0	0	996.9592874
134.079477	0	0	995.1029424
105.5418232	0	0	996.9856147
104.9042134	0	0	996.9979121
135.4356928	0	0	994.9600753
135.4317704	0	0	994.9577047
104.9503016	0	0	997.0188399
104.9503016	0	0	997.0186215
104.9503016	0	0	997.0188337
104.9503016	0	0	997.0186188
188.79956	14315.07793	0	990.269801
104.9503016	0	0	997.0188447
104.9503016	0	0	997.018625
163.7957433	0	0	992.6515301
104.9503016	0	0	997.0162054
104.9503016	0	0	997.0162408
104.9503016	0	0	997.0161946
104.5494764	0	0	996.9515976
126.0903873	0	0	995.6138759
126.0903873	0	0	995.6141581
104.547221	0	0	996.9511631
126.1050963	0	0	995.6243099
104.9718792	0	0	997.0308887
126.1217665	0	0	995.6338449
104.9415779	0	0	997.0133414
104.8777372	0	0	997.0031976
104.547221	0	0	996.9514495
105.0016486	0	0	997.0095254
104.9976646	0	0	996.9960943
104.9872576	0	0	997.0029885

TABLE 231 CONTINUED: NODE RESULTS - C

Flow Node Results			
Enthalpy (kJ/kg)	**Energy source (kW)**	**Liquid phase volume fraction**	**Density (kg/m^3)**
105.5408426	0	0	996.9862647
104.8897986	0	0	996.9918334
104.547221	0	0	996.9508892
104.547221	0	0	996.9418266
104.547221	0	0	996.9413784
104.9415779	0	0	997.0294498
104.9571702	0	0	997.0236866
104.9571702	0	0	997.0219876
104.9130324	0	0	996.9563471
104.9571702	0	0	997.021686
104.9571702	0	0	997.0227234
104.9571702	0	0	997.0223111
131.6469481	0	0	995.277937
104.548888	0	0	996.952405
104.5494764	0	0	996.9486027
105.0949337	0	0	996.9899215
104.909414	0	0	996.9238436
105.5359396	0	0	997.0708439
104.9846226	0	0	997.0538626
104.9800138	0	0	997.0515719
104.9790332	0	0	997.0506807
104.547221	0	0	996.9511605
104.977072	0	0	997.049705
104.9760914	0	0	997.0492294
138.5434	1178.331277	0	994.73064
104.9741302	0	0	997.0484532
104.9130324	0	0	996.9563471
134.7824575	0	0	995.0180824
104.909414	0	0	996.9238436
186.6908975	11968.9399	0	990.4737011
159.3081661	0	0	993.0225326
104.9503016	0	0	997.0365213
104.9311246	0	0	997.0092159
119.7664343	0	0	996.091088
126.0952903	0	0	995.6167351
104.5494764	0	0	996.9528235
104.9849496	0	0	997.0019693
105.5160334	0	0	997.0652117
105.539862	0	0	996.9858058
104.9415779	0	0	996.9271637
104.5476571	0	0	996.9557463
104.9415779	0	0	996.9271637

TABLE 231 CONTINUED: NODE RESULTS - C

Flow Node Results			
Enthalpy (kJ/kg)	**Energy source (kW)**	**Liquid phase volume fraction**	**Density (kg/m^3)**
104.547221	0	0	996.9420702
104.5476571	0	0	996.9557293
104.9415779	0	0	996.9271637
104.5476571	0	0	996.9557468
104.9415779	0	0	996.9271637
104.5476571	0	0	996.95573
104.9415779	0	0	997.0218428
104.9415779	0	0	997.0218428
132.8490271	0	0	995.1264804
104.9415779	0	0	997.0218428
104.9415779	0	0	997.0218428

TABLE 232: NODE RESULTS - D

Flow Node Results			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
0.607001705	0.000899064	4.179695173	6.190780196
0.607001705	0.000899064	4.17960463	6.190646089
0.607003974	0.000899152	4.181085816	6.193420128
0.607003885	0.000898809	4.179791364	6.18914385
0.607002997	0.000898807	4.179787352	6.189130878
0.607003885	0.000898809	4.179791364	6.18914385
0.637257235	0.0005997	4.17944775	3.933129243
0.637257232	0.0005997	4.179086984	3.932789929
0.607003974	0.000899152	4.181723701	6.194365024
0.607001405	0.000899018	4.180063437	6.191011459
0.607003974	0.000899152	4.181723763	6.194365116
0.607002581	0.000899108	4.179957236	6.191463223
0.607003974	0.000899152	4.181856025	6.194561034
0.607004189	0.000899158	4.18181542	6.194544973
0.607003974	0.000899152	4.181724576	6.194366319
0.607003974	0.000899152	4.181724755	6.194366585
0.607003503	0.000898804	4.179790614	6.189111758
0.60700372	0.000899144	4.181102116	6.193392414
0.607004189	0.000899158	4.181815455	6.194545025
0.607005873	0.000899211	4.181692609	6.194707944
0.607004209	0.000898805	4.179791364	6.189114469
0.607004189	0.000899158	4.181825148	6.194559383
0.607001405	0.000899018	4.180660014	6.191895037
0.607004265	0.000899161	4.181743235	6.194453605
0.607004189	0.000899158	4.181825925	6.194560534

TABLE 232 CONTINUED: NODE RESULTS - D

Flow Node Results			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
0.607003503	0.000898804	4.179790614	6.189111758
0.607002961	0.00089912	4.179582323	6.190985653
0.607004209	0.000898805	4.179791364	6.189114469
0.607002961	0.00089912	4.179581042	6.190983756
0.607003467	0.000899136	4.1795732	6.19107582
0.607003974	0.000899152	4.181088242	6.193423722
0.607003974	0.000899152	4.181095629	6.193434664
0.607003974	0.000899152	4.181085821	6.193420136
0.607003974	0.000899152	4.181060467	6.193382579
0.607002074	0.000899092	4.179586622	6.190810576
0.607001626	0.000899052	4.179623472	6.190590592
0.607004189	0.000899158	4.180203537	6.192157283
0.607001405	0.000899018	4.180062263	6.191009719
0.607004189	0.000899158	4.180210721	6.192167924
0.607004265	0.000899161	4.181743193	6.194453543
0.607004189	0.000899158	4.180213094	6.19217144
0.607004265	0.000899161	4.181754368	6.194470095
0.607004265	0.000899161	4.181785961	6.194516895
0.607004607	0.000899172	4.17959084	6.191335225
0.607003974	0.000899152	4.181070994	6.193398172
0.607002708	0.000899112	4.180896214	6.19287999
0.607004189	0.000899158	4.180207514	6.192163174
0.607003974	0.000899152	4.181727014	6.194369931
0.606999309	0.000898696	4.181455475	6.190875542
0.607004189	0.000899158	4.180213593	6.192172178
0.607003974	0.000899152	4.181770112	6.194433772
0.607003341	0.000899132	4.179477669	6.190908393
0.607003974	0.000899152	4.181727329	6.194370398
0.607004607	0.000899172	4.17950618	6.191209815
0.607003974	0.000899152	4.181731162	6.194376076
0.606999441	0.000898716	4.181223157	6.190670683
0.606999707	0.000898757	4.181183368	6.190889961
0.607002454	0.000899104	4.179963639	6.191446784
0.607003974	0.000899152	4.181731777	6.194376987
0.607003974	0.000899152	4.181766581	6.194428542
0.607002961	0.00089912	4.179564832	6.190959744
0.607002074	0.000899092	4.179586441	6.190810307
0.607004871	0.000899068	4.17968276	6.190759024
0.607004039	0.00089907	4.179680323	6.190776661
0.607002834	0.000899116	4.179566207	6.19093586
0.606990722	0.00089904	4.181272717	6.193059157
0.607003974	0.000899152	4.181072621	6.193400582

TABLE 232 CONTINUED: NODE RESULTS - D

Flow Node Results			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
0.607005821	0.000899154	4.179655155	6.191295911
0.607004481	0.000899154	4.179652715	6.191305415
0.606994498	0.000899137	4.181207762	6.193594806
0.607003974	0.000899152	4.181861974	6.194569847
0.606999309	0.000898696	4.180078684	6.188837128
0.607003974	0.000899152	4.181065665	6.193390278
0.606999441	0.000898716	4.18122271	6.190670021
0.607003974	0.000899152	4.181866431	6.194576449
0.607003341	0.000899132	4.181120284	6.193341539
0.607003974	0.000899152	4.18105825	6.193379295
0.607003974	0.000899152	4.18106926	6.193395604
0.607003974	0.000899152	4.181067495	6.193392989
0.607003974	0.000899152	4.181070962	6.193398125
0.607003341	0.000899132	4.181118538	6.193338953
0.607005873	0.000899211	4.181690567	6.194704921
0.607003974	0.000899152	4.181064494	6.193388544
0.607005873	0.000899211	4.181044152	6.193747329
0.607005873	0.000899211	4.181045182	6.193748855
0.60700524	0.000899191	4.181065866	6.193649859
0.607002581	0.000899108	4.180353483	6.192050154
0.607005873	0.000899211	4.181690454	6.194704753
0.606999768	0.000898767	4.180019896	6.189231226
0.607004353	0.000899164	4.181087021	6.193499699
0.607001626	0.000899052	4.179610917	6.190571996
0.607001626	0.000899052	4.179586727	6.190536167
0.607001626	0.000899052	4.179586396	6.190535677
0.607001811	0.00089908	4.179571566	6.190708319
0.606999707	0.000898757	4.181205888	6.190923307
0.607001652	0.000899056	4.179609329	6.190597445
0.607002834	0.000899116	4.180357822	6.192108431
0.607002961	0.00089912	4.179567755	6.190964074
0.607003467	0.000899136	4.179573063	6.191075617
0.607004189	0.000899158	4.181748491	6.194445831
0.607002834	0.000899116	4.179569085	6.190940123
0.607004189	0.000899158	4.180202354	6.19215553
0.607002961	0.00089912	4.17956947	6.190966613
0.607002961	0.00089912	4.179580887	6.190983525
0.607002834	0.000899116	4.179570818	6.190942691
0.607004189	0.000899158	4.180204211	6.19215828
0.607002961	0.00089912	4.179566123	6.190961656
0.607002961	0.00089912	4.179582103	6.190985327
0.607002834	0.000899116	4.179567536	6.190937829

TABLE 232 CONTINUED: NODE RESULTS - D

Flow Node Results			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
0.607005873	0.000899211	4.179635416	6.191660444
0.607004607	0.000899172	4.179453789	6.191132207
0.607004607	0.000899172	4.179588942	6.191332413
0.607004607	0.000899172	4.179447745	6.191123255
0.607001626	0.000899052	4.179633462	6.190605388
0.607004607	0.000899172	4.179527941	6.191242051
0.607005873	0.000899211	4.181009074	6.193695364
0.607001626	0.000899052	4.179628543	6.190598102
0.607001626	0.000899052	4.17963355	6.190605518
0.607005873	0.000899211	4.181011442	6.193698872
0.607001405	0.000899018	4.18006717	6.191016987
0.607005873	0.000899211	4.18168407	6.194695295
0.636627665	0.000604856	4.1793485	3.970772228
0.607003974	0.000899152	4.181066408	6.193391379
0.606999441	0.000898716	4.181187022	6.190617182
0.636627662	0.000604856	4.179074273	3.970511872
0.607005873	0.000899211	4.181052869	6.193760242
0.607003087	0.000899124	4.180975209	6.193074788
0.606999768	0.000898767	4.1811614	6.190921417
0.607001405	0.000899018	4.18057215	6.191764903
0.607001405	0.000899018	4.180570941	6.191763113
0.607001405	0.000899018	4.180546848	6.191727429
0.607001405	0.000899018	4.180566891	6.191757114
0.607001405	0.000899018	4.180565702	6.191755354
0.607001405	0.000899018	4.180541998	6.191720245
0.606999309	0.000898696	4.181511332	6.190958243
0.607001405	0.000899018	4.180574086	6.191767771
0.607001405	0.000899018	4.18057287	6.19176597
0.607001405	0.000899018	4.180548631	6.19173007
0.607005873	0.000899211	4.181690566	6.194704918
0.607004607	0.000899172	4.179531017	6.191246607
0.607003087	0.000899124	4.180978504	6.193079668
0.607000158	0.000898826	4.181241847	6.191449458
0.607001811	0.00089908	4.179550279	6.190676789
0.607001705	0.000899064	4.179556779	6.190575213
0.607001405	0.000899018	4.181099759	6.192546334
0.607001405	0.000899018	4.181101002	6.192548176
0.607001405	0.000899018	4.181099772	6.192546355
0.607001405	0.000899018	4.181100996	6.192548167
0.637268515	0.000599703	4.17933975	3.932976879
0.607001405	0.000899018	4.181099739	6.192546306
0.607001405	0.000899018	4.18110099	6.192548158

TABLE 232 CONTINUED: NODE RESULTS - D

Flow Node Results			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
0.637268512	0.000599703	4.179162364	3.932810129
0.607001405	0.000899018	4.181113739	6.192567041
0.607001405	0.000899018	4.181113533	6.192566735
0.607001405	0.000899018	4.181113803	6.192567135
0.607004265	0.000899161	4.181755146	6.194471248
0.606999309	0.000898696	4.180077778	6.188835786
0.606999309	0.000898696	4.180076746	6.188834259
0.607003974	0.000899152	4.181761472	6.194420974
0.606999707	0.000898757	4.180029581	6.189181601
0.607005873	0.000899211	4.181018481	6.1937093
0.607000158	0.000898826	4.179984272	6.189587282
0.607000158	0.000898826	4.181134303	6.19129021
0.606999441	0.000898716	4.181225886	6.190674723
0.607003974	0.000899152	4.18175791	6.194415697
0.607000158	0.000898826	4.181124469	6.191275648
0.606999441	0.000898716	4.181203006	6.190640848
0.606999768	0.000898767	4.181169237	6.190933021
0.607002961	0.00089912	4.180974055	6.193047149
0.606999768	0.000898767	4.181284029	6.19110299
0.607003974	0.000899152	4.181764171	6.194424972
0.607003974	0.000899152	4.181854209	6.194558344
0.607003974	0.000899152	4.181858706	6.194565005
0.607005873	0.000899211	4.181042585	6.193745008
0.607003974	0.000899152	4.181067691	6.193393279
0.607003974	0.000899152	4.181078801	6.193409736
0.60698704	0.000898771	4.18150375	6.191587927
0.607003974	0.000899152	4.181080518	6.19341228
0.607003974	0.000899152	4.181073175	6.193401403
0.607003974	0.000899152	4.181075106	6.193404264
0.607001811	0.00089908	4.179686585	6.190878683
0.607004189	0.000899158	4.181746918	6.1944435
0.607004265	0.000899161	4.181785183	6.194515743
0.606999441	0.000898716	4.181187022	6.190617182
0.606985222	0.000898768	4.181745779	6.191944722
0.607002328	0.0008991	4.180366864	6.192018123
0.607004189	0.000899158	4.18084505	6.193107559
0.607003594	0.00089914	4.180865087	6.193015381
0.607003467	0.000899136	4.180871812	6.192999415
0.607003974	0.000899152	4.181760796	6.194419972
0.607003214	0.000899128	4.180880492	6.192960415
0.607003087	0.000899124	4.180884667	6.192940671
0.6201847	0.000752712	4.1793828	5.072472897

TABLE 232 CONTINUED: NODE RESULTS - D

Flow Node Results			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Specific heat (kJ/kg.K)**	**Prandtl number**
0.607002834	0.000899116	4.180891565	6.192899033
0.60698704	0.000898771	4.18150375	6.191587927
0.607002074	0.000899092	4.179566113	6.190780197
0.606985222	0.000898768	4.181745779	6.191944722
0.636620653	0.000604854	4.17941225	3.970864966
0.636620649	0.000604854	4.179117614	3.970585223
0.607001405	0.000899018	4.18099625	6.192393029
0.606999822	0.000899203	4.181163282	6.193930644
0.6201847	0.000752712	4.179980951	5.073198866
0.606999441	0.000898716	4.180064912	6.188955799
0.607004265	0.000899161	4.181742162	6.194452016
0.606999707	0.000898757	4.18117625	6.190879423
0.607001405	0.000899018	4.180421688	6.191542056
0.607002834	0.000899116	4.180977177	6.193025845
0.607003974	0.000899152	4.181686497	6.194309913
0.607003974	0.000899152	4.181722773	6.194363649
0.607003974	0.000899152	4.181686497	6.194309913
0.607003974	0.000899152	4.181851764	6.194554723
0.607003974	0.000899152	4.181722886	6.194363817
0.607003974	0.000899152	4.181686497	6.194309913
0.607003974	0.000899152	4.181722768	6.194363642
0.607003974	0.000899152	4.181686497	6.194309913
0.607003974	0.000899152	4.181722881	6.194363809
0.607003974	0.000899152	4.1810859	6.193420252
0.607003974	0.000899152	4.1810859	6.193420252
0.607002997	0.000898807	4.179787352	6.189130878
0.607003974	0.000899152	4.1810859	6.193420252
0.607003974	0.000899152	4.1810859	6.193420252

TABLE 233: NODE RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
27.62675465	27.88174011	0	-1.93667E-13
28.3671373	28.3671373	0	-2.32092E-13
29.40008128	29.40008128	0	0
24.87654333	24.97085404	0	-7.1002E-13
25.11876145	25.18350781	0	-6.78693E-13
24.87654333	24.97085404	0	-7.09801E-13
41.24405018	41.24405018	0	0
39.28490221	39.28490221	0	-1.76463E-13
12.16519807	12.17582377	0	-1.3919E-16
26.85947939	26.97171798	0	-5.0975E-13
12.16349805	12.17412376	0	-8.35138E-16
29.61318859	29.67409549	0	-2.33749E-13
9.369418705	9.369418705	0	-4.80205E-14
10.01772784	10.03695846	0	-1.06618E-13
12.14215571	12.17278987	0	-1.3919E-16
12.13725453	12.16788869	0	-8.35138E-16
24.92119397	24.98594042	0	-6.21952E-13
28.94108222	28.99046163	0	-4.50037E-13
10.01701788	10.0362485	0	-1.2513E-13
11.45021235	11.45797917	0	-9.01824E-14
24.87654341	24.97085404	0	-6.54156E-13
9.82393444	9.949964763	0	-1.44755E-13
27.62682048	27.70338528	0	-1.02119E-12
11.41916755	11.42693446	0	-1.44058E-13
9.808179575	9.934209918	0	-1.66051E-13
24.92119397	24.98594042	0	-6.21952E-13
28.46425707	28.58300757	0	-8.15587E-13
24.87654341	24.97085404	0	-6.54156E-13
28.57380316	28.65780709	0	-8.15804E-13
28.8385955	28.91243049	0	-8.15563E-13
29.2313257	29.65600423	0	-1.7746E-13
28.97548856	29.40016819	0	-2.04773E-13
29.40008122	29.40008122	0	0
30.1772743	30.26533339	-2.3465E-10	-7.29254E-14
28.8130246	28.91101794	0	-8.15412E-13
27.19446644	27.31325176	-1.06581E-14	-3.41298E-13
50.91862923	50.97938977	0	-2.21414E-13
26.91764575	26.95315866	0	-5.3947E-13
50.73330588	50.97634804	-4.47855E-11	-2.51056E-13
11.42001793	11.42778485	0	-1.24155E-13
50.66946074	50.91250305	4.47855E-11	-2.81938E-13
11.19623605	11.29223262	0	-1.65772E-13

TABLE 233 CONTINUED: NODE RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
10.55555286	10.65155004	0	-2.259E-13
26.90160304	27.16693774	0	-3.67956E-13
29.82737452	30.17961117	2.3465E-10	-7.56982E-14
35.98870083	35.99646626	0	-4.3459E-13
50.81164722	50.87240782	0	-3.15026E-13
12.07812608	12.13197984	0	0
27.74141899	27.74141899	3.74374E-11	1.38307E-16
50.64812578	50.70888648	0	-3.08271E-13
11.11502516	11.23161526	0	-1.79555E-14
36.03272721	36.40431537	0	-4.83003E-13
12.06950998	12.12336374	0	-6.95951E-16
33.19293804	33.56453379	0	-5.34846E-13
11.96693896	12.07201265	0	-1.3919E-16
35.73887853	35.74330666	0	-6.24381E-13
35.75392395	35.75392395	0	0
29.39152294	29.63515082	0	-2.56295E-13
11.95012812	12.05520183	0	-6.95951E-16
11.18381054	11.21295807	0	-2.43582E-14
29.97206125	30.07005297	0	-7.1486E-13
28.82870161	28.92669494	0	-7.80676E-13
24.94871551	24.99417594	0	-5.9034E-13
25.14628051	25.19174089	2.84217E-14	-6.47272E-13
29.95639541	30.05438722	0	-7.47211E-13
25.27958085	25.27958085	0	0
29.77102466	30.12326151	0	-9.23352E-14
24.91209205	24.99655351	0	-5.58937E-13
25.10965542	25.19411679	0	-6.16297E-13
25.27933653	25.27933653	0	0
9.248834709	9.248834709	0	-3.20137E-14
27.72568289	27.74344491	0	-1.13366E-12
29.99727946	30.0853387	0	-1.10775E-13
35.75511541	35.77282794	0	-5.26561E-13
9.158493994	9.158493994	0	-3.75813E-14
28.62897016	28.68849022	0	-2.99062E-13
30.22591978	30.31802686	-2.40561E-10	-5.94743E-14
29.8599355	30.22836416	2.40561E-10	-6.23857E-14
29.92966146	29.94107392	0	-1.12577E-13
29.80099529	30.16942417	0	-7.72196E-14
28.68892214	28.73904362	0	-4.09564E-13
11.50578354	11.50799831	0	-5.07972E-14
30.0096748	30.10178208	0	-9.41331E-14
29.15484681	29.21149456	0	-2.98868E-13

TABLE 232 CONTINUED: NODE RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
29.12079943	29.20713963	0	-3.33662E-13
28.9367987	29.10738832	-2.84217E-14	-4.09368E-13
48.2104163	48.27117916	0	-4.28955E-13
11.50880575	11.50924324	0	-4.07769E-14
28.53715739	28.55087779	0	-7.78096E-13
28.93599815	28.9822428	0	-4.50293E-13
28.13872385	28.19162115	0	-2.80994E-13
27.78968218	27.88182774	0	-3.02039E-13
27.81849548	27.87895212	0	-3.27749E-13
28.22685571	28.27607631	0	-2.41201E-13
35.28401245	35.33874234	0	-8.11203E-13
28.17188694	28.22478418	0	-2.56E-13
47.89575966	48.20337393	0	-4.77895E-13
29.71949016	29.79332477	0	-7.14643E-13
28.85040759	28.92424257	0	-7.80831E-13
11.37425525	11.37425525	0	-9.01936E-14
29.70768885	29.78152352	0	-7.47211E-13
50.96119936	51.26880134	0	-1.68611E-13
29.5719713	29.65597443	0	-7.15077E-13
28.58724211	28.67124603	0	-7.81505E-13
29.55854316	29.64254637	0	-7.47862E-13
50.91125084	51.21885297	0	-1.94117E-13
29.86141025	29.98015918	0	-7.1486E-13
28.48325479	28.60200527	0	-7.81288E-13
29.84242362	29.96117266	0	-7.47862E-13
24.9796034	25.48830247	0	-4.98675E-13
36.5389619	36.91801369	0	-4.52796E-13
27.05813536	27.12446906	0	-3.95776E-13
36.91794203	36.91797919	0	-4.24143E-13
26.34840983	26.77474597	0	-3.96297E-13
31.8213646	33.30775152	0	-5.65018E-13
30.34081592	30.34081592	0	-4.76837E-14
26.75990462	26.86648857	0	-3.68472E-13
26.34088047	26.76721665	0	-4.24993E-13
30.28711258	30.28711258	0	-5.91916E-14
26.67069824	26.81275006	0	-5.6919E-13
11.69404112	11.93848279	0	-9.32441E-15
43.03668519	43.03668519	0	0
29.93894846	29.95088555	0	-1.1271E-13
35.75428256	35.75428256	-3.74374E-11	0
40.79551115	40.79551115	0	-1.36995E-13
28.8733113	29.29798569	0	-2.34409E-13

TABLE 232 CONTINUED: NODE RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
30.61022301	31.84087934	0	-5.23661E-13
35.75402862	35.75402862	0	0
30.77050597	31.0314515	0	-9.29529E-13
30.81358758	31.074533	0	-8.71953E-13
31.66110897	31.72429048	0	-8.15854E-13
30.79286268	31.04962064	0	-8.7025E-13
30.83525292	31.09201078	0	-8.143E-13
31.66930419	31.73147179	0	-7.5996E-13
27.74109347	27.74109347	-3.74356E-11	0
30.76258159	31.02510317	0	-8.13114E-13
30.8059234	31.06844486	0	-7.58486E-13
31.65851411	31.72207722	0	-7.05603E-13
11.50573501	11.5058886	0	-7.58478E-14
31.58357639	33.06996676	0	-5.96058E-13
30.44419433	30.75186182	0	-5.71367E-13
32.2411954	32.25487808	0	-8.12183E-13
28.05869969	28.11212746	0	-1.9684E-13
27.86428023	28.07799205	0	-2.19409E-13
32.2152402	32.47606628	0	-6.78302E-13
32.1721787	32.43300489	0	-7.31961E-13
32.2145306	32.47117017	0	-6.26167E-13
32.17216027	32.42879995	0	-6.7747E-13
43.71517996	43.71517996	0	0
32.21599603	32.47839776	0	-5.75004E-13
32.17267439	32.43507624	0	-6.24919E-13
40.33483672	40.33483672	0	-1.25445E-13
31.7200345	31.78318796	0	-7.86591E-13
31.72713847	31.78927826	0	-7.30575E-13
31.71784992	31.7813849	0	-6.76083E-13
11.18045653	11.27645312	0	-1.89294E-13
27.76512388	27.76956438	0	-1.03441E-12
27.81122263	27.86610564	0	-9.05611E-13
11.29027211	11.40791602	0	-3.20137E-14
28.34829633	28.40317822	0	-7.99227E-13
30.06361808	30.06361808	0	-7.27791E-14
28.59951197	28.61323216	0	-7.26547E-13
35.7536864	35.7536864	0	0
35.64718729	35.70191747	0	-7.04995E-13
11.35967917	11.38909015	0	-4.07826E-14
35.75378677	35.75378677	0	0
35.75413691	35.75413691	3.74452E-11	-6.23529E-13
35.75395389	35.75395389	0	0

TABLE 232 CONTINUED: NODE RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
30.69082292	30.75159626	0	-6.21009E-13
32.33188601	32.34556885	0	-7.52916E-13
11.23533546	11.34680146	0	-2.40798E-14
9.4062371	9.4062371	0	-5.05259E-14
9.31507989	9.31507989	0	-5.97125E-14
29.39986178	29.39986178	0	0
29.94767925	30.04061917	-2.05574E-10	-8.76244E-14
29.57838525	29.95014527	2.05574E-10	-9.13679E-14
25.28022173	25.28022173	0	0
29.51891201	29.89067226	0	-1.09946E-13
29.75775482	29.85069492	0	-1.30189E-13
29.68638889	29.69843391	0	-1.28802E-13
27.85873118	27.92247732	0	-1.73544E-13
11.40678948	11.42601983	0	-7.57181E-14
10.57133251	10.66732967	0	-1.97924E-13
35.75428256	35.75428256	1.84892E-14	-1.38464E-16
19.1555081	19.1555081	0	0
48.06708301	48.31013475	0	-3.86908E-13
36.14993942	36.24591632	0	-2.0944E-13
36.10058694	36.19656428	0	-2.42717E-13
36.01999435	36.02775974	0	-2.77512E-13
11.30109772	11.32896422	0	-3.18745E-14
35.99588127	36.02694289	-1.47864E-11	-3.14529E-13
35.98775181	36.01881346	1.47864E-11	-3.52791E-13
31.37068791	31.37068791	0	0
36.00958651	36.01735193	0	-3.92583E-13
25.28022173	25.28022173	0	0
28.40852251	28.40852251	0	-2.18955E-13
19.1555081	19.1555081	0	0
41.49255788	41.49255788	0	0
38.97835051	38.97835051	0	-1.55834E-13
35.72802448	35.80454909	0	-6.20898E-13
25.27916073	25.27916073	0	0
30.38564619	30.38564619	0	-4.5126E-13
27.82314358	28.04267411	0	-8.52144E-13
11.44092469	11.44869161	0	-1.06756E-13
35.75399225	35.75399225	0	0
48.71044274	48.95349722	0	-3.47262E-13
30.68775353	30.74852693	0	-6.71893E-13
11.50789323	11.50789323	0	0
12.18946497	12.20885281	0	-1.39189E-16
11.50789323	11.50789323	0	0

TABLE 232 CONTINUED: NODE RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
9.455788809	9.455788809	0	-4.05043E-14
12.1863631	12.20575094	0	-6.95947E-16
11.50789323	11.50789323	0	0
12.18958453	12.20886856	0	-2.78379E-16
11.50789323	11.50789323	0	0
12.18649926	12.2057833	0	-8.35136E-16
29.40008037	29.40008037	0	0
29.40008037	29.40008037	0	0
25.11876145	25.18350781	0	-6.78693E-13
29.40008037	29.40008037	0	0
29.40008037	29.40008037	0	0

PIPING

TABLE 234: PIPING RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
Pipe - 0	False	False	0.040186498
Pipe - 1	False	False	0.000518294
Pipe - 10	False	False	0.032272893
Pipe - 102	False	False	-6.30079E-09
Pipe - 108	False	False	0
Pipe - 109	False	False	0
Pipe - 110	False	False	4.094676597
Pipe - 113	False	False	0.077042031
Pipe - 115	False	False	0.02583806
Pipe - 116	False	False	1.144648466
Pipe - 117	False	False	0.001606686
Pipe - 118	False	False	3.759331487
Pipe - 119	False	False	0.042157479
Pipe - 120	False	False	0.030164494
Pipe - 121	False	False	0.026635582
Pipe - 122	False	False	0.035003716
Pipe - 123	False	False	1.371413129
Pipe - 124	False	False	0.008313871
Pipe - 126	False	False	17.42992412
Pipe - 131	False	False	0.030133943
Pipe - 135	False	False	0.895578931
Pipe - 137	False	False	1.425165002
Pipe - 141	False	False	0.274277206
Pipe - 142	False	False	17.17440622
Pipe - 147	False	False	12.32539138
Pipe - 152	False	False	0.415976753
Pipe - 156	False	False	11.00581572
Pipe - 167	False	False	0.7846392
Pipe - 169	False	False	0.810580971
Pipe - 170	False	False	9.38749E-07
Pipe - 171	False	False	-2.21444E-11
Pipe - 172	False	False	-7.03876E-11
Pipe - 174	False	False	0.034318638
Pipe - 175	False	False	-7.03876E-11
Pipe - 177	False	False	0.030360739
Pipe - 178	False	False	0.171697974
Pipe - 179	False	False	0.03020676
Pipe - 180	False	False	0.060609171

TABLE 234 CONTINUED: PIPING RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
Pipe - 181	False	False	0.687967968
Pipe - 182	False	False	0.025053842
Pipe - 183	False	False	0.661074918
Pipe - 184	False	False	0.085706183
Pipe - 186	False	False	0.162441105
Pipe - 187	False	False	0.054683218
Pipe - 188	False	False	0.085706183
Pipe - 190	False	False	0.017217431
Pipe - 191	False	False	0.033848798
Pipe - 192	False	False	0.046887473
Pipe - 193	False	False	0.095415218
Pipe - 194	False	False	0.284141094
Pipe - 195	False	False	0.025053833
Pipe - 196	False	False	0.085706162
Pipe - 198	False	False	0.112243097
Pipe - 199	False	False	0.221064634
Pipe - 2	False	False	2.836431908
Pipe - 20	False	False	0.262315621
Pipe - 200	False	False	0.085706162
Pipe - 202	False	False	0.080418808
Pipe - 203	False	False	0.166151618
Pipe - 204	False	False	0.666720088
Pipe - 205	False	False	0.321181881
Pipe - 206	False	False	0.296637721
Pipe - 207	False	False	0.296638753
Pipe - 208	False	False	-1.50194E-11
Pipe - 217	False	False	0.925346798
Pipe - 218	False	False	0.064900177
Pipe - 222	False	False	0.393135716
Pipe - 223	False	False	0.213797608
Pipe - 226	False	False	0.672482797
Pipe - 233	False	False	1.224407091
Pipe - 234	False	False	0.314735395
Pipe - 235	False	False	8.365751788
Pipe - 237	False	False	0.052392468
Pipe - 238	False	False	0.035252356
Pipe - 239	False	False	0.080893393
Pipe - 240	False	False	0.103963787
Pipe - 241	False	False	0.323729069
Pipe - 250	False	False	1.266912201
Pipe - 251	False	False	0.357382976

TABLE 234 CONTINUED: PIPING RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
Pipe - 252	False	False	9.478860013
Pipe - 26	False	False	0.370488456
Pipe - 261	False	False	0.502787291
Pipe - 263	False	False	13.2640855
Pipe - 267	False	False	5.015167733
Pipe - 27	False	False	0.02757981
Pipe - 278	False	False	2.507612572
Pipe - 28	False	False	0.252749022
Pipe - 283	False	False	0.334349346
Pipe - 286	False	False	11.48240823
Pipe - 289	False	False	2.728029059
Pipe - 29	False	False	0.000459478
Pipe - 3	False	False	2.501607158
Pipe - 30	False	False	2.32831E-13
Pipe - 316	False	False	0.014396773
Pipe - 322	False	False	0.150549362
Pipe - 324	False	False	0.107913508
Pipe - 325	False	False	0.997291679
Pipe - 326	False	False	0.205373254
Pipe - 335	False	False	32.53382063
Pipe - 341	False	False	6.352156776
Pipe - 348	False	False	0.205751275
Pipe - 354	False	False	32.02060846
Pipe - 355	False	False	6.251485893
Pipe - 365	False	False	32.72695142
Pipe - 366	False	False	6.390042268
Pipe - 39	False	False	1.077087102
Pipe - 4	False	False	0
Pipe - 40	False	False	0.030135741
Pipe - 409	False	False	32.54717085
Pipe - 415	False	False	6.353745787
Pipe - 419	False	False	32.03399929
Pipe - 421	False	False	6.253081688
Pipe - 428	False	False	32.74028624
Pipe - 429	False	False	6.391628724
Pipe - 442	False	False	0.114946611
Pipe - 48	False	False	0.006940908
Pipe - 488	False	False	7.099245743
Pipe - 49	False	False	0.15402653
Pipe - 5	False	False	0.032375747
Pipe - 50	False	False	0.488490848

TABLE 234 CONTINUED: PIPING RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
Pipe - 502	False	False	-3.98124E-07
Pipe - 503	False	False	0.08247002
Pipe - 51	False	False	0.391741352
Pipe - 512	False	False	-2.876E-11
Pipe - 513	False	False	0.079649144
Pipe - 515	False	False	0.000240967
Pipe - 520	False	False	1.039019314
Pipe - 525	False	False	0.610111464
Pipe - 531	False	False	0.713578458
Pipe - 536	False	False	2.87619E-11
Pipe - 539	False	False	-1.28935E-06
Pipe - 541	False	False	0.885325098
Pipe - 584	False	False	0.080596015
Pipe - 6	False	False	0.000242832
Pipe - 61	False	False	0.276737541
Pipe - 67	False	False	0.390561802
Pipe - 68	False	False	0.029043328
Pipe - 682	False	False	0.114679325
Pipe - 69	False	False	0.033782741
Pipe - 70	False	False	78.34553691
Pipe - 71	False	False	-1.91089E-05
Pipe - 72	False	False	2.91038E-14
Pipe - 84	False	False	6.287839934
Pipe - 85	False	False	0.091452264
Pipe - 86	False	False	0.383142693
Pipe - 87	False	False	0.154269714
Pipe - 88	False	False	0.154269999
Pipe - 89	False	False	1.72423191
Pipe - 9	False	False	0.004966419
Pipe - 90	False	False	0.483304041
Pipe - 91	False	False	0.008312084
Pipe - 92	False	False	0.014546169
Pipe - 93	False	False	3.520850383
Pipe - 94	False	False	72.24257083
Pipe - 95	False	False	1.94559E-11

TABLE 235: PIPING RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	**Incondensable Mass Flow Rate (kg/s)**	**Element is choked**	**Mass Flux (kg/m^2.s)**
31.3637771	0	False	2225.67603
24.91302508	0	False	184.6929
25.81318581	0	False	223.706630
24.96005204	0	False	0
24.96851259	0	False	0
24.96863094	0	False	0
24.91250534	0	False	2182.86309
24.9129722	0	False	1512.85080
24.91299794	0	False	857.726959
24.97400939	0	False	1962.30435
24.91302485	0	False	184.6929
31.90047358	0	False	2968.16426
31.93941357	0	False	1518.57951
31.93926358	0	False	1277.23203
31.93882847	0	False	1197.4361
31.93855713	0	False	1379.48695
29.15961344	0	False	1662.2362
24.91296297	0	False	778.197499
29.20595251	0	False	2176.88922
25.06714238	0	False	2176.88922
31.90192048	0	False	2877.36505
31.90144554	0	False	2269.98039
24.91343612	0	False	1507.52766
25.06929648	0	False	2176.88922
31.93116664	0	False	5372.73466
31.93626845	0	False	1379.48695
31.9374088	0	False	1379.48695
30.05585353	0	False	587.622008
24.96323987	0	False	587.622008
28.32274293	0	False	0
24.97463647	0	False	0
24.98274775	0	False	0
24.91168353	0	False	545.71577
24.98274775	0	False	0
24.91116814	0	False	614.754245
24.91150185	0	False	614.754245
24.91116814	0	False	613.106246
24.91148951	0	False	613.106246
31.67386859	0	False	1571.6617
31.67371093	0	False	989.960783

TABLE 235 CONTINUED: PIPING RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	**Incondensable Mass Flow Rate (kg/s)**	**Element is choked**	**Mass Flux (kg/m^2.s)**
24.97265048	0	False	2680.04917
31.67265533	0	False	889.351369
24.91174665	0	False	1091.43154
24.91169188	0	False	747.986512
31.67265533	0	False	889.351369
24.9111651	0	False	455.109162
24.91147596	0	False	455.109162
24.91116461	0	False	772.751329
24.91149257	0	False	772.751329
31.67364591	0	False	3143.32285
31.67412618	0	False	989.960392
31.67307057	0	False	889.351017
24.91204027	0	False	2182.86309
24.91184498	0	False	1546.7991
24.96327422	0	False	2065.85862
24.91318939	0	False	1474.02864
31.67307057	0	False	889.351017
24.91116043	0	False	1024.57701
24.91150469	0	False	1024.57701
24.91121549	0	False	1431.14396
24.91165976	0	False	1431.14396
31.67452696	0	False	1571.66111
31.6741117	0	False	1571.6617
24.97238493	0	False	0
24.97374936	0	False	2877.36505
24.97386561	0	False	2101.78567
24.97401862	0	False	1716.13555
24.97467084	0	False	1976.98854
24.97393234	0	False	2594.79712
24.9740703	0	False	1899.00064
31.93686688	0	False	1197.4361
31.93783868	0	False	1197.4361
32.00938442	0	False	1769.90098
32.09789106	0	False	2675.21098
32.09794068	0	False	2166.92089
32.11262906	0	False	1955.21361
31.90909744	0	False	2027.06360
31.93621331	0	False	2795.81155
31.93714847	0	False	1277.23203
31.93819914	0	False	1277.23203
24.97151971	0	False	2620.49536

TABLE 235 CONTINUED: PIPING RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	**Incondensable Mass Flow Rate (kg/s)**	**Element is choked**	**Mass Flux (kg/m².s)**
31.93644296	0	False	1518.57951
31.93792856	0	False	1518.57951
31.92229105	0	False	5372.73466
24.97193409	0	False	943.378331
31.92919215	0	False	5372.73466
24.97476765	0	False	2154.38716
31.90206874	0	False	2877.36505
31.67188915	0	False	3143.32285
29.16015299	0	False	1662.2362
24.91303255	0	False	109.434023
24.97285606	0	False	2877.36505
25.01459303	0	False	7.44792E-
24.97311237	0	False	964.817704
24.9727069	0	False	1908.19603
24.97256952	0	False	2877.36505
24.97338924	0	False	2877.36505
25.81469002	0	False	669.991960
25.80956833	0	False	2219.1742
25.8052178	0	False	2219.1742
24.9638758	0	False	669.991960
25.81623111	0	False	2201.292
25.81194938	0	False	2201.292
25.80710163	0	False	2225.86713
25.80272521	0	False	2225.86713
31.93607726	0	False	2576.92310
24.97092115	0	False	0
25.1106276	0	False	2176.88922
24.96752094	0	False	2219.1742
24.97188495	0	False	2219.1742
24.96758861	0	False	2201.292
24.97188373	0	False	2201.292
24.96749443	0	False	2225.86713
24.97188436	0	False	2225.86713
24.96397077	0	False	445.610642
24.91594339	0	False	1224.50018
29.1585861	0	False	2955.0867
24.91606695	0	False	3134.72047
24.96398895	0	False	223.706630
25.06638445	0	False	4898.00074
24.98004657	0	False	2.11842E-
29.01802692	0	False	778.197499

TABLE 235 CONTINUED: PIPING RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	**Incondensable Mass Flow Rate (kg/s)**	**Element is choked**	**Mass Flux (kg/m².s)**
25.06732697	0	False	2176.88922
24.98486773	0	False	0
30.0548283	0	False	587.622008
30.0547818	0	False	587.622008
24.9639008	0	False	778.197499
30.05363701	0	False	1032.92931
24.96278516	0	False	2065.85862
24.98633878	0	False	0
24.97698211	0	False	2.11896E-
24.97043375	0	False	1032.92931
24.9626033	0	False	587.622008
24.96265781	0	False	587.622008
24.91305456	0	False	1514.3265
24.97115817	0	False	2692.13615
24.97159546	0	False	969.169017
25.81658093	0	False	445.610642
32.27000528	0	False	2036.94749
25.03809088	0	False	7.44792E-
24.99517781	0	False	0
25.01457886	0	False	7.4516E-
25.07175251	0	False	2176.88922
24.91302392	0	False	778.197499
24.91302675	0	False	1224.50018
24.91320512	0	False	2735.85058
24.91455325	0	False	2735.85058
30.05440298	0	False	2065.85862
24.91302708	0	False	415.5590
24.96362121	0	False	2735.85058
24.96402542	0	False	778.197499
24.96399034	0	False	778.197499
30.05401229	0	False	2065.85862
24.97132346	0	False	7.15202E-
25.00035812	0	False	0

TABLE 236: PIPING RESULTS - C

Flow Element Results	
Flow and Geometry variables	
Total mass flow (kg/s)	**Total volume flow (m^3/s)**
157.3237684	0.158070672
52.22069286	0.052379965
1.12447217	0.00112811
0	-5.29465E-11
0	0
0	0
617.19	0.619072399
427.7484867	0.429053316
242.5165844	0.243256284
138.7071214	0.139121744
52.22069286	0.052379964
582.7976915	0.58567733
5.039113412	0.005064018
4.238248318	0.004259193
3.973461047	0.003993086
4.577561551	0.004600191
52.22069286	0.052436545
13.75188495	0.01379392
38.46880791	0.038627847
38.46880791	0.038581059
564.9693071	0.567762644
17.82838433	0.017916379
189.4415133	0.190020372
38.46880791	0.038581574
17.82838433	0.01791621
4.577561551	0.00460015
4.577561551	0.004600172
10.38413803	0.010429689
10.38413803	0.010415171
0	1.1225E-09
0	-3.14949E-13
0	-1.90948E-13
154.2975	0.154767552
0	-1.90948E-13
77.25229682	0.077488509
77.25229682	0.077487913
77.04520318	0.077280782
77.04520318	0.077280186
308.595061	0.310092243
308.595061	0.310095626
189.4415133	0.19000728

TABLE 236 CONTINUED: PIPING RESULTS - C

Flow Element Results	
Flow and Geometry variables	
Total mass flow (kg/s)	**Total volume flow (m^3/s)**
154.2975305	0.15505076
308.595	0.309535257
211.488204	0.212132512
555471.1098	0.15505076
57.190704	0.057365576
57.190704	0.057365138
97.106796	0.097403729
97.106796	0.097402989
617.19	0.620185109
308.594939	0.310095793
154.2974695	0.155050869
617.19	0.619071669
437.3471448	0.438679986
10.38413803	0.010415347
185.2319023	0.185797779
154.2974695	0.155050869
128.7521448	0.129145867
128.7521448	0.129144908
179.8428552	0.180392879
179.8428552	0.180391591
308.594939	0.310093607
308.595061	0.31009345
0	-1.47504E-13
564.9693071	0.566655323
412.6846521	0.413915921
272.9395668	0.273754233
139.7450853	0.14016296
412.6846521	0.413916228
134.2324454	0.134633538
3.973461047	0.003993074
3.973461047	0.003993082
281.4905894	0.282891386
425.473923	0.427605261
425.473923	0.42760506
138.2059065	0.138898436
143.2846829	0.143992526
9.277361729	0.009323147
4.238248318	0.004259171
4.238248318	0.004259184
185.2319023	0.185785054
5.039113412	0.005063982

TABLE 236 CONTINUED: PIPING RESULTS - C

Flow Element Results	
Flow and Geometry variables	
Total mass flow (kg/s)	**Total volume flow (m^3/s)**
5.039113412	0.005064003
17.82838433	0.017915831
185.2319023	0.185784953
17.82838433	0.017916088
152.284655	0.15274009
564.9693071	0.567762833
617.19	0.62018818
52.22069286	0.052436509
13.75188495	0.013793828
564.9693071	0.566658315
3.74374E-11	3.75902E-14
189.4415133	0.190007184
374.6734156	0.375792556
564.9693071	0.566657931
564.9693071	0.566656935
3.367746916	0.003378645
1.12447217	0.001128102
1.12447217	0.001128091
3.367746916	0.003377755
1.115411221	0.001119014
1.115411221	0.001119002
1.127863524	0.001131504
1.127863524	0.001131492
8.551022598	0.008593219
0	0
38.46880791	0.038585133
1.12447217	0.001127825
1.12447217	0.001127836
1.115411221	0.001118737
1.115411221	0.001118748
1.127863524	0.001131226
1.127863524	0.001131238
2.239883391	0.00224654
38.46880791	0.038586678
52.22069286	0.0524365
38.46880791	0.038586767
1.12447217	0.001127814
38.46880791	0.038581174
3.74356E-11	-7.05599E-08
13.75188495	0.013808157
38.46880791	0.038581075

TABLE 236 CONTINUED: PIPING RESULTS - C

Flow Element Results	
Flow and Geometry variables	
Total mass flow (kg/s)	Total volume flow (m^3/s)
0	-9.84823E-15
10.38413803	0.010429887
10.38413803	0.010429816
13.75188495	0.013792677
10.38413803	0.010429717
10.38413803	0.01041536
0	9.84823E-15
3.74452E-11	-2.28503E-07
10.38413803	0.01041544
10.38413803	0.010415346
10.38413803	0.010415102
190.2958916	0.190877181
190.2958916	0.190864365
190.2958916	0.190864256
2.239883391	0.002247132
143.9833336	0.144713113
3.74374E-11	3.75514E-14
0	-1.85451E-17
3.74558E-11	3.75655E-14
38.46880791	0.038581929
13.75188495	0.013793877
38.46880791	0.038586289
13.75188495	0.013793951
13.75188495	0.013793993
10.38413803	0.010429873
52.22069286	0.052379967
13.75188495	0.013792553
13.75188495	0.013792571
13.75188495	0.01379259
10.38413803	0.010429819
3.595E-11	3.60588E-14
0	6.52617E-15

TABLE 237: PIPING RESULTS - D

Flow Element Results	
Flow and Geometry variables	
Volume flow based on ambient conditions (m^3/s)	Abs val of maximum velocity (m/s)
0.157808135	2.23624255
0.052381469	0.185256229
0.001127934	0.224430387
0	0
0	0
0	0
0.619090197	2.189520719
0.429065433	1.51746569
0.243263241	0.860343112
0.13913417	1.968170068
0.052381469	0.185256229
0.584592002	2.982830149
0.005054628	1.526084866
0.004251297	1.283543926
0.003985694	1.203350302
0.004591655	1.386306392
0.052381469	1.669107077
0.013794224	0.780576213
0.038587245	2.185888993
0.038587245	2.18324133
0.566708728	2.891591399
0.017883274	2.281184272
0.190024764	1.512134119
0.038587245	2.183270497
0.017883274	5.399201547
0.004591655	1.38629424
0.004591655	1.386300925
0.010416109	0.59019967
0.010416109	0.589378125
0	0
0	0
0	0
0.154772549	0.547378243
0	0
0.07749014	0.616633961
0.07749014	0.616629223
0.077282409	0.614980923
0.077282409	0.614976178
0.309545159	1.579286833
0.309545159	0.994774536
0.190024764	2.688053139

TABLE 237 CONTINUED: PIPING RESULTS - D

Flow Element Results	
Flow and Geometry variables	
Volume flow based on ambient conditions (m^3/s)	Abs val of maximum velocity (m/s)
0.154772579	0.893692886
0.309545098	1.094757028
0.212139331	0.750265286
0.154772579	0.893692886
0.057366782	0.456500751
0.057366782	0.45649726
0.097405767	0.775114247
0.097405767	0.775108362
0.619090197	3.158576825
0.309545038	0.994775072
0.154772519	0.893693518
0.619090197	2.189518139
0.438693644	1.551513076
0.010416109	2.072067394
0.185802192	1.478531773
0.154772519	0.893693518
0.129148545	1.027710158
0.129148545	1.027702524
0.180396553	1.435520919
0.180396553	1.435510682
0.309545038	1.579293824
0.309545159	1.579292972
0	0
0.566708728	2.885951862
0.41395522	2.108056473
0.273779889	1.721257849
0.140175331	1.982900306
0.41395522	2.602540791
0.134645719	1.904674935
0.003985694	1.203346578
0.003985694	1.203348955
0.282357239	1.77870867
0.426783867	2.688611989
0.426783867	2.177774715
0.138631413	1.965010958
0.143725825	2.037077533
0.009305925	2.809609502
0.004251297	1.283537206
0.004251297	1.283541121
0.185802192	2.628320855
0.005054628	1.526073921

TABLE 237 CONTINUED: PIPING RESULTS - D

Flow Element Results	
Flow and Geometry variables	
Volume flow based on ambient conditions (m^3/s)	Abs val of maximum velocity (m/s)
0.005054628	1.526080079
0.017883274	5.39908752
0.185802192	0.946195006
0.017883274	5.399164934
0.152753507	2.160830297
0.566708728	2.891592369
0.619090197	3.158592464
0.052381469	1.669105912
0.013794224	0.109767796
0.566708728	2.885967102
3.75526E-14	7.47041E-12
0.190024764	0.967698659
0.375826956	1.913895789
0.566708728	2.885965143
0.566708728	2.885960074
0.003378115	0.672160014
0.001127934	2.226337782
0.001127934	2.226315152
0.003378115	0.671983037
0.001118845	2.208401491
0.001118845	2.208379401
0.001131336	2.23305102
0.001131336	2.233028186
0.008577349	2.589639288
0	0
0.038587245	2.183471893
0.001127934	2.22579078
0.001127934	2.225813789
0.001118845	2.207855764
0.001118845	2.207878227
0.001131336	2.232503536
0.001131336	2.232526752
0.00224678	0.446934974
0.038587245	1.228252097
0.052381469	2.96729889
0.038587245	3.144332621
0.001127934	0.224371476
0.038587245	4.912307636
3.75531E-14	2.12488E-12
0.013794224	0.781381852

TABLE 237 CONTINUED: PIPING RESULTS - D

Flow Element Results	
Flow and Geometry variables	
Volume flow based on ambient conditions (m^3/s)	Abs val of maximum velocity (m/s)
0.038587245	2.18324226
0	0
0.010416109	0.590210855
0.010416109	0.590210784
0.013794224	0.780505861
0.010416109	1.037463093
0.010416109	2.072070104
0	0
3.75618E-14	2.12534E-12
0.010416109	1.036042941
0.010416109	0.589387991
0.010416109	0.589388067
0.190881772	1.51895236
0.190881772	2.700178412
0.190881772	0.972063684
0.00224678	0.447052772
0.144426628	2.047271666
3.75526E-14	7.4706E-12
0	0
3.75712E-14	7.4741E-12
0.038587245	2.183290568
0.013794224	0.780573739
0.038587245	1.228239725
0.013794224	2.744219356
0.013794224	2.744227813
0.010416109	2.074957206
0.052381469	0.416826533
0.013794224	2.743941191
0.013794224	0.780499863
0.013794224	0.780500921
0.010416109	2.074946627
3.60607E-14	7.17367E-12
0	0

TABLE 238: PIPING RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Maximum velocity (m/s)	**Mean pressure (kPa)**	**Node pressure drop (kPa)**	**Pressure ratio (up/down)**
2.23624255	233.6254917	4.760685304	1.020587179
0.185256229	112.5167289	0.000518294	1.000004606
0.224430387	223.5207784	0.104486701	1.000467568
0	105.1764156	14.6811448	1.150058959
0	272.7734012	0	1
0	272.7734012	0	1
2.189520719	114.665592	4.094676597	1.036358907
1.51746569	112.6197277	-0.002948081	0.999973823
0.860343112	112.6089174	0.024568742	1.000218201
1.968170068	273.2504854	12.87677883	1.048261601
0.185256229	112.5568105	0.079645015	1.000707849
2.982830149	229.3654833	3.759331487	1.016525564
1.526084866	256.4447851	0.037716706	1.000147086
1.283543926	257.1806954	0.02590282	1.000100723
1.203350302	263.5707732	0.022577317	1.000085663
1.386306392	252.817922	0.031302768	1.000123823
1.669107077	215.3611303	1.371413129	1.00638831
0.780576213	99.29955256	0.008313871	1.000083729
2.185888993	243.184065	39.71357417	1.177826795
2.18324133	485.4307233	0.030133943	1.000062079
2.891591399	222.6781434	0.895578931	1.004029958
2.281184272	241.4099929	-27.84835054	0.89093371
1.512134119	103.8777237	17.48105999	1.183745802
2.183270497	457.1027525	51.3950926	1.11913415
5.399201547	301.8964166	22.08332237	1.075925602
1.38629424	272.1767654	2.401859499	1.008863741
1.386300925	261.416813	16.86049655	1.066645818
0.59019967	184.8409052	-76.52965433	0.656980332
0.589378125	266.9232561	73.50801435	1.319365053
0	246.650895	-0.990356258	0.99599283
0	221.6790074	21.60421938	1.102449437
0	178.9679421	63.81791125	1.433961316
0.547378243	118.9933296	0.137352253	1.001154952
0	178.9679421	63.81791125	1.433961316
0.616633961	95.93566136	-17.51134383	0.832733587
0.616629223	111.8615064	-14.40099865	0.879046228
0.614980923	95.93573835	-17.51149781	0.832732362
0.614976178	111.8616646	-14.40068228	0.879048886
1.579286833	247.3014204	2.291407144	1.009308771
0.994774536	220.4264058	21.58949407	1.102987756
2.688053139	279.9647853	0.661074918	1.00236407

TABLE 238 CONTINUED: PIPING RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Maximum velocity (m/s)	**Mean pressure (kPa)**	**Node pressure drop (kPa)**	**Pressure ratio (up/down)**
0.893692886	177.7384849	63.78634769	1.437356177
1.094757028	118.3015999	0.637105472	1.005399975
0.750265286	118.7724031	0.304500848	1.002567025
0.893692886	177.7384849	63.78634769	1.437356177
0.456500751	95.77420686	-17.18843465	0.835310011
0.45649726	111.6382286	-14.57284988	0.87746149
0.775114247	95.75937103	-17.158763	0.835547555
0.775108362	111.4554939	-14.3293176	0.879199973
3.158576825	248.5891946	0.284141094	1.001143668
0.994775072	218.4982627	21.58947391	1.103943705
0.893693518	175.810387	63.78627744	1.44321496
2.189518139	116.7690519	0.112243097	1.000961702
1.551513076	117.4041103	1.157873801	1.009911167
2.072067394	232.2323775	-6.940185254	0.970555314
1.478531773	104.4422619	16.35787982	1.169928478
0.893693518	175.810387	63.78627744	1.44321496
1.027710158	95.55987249	-16.75976515	0.838755006
1.027702524	110.9192826	-14.12752927	0.880257973
1.435520919	95.26671874	-16.17345767	0.843513129
1.435510682	110.0071333	-13.63608019	0.883277895
1.579293824	238.8700618	19.1541244	1.083535583
1.579292972	238.6884348	14.93456404	1.064589956
0	239.8135951	14.66495601	1.063080203
2.885951862	285.9786295	0.925346798	1.003240964
2.108056473	285.5559968	-0.080081313	0.999719599
1.721257849	282.2849039	5.19205823	1.018563692
1.982900306	273.1506328	23.46060046	1.08974283
2.602540791	285.2171744	0.672482797	1.002360575
1.904674935	275.654796	8.068157677	1.029703764
1.203346578	270.8264664	5.102457526	1.019019487
1.203348955	265.4407583	3.486843287	1.013222899
1.77870867	233.8777877	1.648684794	1.007074278
2.688611989	233.0358191	0.035252356	1.000151286
2.177774715	232.1176551	1.745011978	1.007546156
1.965010958	239.198449	8.992637742	1.038315109
2.037077533	236.7067268	1.299508605	1.005505063
2.809609502	281.7184732	18.27256446	1.067035063
1.283537206	269.7585005	5.647380914	1.021156405
1.283541121	261.5763375	8.503080028	1.033044153
2.628320855	279.6587994	0.370488456	1.001325666
1.526073921	271.3403595	2.483662878	1.009195396

TABLE 238 CONTINUED: PIPING RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Maximum velocity (m/s)	**Mean pressure (kPa)**	**Node pressure drop (kPa)**	**Pressure ratio (up/down)**
1.526080079	262.7931944	12.28830507	1.047879801
5.39908752	343.1091215	14.77330481	1.044004516
0.946195006	277.6531817	0.819629082	1.002956352
5.399164934	316.5125481	2.507612572	1.007954141
2.160830297	273.2209819	24.58994833	1.094241078
2.891592369	221.6680855	0.977582554	1.004419865
3.158592464	234.9552796	-27.55197091	0.889229965
1.669105912	217.927359	-6.503870471	0.970594578
0.109767796	112.4915016	0.015658615	1.000139208
2.885967102	274.0242048	2.501607158	1.009171008
7.47041E-12	229.9847542	2.32831E-13	1
0.967698659	277.701107	0.915479652	1.00330208
1.913895789	276.3131445	1.860445263	1.006755848
2.885965143	275.3289651	0.107913508	1.000392021
2.885960074	279.6073521	-13.6679017	0.952283761
0.672160014	223.1428694	0.074274125	1.00033291
2.226337782	239.839932	32.53382063	1.14551765
2.226315152	259.7040773	6.352156776	1.024762041
0.671983037	303.460801	0.432924581	1.001427643
2.208401491	239.8762694	32.81546881	1.146846037
2.208379401	259.8241441	6.251485893	1.024353427
2.23305102	239.6124788	32.86494459	1.147257566
2.233028186	259.6636727	6.390042268	1.024915491
2.589639288	282.1162253	17.47706024	1.063930088
0	272.7734012	0	1
2.183471893	277.6516435	1.007779454	1.003636253
2.22579078	286.5627282	32.54717085	1.120416124
2.225813789	266.6912097	6.353745787	1.024111575
2.207855764	286.5560901	32.6296343	1.120742601
2.207878227	266.7004302	6.253081688	1.023724208
2.232503536	286.7781385	32.93240024	1.121831098
2.232526752	266.6925202	6.391628724	1.024256959
0.446934974	303.057623	0.37343143	1.001232972
1.228252097	85.11617829	0.006940908	1.00008155
2.96729889	219.777655	7.099245743	1.032832217
3.144332621	84.19210598	0.15402653	1.00183114
0.224371476	302.8536105	0.034593563	1.000114232
4.912307636	488.0314392	0.488490848	1.001001443
2.12488E-12	146.7034158	0.095372956	1.000650319
0.781381852	223.2165051	-0.221545569	0.999007978
2.18324226	484.5953888	0.391741352	1.000808715

TABLE 238 CONTINUED: PIPING RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Maximum velocity (m/s)	**Mean pressure (kPa)**	**Node pressure drop (kPa)**	**Pressure ratio (up/down)**
0	249.1956171	14.37167136	1.059384671
0.590210855	146.6159037	0.079651355	1.000543413
0.590210784	146.7434209	0.175383157	1.001195883
0.780505861	315.5869762	23.81942595	1.078436646
1.037463093	178.8321673	14.96193775	1.08731738
2.072070104	229.1190741	0.713578458	1.003119301
0	249.1956199	-14.37166573	0.943944207
2.12534E-12	230.0367003	0.10389218	1.000451735
1.036042941	215.428083	-13.4861739	0.939298272
0.589387991	230.1289476	0.080602551	1.000350311
0.589388067	229.9846279	0.208036888	1.000904978
1.51895236	104.7287219	15.73582232	1.16245809
2.700178412	277.3744937	0.390561802	1.001409059
0.972063684	275.5366972	0.307550688	1.001116811
0.447052772	223.3242707	0.288528537	1.001292806
2.047271666	235.4493363	4.791782077	1.020560872
7.4706E-12	188.3679282	83.23365184	1.56717565
0	234.8730225	9.776536622	1.042509499
7.4741E-12	229.9847542	2.91038E-14	1
2.183290568	438.185194	-13.5599757	0.96952576
0.780573739	105.7616871	12.50716068	1.125689867
1.228239725	105.5995935	13.79947492	1.139812513
2.744219356	97.90129727	0.154269714	1.00157701
2.744227813	91.79189513	0.154269999	1.001682063
2.074957206	151.0765519	6.605732499	1.044701683
0.416826533	112.5018141	0.004966419	1.000044146
2.743941191	338.8374953	5.078534772	1.015101283
0.780499863	332.6879407	1.963726823	1.005920081
0.780500921	329.6637515	1.969958257	1.005993567
2.074946627	161.0213688	13.28390134	1.086047101
7.17367E-12	191.5708515	74.38286669	1.481818545
0	234.8730253	-9.776542252	0.959223851

TABLE 239: PIPING RESULTS - F

Flow Element Results				
Flow and Geometry variables				
Pressure ratio (down/up)	Total temperature (°C)	Quality	Total volume (m^3)	Total mass (kg)
0.979828103	31.3640325	0	0.02120575	21.1055507
0.999995394	24.91302541	0	0.282743339	281.8836006
0.999532651	25.81319424	0	0.018095574	18.03721798
0.869520638	24.96004932	0	0.188495559	187.9193604
1	24.96851259	0	0.141371669	140.9506424
1	24.96863094	0	0.569413668	567.7178472
0.964916684	24.91255029	0	14.56128195	14517.00581
1.000026178	24.91300263	0	0.791681349	789.2737019
0.999781846	24.91300502	0	0.791681349	789.2739849
0.953960347	24.97404863	0	0.120165919	119.8077901
0.999292652	24.91301654	0	0.87650435	873.8391625
0.98374309	31.90058474	0	3.514656781	3497.376034
0.999852935	31.93944219	0	0.000331831	0.330198767
0.999899287	31.93928371	0	0.000331831	0.330198931
0.999914344	31.93884612	0	0.000331831	0.330199863
0.999876192	31.93858074	0	0.000331831	0.330198402
0.993652242	29.15964615	0	0.345575192	344.1526486
0.999916278	24.91296881	0	0.003534292	3.5235214
0.849021269	29.20616932	0	0.848230016	844.7376724
0.999937925	25.06718749	0	0.001767146	1.762004383
0.995986218	31.90202495	0	1.472621556	1465.376403
1.122417964	31.90151055	0	0.023561945	23.44622205
0.844775963	24.91317541	0	0.188495559	187.9213401
0.893547927	25.06934167	0	0.889351501	886.7520989
0.929432294	31.93153081	0	0.003318307	3.302040898
0.991214135	31.93628876	0	0.001659154	1.651006482
0.937518324	31.93743281	0	0.092912603	92.45591714
1.522115582	30.05587186	0	0.413512133	411.7061434
0.757940342	24.96320251	0	0.4276493	426.3750721
1.004023292	28.32296735	0	3.236743641	3224.183761
0.907071079	24.97463647	0	0.688848869	686.7800483
0.697368882	24.9827554	0	1.132537099	1129.110105
0.99884638	24.91169773	0	2.484861559	2477.314666
0.697368882	24.9827554	0	1.132537099	1129.110105
1.200864257	24.91117092	0	0.477522083	476.0664288
1.137596599	24.91151555	0	1.344124134	1340.03707
1.200866024	24.91117091	0	0.477522083	476.0664291
1.137593161	24.91151551	0	0.376991118	375.8448176
0.990777083	31.6740478	0	3.688347585	3670.539551
0.906628378	31.67372329	0	0.688848869	685.5155026
0.997641506	24.97272367	0	0.000268606	0.267806369

TABLE 239 CONTINUED: PIPING RESULTS - F

Flow Element Results				
Flow and Geometry variables				
Pressure ratio (down/up)	Total temperature (°C)	Quality	Total volume (m^3)	Total mass (kg)
0.695721781	31.6726653	0	1.132537099	1127.035288
0.994629028	24.91181036	0	3.135171238	3125.64771
0.997439548	24.91172477	0	2.176049284	2169.439992
0.695721781	31.6726653	0	1.132537099	1127.035288
1.19716032	24.91116631	0	0.477522083	476.0664131
1.139651155	24.91148429	0	0.376991118	375.8447791
1.196819971	24.91116959	0	0.477522083	476.0663685
1.137397669	24.91152469	0	0.376991118	375.8447233
0.998857638	31.67377046	0	0.392699082	390.8025888
0.905843292	31.67413854	0	0.688848869	685.5148618
0.692897474	31.67308054	0	1.132537099	1127.034046
0.999039222	24.91208521	0	0.565486678	563.7678803
0.9901861	24.91197111	0	2.176049284	2169.437788
1.030337978	24.96331768	0	0.011058406	11.02527057
0.854753105	24.91305084	0	0.188495559	187.9214627
0.692897474	31.67308054	0	1.132537099	1127.034046
1.192243256	24.91116986	0	0.477522083	476.0662785
1.136030608	24.91155557	0	0.376991118	375.8445905
1.185518003	24.91123468	0	0.477522083	476.0661031
1.132146526	24.91175725	0	0.376991118	375.8443404
0.922904624	31.67410373	0	0.392699082	390.8011725
0.939328795	31.67414284	0	0.392699082	390.8015378
0.9406628	24.97238493	0	0.392699082	391.5232005
0.996769506	24.97383373	0	0.373064128	371.9541194
1.000280479	24.97392654	0	0.196349541	195.7654633
0.981774638	24.97405847	0	0.454863346	453.5097177
0.917647699	24.97430514	0	0.141371669	140.9501879
0.997644984	24.97400095	0	0.076499745	76.27212543
0.971153098	24.97410705	0	0.049480084	49.33267619
0.981335502	31.93657957	0	0.001659154	1.651004424
0.986949664	31.93785677	0	0.092912603	92.45606512
0.992975416	32.00959585	0	0.159043128	158.2555897
0.999848737	32.09798143	0	0.047712938	47.47512003
0.992510362	32.09817917	0	0.231888808	230.7330964
0.963098766	32.11289901	0	0.070685835	70.33340245
0.994525076	31.90914929	0	0.035342917	35.16917756
0.937176326	31.93458581	0	0.000663661	0.660402218
0.979281915	31.93680957	0	0.001659154	1.651003297
0.968012836	31.93821973	0	0.092912603	92.45590259
0.99867609	24.97158968	0	0.141371669	140.9507533
0.990888389	31.9364689	0	0.001659154	1.651005676

TABLE 239 CONTINUED: PIPING RESULTS - F

Flow Element Results				
Flow and Geometry variables				
Pressure ratio (down/up)	Total temperature (°C)	Quality	Total volume (m^3)	Total mass (kg)
0.954307926	31.93795766	0	0.092912603	92.45594481
0.957850263	31.92265514	0	0.003318307	3.302110637
0.997052362	24.97203013	0	0.392699082	391.530078
0.992108628	31.92955629	0	0.001659154	1.651031645
0.913875397	24.9742897	0	0.141371669	140.9501294
0.995599585	31.90224248	0	0.549778714	547.0736736
1.124568491	31.67201371	0	8.953539063	8910.254906
1.030296297	29.1600637	0	0.549778714	547.5159594
0.999860811	24.91303098	0	0.175929189	175.3942381
0.990912335	24.97294042	0	0.138840135	138.4263014
1	25.01459303	0	0.035185838	35.07992559
0.996708788	24.9732208	0	0.196349541	195.7649849
0.993289487	24.97293176	0	0.549778714	548.1414242
0.999608133	24.97265388	0	0.176714587	176.1879826
1.050107165	24.97347362	0	0.490873852	489.4119225
0.999667201	25.81471249	0	0.015079645	15.03100533
0.87296778	25.80962012	0	0.003546952	3.535539509
0.975836302	25.80526959	0	0.000506707	0.505082207
0.998574393	24.96385492	0	0.015079645	15.03496396
0.871956625	25.81636912	0	0.003546952	3.535533996
0.976225562	25.81200035	0	0.000506707	0.505081337
0.871643848	25.80716884	0	0.003546952	3.535541553
0.9756902	25.80277731	0	0.000506707	0.505082529
0.939911382	31.93450015	0	0.000663661	0.6604026
1	24.97092115	0	0.138840135	138.4265582
0.996376921	25.11067615	0	0.001767146	1.761818324
0.892525535	24.96756899	0	0.003546952	3.536408389
0.976456105	24.97193512	0	0.000506707	0.505195976
0.892265538	24.96757042	0	0.003546952	3.536407893
0.976825587	24.9719331	0	0.000506707	0.505195988
0.891399785	24.96752137	0	0.003546952	3.536408584
0.976317507	24.97193484	0	0.000506707	0.505195973
0.998768546	24.96394406	0	0.018095574	18.04195391
0.999918457	24.91595786	0	0.003141593	3.131996111
0.968211471	29.15868947	0	0.229728963	228.7834938
0.998172207	24.91616177	0	0.002454369	2.446866318
0.999885781	24.96398917	0	0.018095574	18.04195381
0.998999559	25.06661279	0	0.001570796	1.566221449
0.999350104	24.98005711	0	0.000176715	0.176177138
1.000993007	29.01796936	0	0.035342917	35.19888495
0.999191938	25.06737207	0	0.022972896	22.90604721

TABLE 239 CONTINUED: PIPING RESULTS - F

Flow Element Results				
Flow and Geometry variables				
Pressure ratio (down/up)	**Total temperature (°C)**	**Quality**	**Total volume (m^3)**	**Total mass (kg)**
0.943944185	24.98486768	0	0.007389026	7.366907962
0.999456882	30.05483247	0	0.058315814	58.0600225
0.998805545	30.05480491	0	0.000176715	0.175939483
0.927268193	24.96390655	0	0.441786467	440.4798745
0.919694671	30.05364992	0	0.014778052	14.71347079
0.996890399	24.96282861	0	0.006031858	6.013776087
1.059384647	24.98633878	0	0.007389026	7.366905076
0.999548469	24.9769707	0	0.000176715	0.176184425
1.06462455	24.97044463	0	0.020106193	20.04576764
0.999649812	24.96260681	0	0.058315814	58.14108202
0.99909584	24.96263851	0	0.000176715	0.176185074
0.860246067	24.91298763	0	0.188495559	187.9215207
0.998592924	24.97123201	0	0.141371669	140.9506059
0.998884435	24.97163561	0	0.392699082	391.5296799
0.998708863	25.81660205	0	0.018095574	18.03719988
0.97985336	32.27025487	0	0.02120575	21.09881205
0.638090568	25.03811119	0	0.035185838	35.07901668
0.959223874	24.99517775	0	0.010053096	10.02291027
1	25.01457886	0	0.005026548	5.01141796
1.03143211	25.07179761	0	0.250934713	250.1989796
0.888344143	24.91302954	0	0.038877209	38.75885822
0.877337271	24.91299484	0	0.078539816	78.30069152
0.998425473	24.91327736	0	0.000753982	0.751682892
0.998320762	24.91462548	0	0.000753982	0.751680576
0.957211055	30.05445457	0	0.006031858	6.005408499
0.999955856	24.9130287	0	0.163362818	162.8660734
0.985123373	24.96369188	0	0.002362478	2.355511826
0.99411476	24.96403114	0	0.003534292	3.523866077
0.994042142	24.96399606	0	0.006185011	6.166757275
0.920770379	30.05406389	0	0.011058406	11.00997171
0.67484646	24.97110714	0	0.005026548	5.011382394
1.042509523	25.00035807	0	0.007539822	7.517172339

TABLE 240: PIPING RESULTS - G

Flow Element Results		
Flow and Geometry variables	**Energy and Heat Transfer variables**	
Static pressure (kPa)	**Total heat transfer (kW)**	**Total power (kW)**
232.0332156	0	0
112.4996211	0	0
223.531782	0	0
105.1678618	0	0
272.7734012	0	0
272.7734012	0	0
112.27588	0	0
111.5118732	0	0
112.2405823	0	0
271.319411	0	0
112.5006836	0	0
224.9387184	0	0
255.2838241	0	0
256.3588729	0	0
262.8482765	0	0
251.8598758	0	0
213.9739051	0	0
98.99583133	0	0
241.5462786	0	0
483.0543861	0	0
218.5180614	0	0
238.8208711	0	0
101.4666361	0	0
454.7263835	0	0
287.392178	0	0
271.2034215	0	0
260.460621	0	0
184.7213317	0	0
266.5754668	0	0
247.1460736	0	0
221.6790074	0	0
178.9679421	0	0
118.89549	0	0
178.9679421	0	0
95.74612218	0	0
111.7177577	0	0
95.74721403	0	0
111.7746335	0	0
246.7479074	0	0
219.9340119	0	0
276.362728	0	0

TABLE 240 CONTINUED: PIPING RESULTS - G

Flow Element Results		
Flow and Geometry variables	**Energy and Heat Transfer variables**	
Static pressure (kPa)	**Total heat transfer (kW)**	**Total power (kW)**
177.3410814	0	0
117.9415059	0	0
118.6167178	0	0
177.3410814	0	0
95.67032802	0	0
111.5631379	0	0
95.45988575	0	0
111.2757801	0	0
243.6249812	0	0
218.0058687	0	0
175.4129834	0	0
114.3793427	0	0
116.6725754	0	0
230.0920783	0	0
102.6368813	0	0
175.4129834	0	0
95.03338838	0	0
110.578095	0	0
94.23950019	0	0
109.3334192	0	0
235.5192169	0	0
237.4473777	0	0
239.8135951	0	0
281.826661	0	0
283.4131461	0	0
280.8526913	0	0
269.3439104	0	0
281.8406417	0	0
273.8463065	0	0
268.6879237	0	0
264.7202916	0	0
233.1018647	0	0
229.439517	0	0
230.5901816	0	0
238.3067899	0	0
234.642084	0	0
269.7759699	0	0
267.2695971	0	0
260.7566476	0	0
276.2150481	0	0
270.1669738	0	0

TABLE 240 CONTINUED: PIPING RESULTS - G

Flow Element Results		
Flow and Geometry variables	**Energy and Heat Transfer variables**	
Static pressure (kPa)	**Total heat transfer (kW)**	**Total power (kW)**
261.6344575	0	0
328.6051892	0	0
277.6028964	0	0
302.0084078	0	0
268.5015104	0	0
217.8296187	0	0
229.9910417	0	0
215.976926	0	0
112.4778959	0	0
269.8722143	0	0
229.9847542	0	0
277.684822	0	0
275.3420483	0	0
271.1769775	0	0
275.4553717	0	0
222.9987645	0	0
237.3696163	0	0
257.2337867	0	0
303.1221027	0	0
237.8430311	0	0
257.3934999	0	0
237.1962379	0	0
257.1784607	0	0
271.0674805	0	0
272.7734012	0	0
275.2750553	0	0
284.0930195	0	0
264.2214754	0	0
283.8282047	0	0
264.2703377	0	0
284.1974534	0	0
264.2078662	0	0
302.8288011	0	0
84.36418083	0	0
215.3933423	0	0
79.26380405	0	0
302.8274049	0	0
476.001196	0	0
146.7511025	0	0
222.6139721	0	0
482.2190505	0	0

TABLE 240 CONTINUED: PIPING RESULTS - G

Flow Element Results		
Flow and Geometry variables	**Energy and Heat Transfer variables**	
Static pressure (kPa)	**Total heat transfer (kW)**	**Total power (kW)**
249.1956171	0	0
146.4424921	0	0
146.6575816	0	0
315.2832824	0	0
178.2963543	0	0
226.9787721	0	0
249.1956199	0	0
229.9847535	0	0
214.8930034	0	0
229.9557822	0	0
229.7075622	0	0
103.1811874	0	0
273.7398697	0	0
275.2049039	0	0
223.3115896	0	0
234.2797612	0	0
188.3679282	0	0
234.8730225	0	0
229.9847542	0	0
435.8088032	0	0
105.4579668	0	0
104.6405735	0	0
94.14741021	0	0
88.0379965	0	0
148.9332678	0	0
112.4152061	0	0
335.0839888	0	0
332.3842492	0	0
329.3600596	0	0
158.8780957	0	0
190.5007036	0	0
234.8730253	0	0

TABLE 241: PIPING RESULTS - H

Flow Element Results			
Non-dimensional variables			
Reynolds number	**Prandtl number**	**Total non-dimensional mass flow**	**Mach number**
860904.524	5.247945936	1163.255573	0
123059.1424	6.205271831	801.2694493	0
20273.23419	6.065867788	8.696373198	0
0	6.198115603	0	0
0	6.194913775	0	0
0	6.194895573	0	0
1454404.403	6.205354321	9129.632259	0
1007996.785	6.205290957	6557.430998	0
571494.9762	6.20527889	3717.708389	0
654631.2669	6.194085276	856.2923567	0
123059.1418	6.205271855	800.7026492	0
1932189.955	5.190410648	4401.805355	0
128603.2635	5.186051325	34.31957583	0
108164.0944	5.186060753	28.78323719	0
101405.7398	5.186067293	26.33093448	0
116822.1299	5.186164196	31.62368124	0
406964.07	5.560892134	420.2624745	0
129625.8548	6.2054349	239.0841409	0
400173.5454	5.553737841	254.2984122	0
363874.3035	6.177175454	136.8466977	0
1873130.296	5.190295428	4422.437387	0
295544.1132	5.190220422	136.8812242	0
669638.7839	6.20533128	2904.15908	0
363888.2982	6.177193886	137.5966804	0
454931.6119	5.186736243	99.50861417	0
116817.5013	5.186289879	29.24707527	0
116819.7938	5.186234086	29.62974186	0
110281.6946	5.427461254	123.3603012	0
97993.08512	6.195796887	59.04039045	0
0	5.685984488	0	0
0	6.194566276	0	0
0	6.193804087	0	0
363595.0563	6.205407189	2237.374939	0
0	6.193804087	0	0
273057.7689	6.205758025	1529.844063	0
273060.8152	6.205514994	1274.322414	0
272325.7711	6.205758009	1525.742943	0
272328.7387	6.20551626	1270.90244	0
1018908.189	5.214565793	2168.599905	0
808652.5498	5.214753381	2330.16128	0
894048.1459	6.194235606	1166.962206	0

TABLE 241 CONTINUED: PIPING RESULTS - H

Flow Element Results			
Non-dimensional variables			
Reynolds number	**Prandtl number**	**Total non-dimensional mass flow**	**Mach number**
541957.7902	5.215119181	1285.068551	0
727190.9753	6.205408085	4491.418491	0
498362.4176	6.205409005	3070.204719	0
541957.7902	5.215119181	1285.068551	0
202147.5766	6.205759585	1132.559969	0
202149.7298	6.205520699	946.1898933	0
343235.8838	6.205762694	1923.027034	0
343239.6732	6.205521339	1607.51973	0
2037807.038	5.214609554	4332.243867	0
808658.1402	5.214721109	2349.756567	0
541961.6632	5.215085317	1296.998345	0
1454390.236	6.205402512	9120.860327	0
1030591.872	6.205407063	6399.703865	0
183735.0778	6.196216252	78.37479476	0
654755.2537	6.205356242	2839.550948	0
541961.6632	5.215085317	1296.998345	0
455090.1423	6.205769486	2549.706759	0
455095.3322	6.205527233	2140.315195	0
635677.0717	6.205772455	3561.46722	0
635685.7265	6.205517208	3008.931759	0
1018918.658	5.214566648	2168.599048	0
1018911.614	5.214598916	2188.788676	0
0	6.194701648	0	0
1599827.08	6.194003044	3405.551788	0
1168605.233	6.193966711	2495.665391	0
858765.5323	6.193972962	1654.251889	0
659539.1018	6.194006525	846.9771313	0
1298451.518	6.19397474	2495.337968	0
633514.2813	6.194046514	828.668463	0
101402.1809	5.186241323	25.38734063	0
101403.9325	5.186161742	25.97586366	0
1038999.211	5.178694074	2095.126444	0
1572988.182	5.169240479	3189.655781	0
1415690.813	5.169228195	3190.522219	0
766633.2701	5.167609302	990.8714299	0
791861.2933	5.189426512	1054.364278	0
236754.209	5.1863046	55.71307603	0
108160.054	5.186219922	27.15816172	0
108162.0485	5.186147609	27.84824677	0
874159.6801	6.194411235	1142.868871	0
128596.5107	5.186277591	32.29000443	0

TABLE 241 CONTINUED: PIPING RESULTS - H

Flow Element Results			
Non-dimensional variables			
Reynolds number	**Prandtl number**	**Total non-dimensional mass flow**	**Mach number**
128599.8729	5.186171169	32.72762754	0
454860.1113	5.187427128	88.84449957	0
524500.7922	6.194331358	1150.189922	0
454915.9658	5.186857026	97.99647114	0
718722.0273	6.194001434	920.9248301	0
1873135.211	5.190283809	4441.729735	0
2037739.053	5.214884777	4871.877359	0
406969.5161	5.560794826	422.9474492	0
48609.90953	6.205270923	211.0407619	0
1599789.83	6.194279493	3543.688736	0
6.63155E-07	6.188324087	2.81083E-10	0
536434.5319	6.19414919	1175.926307	0
1060938.672	6.194238803	2333.400344	0
1599780.449	6.194308384	3542.299941	0
1599811.288	6.194132542	3576.191231	0
60719.51208	6.065643458	26.09120247	0
63847.81181	6.066267622	7.59156314	0
63841.98662	6.06671257	7.395942213	0
59590.45493	6.19527142	19.14777059	0
63342.74745	6.065242498	7.525269671	0
63337.05861	6.065680458	7.334483213	0
64036.84866	6.066647133	7.616267817	0
64030.97189	6.067094711	7.418822732	0
218217.8417	5.186311194	51.35121234	0
0	6.194543333	0	0
364198.2292	6.17303619	238.8465809	0
62672.10699	6.194934577	6.411090995	0
62677.70395	6.194494591	7.194384513	0
62167.18477	6.194927252	6.358704252	0
62172.649	6.19449421	7.137499901	0
62861.08867	6.19493744	6.421773224	0
62866.73585	6.19449484	7.215540899	0
39633.60038	6.195260445	12.75333662	0
271972.8046	6.205187045	780.2523657	0
542605.4738	5.561033903	406.5609105	0
435156.8893	6.20524155	788.1277128	0
19896.97254	6.195257667	6.410358646	0
545801.192	6.177378879	136.053434	0
3.53391E-07	6.194577278	4.4046E-10	0
142408.5087	5.581992637	107.1459493	0
363875.6821	6.177157399	137.0314916	0

TABLE 241 CONTINUED: PIPING RESULTS - H

Flow Element Results			
Non-dimensional variables			
Reynolds number	**Prandtl number**	**Total non-dimensional mass flow**	**Mach number**
0	6.192672533	0	0
110278.7601	5.427874362	123.2932985	0
110278.6347	5.427879817	123.1460225	0
129777.7081	6.195117032	72.501419	0
103383.4211	5.427834747	97.04971517	0
183732.9327	6.196327727	78.13105986	0
0	6.192446283	0	0
3.53465E-07	6.194108841	2.8099E-10	0
91881.49842	6.195291745	85.91617424	0
97990.59862	6.19632105	77.8956699	0
97990.70792	6.196315553	77.92295991	0
672653.4667	6.205370943	2917.816983	0
898050.2213	6.194495636	1183.732746	0
538835.5363	6.194411336	1191.802734	0
40386.16242	6.065350529	17.33086911	0
800983.0259	5.150795946	1057.953511	0
6.63488E-07	6.185187198	2.81083E-10	0
0	6.191253286	0	0
6.63482E-07	6.188326266	2.81222E-10	0
363905.7655	6.177049849	153.9899562	0
129626.2164	6.205350333	211.9527929	0
271957.2001	6.20535899	590.3544542	0
243049.3537	6.205467516	242.3181633	0
243056	6.205348067	258.4331997	0
206770.5274	5.427920694	117.1247697	0
184588.7185	6.205272463	801.3598376	0
243333.2198	6.194914922	69.55353839	0
129778.7556	6.194886182	71.16009925	0
129778.5333	6.194929011	71.81027101	0
206768.6108	5.42791112	107.844925	0
6.36197E-07	6.195433632	2.71334E-10	0
0	6.190456553	0	0

TABLE 242: PIPING RESULTS - I

Flow Element Results				
Non-dimensional variables	**Fluid variables**			
Friction factor	**Density (kg/m^3)**	**Conductivity (W/m.K)**	**Viscosity (kg/m.s)**	**Static enthalpy (kJ/kg)**
0.016148386	995.2748803	0.617708656	0.000775583	131.6390544
0.018177506	996.9592982	0.606846273	0.000900508	104.5619128
0.028569016	996.775139	0.60841161	0.000882766	108.4275505
64000000	996.9431701	0.606922675	0.000899584	104.751754
64000000	997.0218428	0.607011267	0.000899379	104.9415779
64000000	997.0218114	0.607011467	0.000899377	104.9420726
0.014090799	996.959324	0.606845307	0.000900518	104.559533
0.014382547	996.9588183	0.606845789	0.000900509	104.5607787
0.015005908	996.9591758	0.606846124	0.000900509	104.5615599
0.016368026	997.019713	0.607019814	0.000899272	104.9632218
0.018177506	996.9592988	0.606846273	0.000900508	104.5619128
0.01433597	995.0832334	0.618505751	0.000768083	133.8755239
0.023648401	995.0819593	0.618578728	0.000767536	134.0655648
0.023919871	995.0824521	0.618579031	0.000767538	134.0659055
0.024030404	995.0852617	0.618581566	0.000767544	134.0699276
0.023794722	995.0808586	0.61857577	0.000767549	134.0589041
0.017974576	995.8835492	0.614052255	0.000816896	122.4087344
0.020530021	996.9526185	0.606840722	0.000900512	104.5491717
0.018931139	995.8827865	0.614144215	0.000815979	122.6274219
0.019021254	997.0905146	0.607273644	0.00089738	105.5479711
0.014351943	995.0800982	0.618504757	0.000768063	133.8757919
0.018348113	995.0885695	0.618514017	0.000768068	133.8920797
0.015636932	996.9536727	0.606842553	0.000900502	104.5534322
0.019021216	997.077194	0.60726453	0.000897345	105.5308106
0.022475608	995.098	0.618582183	0.000767649	134.0599983
0.023794784	995.0895815	0.618581848	0.000767579	134.0667489
0.023794753	995.0847831	0.618578277	0.000767564	134.0618459
0.020877569	995.6325595	0.615551113	0.000799256	126.1290939
0.021155067	997.0203906	0.606999273	0.000899485	104.9138457
64000000	996.1195938	0.61265704	0.000833363	118.9402708
64000000	996.9966992	0.606996051	0.000899273	104.9202693
64000000	996.9740558	0.606990483	0.000899123	104.9148417
0.015687283	996.9628516	0.606846568	0.000900533	104.5622163
64000000	996.9740558	0.606990483	0.000899123	104.9148417
0.01686125	996.9516498	0.60683625	0.000900548	104.5386693
0.01686123	996.9593109	0.606843391	0.000900538	104.5548215
0.016866041	996.9516503	0.606836251	0.000900548	104.5386703
0.016866022	996.9593426	0.606843393	0.000900538	104.5548225
0.014755258	995.1718124	0.618178471	0.000771248	132.94817
0.014506053	995.1609617	0.618165009	0.000771252	132.9233786
0.016121512	997.0223954	0.607020043	0.000899297	104.962171

TABLE 242 CONTINUED: PIPING RESULTS - I

Flow Element Results				
Non-dimensional variables	Fluid variables			
Friction factor	Density (kg/m^3)	Conductivity (W/m.K)	Viscosity (kg/m.s)	Static enthalpy (kJ/kg)
0.015527856	995.1420483	0.618144386	0.000771269	132.8806336
0.014712765	996.9623579	0.606846293	0.000900532	104.5615983
0.015193257	996.96271	0.606846471	0.000900533	104.5619935
0.015527856	995.1420483	0.618144386	0.000771269	132.8806336
0.017446876	996.9516169	0.606836211	0.000900548	104.5385867
0.017446853	996.9592404	0.606843285	0.000900539	104.5545703
0.01648002	996.9515235	0.606836117	0.000900548	104.5383905
0.016480003	996.9590924	0.606843198	0.000900538	104.5543741
0.014309472	995.1706205	0.618176598	0.000771251	132.9444287
0.014506046	995.1600313	0.618164678	0.000771247	132.9233786
0.015527847	995.1409511	0.618144221	0.000771263	132.8806336
0.014090806	996.960499	0.606845364	0.000900527	104.559533
0.014362676	996.9616974	0.606845952	0.000900531	104.5608364
0.022226708	997.0035857	0.60698109	0.000899494	104.8804935
0.015659558	996.9543233	0.606842605	0.000900507	104.5534825
0.015527847	995.1409511	0.618144221	0.000771263	132.8806336
0.01607862	996.9513351	0.60683592	0.000900549	104.5379795
0.016078605	996.9587403	0.60684294	0.000900538	104.5537799
0.015689872	996.9509677	0.60683566	0.000900548	104.5374772
0.015689858	996.9580769	0.606842703	0.000900536	104.5532776
0.01475525	995.1670138	0.618173914	0.00077124	132.9408154
0.014755256	995.1679441	0.618174246	0.000771245	132.9408154
64000000	997.0056432	0.60700132	0.000899312	104.9275062
0.01443932	997.0246182	0.607024628	0.000899274	104.9717809
0.014647887	997.0253175	0.607025618	0.000899271	104.9737233
0.015135645	997.0240983	0.607024596	0.000899269	104.9720124
0.016361422	997.018628	0.607019942	0.000899259	104.9641733
0.014819951	997.024576	0.607024944	0.00089927	104.9725586
0.016397453	997.0208598	0.60702118	0.00089927	104.9657962
0.024030465	995.0883415	0.618581506	0.000767571	134.0669858
0.024030435	995.0863759	0.618581008	0.000767558	134.0674761
0.01497821	995.0482716	0.618672218	0.00076656	134.3380092
0.014703585	995.0156414	0.61880245	0.000765324	134.7045823
0.014514722	995.0160968	0.618803087	0.000765323	134.7058253
0.016235894	995.0141035	0.61882877	0.000765117	134.774153
0.016210684	995.0841695	0.618523379	0.000767962	133.9202961
0.022934949	995.0890166	0.618581065	0.00076758	134.0652338
0.023919934	995.087662	0.61858123	0.000767567	134.0668861
0.023919903	995.0846266	0.618579601	0.000767553	134.0654152
0.016137422	997.0226279	0.607018061	0.000899319	104.9573084
0.023648478	995.0890959	0.618581599	0.000767577	134.0665454

TABLE 242 CONTINUED: PIPING RESULTS - I

Flow Element Results				
Non-dimensional variables	Fluid variables			
Friction factor	Density (kg/m^3)	Conductivity (W/m.K)	Viscosity (kg/m.s)	Static enthalpy (kJ/kg)
0.02364844	995.085081	0.618579629	0.000767557	134.0650745
0.022475691	995.1190163	0.618588008	0.00076777	134.059999
0.015448901	997.0231566	0.607019454	0.000899311	104.9603148
0.022475626	995.104748	0.618586329	0.000767675	134.0649015
0.01628801	997.0182146	0.607019684	0.000899257	104.9638046
0.014351942	995.0797645	0.618504641	0.000768061	133.8757919
0.014309489	995.1656929	0.618167253	0.000771277	132.9248167
0.017974562	995.8842442	0.614054167	0.000816885	122.4128039
0.021857667	996.9592853	0.606846277	0.000900508	104.561924
0.014439334	997.0193533	0.607017144	0.000899295	104.9570718
64000000	996.9899215	0.607067611	0.000898484	105.0949337
0.015420039	997.0228811	0.607021483	0.000899287	104.9653156
0.014722478	997.0219106	0.607019628	0.000899296	104.9614699
0.014439337	997.02003	0.607017313	0.0008993	104.9570718
0.014439326	997.0217814	0.607020835	0.000899283	104.9644263
0.024322068	996.7744992	0.608413881	0.000882737	108.4333509
0.030261938	996.7823519	0.608412427	0.000882834	108.4250974
0.030262091	996.792484	0.608415019	0.000882915	108.4250975
0.024373258	997.037014	0.607018463	0.000899462	104.9500758
0.030275281	996.7807977	0.608423903	0.000882703	108.4533845
0.030275432	996.7907684	0.608426455	0.000882782	108.4533846
0.030256992	996.7829281	0.608408179	0.000882883	108.4146267
0.030257146	996.7931209	0.608410787	0.000882964	108.4146268
0.023011532	995.089593	0.618581496	0.000767582	134.0658276
64000000	997.0212028	0.607015331	0.000899332	104.9516466
0.01902038	996.9852269	0.607252266	0.000896581	105.5379685
0.030293296	997.0273171	0.607015254	0.000899396	104.9478245
0.030293145	997.0170104	0.607012681	0.000899315	104.9478245
0.030307091	997.0271772	0.607015236	0.000899394	104.9478643
0.030306941	997.0170332	0.607012703	0.000899315	104.9478642
0.030288185	997.0273722	0.607015262	0.000899396	104.9478095
0.030288032	997.0170043	0.607012673	0.000899315	104.9478095
0.025651585	997.0368567	0.607018492	0.00089946	104.9502017
0.018459925	996.9453257	0.606839247	0.000900458	104.5481337
0.018683515	995.8844155	0.614051231	0.000816916	122.4057249
0.019533418	996.9430262	0.606837189	0.000900457	104.5439446
0.028667564	997.0368513	0.607018522	0.00089946	104.9502764
0.020302617	997.0875423	0.607269191	0.000897396	105.538289
64000000	996.9586632	0.606973039	0.000899182	104.8737786
0.020343884	995.9247167	0.613817718	0.000819682	121.8246515
0.01902125	997.0900896	0.607273579	0.000897376	105.5479711

TABLE 242 CONTINUED: PIPING RESULTS - I

Flow Element Results				
Non-dimensional variables	Fluid variables			
Friction factor	Density (kg/m^3)	Conductivity (W/m.K)	Viscosity (kg/m.s)	Static enthalpy (kJ/kg)
64000000	997.0066475	0.60702707	0.000899064	104.9883035
0.020877629	995.6136917	0.615534072	0.000799277	126.0902131
0.020877632	995.6138116	0.61553408	0.000799278	126.0902131
0.020527633	997.0424799	0.607023978	0.000899458	104.961421
0.023110157	995.6299344	0.615544804	0.0007993	126.1140209
0.022226722	997.0022822	0.606978708	0.000899505	104.8755904
64000000	997.0062569	0.607029551	0.000899035	104.9944531
64000000	996.9998996	0.607004161	0.000899225	104.9377009
0.023341744	996.9946902	0.606985568	0.000899358	104.8964693
0.021155129	997.003701	0.60697989	0.000899508	104.8775635
0.021155126	997.0035723	0.606979858	0.000899507	104.8775635
0.015632453	996.9546311	0.606842596	0.000900509	104.5534219
0.016118386	997.0215847	0.607016214	0.000899327	104.9535247
0.015414359	997.0221428	0.607017684	0.000899318	104.9566977
0.025585185	996.774139	0.608417228	0.0008827	108.4415423
0.016201913	994.9571054	0.619061552	0.000762918	135.4282038
64000000	996.9640899	0.607087606	0.000898032	105.1548974
64000000	996.9973212	0.607037301	0.000898865	105.0182558
64000000	996.9899252	0.607067587	0.000898485	105.0948745
0.019021169	997.0680278	0.60726016	0.000897302	105.5236031
0.020530015	996.9557776	0.606843455	0.000900509	104.5553985
0.018460004	996.9553682	0.606843132	0.000900509	104.5546547
0.021917863	996.9503995	0.606838976	0.000900509	104.545711
0.021917836	996.9473269	0.606838535	0.000900484	104.545711
0.022088053	995.6150498	0.615534351	0.000799286	126.090686
0.017644195	996.9592554	0.606846243	0.000900508	104.5618431
0.021916711	997.0514646	0.607032417	0.000899458	104.9785536
0.020527616	997.0501422	0.607031884	0.000899451	104.977748
0.02052762	997.0487906	0.607030464	0.000899452	104.9748062
0.022088063	995.6201258	0.61553767	0.000799293	126.0980406
64000000	996.9828496	0.606975823	0.000899346	104.8777372
64000000	996.9959466	0.607046041	0.000898763	105.039912

TABLE 243: PIPING RESULTS - J

Flow Element Results		
Fluid variables		
Specific heat (kJ/kg.K)	Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)
4.179697242	-1	0
4.181690503	-1	0
4.180657867	-1	0
4.181687031	-1	0
4.1810859	-1	0
4.181085819	-1	0
4.181691728	-1	0
4.181694383	-1	0
4.18169153	-1	0
4.181086658	-1	0
4.181690499	-1	0
4.179625253	-1	0
4.179582348	-1	0
4.17958106	-1	0
4.179573216	-1	0
4.179586643	-1	0
4.180065786	-1	0
4.1817444	-1	0
4.180002367	-1	0
4.180210664	-1	0
4.179632926	-1	0
4.179608036	-1	0
4.181733156	-1	0
4.180321173	-1	0
4.179544338	-1	0
4.179563392	-1	0
4.179576327	-1	0
4.179987391	-1	0
4.181108736	-1	0
4.180119775	-1	0
4.181240241	-1	0
4.181383893	-1	0
4.18166653	-1	0
4.181383893	-1	0
4.181762494	-1	0
4.181694583	-1	0
4.181762489	-1	0
4.18169437	-1	0
4.17963151	-1	0
4.179666334	-1	0
4.181071938	-1	0

TABLE 243 CONTINUED: PIPING RESULTS - J

Flow Element Results		
Fluid variables		
Specific heat (kJ/kg.K)	Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)
4.179731596	-1	0
4.181670199	-1	0
4.181667609	-1	0
4.179731596	-1	0
4.18176289	-1	0
4.181695202	-1	0
4.181763983	-1	0
4.181696309	-1	0
4.179635596	-1	0
4.179668772	-1	0
4.179734863	-1	0
4.18168386	-1	0
4.181675069	-1	0
4.181221945	-1	0
4.18172877	-1	0
4.179734863	-1	0
4.181766201	-1	0
4.181699016	-1	0
4.181770286	-1	0
4.181703753	-1	0
4.179645984	-1	0
4.179643544	-1	0
4.181185522	-1	0
4.181054235	-1	0
4.181049234	-1	0
4.181057074	-1	0
4.181092335	-1	0
4.181054067	-1	0
4.181078776	-1	0
4.179566375	-1	0
4.179571075	-1	0
4.179598869	-1	0
4.179589875	-1	0
4.17958852	-1	0
4.179577306	-1	0
4.179612029	-1	0
4.179565139	-1	0
4.179568064	-1	0
4.179575854	-1	0
4.181073168	-1	0
4.179564631	-1	0

TABLE 243 CONTINUED: PIPING RESULTS - J

Flow Element Results		
Fluid variables		
Specific heat (kJ/kg.K)	Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)
4.179574822	-1	0
4.179483445	-1	0
4.181068579	-1	0
4.179525935	-1	0
4.181094883	-1	0
4.17963375	-1	0
4.179653556	-1	0
4.180061592	-1	0
4.181690583	-1	0
4.181091936	-1	0
4.181187022	-1	0
4.181067521	-1	0
4.181075066	-1	0
4.181088083	-1	0
4.181074249	-1	0
4.180658441	-1	0
4.180618577	-1	0
4.180561584	-1	0
4.180992238	-1	0
4.180612576	-1	0
4.180556495	-1	0
4.180620794	-1	0
4.180563456	-1	0
4.179563584	-1	0
4.181084255	-1	0
4.180981147	-1	0
4.181051449	-1	0
4.181110132	-1	0
4.181052225	-1	0
4.181109981	-1	0
4.181051143	-1	0
4.181110175	-1	0
4.180993331	-1	0
4.181818374	-1	0
4.180063033	-1	0
4.181844783	-1	0
4.180993324	-1	0
4.18023907	-1	0
4.181511332	-1	0
4.180069749	-1	0
4.180213839	-1	0

TABLE 243 CONTINUED: PIPING RESULTS - J

Flow Element Results		
Fluid variables		
Specific heat (kJ/kg.K)	Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)
4.18114786	-1	0
4.180078591	-1	0
4.180078088	-1	0
4.180944206	-1	0
4.180003041	-1	0
4.181231944	-1	0
4.181146853	-1	0
4.181212861	-1	0
4.181264188	-1	0
4.181222829	-1	0
4.181223562	-1	0
4.181726744	-1	0
4.181081095	-1	0
4.18107625	-1	0
4.180656197	-1	0
4.17955844	-1	0
4.181309127	-1	0
4.181185204	-1	0
4.181187032	-1	0
4.180394276	-1	0
4.181717905	-1	0
4.181721084	-1	0
4.181769415	-1	0
4.181800231	-1	0
4.180072744	-1	0
4.18169083	-1	0
4.18086622	-1	0
4.180876603	-1	0
4.180888567	-1	0
4.180049162	-1	0
4.181346807	-1	0
4.181181648	-1	0

TABLE 244: PIPING RESULTS - K

Flow Element Results		
Convergence	Upstream Results	
Pressure convergence (kPa)	Velocity (m/s)	Junction pressure loss (kPa)
1.69502E-08	2.23624123	0
-7.46584E-13	0.185256229	0
-3.02009E-08	0.224430385	0
-6.30079E-09	0	0.017107719
0	0	0
0	0	0
1.20017E-11	2.189518208	0
2.66484E-08	1.517465657	-0.079990112
6.05236E-09	0.860343106	-0.001269318
-4.44076E-09	1.968164215	0
-2.55702E-08	0.185256229	0.078038329
7.55591E-10	2.982827418	0
-1.63554E-09	1.52608485	0
1.71089E-09	1.283543917	0
2.32575E-09	1.203350294	0
4.29115E-09	1.38630638	0
-2.49913E-09	1.66910653	0
-2.5672E-11	0.780576211	0
-6.40325E-07	2.1858705	0
-3.79506E-11	2.183241313	0
1.56847E-10	2.891590768	0
1.17674E-09	2.281196908	0
-6.27969E-07	1.512128498	2.54259121
-2.19344E-08	2.18324426	0
1.14379E-08	5.399174731	0
3.99215E-08	1.386293555	0.034313058
4.48374E-08	1.386295573	0
-5.08611E-08	0.590210868	0
-1.65796E-07	0.58936829	0.34924695
9.38749E-07	0	-0.990357197
-2.21444E-11	0	0
-7.03876E-11	0	0
-2.3213E-08	0.547378238	0
-7.03876E-11	0	0
5.02841E-11	0.61663634	0
-1.85241E-08	0.616631438	0
5.03787E-11	0.614983296	0
-1.85257E-08	0.614978407	0
-1.02653E-06	1.579286569	0.114180233
-3.90355E-11	0.994770241	0
9.76327E-10	2.688052677	0

TABLE 244 CONTINUED: PIPING RESULTS - K

Flow Element Results		
Convergence	Upstream Results	
Pressure convergence (kPa)	Velocity (m/s)	Junction pressure loss (kPa)
-1.35551E-10	0.893679726	0
-9.22114E-08	1.094756978	0
-6.75975E-08	0.750265274	0
-1.35551E-10	0.893679726	0
4.88471E-11	0.45650248	0
-7.30428E-09	0.456498918	0
4.89599E-11	0.775117176	0
-7.4902E-08	0.775111164	0
2.55284E-13	3.158576607	0
5.46897E-11	0.994770778	0
1.81644E-10	0.893680208	0
3.36144E-13	2.18951807	0
-2.71829E-07	1.55151298	0
-1.02054E-08	2.072070488	-1.48195E-12
-3.88286E-07	1.478526282	1.431363059
1.81644E-10	0.893680208	0
4.59804E-11	1.027713951	0
-2.24875E-08	1.027706218	0
4.78103E-11	1.435526004	0
-2.94318E-07	1.435515779	0
-1.04728E-06	1.579289089	4.219575074
-6.11602E-10	1.579288236	0
-1.50194E-11	0	0
1.6922E-10	2.885951168	0
3.55309E-08	2.108056438	-0.14498149
6.2127E-08	1.721255753	-0.08948664
-9.74909E-07	1.982891351	3.693273522
-2.28032E-10	2.602540336	0
1.49597E-09	1.904671355	0
3.001E-07	1.203346013	2.836154876
-1.92799E-08	1.203347683	0
-2.8091E-07	1.778708647	0
-7.07816E-12	2.688611966	0
-2.96031E-07	2.177774671	0
-4.90681E-07	1.965008194	0
-1.18448E-09	2.037076972	0
-2.08616E-07	2.809608083	16.02986797
-3.21118E-07	1.28353659	3.338432015
7.9825E-08	1.283538408	0
1.82361E-10	2.628320602	0
1.70683E-07	1.526073135	0.029306852

TABLE 244 CONTINUED: PIPING RESULTS - K

Flow Element Results		
Convergence	**Upstream Results**	
Pressure convergence (kPa)	**Velocity (m/s)**	**Junction pressure loss (kPa)**
-7.97204E-08	1.526075445	0
4.55074E-09	5.399068874	0
-1.81651E-07	0.946194999	0
2.27429E-09	5.39916139	0
-9.94059E-07	2.160820517	4.783678082
-2.02145E-07	2.891592134	0
3.15449E-11	3.15860832	0
4.26812E-09	1.669107624	0
-4.82284E-09	0.109767796	0.015199137
4.63718E-10	2.885965224	0
-2.09102E-15	7.47041E-12	0
-1.89196E-07	0.967698655	0
-4.52532E-07	1.913895714	0
1.8782E-11	2.885965062	0
2.06413E-10	2.88596898	0
-7.21238E-08	0.672160022	0
-1.29357E-07	2.22631925	0
-2.56612E-08	2.226311533	0
-1.0603E-07	0.671983002	0.227173307
-3.9933E-07	2.208383401	0
-1.07855E-08	2.208375869	0
-2.0187E-07	2.233032321	0
-2.7654E-08	2.233024534	0
5.45675E-07	2.5896381	15.42418828
0	0	0
-3.94433E-11	2.183471391	0
-1.29099E-07	2.225771943	0
-2.56294E-08	2.225810111	0
-3.12792E-07	2.207837365	0.595635013
-1.07717E-08	2.207874637	0
-2.27631E-07	2.232484534	0.192113999
-2.76198E-08	2.232523041	0
-1.16947E-07	0.446934961	0.258484819
-8.35767E-12	1.228252095	0
-1.33226E-08	2.967293857	0
-1.97967E-10	3.144332499	0
-6.83421E-10	0.224371474	0.002217816
-6.41089E-10	4.912307023	0
-3.98124E-07	2.12488E-12	0
6.33056E-08	0.781381789	0
-4.93142E-10	2.183242042	0

TABLE 244 CONTINUED: PIPING RESULTS - K

Flow Element Results		
Convergence	Upstream Results	
Pressure convergence (kPa)	Velocity (m/s)	Junction pressure loss (kPa)
-2.876E-11	0	0
3.68247E-07	0.590210842	2.21103E-06
-3.92967E-07	0.590210784	0
-3.25787E-09	0.780501686	0
-2.44075E-09	1.037459225	0
-2.43807E-09	2.072069719	0
2.87619E-11	0	0
-1.28935E-06	2.12533E-12	0.103893469
-3.14175E-09	1.036046099	0
1.08909E-06	0.589387978	0
-1.39503E-06	0.589388067	0.207794056
-2.65764E-07	1.518946712	0.794879106
-5.19352E-10	2.700178138	0
-2.21836E-07	0.972063677	0
-7.77414E-08	0.447052759	0
2.54623E-07	2.047270433	0
-3.10794E-07	7.47041E-12	0
-1.91089E-05	0	0
-4.47299E-15	7.4741E-12	2.74329E-27
-8.11036E-09	2.183296735	0
-3.16415E-10	0.780571313	0
-1.49597E-07	1.228235628	0.414060258
-5.28206E-10	2.744219249	0
-5.2823E-10	2.744227707	0
-6.55982E-09	2.074953694	0
-7.79579E-12	0.416826532	0
-1.66494E-09	2.743938039	0
-2.98069E-11	0.780499521	0
-4.90677E-11	0.780500577	0
-1.30439E-08	2.074939561	0
-9.38002E-07	7.17353E-12	2.14029586
1.94559E-11	0	-2.22218E-23

TABLE 245: PIPING RESULTS - L

Flow Element Results	
Upstream Results	
Upstream Node Total Pressure (kPa)	Upstream Node Static Pressure (kPa)
236.0058344	233.5172601
112.516988	112.4998803
223.5730217	223.5479184
112.4998803	112.4998803
272.7734012	272.7734012
272.7734012	272.7734012
116.7129303	114.3232211
112.6982438	111.5503943
112.6224711	112.2535014
279.6888748	277.7578062
112.5185947	112.501487
231.2451491	226.8183882
256.4636434	255.3049028
257.1936468	256.3739551
263.5820619	262.8615943
252.8335734	251.8773776
216.0468369	214.6596121
99.30370949	98.99998827
263.0408521	260.6616531
485.4457903	483.069453
223.1259329	218.9658518
227.4858176	224.8966815
110.0756625	108.9358747
482.8002988	480.4239583
312.9380778	298.4339112
273.3433821	272.3871952
269.8470613	268.8908729
146.576078	146.4026676
303.3280163	303.1548534
247.1460741	247.1460741
232.4811171	232.4811171
210.8768977	210.8768977
119.0620058	118.9126493
210.8768977	210.8768977
87.17998944	86.99044954
104.6610071	104.4714687
87.17998944	86.99146439
104.6613235	104.4727999
248.3329438	247.0918916
231.2211528	230.7287611
280.2953228	276.6932661

TABLE 245 CONTINUED: PIPING RESULTS - L

Flow Element Results	
Upstream Results	
Upstream Node Total Pressure (kPa)	**Upstream Node Static Pressure (kPa)**
209.6316587	209.2342611
118.6201527	118.0227265
118.9246535	118.6440594
209.6316587	209.2342611
87.17998953	87.0761103
104.3518036	104.2479252
87.17998953	86.88050312
104.2908351	103.991351
248.7312651	243.7670521
229.2929996	228.8006078
207.7035257	207.306128
116.8251734	114.4354643
117.9830472	116.7831078
228.7622849	226.6219825
111.1898387	110.1001437
207.7035257	207.306128
87.17998991	86.65350386
103.8555179	103.3290358
87.17998991	86.15276772
103.1890932	102.1618783
244.2275489	242.9864953
246.1557169	244.9146634
247.1460731	247.1460731
286.4413029	282.2893354
285.6609376	283.4455962
284.9704197	283.4934656
281.1876595	279.2275828
285.5534158	282.1768837
279.6888748	277.8803887
270.5415403	269.8210753
267.18418	266.463714
234.7021301	233.128061
233.0534453	229.4571432
232.9901611	230.6306283
243.6947678	241.7737624
237.3564811	235.2918388
274.8248875	270.8973201
269.243759	268.4240719
265.8278775	265.0081893
279.8440436	276.4002927
272.5528841	271.3941524

TABLE 245 CONTINUED: PIPING RESULTS - L

Flow Element Results	
Upstream Results	
Upstream Node Total Pressure (kPa)	Upstream Node Static Pressure (kPa)
268.937347	267.7786135
350.4957739	335.9918917
278.0629962	277.6166863
317.7663543	303.2622236
280.732278	278.404656
222.1568767	217.9967937
221.1792942	216.2150313
214.6754237	213.2881981
112.4841318	112.4781256
275.2750084	271.1230206
229.9847542	229.9847542
278.1588468	277.6920204
277.2433671	275.417323
275.3829219	271.2309344
272.7734012	268.6214081
223.1800065	222.9548356
256.1068423	253.6365472
262.8801557	260.4098691
303.4500899	303.2249783
256.2840038	253.8533552
262.949887	260.5192467
256.0449511	253.5597344
262.8586938	260.3734859
275.4305672	272.093918
272.7734012	272.7734012
278.1555332	275.7789455
302.8363137	300.3666258
269.8680826	267.3983524
302.2752722	299.8452246
269.8269711	267.3968825
303.0522247	300.5676177
269.8883345	267.4036847
302.9858538	302.8862744
85.11964874	84.36765128
223.3272779	218.9429726
84.26911924	79.34081751
302.8686894	302.8435927
488.2756847	476.2454429
146.7511023	146.7511023
223.1057323	222.8016977
484.7912595	482.4149214

TABLE 245 CONTINUED: PIPING RESULTS - L

Flow Element Results	
Upstream Results	
Upstream Node Total Pressure (kPa)	Upstream Node Static Pressure (kPa)
256.3814528	256.3814528
146.6557272	146.4823167
146.8311125	146.6577021
327.4966892	327.192997
186.3131362	185.7773252
229.4758633	227.3355618
242.009787	242.009787
229.9847529	229.9847529
208.684996	208.1499148
230.1692489	229.9960802
229.8808523	229.7076836
111.8017539	110.6516632
277.5697746	273.935151
275.6904726	275.2194256
223.468535	223.3689293
237.8452274	235.7601362
229.9847542	229.9847542
239.7612908	239.7612908
229.9847542	229.9847542
431.4052062	429.0288086
112.0152674	111.7115481
112.0852707	111.3332833
97.97843213	94.22454521
91.86903013	88.11513165
154.3794182	152.2361377
112.5042974	112.4176893
341.3767627	337.6232605
333.6698042	333.3661128
330.6487306	330.3450388
167.6633195	165.5200536
226.621989	226.621989
229.9847542	229.9847542

TABLE 246: PIPING RESULTS - M

Flow Element Results			
Upstream Results			
Upstream Node Total Temperature (°C)	Upstream Node Static Temperature (°C)	Elevation (m)	Quality
31.36387184	31.36380947	3.7	0
24.91302535	24.91302503	0	0
25.8131828	25.81318227	4.83	0
24.91302535	24.91302913	0	0
24.96851259	24.96851259	1.5	0
24.96863468	24.96863468	1.5	0
24.91209762	24.91205267	0	0
24.91300296	24.91296368	0	0
24.91300231	24.91299509	0	0
24.97404214	24.9740029	0.5	0
24.91300774	24.91302467	0	0
31.90017994	31.90006877	4	0
31.93943813	31.93940904	2.3	0
31.93928092	31.93926033	2.3	0
31.93884369	31.9388256	1.9	0
31.93857737	31.93855336	3	0
29.15949761	29.15946491	4.83	0
24.9129679	24.91296205	1.27	0
29.20436695	29.20431074	2.7	0
25.06718416	25.06713905	1.33	0
31.90192851	31.90182404	4	0
31.90098955	31.90092454	4	0
24.91300296	24.91354369	0	0
25.06776875	25.06772364	1.33	0
31.9303261	31.92996195	1	0
31.93626478	31.93624816	2.1	0
31.9363212	31.93629719	2.4	0
30.05484108	30.05483691	12.73	0
24.96380705	24.96388102	4.83	0
31.67429454	31.67408126	0	0
24.9731297	24.9731297	1.5	0
24.97614325	24.97614325	3.7098	0
24.91168254	24.91167973	0	0
24.97614325	24.97614325	3.7098	0
24.911	24.91099606	3.294344414	0
24.91134855	24.91134499	1.5	0
24.911	24.91099608	3.294344414	0
24.91134848	24.91134494	1.5	0
31.67380106	31.67379451	0	0
31.67399114	31.67397879	1.5	0
24.97265108	24.97257789	1.5	0

TABLE 246 CONTINUED: PIPING RESULTS - M

Flow Element Results			
Upstream Results			
Upstream Node Total Temperature (°C)	Upstream Node Static Temperature (°C)	Elevation (m)	Quality
31.67345543	31.67344546	3.7098	0
24.91173993	24.91172869	0	0
24.91169111	24.91168583	0	0
31.67345543	31.67344546	3.7098	0
24.911	24.91099771	3.259969598	0
24.91133629	24.91133434	1.5	0
24.911	24.91099395	3.259969598	0
24.91134977	24.91134414	1.5	0
31.67373986	31.67361531	0	0
31.6744064	31.67439404	1.5	0
31.67387068	31.6738607	3.7098	0
24.9120728	24.91202786	0	0
24.91184311	24.91182054	0	0
24.96290696	24.96286352	12.23	0
24.91300231	24.91329829	0	0
31.67387068	31.6738607	3.7098	0
24.911	24.91098958	3.222586277	0
24.91135835	24.91134845	1.5	0
24.911	24.91097995	3.222586277	0
24.9115057	24.91148638	1.5	0
31.67380106	31.67467866	0	0
31.67429454	31.6742634	0	0
24.97164017	24.97164017	0	0
24.97373212	24.97364775	0	0
24.97393534	24.97385848	0	0
24.97407479	24.97402513	0	0
24.97407479	24.97484603	0	0
24.97392711	24.97385849	0	0
24.97404214	24.97400539	0.5	0
31.93626478	31.93685749	2.1	0
31.93689468	31.93687659	2.4	0
32.00941832	32.00937878	4	0
32.09797763	32.09788726	4	0
32.09799126	32.09793197	4	0
32.11275195	32.11270368	3.3	0
31.90912668	31.90907484	3.9	0
31.93273552	31.93608914	2	0
31.9364361	31.93713449	2.1	0
31.93718678	31.9371662	2.4	0
24.971549	24.97147903	1.5	0
31.9364361	31.93641332	2.1	0

TABLE 246 CONTINUED: PIPING RESULTS - M

Flow Element Results			
Upstream Results			
Upstream Node Total Temperature (°C)	Upstream Node Static Temperature (°C)	Elevation (m)	Quality
31.93651712	31.93648802	2.4	0
31.92223758	31.9218735	1	0
24.97194013	24.97193106	1.5	0
31.92928627	31.92892213	1	0
24.97393534	24.97493856	0	0
31.90213721	31.90203274	4	0
31.67028755	31.67016298	4	0
29.15979468	29.15976197	4.83	0
24.91302925	24.9130325	0	0
24.97266573	24.97258137	1.5	0
25.01459303	25.01459303	12.23	0
24.97312027	24.97311079	1.5	0
24.97272747	24.97269037	1.5	0
24.97264203	24.97255767	1.5	0
24.97321511	24.97313075	1.5	0
25.81466917	25.81466445	4.83	0
25.80605743	25.80600564	4.83	0
25.80457398	25.80452219	4.83	0
24.96380705	24.96385305	4.83	0
25.81277567	25.8127247	4.83	0
25.81131578	25.81126481	4.83	0
25.80356987	25.80351777	4.83	0
25.80207755	25.80202545	4.83	0
31.93273552	31.93597353	2	0
24.9686272	24.9686272	1.5	0
25.11068282	25.11063428	2.3	0
24.963993	24.96394653	4.83	0
24.97123745	24.97118727	4.83	0
24.96398535	24.9640711	4.83	0
24.97124647	24.97119711	4.83	0
24.96390278	24.96389851	4.83	0
24.971233	24.97118252	4.83	0
24.96390278	24.96395806	4.83	0
24.91595709	24.91594262	1.33	0
29.15792057	29.1578172	4.83	0
24.91614477	24.91604995	1.33	0
24.96398535	24.96398537	4.83	0
25.06655882	25.06633047	1.33	0
24.98004657	24.98004657	12.73	0
29.01802855	29.01802142	4.8	0
25.06732879	25.06728368	1.33	0

TABLE 246 CONTINUED: PIPING RESULTS - M

Flow Element Results			
Upstream Results			
Upstream Node Total Temperature (°C)	Upstream Node Static Temperature (°C)	Elevation (m)	Quality
24.97211247	24.97211247	9.53	0
30.05482386	30.05481969	12.73	0
30.05478595	30.05478178	12.73	0
24.96400604	24.96400033	2.5	0
30.05375674	30.05374384	9.53	0
24.96275025	24.9627068	12.23	0
24.98619559	24.98619559	11	0
24.96261566	24.96263848	12.23	0
24.97020151	24.97019065	11	0
24.96259796	24.96259445	12.23	0
24.96261566	24.96265779	12.23	0
24.91300774	24.91316186	0	0
24.97118913	24.97111528	1.5	0
24.97160184	24.97159227	1.5	0
25.81657046	25.81656837	4.83	0
32.27009086	32.27003844	3.7	0
25.01459303	25.01459303	12.23	0
24.97576247	24.97576247	11.23	0
25.01457886	25.01457886	12.23	0
25.0709146	25.07086952	4.83	0
24.91313628	24.91313057	0	0
24.91302925	24.91310666	0	0
24.91326034	24.9131881	1.27	0
24.91460846	24.91453623	1.27	0
30.05432694	30.05427536	12.23	0
24.91302815	24.91302653	0	0
24.96368171	24.96361104	1.33	0
24.96404863	24.96404291	1.9	0
24.96401285	24.96400714	2.2	0
30.05380084	30.05374924	11.23	0
24.96290696	24.96337702	12.23	0
25.01457886	25.01457886	12.23	0

TABLE 247: PIPING RESULTS – N

Flow Element Results			
Upstream Results			
Mach number	**Area (m^2)**	**Total enthalpy (kJ/kg)**	**Static enthalpy (kJ/kg)**
0	0.070685835	131.6430257	131.6405253
0	0.282743339	104.56193	104.5619128
0	0.005026548	108.4275757	108.4275505
0	0.125663706	104.56193	104.56193
0	0.070685835	104.9415779	104.9415779
0	0.196349541	104.9420883	104.9420883
0	0.282743339	104.56193	104.559533
0	0.282743339	104.56193	104.5607787
0	0.282743339	104.56193	104.5615599
0	0.070685835	104.9710422	104.9691054
0	0.282743339	104.56193	104.5619128
0	0.196349541	133.8799726	133.875524
0	0.003318307	134.0667292	134.0655648
0	0.003318307	134.0667292	134.0659055
0	0.003318307	134.0706516	134.0699276
0	0.003318307	134.059865	134.0589041
0	0.031415927	122.4101274	122.4087344
0	0.017671459	104.5494764	104.5491717
0	0.017671459	122.6402543	122.6378653
0	0.017671459	105.5503544	105.5479711
0	0.196349541	133.8799726	133.8757919
0	0.007853982	133.8799726	133.8773707
0	0.125663706	104.56193	104.5607867
0	0.017671459	105.5503544	105.5479711
0	0.003318307	134.079477	134.0649015
0	0.003318307	134.0686904	134.0677295
0	0.003318307	134.0657486	134.0647877
0	0.017671459	126.0903873	126.0902131
0	0.017671459	104.9503016	104.9501279
0	0.196349541	132.949417	132.949417
0	0.311724531	104.9238878	104.9238878
0	0.173494454	104.9166509	104.9166509
0	0.282743339	104.5623661	104.5622163
0	0.173494454	104.9166509	104.9166509
0	0.125663706	104.5300618	104.5298716
0	0.125663706	104.5476571	104.547467
0	0.125663706	104.5300618	104.5298727
0	0.125663706	104.5476571	104.547468
0	0.196349541	132.949417	132.94817
0	0.311724531	132.934708	132.9342132
0	0.070685835	104.9657839	104.962171

TABLE 247 CONTINUED: PIPING RESULTS – N

Flow Element Results			
Upstream Results			
Mach number	**Area (m^2)**	**Total enthalpy (kJ/kg)**	**Static enthalpy (kJ/kg)**
0	0.173494454	132.9130387	132.9126394
0	0.282743339	104.5621976	104.5615983
0	0.282743339	104.562275	104.5619935
0	0.173494454	132.9130387	132.9126394
0	0.125663706	104.5300618	104.5299576
0	0.125663706	104.54732	104.5472158
0	0.125663706	104.5300618	104.5297614
0	0.125663706	104.54732	104.5470196
0	0.196349541	132.949417	132.9444287
0	0.311724531	132.934708	132.9342132
0	0.173494454	132.9130387	132.9126394
0	0.282743339	104.56193	104.559533
0	0.282743339	104.56204	104.5608364
0	0.005026548	104.8777372	104.8755904
0	0.125663706	104.56193	104.560837
0	0.173494454	132.9130387	132.9126394
0	0.125663706	104.5300618	104.5295337
0	0.125663706	104.5469534	104.5464254
0	0.125663706	104.5300618	104.5290314
0	0.125663706	104.5469534	104.5459231
0	0.196349541	132.949417	132.94817
0	0.196349541	132.949417	132.94817
0	0.196349541	104.9311246	104.9311246
0	0.196349541	104.9759452	104.9717809
0	0.196349541	104.9759452	104.9737233
0	0.159043128	104.9759452	104.9744639
0	0.070685835	104.9759452	104.9739793
0	0.159043128	104.9759452	104.9725586
0	0.070685835	104.9710422	104.9692283
0	0.003318307	134.0686904	134.0679664
0	0.003318307	134.0657486	134.0650246
0	0.159043128	134.3395911	134.3380092
0	0.159043128	134.7081966	134.7045823
0	0.196349541	134.7081966	134.7058253
0	0.070685835	134.7795157	134.7775851
0	0.070685835	133.9228612	133.9207864
0	0.003318307	134.069671	134.0657241
0	0.003318307	134.0686904	134.0678667
0	0.003318307	134.0657486	134.0649249
0	0.070685835	104.9607624	104.9573084
0	0.003318307	134.0686904	134.067526

TABLE 247 CONTINUED: PIPING RESULTS – N

Flow Element Results			
Upstream Results			
Mach number	**Area (m^2)**	**Total enthalpy (kJ/kg)**	**Static enthalpy (kJ/kg)**
0	0.003318307	134.0657486	134.0645842
0	0.003318307	134.079477	134.0649021
0	0.196349541	104.9607624	104.9603148
0	0.003318307	134.079477	134.0649016
0	0.070685835	104.9759452	104.9736106
0	0.196349541	133.8799726	133.8757919
0	0.196349541	132.910193	132.9052046
0	0.031415927	122.4101274	122.4087344
0	0.125663706	104.56193	104.561924
0	0.196349541	104.9612362	104.9570718
0	0.005026548	105.0949337	105.0949337
0	0.196349541	104.9657839	104.9653156
0	0.196349541	104.9633014	104.9614699
0	0.196349541	104.9612362	104.9570718
0	0.196349541	104.9612362	104.9570718
0	0.005026548	108.4334297	108.4332038
0	0.000506707	108.4275757	108.4250975
0	0.000506707	108.4275757	108.4250975
0	0.005026548	104.9503016	104.9500758
0	0.000506707	108.4558231	108.4533846
0	0.000506707	108.4558231	108.4533846
0	0.000506707	108.41712	108.4146268
0	0.000506707	108.41712	108.4146268
0	0.003318307	134.069671	134.0663179
0	0.196349541	104.942057	104.942057
0	0.017671459	105.5408426	105.5384588
0	0.000506707	104.9503016	104.9478246
0	0.000506707	104.9503016	104.9478245
0	0.000506707	104.9503016	104.9478643
0	0.000506707	104.9503016	104.9478642
0	0.000506707	104.9503016	104.9478096
0	0.000506707	104.9503016	104.9478095
0	0.005026548	104.9503016	104.9502017
0	0.031415927	104.548888	104.5481337
0	0.017671459	122.4101274	122.4057249
0	0.012271846	104.548888	104.5439446
0	0.005026548	104.9503016	104.9502764
0	0.007853982	105.5503544	105.538289
0	0.017671459	104.8737786	104.8737786
0	0.017671459	121.8251039	121.8247986
0	0.017671459	105.5503544	105.5479711

TABLE 247 CONTINUED: PIPING RESULTS – N

Flow Element Results			
Upstream Results			
Mach number	**Area (m^2)**	**Total enthalpy (kJ/kg)**	**Static enthalpy (kJ/kg)**
0	0.005026548	104.9415779	104.9415779
0	0.017671459	126.0903873	126.0902131
0	0.017671459	126.0903873	126.0902131
0	0.017671459	104.9731496	104.972845
0	0.010053096	126.1217665	126.1212283
0	0.005026548	104.8777372	104.8755904
0	0.005026548	104.9872576	104.9872576
0	0.017671459	104.8777372	104.8777372
0	0.010053096	104.8897986	104.8892619
0	0.017671459	104.8777372	104.8775635
0	0.017671459	104.8777372	104.8775635
0	0.125663706	104.56193	104.5607764
0	0.070685835	104.9571702	104.9535247
0	0.196349541	104.9571702	104.9566977
0	0.005026548	108.4416423	108.4415423
0	0.070685835	135.4317704	135.4296748
0	0.005026548	105.0949337	105.0949337
0	0.005026548	104.9415779	104.9415779
0	0.005026548	105.0948745	105.0948745
0	0.017671459	105.5160334	105.51365
0	0.017671459	104.56193	104.5616254
0	0.031415927	104.56193	104.5611757
0	0.005026548	104.5494764	104.545711
0	0.005026548	104.5494764	104.545711
0	0.005026548	126.0952903	126.0931376
0	0.125663706	104.56193	104.5618431
0	0.005026548	104.9846226	104.980858
0	0.017671459	104.9790332	104.9787286
0	0.017671459	104.9760914	104.9757868
0	0.005026548	126.1050963	126.1029436
0	0.005026548	104.8777372	104.8777372
0	0.005026548	105.0948745	105.0948745

TABLE 248: PIPING RESULTS - O

Flow Element Results		
Upstream Results		Downstream Results
Element Inlet Pressure (kPa)	Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)
236.0058344	131.6430257	2.236243871
112.516988	104.56193	0.185256229
223.5730217	108.4275757	0.224430389
112.4998803	104.56193	0
272.7734012	104.9415779	0
272.7734012	104.9420883	0
116.7129303	104.56193	2.189523231
112.6982438	104.56193	1.517465723
112.6224711	104.56193	0.860343118
279.6888748	104.9710422	1.968175921
112.5185947	104.56193	0.185256229
231.2451491	133.8799726	2.982832881
256.4636434	134.0667292	1.526084882
257.1936468	134.0667292	1.283543936
263.5820619	134.0706516	1.20335031
252.8335734	134.059865	1.386306404
216.0468369	122.4101274	1.669107624
99.30370949	104.5494764	0.780576214
263.0408521	122.6402543	2.185907484
485.4457903	105.5503544	2.183241347
223.1259329	133.8799726	2.89159203
227.4858176	133.8799726	2.281171636
110.0756625	104.56193	1.512139233
482.8002988	105.5503544	2.183296735
312.9380778	134.079477	5.399228365
273.3433821	134.0686904	1.386294925
269.8470613	134.0657486	1.386306277
146.576078	126.0903873	0.59018971
303.3280163	104.9503016	0.589387978
247.1460741	132.949417	0
232.4811171	104.9238878	0
210.8768977	104.9166509	0
119.0620058	104.5623661	0.547378248
210.8768977	104.9166509	0
87.17998944	104.5300618	0.616631428
104.6610071	104.5476571	0.616627008
87.17998944	104.5300618	0.614978396
104.6613235	104.5476571	0.61497395
248.3329438	132.949417	1.579287096
231.2211528	132.934708	0.99477883
280.2953228	104.9657839	2.688053601

TABLE 248 CONTINUED: PIPING RESULTS - O

Flow Element Results		
Upstream Results		Downstream Results
Element Inlet Pressure (kPa)	Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)
209.6316587	132.9130387	0.893706765
118.6201527	104.5621976	1.094757078
118.9246535	104.562275	0.750265297
209.6316587	132.9130387	0.893706765
87.17998953	104.5300618	0.456498914
104.3518036	104.54732	0.456495603
87.17998953	104.5300618	0.775111143
104.2908351	104.54732	0.775105561
248.7312651	132.949417	3.158577042
229.2929996	132.934708	0.994779367
207.7035257	132.9130387	0.893707397
116.8251734	104.56193	2.189518208
117.9830472	104.56204	1.551513172
228.7622849	104.8777372	2.072064301
111.1898387	104.56193	1.478536866
207.7035257	132.9130387	0.893707397
87.17998991	104.5300618	1.02770617
103.8555179	104.5469534	1.027698831
87.17998991	104.5300618	1.435515647
103.1890932	104.5469534	1.435505585
244.2275489	132.949417	1.579298559
246.1557169	132.949417	1.579297707
247.1460731	104.9311246	0
286.4413029	104.9759452	2.885952557
285.6609376	104.9759452	2.108056509
284.9704197	104.9759452	1.721259944
281.1876595	104.9759452	1.98290926
285.5534158	104.9759452	2.602541246
279.6888748	104.9710422	1.904678515
270.5415403	134.0686904	1.203347143
267.18418	134.0657486	1.203350227
234.7021301	134.3395911	1.778708692
233.0534453	134.7081966	2.688612013
232.9901611	134.7081966	2.177774758
243.6947678	134.7795157	1.965013721
237.3564811	133.9228612	2.037078093
274.8248875	134.069671	2.809610921
269.243759	134.0686904	1.283537822
265.8278775	134.0657486	1.283543835
279.8440436	104.9607624	2.628321108
272.5528841	134.0686904	1.526074708

TABLE 248 CONTINUED: PIPING RESULTS - O

Flow Element Results		
Upstream Results		Downstream Results
Element Inlet Pressure (kPa)	Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)
268.937347	134.0657486	1.526084712
350.4957739	134.079477	5.399106165
278.0629962	104.9607624	0.946195013
317.7663543	134.079477	5.399168478
280.732278	104.9759452	2.160840077
222.1568767	133.8799726	2.891592605
221.1792942	132.910193	3.158576607
214.6754237	122.4101274	1.669104201
112.4841318	104.56193	0.109767796
275.2750084	104.9612362	2.88596898
229.9847542	105.0949337	7.47041E-12
278.1588468	104.9657839	0.967698662
277.2433671	104.9633014	1.913895864
275.3829219	104.9612362	2.885965224
272.7734012	104.9612362	2.885951168
223.1800065	108.4334297	0.672160005
256.1068423	108.4275757	2.226356311
262.8801557	108.4275757	2.22631877
303.4500899	104.9503016	0.671983072
256.2840038	108.4558231	2.208419579
262.949887	108.4558231	2.208382933
256.0449511	108.41712	2.233069716
262.8586938	108.41712	2.233031837
275.4305672	134.069671	2.589640476
272.7734012	104.942057	0
278.1555332	105.5408426	2.183472396
302.8363137	104.9503016	2.225809624
269.8680826	104.9503016	2.225817468
302.2752722	104.9503016	2.207874161
269.8269711	104.9503016	2.207881818
303.0522247	104.9503016	2.232522549
269.8883345	104.9503016	2.232530463
302.9858538	104.9503016	0.446934988
85.11964874	104.548888	1.228252099
223.3272779	122.4101274	2.967303922
84.26911924	104.548888	3.144332743
302.8686894	104.9503016	0.224371478
488.2756847	105.5503544	4.912308248
146.7511023	104.8737786	2.12488E-12
223.1057323	121.8251039	0.781381915
484.7912595	105.5503544	2.183242479

TABLE 248 CONTINUED: PIPING RESULTS - O

Flow Element Results		
Upstream Results		Downstream Results
Element Inlet Pressure (kPa)	Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)
256.3814528	104.9415779	0
146.6557272	126.0903873	0.590210868
146.8311125	126.0903873	0.590210784
327.4966892	104.9731496	0.780510036
186.3131362	126.1217665	1.037466961
229.4758633	104.8777372	2.072070488
242.009787	104.9872576	0
229.9847529	104.8777372	2.12535E-12
208.684996	104.8897986	1.036039783
230.1692489	104.8777372	0.589388003
229.8808523	104.8777372	0.589388067
111.8017539	104.56193	1.518957644
277.5697746	104.9571702	2.700178686
275.6904726	104.9571702	0.972063692
223.468535	108.4416423	0.447052785
237.8452274	135.4317704	2.047272899
229.9847542	105.0949337	7.47081E-12
239.7612908	104.9415779	0
229.9847542	105.0948745	7.4741E-12
431.4052062	105.5160334	2.183284402
112.0152674	104.56193	0.780576131
112.0852707	104.56193	1.22824368
97.97843213	104.5494764	2.744219462
91.86903013	104.5494764	2.74422792
154.3794182	126.0952903	2.074960718
112.5042974	104.56193	0.416826534
341.3767627	104.9846226	2.743944343
333.6698042	104.9790332	0.780500205
330.6487306	104.9760914	0.780501264
167.6633195	126.1050963	2.074953694
226.621989	104.8777372	7.17381E-12
229.9847542	105.0948745	0

TABLE 249: PIPING RESULTS - P

Flow Element Results	
Downstream Results	
Junction pressure loss (kPa)	**Downstream Node Total Pressure (kPa)**
1.792599164	233.0377483
0	112.5164697
0.072213807	223.5407488
0	97.83584323
0	272.7734012
0	272.7734012
0	112.6182537
0	112.6212018
0	112.596633
0	266.812096
0	112.516988
0	227.4858176
-0.004440773	256.4214859
-0.004261675	257.1634823
-0.004058265	263.5554263
-0.003700949	252.7985697
0	214.6754237
0	99.29539562
1.482865385	224.8101433
0	485.4156563
0	222.230354
0	255.3341681
0	95.13719372
0	431.4052062
0	290.8547554
0	270.9758357
0	252.9865647
0.107667397	223.2133997
0	230.1692489
0	247.1460731
0	210.8768977
0	147.0589865
0.103033615	119.0276871
0	147.0589865
0	104.6913333
0.091577883	119.1535837
0	104.6914873
0.202983516	119.2649893
1.489258943	247.6449758
0	209.6316587
0	279.6342479

TABLE 249 CONTINUED: PIPING RESULTS - P

Flow Element Results	
Downstream Results	
Junction pressure loss (kPa)	**Downstream Node Total Pressure (kPa)**
0	145.8453111
0.474664367	118.4577116
0.24981763	118.8699703
0	145.8453111
0	104.3684242
0.057574786	118.9822283
0	104.3387525
0.239538476	118.8596911
0	248.447124
0	207.7035257
0	143.9172483
0	116.7129303
0.936809166	117.7619826
0	235.7024701
0	96.26332197
0	143.9172483
0	103.9397551
0.370585227	118.3536324
0	103.3534476
0.706994286	117.5321677
0	229.2929996
0	231.2211528
0	232.4811171
0	285.5159561
0	285.5960374
0	279.6888748
0	261.4203326
0	284.880933
0	271.6207171
0	268.2752377
0	263.6973367
1.596292326	234.6497376
0	233.0181929
1.664118585	232.9092677
2.058698145	236.7608282
0	236.0569725
0	272.582191
0	266.9348101
0	257.3247975
0	279.4735552
0	270.0985281

TABLE 249 CONTINUED: PIPING RESULTS - P

Flow Element Results	
Downstream Results	
Junction pressure loss (kPa)	**Downstream Node Total Pressure (kPa)**
0	256.6490419
0	335.7224691
0.792049272	278.0354164
0	315.2587418
0	260.9260078
0.643233208	221.8225274
0	248.7312651
-1.126417585	220.0528766
0	112.4836723
0	272.7734012
3.33943E-23	229.9847542
0.901082879	278.14445
1.709895901	277.0928178
0	275.2750084
0	286.4413029
0.162131993	223.2678643
0	223.5730217
0	256.5279989
0	303.2443387
0.794860348	224.2633953
0	256.6984011
0.137993172	223.3179996
0	256.4686516
0	273.3776952
0	272.7734012
0	277.1477538
0	270.2891428
0	263.5143368
0	270.2412729
0	263.5738894
0	270.3119384
0	263.4967058
0	302.8709072
0	85.11270784
0	216.2280322
0	84.11509271
0	302.8363137
0	487.7871938
0.095373354	146.7511027
-0.596996722	222.7302812
0	484.3995181

TABLE 249 CONTINUED: PIPING RESULTS - P

Flow Element Results	
Downstream Results	
Junction pressure loss (kPa)	**Downstream Node Total Pressure (kPa)**
0	242.0097814
0	146.576078
0.17514219	146.8308716
0	303.6772632
0	171.3511984
0	228.7622849
0	256.3814528
0	229.9847542
0	222.1711699
6.53603E-06	230.0886529
0	229.8806095
0	96.86081073
0	277.1792128
0.27850736	275.6614292
0.173849212	223.3538557
1.831034523	234.8844798
0	146.7511023
0	229.9847542
0	229.9847542
0	444.9651819
0	99.50810675
0	98.69985601
0	97.82416242
0	91.71476013
0	147.7736857
0	112.4993309
0	336.2982279
0	331.7060773
0	328.6787724
0	154.3794182
0	154.3794182
0	239.7612964

TABLE 250: PIPING RESULTS - Q

Flow Element Results	
Downstream Results	
Downstream Node Static Pressure (kPa)	Downstream Node Total Temperature (°C)
230.5491711	31.36419317
112.499362	24.91302546
223.5156455	25.81320568
97.83584323	25.00707329
272.7734012	24.96851259
272.7734012	24.9686272
110.228539	24.91300296
111.4733522	24.91300231
112.2276633	24.91300774
264.8810159	24.97405512
112.4998803	24.91302535
223.0590486	31.90098955
255.2627453	31.93944626
256.3437906	31.9392865
262.8349587	31.93884855
251.8423739	31.93858411
213.2881981	29.15979468
98.99167439	24.91296973
222.4309041	29.20797169
483.0393191	25.06719082
218.070271	31.90212138
252.7450607	31.90203155
93.99739785	24.91334787
429.0288086	25.0709146
276.3504447	31.93273552
270.0196478	31.93631275
252.030369	31.93854442
223.0399955	30.05690264
229.9960802	24.96259796
247.1460731	24.97164017
210.8768977	24.97614325
147.0589865	24.98936755
118.8783307	24.91171291
147.0589865	24.98936755
104.5017949	24.91134184
118.9640466	24.91168254
104.5029637	24.91134181
119.0764671	24.91168254
246.4039233	31.67429454
209.1392627	31.67345543
276.0321899	24.97279626

TABLE 250 CONTINUED: PIPING RESULTS - Q

Flow Element Results	
Downstream Results	
Downstream Node Static Pressure (kPa)	Downstream Node Total Temperature (°C)
145.4479014	31.67187517
117.8602854	24.91188079
118.5893761	24.91175844
145.4479014	31.67187517
104.2645458	24.91133262
118.8783506	24.91163229
104.0392684	24.91133918
118.5602092	24.91169961
243.4829103	31.67380106
207.2111296	31.67387068
143.5198385	31.67229041
114.3232211	24.91209762
116.562043	24.91209912
233.5621742	24.96372839
95.17361912	24.91309937
143.5198385	31.67229041
103.413273	24.91133972
117.8271541	24.9117528
102.3262328	24.91146936
116.5049601	24.91200881
228.0519385	31.6744064
229.9800919	31.67399114
232.4811171	24.9731297
281.3639866	24.97393534
283.3806959	24.97391775
278.2119171	24.97404214
259.4602381	24.9745355
281.5043997	24.97407479
269.8122243	24.97417196
267.554772	31.93689436
262.9768692	31.93881886
233.0756685	32.00977338
229.4218908	32.09798522
230.5497349	32.09836707
234.8398174	32.11304608
233.9923291	31.9091719
268.6546196	31.9364361
266.1151222	31.93718304
256.5051058	31.93925267
276.0298035	24.97163036
268.9397952	31.93650169

TABLE 250 CONTINUED: PIPING RESULTS - Q

Flow Element Results	
Downstream Results	
Downstream Node Static Pressure (kPa)	**Downstream Node Total Temperature (°C)**
255.4903014	31.93939821
321.2184867	31.9230727
277.5891065	24.97212013
300.754592	31.92982631
258.5983647	24.97464406
217.6624436	31.90234774
243.7670521	31.67373986
218.6656538	29.16033273
112.4776662	24.91303272
268.6214081	24.97321511
229.9847542	25.01459303
277.6776236	24.97332132
275.2667735	24.97313604
271.1230206	24.97266573
282.2893354	24.97373212
223.0426934	25.81475581
221.1026854	25.8131828
254.0577043	25.80596519
303.019227	24.96390278
221.832707	25.81996257
254.2677531	25.81268492
220.8327414	25.81076782
253.9834355	25.80347707
270.041043	31.93626478
272.7734012	24.97321511
274.771165	25.11066947
267.8194132	24.97114498
261.0445984	24.9726328
267.8111848	24.97115549
261.1437929	24.97261972
267.8272891	24.97113997
261.0120477	24.97263667
302.7713277	24.96398535
84.36071037	24.91595862
211.843712	29.15945836
79.18679059	24.91617876
302.811217	24.963993
475.7569491	25.06666676
146.7511027	24.98006765
222.4262465	29.01791017
482.0231796	25.06741536

TABLE 250 CONTINUED: PIPING RESULTS - Q

Flow Element Results	
Downstream Results	
Downstream Node Static Pressure (kPa)	Downstream Node Total Temperature (°C)
242.0097814	24.99762288
146.4026676	30.05484108
146.6574611	30.05482386
303.3735678	24.96380705
170.8153834	30.0535431
226.6219825	24.96290696
256.3814528	24.98648197
229.9847542	24.99132574
221.636092	24.97068774
229.9154842	24.96261566
229.7074408	24.96266135
95.71071175	24.91296752
273.5445885	24.9712749
275.1903822	24.97166938
223.2542499	25.81663365
232.7993861	32.27041888
146.7511023	25.06162936
229.9847542	25.01459303
229.9847542	25.01457886
442.5887978	25.07268063
99.20438556	24.91292279
97.9478637	24.91296042
94.07027521	24.91329438
87.96086135	24.91464251
145.6303979	30.05458219
112.4127229	24.91302925
332.5447171	24.96370205
331.4023857	24.96401365
328.3750803	24.96397926
152.2361377	30.05432694
154.3794182	24.97930732
239.7612964	24.98613728

TABLE 251: PIPING RESULTS - R

Flow Element Results				
Downstream Results				
Downstream Node Static Temperature (°C)	Elevation (m)	Quality	Mach number	Area (m^2)
31.36374473	4	0	0	0.070685835
24.91302514	0	0	0	0.282743339
25.81318934	4.83	0	0	0.005026548
25.00707329	1.5	0	0	0.125663706
24.96851259	1.5	0	0	0.070685835
24.9686272	1.5	0	0	0.196349541
24.91295801	0	0	0	0.282743339
24.91298072	0	0	0	0.282743339
24.9130008	0	0	0	0.282743339
24.97401589	1.7	0	0	0.070685835
24.91302503	0	0	0	0.282743339
31.90087839	4	0	0	0.196349541
31.93941811	2.3	0	0	0.003318307
31.93926683	2.3	0	0	0.003318307
31.93883133	1.9	0	0	0.003318307
31.93856089	3	0	0	0.003318307
29.15976197	4.83	0	0	0.031415927
24.91296389	1.27	0	0	0.017671459
29.20759434	4.83	0	0	0.017671459
25.06714571	1.33	0	0	0.017671459
31.90201692	4	0	0	0.196349541
31.90196654	1	0	0	0.007853982
24.91332593	1.5	0	0	0.125663706
25.07086952	4.83	0	0	0.017671459
31.93237133	2	0	0	0.003318307
31.93628874	2.3	0	0	0.003318307
31.93852041	3	0	0	0.003318307
30.05687518	4.8	0	0	0.017671459
24.96259445	12.23	0	0	0.017671459
24.97164017	0	0	0	0.196349541
24.97614325	3.7098	0	0	0.311724531
24.98936755	10.2376	0	0	0.173494454
24.91168732	0	0	0	0.282743339
24.98936755	10.2376	0	0	0.173494454
24.91133828	1.5	0	0	0.125663706
24.91165873	0	0	0	0.125663706
24.91133827	1.5	0	0	0.125663706
24.91163412	0	0	0	0.125663706
31.67394267	0	0	0	0.196349541
31.67344307	3.7098	0	0	0.311724531
24.97272307	1.5	0	0	0.070685835

TABLE 251 CONTINUED: PIPING RESULTS - R

Flow Element Results				
Downstream Results				
Downstream Node Static Temperature (°C)	Elevation (m)	Quality	Mach number	Area (m^2)
31.6718652	10.2376	0	0	0.173494454
24.9117646	0	0	0	0.282743339
24.91169792	0	0	0	0.282743339
31.6718652	10.2376	0	0	0.173494454
24.91133067	1.5	0	0	0.125663706
24.9116176	0	0	0	0.125663706
24.91133355	1.5	0	0	0.125663706
24.91164102	0	0	0	0.125663706
31.6736765	0	0	0	0.196349541
31.67385832	3.7098	0	0	0.311724531
31.67228043	10.2376	0	0	0.173494454
24.91205267	0	0	0	0.282743339
24.91186942	0	0	0	0.282743339
24.96368494	11.23	0	0	0.005026548
24.9130784	1.5	0	0	0.125663706
31.67228043	10.2376	0	0	0.173494454
24.91132982	1.5	0	0	0.125663706
24.91166096	0	0	0	0.125663706
24.91145004	1.5	0	0	0.125663706
24.91183317	0	0	0	0.125663706
31.67437526	1.5	0	0	0.196349541
31.67396	1.5	0	0	0.196349541
24.9731297	1.5	0	0	0.196349541
24.97385096	0	0	0	0.196349541
24.97387273	0	0	0	0.196349541
24.97401213	0.5	0	0	0.159043128
24.97449568	2	0	0	0.070685835
24.97400618	0	0	0	0.159043128
24.97413522	1.2	0	0	0.070685835
31.93687627	2.3	0	0	0.003318307
31.93880077	1.9	0	0	0.003318307
32.00939006	4	0	0	0.159043128
32.09789486	4	0	0	0.159043128
32.09794939	4	0	0	0.196349541
32.11255444	4	0	0	0.070685835
31.90912005	4	0	0	0.070685835
31.93633748	2.1	0	0	0.003318307
31.93716245	2.3	0	0	0.003318307
31.93923209	2.3	0	0	0.003318307
24.97156039	1.5	0	0	0.070685835
31.93647259	2.3	0	0	0.003318307

TABLE 251 CONTINUED: PIPING RESULTS - R

Flow Element Results				
Downstream Results				
Downstream Node Static Temperature (°C)	Elevation (m)	Quality	Mach number	Area (m^2)
31.93936911	2.3	0	0	0.003318307
31.9227086	2	0	0	0.003318307
24.97193712	1.5	0	0	0.196349541
31.92946217	1	0	0	0.003318307
24.97459677	2	0	0	0.070685835
31.90210475	4	0	0	0.196349541
31.67361531	0	0	0	0.196349541
29.16054401	4	0	0	0.031415927
24.9130326	0	0	0	0.125663706
24.97313075	1.5	0	0	0.196349541
25.01459303	12.23	0	0	0.005026548
24.97311395	1.5	0	0	0.196349541
24.97272343	1.5	0	0	0.196349541
24.97258137	1.5	0	0	0.196349541
24.97364775	0	0	0	0.196349541
25.81471558	4.8	0	0	0.005026548
25.81313101	4.83	0	0	0.000506707
25.8059134	4.83	0	0	0.000506707
24.96389854	4.83	0	0	0.005026548
25.81973751	4.83	0	0	0.000506707
25.81263394	4.83	0	0	0.000506707
25.8106855	4.83	0	0	0.000506707
25.80342497	4.83	0	0	0.000506707
31.936181	2.1	0	0	0.003318307
24.97321511	1.5	0	0	0.196349541
25.11062092	2.4	0	0	0.017671459
24.9710948	4.83	0	0	0.000506707
24.97258263	4.83	0	0	0.000506707
24.97110612	4.83	0	0	0.000506707
24.97257035	4.83	0	0	0.000506707
24.97108949	4.83	0	0	0.000506707
24.97258619	4.83	0	0	0.000506707
24.96398347	4.83	0	0	0.005026548
24.91594415	1.33	0	0	0.031415927
29.15935499	4.83	0	0	0.017671459
24.91608394	1.33	0	0	0.012271846
24.96399253	4.83	0	0	0.005026548
25.06643842	1.33	0	0	0.007853982
24.98004657	12.73	0	0	0.017671459
29.01803241	4.83	0	0	0.017671459
25.06737025	1.33	0	0	0.017671459

TABLE 251 CONTINUED: PIPING RESULTS - R

Flow Element Results				
Downstream Results				
Downstream Node Static Temperature (°C)	Elevation (m)	Quality	Mach number	Area (m^2)
24.99762288	11	0	0	0.005026548
30.05483691	12.73	0	0	0.017671459
30.05478183	12.73	0	0	0.017671459
24.96380134	4.83	0	0	0.017671459
30.0535302	11	0	0	0.010053096
24.96286352	12.23	0	0	0.005026548
24.98648197	9.53	0	0	0.005026548
24.99132574	12.23	0	0	0.017671459
24.97067687	9.53	0	0	0.010053096
24.96261215	12.23	0	0	0.017671459
24.96265784	12.23	0	0	0.017671459
24.91294539	1.5	0	0	0.125663706
24.97120105	1.5	0	0	0.070685835
24.97159865	1.5	0	0	0.196349541
25.81659349	4.83	0	0	0.005026548
32.26997212	4	0	0	0.070685835
25.06162936	12.73	0	0	0.005026548
25.01459303	12.23	0	0	0.005026548
25.01457886	12.23	0	0	0.005026548
25.07263554	2.8	0	0	0.017671459
24.91291695	1.27	0	0	0.017671459
24.91294595	1.33	0	0	0.031415927
24.91322214	1.27	0	0	0.005026548
24.91457027	1.27	0	0	0.005026548
30.05453061	12.73	0	0	0.005026548
24.91302762	0	0	0	0.125663706
24.96363138	1.8	0	0	0.005026548
24.96400793	2.1	0	0	0.017671459
24.96397354	2.4	0	0	0.017671459
30.05427536	12.23	0	0	0.005026548
24.97930732	12.23	0	0	0.005026548
24.98613728	11.23	0	0	0.005026548

TABLE 252: PIPING RESULTS - S

Flow Element Results		
Downstream Results		
Total enthalpy (kJ/kg)	**Static enthalpy (kJ/kg)**	**Element Exit Pressure (kPa)**
131.6400839	131.6375835	233.0377483
104.56193	104.5619128	112.5164697
108.4275757	108.4275505	223.5407488
104.9415779	104.9415779	97.83584323
104.9415779	104.9415779	272.7734012
104.942057	104.942057	272.7734012
104.56193	104.559533	112.6182537
104.56193	104.5607787	112.6212018
104.56193	104.5615599	112.596633
104.959275	104.9573382	266.812096
104.56193	104.5619128	112.516988
133.8799726	133.8755239	227.4858176
134.0667292	134.0655648	256.4214859
134.0667292	134.0659055	257.1634823
134.0706516	134.0699276	263.5554263
134.059865	134.0589041	252.7985697
122.4101274	122.4087344	214.6754237
104.5494764	104.5491717	99.29539562
122.6193676	122.6169785	224.8101433
105.5503544	105.5479711	485.4156563
133.8799726	133.8757919	222.230354
133.9093906	133.9067887	255.3341681
104.547221	104.5460777	95.13719372
105.5160334	105.51365	431.4052062
134.069671	134.0550952	290.8547554
134.0667292	134.0657683	270.9758357
134.059865	134.0589041	252.9865647
126.1681489	126.1679747	223.2133997
104.8777372	104.8775635	230.1692489
104.9311246	104.9311246	247.1460731
104.9166509	104.9166509	210.8768977
104.9130324	104.9130324	147.0589865
104.5623661	104.5622163	119.0276871
104.9130324	104.9130324	147.0589865
104.5476571	104.547467	104.6913333
104.5623661	104.562176	119.1535837
104.5476571	104.547468	104.6914873
104.5623661	104.562177	119.2649893
132.949417	132.94817	247.6449758
132.9130387	132.9125439	209.6316587
104.9657839	104.962171	279.6342479

TABLE 252 CONTINUED: PIPING RESULTS - S

Flow Element Results		
Downstream Results		
Total enthalpy (kJ/kg)	**Static enthalpy (kJ/kg)**	**Element Exit Pressure (kPa)**
132.8490271	132.8486278	145.8453111
104.5621976	104.5615983	118.4577116
104.562275	104.5619935	118.8699703
132.8490271	132.8486278	145.8453111
104.54732	104.5472158	104.3684242
104.562029	104.5619248	118.9822283
104.54732	104.5470196	104.3387525
104.562029	104.5617286	118.8596911
132.949417	132.9444287	248.447124
132.9130387	132.9125439	207.7035257
132.8490271	132.8486278	143.9172483
104.56193	104.559533	116.7129303
104.56204	104.5608364	117.7619826
104.8875432	104.8853965	235.7024701
104.547221	104.546128	96.26332197
132.8490271	132.8486278	143.9172483
104.5469534	104.5464254	103.9397551
104.5616624	104.5611344	118.3536324
104.5469534	104.5459231	103.3534476
104.5616624	104.5606321	117.5321677
132.934708	132.9334609	229.2929996
132.934708	132.9334609	231.2211528
104.9238878	104.9238878	232.4811171
104.9759452	104.9717809	285.5159561
104.9759452	104.9737233	285.5960374
104.9710422	104.9695609	279.6888748
104.9563332	104.9543673	261.4203326
104.9759452	104.9725586	284.880933
104.964178	104.9623641	271.6207171
134.0667292	134.0660052	268.2752377
134.0706516	134.0699276	263.6973367
134.3395911	134.3380092	234.6497376
134.7081966	134.7045823	233.0181929
134.7081966	134.7058253	232.9092677
134.7726515	134.7707208	236.7608282
133.9218806	133.9198058	236.0569725
134.0686904	134.0647435	272.582191
134.0667292	134.0659055	266.9348101
134.0667292	134.0659055	257.3247975
104.9607624	104.9573084	279.4735552

TABLE 252 CONTINUED: PIPING RESULTS - S

Flow Element Results		
Downstream Results		
Total enthalpy (kJ/kg)	**Static enthalpy (kJ/kg)**	**Element Exit Pressure (kPa)**
134.0667292	134.0655648	270.0985281
134.0667292	134.0655648	256.6490419
134.069671	134.0550959	335.7224691
104.9607624	104.9603148	278.0354164
134.079477	134.0649015	315.2587418
104.9563332	104.9539986	260.9260078
133.8799726	133.8757919	221.8225274
132.949417	132.9444287	248.7312651
122.4182663	122.4168734	220.0528766
104.56193	104.561924	112.4836723
104.9612362	104.9570718	272.7734012
105.0949337	105.0949337	229.9847542
104.9657839	104.9653156	278.14445
104.9633014	104.9614699	277.0928178
104.9612362	104.9570718	275.2750084
104.9759452	104.9717809	286.4413029
108.4337239	108.433498	223.2678643
108.4275757	108.4250974	223.5730217
108.4275757	108.4250975	256.5279989
104.9503016	104.9500758	303.2443387
108.4558231	108.4533845	224.2633953
108.4558231	108.4533846	256.6984011
108.41712	108.4146267	223.3179996
108.41712	108.4146268	256.4686516
134.0686904	134.0653373	273.3776952
104.9612362	104.9612362	272.7734012
105.539862	105.5374782	277.1477538
104.9503016	104.9478245	270.2891428
104.9503016	104.9478245	263.5143368
104.9503016	104.9478642	270.2412729
104.9503016	104.9478642	263.5738894
104.9503016	104.9478095	270.3119384
104.9503016	104.9478095	263.4967058
104.9503016	104.9502017	302.8709072
104.548888	104.5481337	85.11270784
122.4101274	122.4057249	216.2280322
104.548888	104.5439446	84.11509271
104.9503016	104.9502764	302.8363137
105.5503544	105.538289	487.7871938
104.8737786	104.8737786	146.7511027
121.8248097	121.8245044	222.7302812

TABLE 252 CONTINUED: PIPING RESULTS - S

Flow Element Results		
Downstream Results		
Total enthalpy (kJ/kg)	**Static enthalpy (kJ/kg)**	**Element Exit Pressure (kPa)**
105.5503544	105.5479711	484.3995181
105.0350291	105.0350291	242.0097814
126.0903873	126.0902131	146.576078
126.0903873	126.0902131	146.8308716
104.9503016	104.949997	303.6772632
126.1073517	126.1068135	171.3511984
104.8777372	104.8755904	228.7622849
105.0016486	105.0016486	256.3814528
104.9976646	104.9976646	229.9847542
104.9042134	104.9036767	222.1711699
104.8777372	104.8775635	230.0886529
104.8777372	104.8775635	229.8806095
104.547221	104.5460674	96.86081073
104.9571702	104.9535247	277.1792128
104.9571702	104.9566977	275.6614292
108.4416423	108.4415423	223.3538557
135.4288286	135.4267329	234.8844798
105.2148611	105.2148611	146.7511023
105.0949337	105.0949337	229.9847542
105.0948745	105.0948745	229.9847542
105.5359396	105.5335562	444.9651819
104.5494764	104.5491717	99.50810675
104.548888	104.5481337	98.69985601
104.5494764	104.545711	97.82416242
104.5494764	104.545711	91.71476013
126.0903873	126.0882345	147.7736857
104.56193	104.5618431	112.4993309
104.9800138	104.9762491	336.2982279
104.977072	104.9767674	331.7060773
104.9741302	104.9738256	328.6787724
126.0952903	126.0931376	154.3794182
104.8777372	104.8777372	154.3794182
104.9849496	104.9849496	239.7612964

TABLE 253: PIPING RESULTS - T

Flow Element Results		
Downstream Results	Forces	
	Forces From Pressure Difference	Forces From Velocity Change
Element Exit Enthalpy (kJ/kg)	Magnitude (N)	Magnitude (N)
131.6400839	209.8018541	-0.000415439
104.56193	0.146544157	-2.80937E-09
108.4275757	0.16222124	-4.16683E-09
104.9415779	1842.737247	0
104.9415779	0	0
104.942057	0	0
104.56193	1157.744083	-0.003100311
104.56193	21.783136	-2.8019E-05
104.56193	7.30554096	-3.02058E-06
104.959275	910.2066712	-0.001623758
104.56193	0.454278868	-8.70886E-09
133.8799726	738.1446035	-0.003183638
134.0667292	0.139891546	-1.58039E-07
134.0667292	0.100095102	-7.9992E-08
134.0706516	0.088385076	-6.2081E-08
134.059865	0.116153142	-1.08284E-07
122.4101274	43.08424246	-5.71143E-05
104.5494764	0.146918247	-4.502E-08
122.6193676	675.5930997	-0.001422724
105.5503544	0.532511377	-1.2914E-06
133.8799726	175.8468684	-0.000712786
133.9093906	-218.7206589	0.000450558
104.547221	1877.224359	-0.002033781
105.5160334	908.2272634	-0.002018636
134.069671	73.27972669	-0.00095621
134.0667292	7.856249662	-6.27157E-06
134.059865	55.94833264	-4.89993E-05
126.1681489	-1354.293374	0.000219705
104.8777372	1292.822237	-0.000204445
104.9311246	0.000202772	0
104.9166509	6734.565154	0
104.9130324	11072.05369	0
104.5623661	9.703366333	-1.62402E-06
104.9130324	11072.05369	0
104.5476571	-2200.540554	0.000379496
104.5623661	-1821.19105	0.000342265
104.5476571	-2200.559904	0.000377471
104.5623661	-1835.15094	0.000343381
132.949417	135.0822531	-0.000162543
132.9130387	6729.976241	-0.002650661
104.9657839	46.72872008	-0.000175115

TABLE 253 CONTINUED: PIPING RESULTS - T

Flow Element Results		
Downstream Results	Forces	
	Forces From Pressure Difference	Forces From Velocity Change
Element Exit Enthalpy (kJ/kg)	Magnitude (N)	Magnitude (N)
132.8490271	11066.57967	-0.004172164
104.5621976	45.92915284	-3.07481E-05
104.562275	15.46131594	-4.8615E-06
132.8490271	11066.57967	-0.004172164
104.54732	-2159.962503	0.000203947
104.562029	-1838.513481	0.000189598
104.54732	-2156.234044	0.000585912
104.562029	-1830.776721	0.000544019
132.949417	55.79110759	-0.000268534
132.9130387	6729.969954	-0.002650686
132.8490271	11066.56749	-0.004195259
104.56193	31.73603039	-8.49854E-05
104.56204	62.50458622	-8.4046E-05
104.8875432	-34.88520826	6.425E-05
104.547221	1875.722391	-0.001960551
132.8490271	11066.56749	-0.004195259
104.5469534	-2106.094704	0.001001837
104.5616624	-1821.887275	0.000951122
104.5469534	-2032.417563	0.001862648
104.5616624	-1802.404816	0.001833302
132.934708	2932.393342	-0.002922639
132.934708	2932.396254	-0.002922612
104.9238878	2879.457378	0
104.9759452	181.6918115	-0.000784834
104.9759452	12.74313537	-2.93702E-05
104.9710422	839.99399	-0.001143808
104.9563332	1397.271248	-0.002502724
104.9759452	106.9539554	-0.000375712
104.964178	570.3049407	-0.000961098
134.0667292	7.520290839	-4.4896E-06
134.0706516	11.57042222	-1.01075E-05
134.3395911	8.332663388	-1.28079E-05
134.7081966	5.606654786	-1.97261E-05
134.7081966	15.88339239	-3.66648E-05
134.7726515	490.1316861	-0.000763747
133.9218806	91.85693056	-0.0001606
134.0686904	7.441969077	-2.63338E-05
134.0667292	7.661804361	-5.22103E-06
134.0667292	28.21584419	-2.29987E-05
104.9607624	26.18833269	-9.38292E-05
134.0667292	8.144311369	-7.92547E-06

TABLE 253 CONTINUED: PIPING RESULTS - T

Flow Element Results		
Downstream Results	Forces	
	Forces From Pressure Difference	Forces From Velocity Change
Element Exit Enthalpy (kJ/kg)	Magnitude (N)	Magnitude (N)
134.0667292	40.77639437	-4.67003E-05
134.069671	49.02269675	-0.000664833
104.9607624	5.415280306	-2.51451E-06
134.079477	8.321092154	-0.000126365
104.9563332	1400.024226	-0.002978687
133.8799726	65.64946923	-0.000266108
132.949417	-5409.826623	0.019573042
122.4182663	-168.9377545	0.000178769
104.56193	0.057739625	-3.88613E-10
104.9612362	491.190478	-0.002121695
105.0949337	1.25056E-12	0
104.9657839	2.8267963	-1.37289E-06
104.9633014	29.5603164	-5.61574E-05
104.9612362	21.18881357	-9.15259E-05
104.9759452	-2683.691255	0.010063102
108.4337239	-0.441621888	5.93602E-08
108.4275757	16.48515091	-4.16741E-05
108.4275757	3.218689385	-8.138E-06
104.9503016	1.034218762	-2.37624E-07
108.4558231	16.22510188	-4.03532E-05
108.4558231	3.167678584	-7.87945E-06
108.41712	16.58301197	-4.21768E-05
108.41712	3.237886294	-8.23639E-06
134.0686904	6.812070228	-2.03228E-05
104.9612362	0	0
105.539862	17.80895231	-3.86634E-05
104.9503016	16.49191592	-4.23709E-05
104.9503016	3.219494615	-8.27206E-06
104.9503016	16.23188747	-4.10422E-05
104.9503016	3.168487251	-8.01034E-06
104.9503016	16.58976917	-4.28748E-05
104.9503016	3.23869023	-8.37165E-06
104.9503016	0.577784649	-5.8724E-08
104.548888	0.218055144	-1.6544E-07
122.4101274	125.45429	-0.000525628
104.548888	1.890194596	-9.39859E-06
104.9503016	0.162738254	-4.16856E-09
105.5503544	3.836621691	-4.71031E-05
104.8737786	-7.81453E-06	2.40624E-35
121.8248097	6.634770537	-1.73212E-06
105.5503544	6.922649491	-1.67883E-05

TABLE 253 CONTINUED: PIPING RESULTS - T

Flow Element Results		
Downstream Results	Forces	
	Forces From Pressure Difference	Forces From Velocity Change
Element Exit Enthalpy (kJ/kg)	Magnitude (N)	Magnitude (N)
105.0350291	72.23989947	0
126.0903873	1.407517411	-2.73242E-07
126.0903873	0.004257471	-8.26171E-10
104.9503016	420.9240587	-0.00011482
126.1073517	150.4138441	-8.03348E-05
104.8777372	3.586840508	-7.98693E-06
105.0016486	-72.23987118	0
104.9976646	-2.53134E-05	-6.07555E-28
104.9042134	-135.5778404	6.55944E-05
104.8777372	1.424251407	-2.566E-07
104.8777372	0.004288457	-7.71529E-10
104.547221	1877.535333	-0.002080219
104.9571702	27.60723909	-0.000104395
104.9571702	5.702640929	-2.7947E-06
108.4416423	0.576441144	-5.87459E-08
135.4288286	209.2830916	-0.0003551
105.2148611	418.377963	-1.48339E-26
105.0949337	49.14223301	0
105.0948745	1.13687E-13	0
105.5359396	-239.6247878	0.000474434
104.5494764	221.0198062	-6.62477E-05
104.548888	420.5153581	-0.000309767
104.5494764	0.775445621	-2.93689E-06
104.5494764	0.775447056	-2.93692E-06
126.0903873	33.2040695	-7.2943E-05
104.56193	0.624098627	-6.05701E-08
104.9800138	25.52754338	-8.66959E-05
104.977072	34.70192211	-9.41272E-06
104.9741302	34.81204066	-9.44689E-06
126.0952903	66.77224418	-0.000146758
104.8777372	363.1307679	-1.01627E-26
104.9849496	-49.14226131	0

TABLE 254: PIPING RESULTS - U

Flow Element Results
Water Hammer Parameters
Axial restraint constant
1.277208937
1.272874347
1.306936713
63.53816794
1.277202284
1.27373624
1.272874347
1.272874347
1.272874347
1.277208937
1.272874347
1.27373624
1.316782309
1.316782309
1.316782309
1.316782309
1.282678773
1.288242828
1.288242828
1.288242828
1.27373624
1.29047619
1.275033802
1.288242828
1.316782309
1.316782309
1.316782309
1.288242828
1.288242828
1.27373624
1.25
1.271154631
1.272874347
1.271154631
1.275033802
1.275033802
1.275033802
1.275033802
1.27373624
1.25
1.277202284

TABLE 254 CONTINUED: PIPING RESULTS - U

Flow Element Results
Water Hammer Parameters
Axial restraint constant
1.271154631
1.272874347
1.272874347
1.271154631
1.275033802
1.275033802
1.275033802
1.275033802
1.27373624
1.25
1.271154631
1.272874347
1.272874347
1.306936713
63.53816794
1.271154631
1.275033802
1.275033802
1.275033802
1.275033802
1.27373624
1.27373624
1.27373624
1.273723743
60.38809752
1.25
1.277208937
1.27500903
1.277208937
1.316782309
1.316782309
1.275010498
1.25
1.27373624
1.277208937
1.277208937
1.316782309
1.316782309
1.316782309
1.277202284
1.316782309

TABLE 254 CONTINUED: PIPING RESULTS - U

Flow Element Results
Water Hammer Parameters
Axial restraint constant
1.316782309
1.316782309
1.27373624
1.316782309
1.277208937
1.273735253
1.27373624
1.282678773
1.275033802
1.27373624
1.306936713
1.27373624
1.27373624
1.27373624
1.27373624
1.306936713
266.0093284
1.369265666
1.306936713
266.0093284
1.369265666
266.0093284
1.369265666
1.316782309
1.27373624
1.288242828
266.0093284
1.369265666
266.0093284
1.369265666
1.369265666
1.369265666
1.306936713
1.282678773
1.288300207
1.288884641
1.306936713
1.29942105
1.288242828
1.279045249
1.288242828

TABLE 254 CONTINUED: PIPING RESULTS - U

Flow Element Results
Water Hammer Parameters
Axial restraint constant
1.306936713
1.288242828
1.288242828
1.288300207
1.306936713
1.306936713
1.306936713
1.288242828
1.306936713
1.288242828
1.288242828
63.53816794
1.277202284
1.27373624
1.306936713
1.277208937
1.306936713
1.306936713
1.306936713
1.288242828
1.288242828
1.282678773
1.306937279
1.306936713
1.306936713
1.275033802
1.306936713
1.288242828
1.288242828
1.306936713
1.306936713
1.306936713

RESERVOIRS

TABLE 255: RESERVOIR RESULTS - A

General	Flow Node Results		
Identifier	Total pressure (kPa)	Total temperature (°C)	Static pressure (kPa)
Reservoir - 209	87.17998944	24.911	87.17998944
Reservoir - 210	87.17998953	24.911	87.17998953
Reservoir - 211	87.17998991	24.911	87.17998991

TABLE 256: RESERVOIR RESULTS - B

Flow Node Results				
Static temperature (°C)	Total mass (kg)	Mass source (kg/s)	Mach number	Heat transfer (kW)
24.91099971	339959.2296	154.2975	0	0
24.91099971	339959.2296	154.2975	0	0
24.91099971	339959.2296	308.595	0	0

TABLE 257: RESERVOIR RESULTS - C

Flow Node Results			
Flashing/cavitating	Enthalpy (kJ/kg)	Energy source (kW)	Liquid phase volume fraction
False	104.5300618	-59.42961662	0
False	104.5300618	-59.4296166	0
False	104.5300618	-118.8592331	0

TABLE 258: RESERVOIR RESULTS - D

Flow Node Results				
Density (kg/m^3)	Conductivity (W/m.K)	Viscosity (kg/m.s)	Specific heat (kJ/kg.K)	Prandtl number
996.9478873	0.606877423	0.000900532	4.181807089	6.205292274
996.9478873	0.606877557	0.000900532	4.181807089	6.205290477
996.9478873	0.606877704	0.000900532	4.181807089	6.205288522

TABLE 259: RESERVOIR RESULTS - E

Flow Node Results			
Flow Node Results		Convergence	
Hydraulic Grade Line (m)	Energy Line (m)	Mass convergence	Energy convergence
12.21203608	12.21203608	0	0
12.17766127	12.17766127	0	0
12.140278	12.140278	0	0

NON-RETURN VALVES

TABLE 260: NON-RETURN VALVE RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
V-601	False	False	0.885020528
V-609	False	False	0.624396879
V-616	False	False	0.079639753
V-621	False	False	0.838543705
V-628	False	False	0.8770906
V-675	False	False	0

TABLE 261: NON-RETURN VALVE RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	Incondensable Mass Flow Rate (kg/s)	Element is choked	Mass Flux (kg/m^2.s)
24.97096424	0	False	2692.13615
25.0672598	0	False	2176.88922
24.96401325	0	False	778.197499
24.97133592	0	False	2620.49536
24.97242821	0	False	2680.04917
24.96851259	0	False	0

TABLE 262: NON-RETURN VALVE RESULTS - C

Flow Element Results		
Generic Results	Flow and Geometry variables	
Critical Mass Flux (kg/m^2.s)	Total mass flow (kg/s)	Total volume flow (m^3/s)
47227.61849	190.2958916	0.1908642
60355.89821	38.46880791	0.038581059
49969.44935	13.75188495	0.013792577
47434.23223	185.2319023	0.185784901
47465.0058	189.4415133	0.190007104
46999.21647	0	0

TABLE 263: NON-RETURN VALVE RESULTS - D

Flow Element Results		
Flow and Geometry variables		
Volume flow based on ambient conditions (m^3/s)	Maximum velocity (m/s)	Mean pressure (kPa)
0.190881772	0	278.5938245
0.038587245	0	485.1034579
0.013794224	0	331.177404
0.185802192	0	280.8143155
0.190024764	0	281.310197
0	0	272.7734012

TABLE 264: NON-RETURN VALVE RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Node pressure drop (kPa)	Pressure ratio (up/down)	Pressure ratio (down/up)	Total temperature (°C)
0.885020528	1.003181795	0.996828296	24.9709642
0.624396879	1.001287971	0.998713686	25.067259
1.057346694	1.003197795	0.996812399	24.9640132
0.838543705	1.00299058	0.997018337	24.9713359
0.8770906	1.003122745	0.996886976	24.9724282
0	1	1	24.9685125

TABLE 265: NON-RETURN VALVE RESULTS - F

Flow Element Results				
Flow and Geometry variables				Energy and Heat Transfer variables
Quality	Total volume (m^3)	Total mass (kg)	Static pressure (kPa)	Total heat transfer (kW)
0	0	0	275.4017139	0
0	0	0	483.0393191	0
0	0	0	331.4023857	0
0	0	0	277.7898389	0
0	0	0	278.1466883	0
0	0	0	272.7734012	0

TABLE 266: NON-RETURN VALVE RESULTS - G

Flow Element Results			
Energy and Heat Transfer variables	Non-dimensional variables		Fluid variables
Total power (kW)	Total non-dimensional mass flow	Mach number	Density (kg/m^3)
0	1177.510643	0	997.0224466
0	136.8551945	0	997.0905069
0	71.5813686	0	997.049705
0	1137.221502	0	997.0234447
0	1160.941732	0	997.0233206
0	0	0	997.0218428

TABLE 267: NON-RETURN VALVE RESULTS - H

Flow Element Results			
Fluid variables			
Conductivity (W/m.K)	Viscosity (kg/m.s)	Static enthalpy (kJ/kg)	Specific heat (kJ/kg.K)
0.607016429	0.000899334	104.9535247	4.181076187
0.607273643	0.00089738	105.5479711	4.180210721
0.607031412	0.000899452	104.9767674	4.180880492
0.607018265	0.000899326	104.9573084	4.181068517
0.607020274	0.000899304	104.9621711	4.18106667
0.607011267	0.000899379	104.9415779	4.1810859

TABLE 268: NON-RETURN VALVE RESULTS - I

Flow Element Results		
Fluid variables		Convergence
Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)	Pressure convergence (kPa)
-1	0	-1.27002E-09
-1	0	-8.608E-10
-1	0	-2.97006E-10
-1	0	4.43696E-10
-1	0	1.29415E-09
-1	0	0

TABLE 269: NON-RETURN VALVE RESULTS - J

Flow Element Results		
Upstream Results		
Velocity (m/s)	Junction pressure loss (kPa)	Upstream Node Total Pressure (kPa)
2.700176078	0	279.0363347
2.183241347	0	485.4156563
0.780500205	0	331.7060773
2.628318702	0	281.2335874
2.688050644	0	281.7487423
0	0	272.7734012

TABLE 270: NON-RETURN VALVE RESULTS - K

Flow Element Results	
Upstream Results	
Upstream Node Static Pressure (kPa)	Upstream Node Total Temperature (°C)
275.4017139	24.97086706
483.0393191	25.06719082
331.4023857	24.96401365
277.7898389	24.97124384
278.1466883	24.9723319
272.7734012	24.96851259

TABLE 271: NON-RETURN VALVE RESULTS - L

Flow Element Results				
Upstream Results				
Upstream Node Static Temperature (°C)	Elevation (m)	Quality	Mach number	Area (m^2)
24.97079321	1.5	0	0	0.070685835
25.06714571	1.33	0	0	0.017671459
24.96400793	2.1	0	0	0.017671459
24.97117387	1.5	0	0	0.070685835
24.97225871	1.5	0	0	0.070685835
24.96851259	1.5	0	0	0.070685835

TABLE 272: NON-RETURN VALVE RESULTS - M

Flow Element Results		
Upstream Results		
Total enthalpy (kJ/kg)	Static enthalpy (kJ/kg)	Element Inlet Pressure (kPa)
104.9571702	104.9535247	279.0363347
105.5503544	105.5479711	485.4156563
104.977072	104.9767674	331.7060773
104.9607624	104.9573084	281.2335874
104.9657839	104.9621711	281.7487423
104.9415779	104.9415779	272.7734012

TABLE 273: NON-RETURN VALVE RESULTS - N

Flow Element Results		
Upstream Results	Downstream Results	
Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)	Junction pressure loss (kPa)
104.9571702	2.700177321	0
105.5503544	2.183242042	0
104.977072	0.780500577	0
104.9607624	2.628319848	0
104.9657839	2.688051871	0
104.9415779	0	0

TABLE 274: NON-RETURN VALVE RESULTS - O

Flow Element Results	
Downstream Results	
Downstream Node Total Pressure (kPa)	Downstream Node Static Pressure (kPa)
278.1513142	274.5166917
484.7912595	482.4149214
330.6487306	330.3450388
280.3950436	276.9512937
280.8716517	277.2695961
272.7734012	272.7734012

TABLE 275: NON-RETURN VALVE RESULTS - P

Flow Element Results	
Downstream Results	
Downstream Node Total Temperature (°C)	Downstream Node Static Temperature (°C)
24.97106142	24.97098757
25.06732879	25.06728368
24.96401285	24.96400714
24.97142799	24.97135802
24.97252452	24.97245133
24.96851259	24.96851259

TABLE 276: NON-RETURN VALVE RESULTS - Q

Flow Element Results					
Downstream Results					
Elevation (m)	Quality	Mach number	Area (m^2)	Total enthalpy (kJ/kg)	Static enthalpy (kJ/kg)
1.5	0	0	0.070686	104.9571702	104.9535247
1.33	0	0	0.017671	105.5503544	105.5479711
2.2	0	0	0.017671	104.9760914	104.9757868
1.5	0	0	0.070686	104.9607624	104.9573084
1.5	0	0	0.070686	104.9657839	104.962171
1.5	0	0	0.070686	104.9415779	104.9415779

TABLE 277: NON-RETURN VALVE RESULTS - R

Flow Element Results		
Downstream Results		Forces
		Forces From Pressure Difference
Element Exit Pressure (kPa)	Element Exit Enthalpy (kJ/kg)	Magnitude (N)
278.1513142	104.9571702	62.55853281
484.7912595	105.5503544	11.034017
330.6487306	104.9760914	18.68486095
280.3950436	104.9607624	59.27326796
280.8716517	104.9657839	61.99799754
272.7734012	104.9415779	0

TABLE 278: NON-RETURN VALVE RESULTS - S

Flow Element Results Downstream Results Forces From Velocity Change	Check Valve Results	
Magnitude (N)	Valve flow coefficient (Cv) (m^3/sqrt(bar).h)	Opening (0-1)
-0.000236563	7295.474579	1
-2.67588E-05	1755.757367	1
-5.11983E-06	1757.487178	1
-0.00021237	7295.474579	1
-0.000232339	7295.474579	1
0	7295.474579	1

TABLE 279: NON-RETURN VALVE RESULTS - T

Check Valve Results
Static pressure differential (kPa)
0.885022201
0.624397636
0.079639898
0.838545207
0.877092243
0

CONTROL VALVES WITH ITERATIVE SCRIPT

TABLE 280: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
GV - 0	False	False	0.185398478
GV - 1	False	False	0.131150666
GV - 11	False	False	0.414257192
GV - 15	False	False	0.000232061
GV - 17	False	False	160.0054097
GV - 184	False	False	0.380221462
GV - 19	False	False	2.320663972
GV - 2	False	False	0.115274805
GV - 212	False	False	0.030326143
GV - 213	False	False	0.030163768
GV - 214	False	False	0.016620547
GV - 215	False	False	0.047917453
GV - 216	False	False	0.084237129
GV - 217	False	False	0.164354365
GV - 218	False	False	0.147248265
GV - 219	False	False	2.075311059
GV - 220	False	False	59.87898649
GV - 221	False	False	59.87898649
GV - 222	False	False	2.075311059
GV - 223	False	False	0.147248265
GV - 248	False	False	0.398171189
GV - 3	False	False	0.152991315
GV - 30	False	False	0.174352455
GV - 336	False	False	0.421156583
GV - 356	False	False	0.414397308
GV - 367	False	False	0.423700523
GV - 41	False	False	0.185397262
GV - 410	False	False	0.421060267
GV - 422	False	False	0.414301839
GV - 430	False	False	0.42360389
GV - 45	False	False	0.131150051
GV - 48	False	False	0.333614007
GV - 49	False	False	0.115274509
GV - 53	False	False	0.152990062
GV - 54	False	False	0.576328898
GV - 55	False	False	0.550999999
GV - 56	False	False	0.581539599
GV - 571	False	False	0.182367338
GV - 66	False	False	0.380671611
GV - 71	False	False	0.184015836

TABLE 281: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	**Incondensable Mass Flow Rate (kg/s)**	**Element is choked**	**Mass Flux (kg/m².s)**
31.93936911	0	False	1518.579519
31.93923209	0	False	1277.232037
31.90196654	0	False	2269.980394
31.92223749	0	False	53.72734661
25.07275714	0	False	4898.000747
25.07263554	0	False	2176.889221
31.92946217	0	False	5372.734661
31.93880077	0	False	1197.43615
24.91133828	0	False	614.7542452
24.91133827	0	False	613.1062464
24.91133067	0	False	455.1091621
24.91133355	0	False	772.7513295
24.91132982	0	False	1024.577014
24.91145004	0	False	1431.143969
31.6722673	0	False	1353.377559
31.67185207	0	False	1353.378094
24.98936755	0	False	0
24.98936755	0	False	0
31.67185207	0	False	1353.378094
31.6722673	0	False	1353.377559
31.36382156	0	False	2225.676037
31.93852041	0	False	1379.486955
24.9130784	0	False	1474.028643
25.80591001	0	False	2290.755893
25.8126306	0	False	2272.297081
25.80342156	0	False	2297.664705
31.93647259	0	False	1518.579519
24.97109151	0	False	2290.755893
24.97110288	0	False	2272.297081
24.97108618	0	False	2297.664705
31.93716245	0	False	1277.232037
32.27006471	0	False	2036.947491
31.93687627	0	False	1197.43615
31.93628874	0	False	1379.486955
24.97245133	0	False	2680.049179
24.97135802	0	False	2620.495366
24.97098757	0	False	2692.136159
24.91332593	0	False	1507.527663
29.20425137	0	False	2176.889221
24.91294539	0	False	1514.32659

TABLE 282: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - C

Flow Element Results	
Flow and Geometry variables	
Total mass flow (kg/s)	**Total volume flow (m^3/s)**
5.039113412	0.005064018
4.238248318	0.004259193
17.82838433	0.01791628
17.82838433	0.017915655
38.46880791	0.038581939
38.46880791	0.03858182
17.82838433	0.0179161
3.973461047	0.003993086
77.25229682	0.077488191
77.04520318	0.077280464
57.190704	0.057365345
97.106796	0.097403339
128.7521448	0.129145366
179.8428552	0.180392216
154.2974695	0.155053317
154.2975305	0.155053207
0	0
0	0
154.2975305	0.155053207
154.2974695	0.155053317
157.3237684	0.158070303
4.577561551	0.00460019
185.2319023	0.185798422
1.12447217	0.001128092
1.115411221	0.001119004
1.127863524	0.001131494
5.039113412	0.005063985
1.12447217	0.001127834
1.115411221	0.001118746
1.127863524	0.001131236
4.238248318	0.004259173
143.9833336	0.144712767
3.973461047	0.003993076
4.577561551	0.004600152
189.4415133	0.19000719
185.2319023	0.185784982
190.2958916	0.190864288
189.4415133	0.19002102
38.46880791	0.038627498
190.2958916	0.190877847

TABLE 283: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - D

Flow Element Results		
Flow and Geometry variables		
Volume flow based on ambient conditions (m^3/s)	Maximum velocity (m/s)	Mean pressure (kPa)
0.005054628	1.526084712	256.5563427
0.004251297	1.283543835	257.2592222
0.017883274	2.281171636	255.1270395
0.017883274	0.053990345	350.49589
0.038587245	4.91240511	368.8076993
0.038587245	2.183284402	445.7527988
0.017883274	5.399168478	314.0984098
0.003985694	1.203350227	263.6396993
0.07749014	0.616631428	104.6761702
0.077282409	0.614978396	104.6764054
0.057366782	0.456498914	104.3601139
0.097405767	0.775111143	104.3147938
0.129148545	1.02770617	103.8976365
0.180396553	1.435515647	103.2712704
0.154772519	1.360007263	143.8436241
0.154772579	1.360006301	144.8076555
0	0	117.1194932
0	0	117.1194932
0.154772579	1.360006301	144.8076555
0.154772519	1.360007263	143.8436241
0.157808135	2.236237338	238.1568576
0.004591655	1.386306277	252.9100691
0.185802192	1.478536866	96.17614574
0.001127934	2.298131075	256.3174206
0.001118845	2.279616695	256.4912025
0.001131336	2.30506068	256.2568013
0.005054628	1.526074708	269.5179375
0.001127934	2.297605509	270.0786127
0.001118845	2.279091515	270.034122
0.001131336	2.304534967	270.1001365
0.004251297	1.283537822	266.3813438
0.144426628	2.047266854	239.9633488
0.003985694	1.203347143	267.7297088
0.004591655	1.386294925	270.4114485
0.190024764	2.688051871	280.5834872
0.185802192	2.628319848	280.1195436
0.190881772	2.700177321	277.8605444
0.190024764	1.512139233	95.04601005
0.038587245	2.185869221	263.7194736
0.190881772	1.518957644	96.76880281

TABLE 284: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Node pressure drop (kPa)	**Pressure ratio (up/down)**	**Pressure ratio (down/up)**	**Total temperature (°C)**
0.185398478	1.000722904	0.999277619	31.9394181
0.131150666	1.00050993	0.99949033	31.939266
0.414257192	1.001625048	0.998377588	31.9020761
0.000232061	1.000000662	0.999999338	31.9222375
158.0499604	1.545408508	0.647078099	25.0906752
-1.575233877	0.99647236	1.003540128	25.0727411
2.320663972	1.007415729	0.992638859	31.9300762
0.115274805	1.000437339	0.999562852	31.9388312
0.030326143	1.000289756	0.999710328	24.911345
0.030163768	1.000288204	0.999711879	24.9113451
0.016620547	1.000159274	0.999840751	24.9113344
0.047917453	1.00045946	0.999540751	24.9113444
0.084237129	1.000811099	0.999189558	24.9113490
0.164354365	1.001592749	0.998409783	24.9114875
0.147248265	1.001024193	0.998976855	31.6723062
2.075311059	1.014434938	0.985770464	31.6720986
59.87898649	1.686843158	0.592823343	24.9955490
59.87898649	1.686843158	0.592823343	24.9955490
2.075311059	1.014434938	0.985770464	31.6720986
0.147248265	1.001024193	0.998976855	31.6723062
4.302046479	1.01822856	0.982097772	31.3638778
0.152991315	1.000605107	0.999395259	31.9385608
0.174352455	1.00181449	0.998188797	24.9131186
0.421156583	1.001644457	0.998358243	25.8060113
0.414397308	1.001616946	0.998385665	25.8127302
0.423700523	1.00165479	0.998347944	25.8035234
1.161181127	1.004317664	0.995700898	31.936509
0.421060267	1.001560245	0.998442186	24.9711912
0.414301839	1.001535435	0.998466919	24.9712009
0.42360389	1.001569552	0.998432907	24.9711864
1.106932545	1.004164095	0.995853173	31.9371849
4.236242929	1.017810923	0.982500755	32.2701039
1.091057679	1.004083541	0.995933066	31.9368945
1.128774423	1.004183015	0.995834409	31.9363169
0.576328898	1.002056149	0.99794807	24.972587
0.550999999	1.001968954	0.998034915	24.9714884
0.581539599	1.002095111	0.997909269	24.9711252
0.182367338	1.001920569	0.998083112	24.9133679
1.357243105	1.005159819	0.994866668	29.2043372
0.184015836	1.001903413	0.998100203	24.9129878

TABLE 285: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - F

Flow Element Results				
Flow and Geometry variables				Energy and Heat Transfer variables
Quality	Total volume (m^3)	Total mass (kg)	Static pressure (kPa)	Total heat transfer (kW)
0	0	0	255.4903014	0
0	0	0	256.5051058	0
0	0	0	252.7450607	0
0	0	0	350.4945556	0
0	0	0	435.8021975	0
0	0	0	442.5887978	0
0	0	0	300.754592	0
0	0	0	262.9768692	0
0	0	0	104.5017949	0
0	0	0	104.5029637	0
0	0	0	104.2645458	0
0	0	0	104.0392684	0
0	0	0	103.413273	0
0	0	0	102.3262328	0
0	0	0	142.9969466	0
0	0	0	144.9250097	0
0	0	0	147.0589865	0
0	0	0	147.0589865	0
0	0	0	144.9250097	0
0	0	0	142.9969466	0
0	0	0	237.8193109	0
0	0	0	252.030369	0
0	0	0	95.17361912	0
0	0	0	253.8957703	0
0	0	0	254.1084179	0
0	0	0	253.8205233	0
0	0	0	268.9397952	0
0	0	0	267.6575161	0
0	0	0	267.6518864	0
0	0	0	267.6644141	0
0	0	0	266.1151222	0
0	0	0	239.9963828	0
0	0	0	267.554772	0
0	0	0	270.0196478	0
0	0	0	277.2695961	0
0	0	0	276.9512937	0
0	0	0	274.5166917	0
0	0	0	93.99739785	0
0	0	0	262.0188976	0
0	0	0	95.71071175	0

TABLE 286: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - G

Flow Element Results			
Energy and Heat Transfer variables	**Non-dimensional variables**		**Fluid variables**
Total power (kW)	**Total non-dimensional mass flow**	**Mach number**	**Density (kg/m^3)**
0	34.294781	0	995.0820595
0	28.768565	0	995.0825231
0	121.95230	0	995.0940815
0	88.844440	0	995.1287844
0	148.34178	0	997.0677576
0	149.29767	0	997.0708439
0	98.776036	0	995.1040948
0	26.319422	0	995.0853241
0	1273.9532	0	996.9557463
0	1270.5362	0	996.9557468
0	946.03920	0	996.9556296
0	1606.78145	0	996.9555162
0	2138.5805	0	996.9552042
0	3004.1467	0	996.9546289
0	1871.8425	0	995.1252436
0	1847.0964	0	995.1263406
0	0	0	996.9563471
0	0	0	996.9563471
0	1847.0964	0	995.1263406
0	1871.8425	0	995.1252436
0	1142.4307	0	995.2772001
0	31.6045554	0	995.0809413
0	3322.07206	0	996.9508892
0	7.5790984	0	996.7907916
0	7.5131202	0	996.7891031
0	7.6036841	0	996.7914183
0	32.586927	0	995.0885832
0	7.1831758	0	997.0188028
0	7.1265564	0	997.0187972
0	7.2042323	0	997.0188074
0	27.732764	0	995.0871845
0	1039.4401	0	994.9594438
0	25.870221	0	995.0878744
0	29.506316	0	995.0890898
0	1164.5674	0	997.0228657
0	1140.6228	0	997.0230098
0	1181.2576	0	997.0219876
0	3437.7881	0	996.9503008
0	252.99298	0	995.8917946
0	3391.8397	0	996.9511631

TABLE 287: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - H

Flow Element Results			
Fluid variables			
Conductivity (W/m.K)	**Viscosity (kg/m.s)**	**Static enthalpy (kJ/kg)**	**Specific heat (kJ/kg.K)**
0.618578763	0.000767537	134.0655648	4.179582103
0.618579056	0.000767539	134.0659055	4.179580887
0.618521631	0.00076806	133.9067887	4.17959084
0.618597779	0.000767769	134.0794756	4.179447747
0.607261852	0.000897282	105.5277961	4.180393612
0.607264701	0.000897283	105.5335562	4.180366864
0.618586168	0.000767672	134.0649015	4.179527941
0.618581588	0.000767544	134.0699276	4.179573063
0.606840228	0.000900543	104.547467	4.181722773
0.606840229	0.000900543	104.547468	4.181722768
0.606840121	0.000900543	104.5472158	4.181723701
0.606840035	0.000900543	104.5470196	4.181724576
0.606839779	0.000900543	104.5464254	4.181727014
0.606839547	0.000900541	104.5459231	4.181731162
0.618129838	0.000771274	132.8481023	4.179791115
0.618130003	0.00077128	132.8481023	4.179787853
0.606988887	0.000898999	104.9130324	4.18150375
0.606988887	0.000898999	104.9130324	4.18150375
0.618130003	0.00077128	132.8481023	4.179787853
0.618129838	0.000771274	132.8481023	4.179791115
0.617711594	0.000775582	131.6444477	4.179689187
0.618575799	0.000767549	134.0589041	4.179586441
0.606839218	0.000900511	104.546128	4.181764171
0.608414518	0.000882902	108.424935	4.180571189
0.608425962	0.00088277	108.4532247	4.180565946
0.608410282	0.000882951	108.4144633	4.18057312
0.618581041	0.000767576	134.0655648	4.179566123
0.60701306	0.00089933	104.9476621	4.181100013
0.607013077	0.00089933	104.9477045	4.181100023
0.607013055	0.00089933	104.9476461	4.181099995
0.618580684	0.000767567	134.0659055	4.17956947
0.619064427	0.000762917	135.4335972	4.179552034
0.618580964	0.000767571	134.0660052	4.179567755
0.618581297	0.000767579	134.0657683	4.179564832
0.60702016	0.000899301	104.962171	4.18106926
0.607018157	0.000899322	104.9573084	4.181070994
0.607016314	0.00089933	104.9535247	4.181078801
0.606839113	0.000900506	104.5460777	4.181770112
0.614151582	0.00081601	122.6388459	4.17996088
0.606839233	0.000900513	104.5460674	4.181761472

TABLE 288: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - I

Flow Element Results		
Fluid variables		Convergence
Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)	Pressure convergence (kPa)
-1	0	-1.22817E-09
-1	0	1.23178E-09
-1	0	3.90192E-10
-1	0	1.97217E-13
-1	0	-2.20395E-07
-1	0	-5.19464E-10
-1	0	2.18663E-09
-1	0	-2.98601E-10
-1	0	4.95106E-14
-1	0	1.62387E-13
-1	0	5.55644E-14
-1	0	1.60341E-13
-1	0	2.23949E-13
-1	0	5.49448E-13
-1	0	3.1334E-10
-1	0	-4.41746E-09
-1	0	0
-1	0	0
-1	0	-4.41746E-09
-1	0	3.1334E-10
-1	0	5.65815E-10
-1	0	6.90731E-10
-1	0	9.24806E-11
-1	0	-1.77469E-09
-1	0	-7.45941E-10
-1	0	-1.9125E-09
-1	0	-1.22778E-09
-1	0	-1.7754E-09
-1	0	-7.46246E-10
-1	0	-1.91326E-09
-1	0	1.23246E-09
-1	0	6.75557E-10
-1	0	-2.99086E-10
-1	0	6.90399E-10
-1	0	8.5121E-10
-1	0	2.92291E-10
-1	0	-8.33847E-10
-1	0	2.69288E-10
-1	0	-5.2774E-10
-1	0	-2.6381E-10

TABLE 289: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - J

Flow Element Results		
Upstream Results		
Velocity (m/s)	Junction pressure loss (kPa)	Upstream Node Total Pressure (kPa)
1.526084712	0	256.6490419
1.283543835	0	257.3247975
2.281171636	0	255.3341681
0.053990345	0	350.496006
4.91240511	0	447.8326795
2.183284402	0	444.9651819
5.399168478	0	315.2587418
1.203350227	0	263.6973367
0.616631428	0	104.6913333
0.614978396	0	104.6914873
0.456498914	0	104.3684242
0.775111143	0	104.3387525
1.02770617	0	103.9397551
1.435515647	0	103.3534476
1.360007263	0	143.9172483
1.360006301	0	145.8453111
0	0	147.0589865
0	0	147.0589865
1.360006301	0	145.8453111
1.360007263	0	143.9172483
2.236237338	0	240.3078809
1.386306277	0	252.9865647
1.478536866	0	96.26332197
2.298131075	0	256.5279989
2.279616695	0	256.6984011
2.30506068	0	256.4686516
1.526074708	0	270.0985281
2.297605509	0	270.2891428
2.279091515	0	270.2412729
2.304534967	0	270.3119384
1.283537822	0	266.9348101
2.047266854	0	242.0814703
1.203347143	0	268.2752377
1.386294925	0	270.9758357
2.688051871	0	280.8716517
2.628319848	0	280.3950436
2.700177321	0	278.1513142
1.512139233	0	95.13719372
2.185869221	0	264.3980952
1.518957644	0	96.86081073

TABLE 290: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - K

Flow Element Results	
Upstream Results	
Upstream Node Static Pressure (kPa)	Upstream Node Total Temperature (°C)
255.4903014	31.93939821
256.5051058	31.93925267
252.7450607	31.90203155
350.4945556	31.92223753
435.8021975	25.07298541
442.5887978	25.07268063
300.754592	31.92982631
262.9768692	31.93881886
104.5017949	24.91134184
104.5029637	24.91134181
104.2645458	24.91133262
104.0392684	24.91133918
103.413273	24.91133972
102.3262328	24.91146936
142.9969466	31.67229041
144.9250097	31.67187517
147.0589865	24.98936755
147.0589865	24.98936755
144.9250097	31.67187517
142.9969466	31.67229041
237.8193109	31.36388394
252.030369	31.93854442
95.17361912	24.91309937
253.8957703	25.80596519
254.1084179	25.81268492
253.8205233	25.80347707
268.9397952	31.93650169
267.6575161	24.97114498
267.6518864	24.97115549
267.6644141	24.97113997
266.1151222	31.93718304
239.9963828	32.27011713
267.554772	31.93689436
270.0196478	31.93631275
277.2695961	24.97252452
276.9512937	24.97142799
274.5166917	24.97106142
93.99739785	24.91334787
262.0188976	29.20430757
95.71071175	24.91296752

TABLE 291: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - L

Flow Element Results				
Upstream Results				
Upstream Node Static Temperature (°C)	Elevation (m)	Quality	Mach number	Area (m^2)
31.93936911	2.3	0	0	0.003318
31.93923209	2.3	0	0	0.003318
31.90196654	1	0	0	0.007854
31.92223749	1	0	0	0.331831
25.07275714	2.4	0	0	0.007854
25.07263554	2.8	0	0	0.017671
31.92946217	1	0	0	0.003318
31.93880077	1.9	0	0	0.003318
24.91133828	1.5	0	0	0.125664
24.91133827	1.5	0	0	0.125664
24.91133067	1.5	0	0	0.125664
24.91133355	1.5	0	0	0.125664
24.91132982	1.5	0	0	0.125664
24.91145004	1.5	0	0	0.125664
31.6722673	10.2376	0	0	0.114009
31.67185207	10.2376	0	0	0.114009
24.98936755	10.2376	0	0	0.114009
24.98936755	10.2376	0	0	0.114009
31.67185207	10.2376	0	0	0.114009
31.6722673	10.2376	0	0	0.114009
31.36382156	3.3	0	0	0.070686
31.93852041	3	0	0	0.003318
24.9130784	1.5	0	0	0.125664
25.80591001	4.83	0	0	0.000491
25.8126306	4.83	0	0	0.000491
25.80342156	4.83	0	0	0.000491
31.93647259	2.3	0	0	0.003318
24.97109151	4.83	0	0	0.000491
24.97110288	4.83	0	0	0.000491
24.97108618	4.83	0	0	0.000491
31.93716245	2.3	0	0	0.003318
32.27006471	3.3	0	0	0.070686
31.93687627	2.3	0	0	0.003318
31.93628874	2.3	0	0	0.003318
24.97245133	1.5	0	0	0.070686
24.97135802	1.5	0	0	0.070686
24.97098757	1.5	0	0	0.070686
24.91332593	1.5	0	0	0.125664
29.20425137	2.6	0	0	0.017671
24.91294539	1.5	0	0	0.125664

TABLE 292: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - M

Flow Element Results		
Upstream Results		
Total enthalpy (kJ/kg)	**Static enthalpy (kJ/kg)**	**Element Inlet Pressure (kPa)**
134.0667292	134.0655648	256.6490419
134.0667292	134.0659055	257.3247975
133.9093906	133.9067887	255.3341681
134.079477	134.0794756	350.496006
105.539862	105.5277961	447.8326795
105.5359396	105.5335562	444.9651819
134.079477	134.0649015	315.2587418
134.0706516	134.0699276	263.6973367
104.5476571	104.547467	104.6913333
104.5476571	104.547468	104.6914873
104.54732	104.5472158	104.3684242
104.54732	104.5470196	104.3387525
104.5469534	104.5464254	103.9397551
104.5469534	104.5459231	103.3534476
132.8490271	132.8481023	143.9172483
132.8490271	132.8481023	145.8453111
104.9130324	104.9130324	147.0589865
104.9130324	104.9130324	147.0589865
132.8490271	132.8481023	145.8453111
132.8490271	132.8481023	143.9172483
131.6469481	131.6444477	240.3078809
134.059865	134.0589041	252.9865647
104.547221	104.546128	96.26332197
108.4275757	108.424935	256.5279989
108.4558231	108.4532247	256.6984011
108.41712	108.4144633	256.4686516
134.0667292	134.0655648	270.0985281
104.9503016	104.9476621	270.2891428
104.9503016	104.9477045	270.2412729
104.9503016	104.9476461	270.3119384
134.0667292	134.0659055	266.9348101
135.4356928	135.4335972	242.0814703
134.0667292	134.0660052	268.2752377
134.0667292	134.0657683	270.9758357
104.9657839	104.962171	280.8716517
104.9607624	104.9573084	280.3950436
104.9571702	104.9535247	278.1513142
104.547221	104.5460777	95.13719372
122.6412349	122.6388459	264.3980952
104.547221	104.5460674	96.86081073

TABLE 293: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - N

Flow Element Results		
Upstream Results	Downstream Results	
Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)	Junction pressure loss (kPa)
134.0667292	1.52608485	0
134.0667292	1.283543917	0
133.9093906	2.281172097	0
134.079477	0.053990345	0
105.539862	4.912802875	0
105.5359396	2.18328292	0
134.079477	5.399174731	0
134.0706516	1.203350294	0
104.5476571	0.616631438	0
104.5476571	0.614978407	0
104.54732	0.456498918	0
104.54732	0.775111164	0
104.5469534	1.027706218	0
104.5469534	1.435515779	0
132.8490271	1.360007378	0
132.8490271	1.360007915	0
104.9130324	0	0
104.9130324	0	0
132.8490271	1.360007915	0
132.8490271	1.360007378	0
131.6469481	2.23624123	0
134.059865	1.38630638	0
104.547221	1.478536996	0
108.4275757	2.29813157	0
108.4558231	2.279617179	0
108.41712	2.30506118	0
134.0667292	1.526075445	0
104.9503016	2.297606012	0
104.9503016	2.279092007	0
104.9503016	2.304535475	0
134.0667292	1.283538408	0
135.4356928	2.047270433	0
134.0667292	1.203347683	0
134.0667292	1.386295573	0
104.9657839	2.688052677	0
104.9607624	2.628320602	0
104.9571702	2.700178138	0
104.547221	1.512139372	0
122.6412349	2.1858705	0
104.547221	1.518957785	0

TABLE 294: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - O

Flow Element Results	
Downstream Results	
Downstream Node Total Pressure (kPa)	Downstream Node Static Pressure (kPa)
256.4636434	255.3049028
257.1936468	256.3739551
254.9199109	252.330803
350.4957739	350.4943236
289.7827191	277.751263
446.5404158	444.1640332
312.9380778	298.4339112
263.5820619	262.8615943
104.6610071	104.4714687
104.6613235	104.4727999
104.3518036	104.2479252
104.2908351	103.991351
103.8555179	103.3290358
103.1890932	102.1618783
143.77	142.8496983
143.77	142.8496975
87.18	87.18
87.18	87.18
143.77	142.8496975
143.77	142.8496983
236.0058344	233.5172601
252.8335734	251.8773776
96.08896951	94.99926657
256.1068423	253.4746131
256.2840038	253.6940201
256.0449511	253.3968222
268.937347	267.7786135
269.8680826	267.2364553
269.8269711	267.237584
269.8883345	267.2408096
265.8278775	265.0081893
237.8452274	235.7601362
267.18418	266.463714
269.8470613	268.8908729
280.2953228	276.6932661
279.8440436	276.4002927
277.5697746	273.935151
94.95482638	93.81503041
263.0408521	260.6616531
96.67679489	95.52669581

TABLE 295: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - P

Flow Element Results		
Downstream Results		
Downstream Node Total Temperature (°C)	Downstream Node Static Temperature (°C)	Elevation (m)
31.93943813	31.93940904	2.3
31.93928092	31.93926033	2.3
31.90212076	31.90205575	1
31.92223758	31.92223754	1
25.10836512	25.10811935	2.2
25.07280175	25.07275666	2.6
31.9303261	31.92996195	1
31.93884369	31.9388256	1.9
24.91134855	24.91134499	1.5
24.91134848	24.91134494	1.5
24.91133629	24.91133434	1.5
24.91134977	24.91134414	1.5
24.91135835	24.91134845	1.5
24.9115057	24.91148638	1.5
31.67232212	31.67229902	10.23
31.67232212	31.67229902	10.23
25.00173058	25.00173058	10.23
25.00173058	25.00173058	10.23
31.67232212	31.67229902	10.23
31.67232212	31.67229902	10.23
31.36387184	31.36380947	3.7
31.93857737	31.93855336	3
24.91313784	24.91311687	1.5
25.80605743	25.80600225	4.83
25.81277567	25.81272136	4.83
25.80356987	25.80351435	4.83
31.93651712	31.93648802	2.4
24.97123745	24.97118398	4.83
24.97124647	24.97119387	4.83
24.971233	24.97117921	4.83
31.93718678	31.9371662	2.4
32.27009086	32.27003844	3.7
31.93689468	31.93687659	2.4
31.9363212	31.93629719	2.4
24.97265108	24.97257789	1.5
24.971549	24.97147903	1.5
24.97118913	24.97111528	1.5
24.91338811	24.91336618	1.5
29.20436695	29.20431074	2.7
24.91300813	24.912986	1.5

TABLE 296: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - Q

Flow Element Results				
Downstream Results				
Quality	**Mach number**	**Area (m^2)**	**Total enthalpy (kJ/kg)**	**Static enthalpy (kJ/kg)**
0	0	0.003318307	134.0667292	134.0655648
0	0	0.003318307	134.0667292	134.0659055
0	0	0.007853982	133.9093906	133.9067887
0	0	0.331830724	134.079477	134.0794756
0	0	0.007853982	105.5418232	105.5297554
0	0	0.017671459	105.5379008	105.5355174
0	0	0.003318307	134.079477	134.0649015
0	0	0.003318307	134.0706516	134.0699276
0	0	0.125663706	104.5476571	104.547467
0	0	0.125663706	104.5476571	104.547468
0	0	0.125663706	104.54732	104.5472158
0	0	0.125663706	104.54732	104.5470196
0	0	0.125663706	104.5469534	104.5464254
0	0	0.125663706	104.5469534	104.5459231
0	0	0.114009183	132.8490271	132.8481023
0	0	0.114009183	132.8490271	132.8481023
0	0	0.114009183	104.909414	104.909414
0	0	0.114009183	104.909414	104.909414
0	0	0.114009183	132.8490271	132.8481023
0	0	0.114009183	132.8490271	132.8481023
0	0	0.070685835	131.6430257	131.6405253
0	0	0.003318307	134.059865	134.0589041
0	0	0.125663706	104.547221	104.546128
0	0	0.000490874	108.4275757	108.424935
0	0	0.000490874	108.4558231	108.4532247
0	0	0.000490874	108.41712	108.4144633
0	0	0.003318307	134.0657486	134.0645842
0	0	0.000490874	104.9503016	104.9476621
0	0	0.000490874	104.9503016	104.9477045
0	0	0.000490874	104.9503016	104.9476461
0	0	0.003318307	134.0657486	134.0649249
0	0	0.070685835	135.4317704	135.4296748
0	0	0.003318307	134.0657486	134.0650246
0	0	0.003318307	134.0657486	134.0647877
0	0	0.070685835	104.9657839	104.962171
0	0	0.070685835	104.9607624	104.9573084
0	0	0.070685835	104.9571702	104.9535247
0	0	0.125663706	104.547221	104.5460777
0	0	0.017671459	122.6402543	122.6378653
0	0	0.125663706	104.547221	104.5460674

TABLE 297: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - R

Flow Element Results		
Downstream Results		Forces
		Forces From Pressure Difference
Element Exit Pressure (kPa)	Element Exit Enthalpy (kJ/kg)	Magnitude (N)
256.4636434	134.0667292	0.615209449
257.1936468	134.0667292	0.435198387
254.9199109	133.9093906	3.253572485
350.4957739	134.079477	0.07700485
289.7827191	105.5418232	1241.329133
446.5404158	105.5379008	-27.83670889
312.9380778	134.079477	7.700731819
263.5820619	134.0706516	0.382517351
104.6610071	104.5476571	3.810895931
104.6613235	104.5476571	3.79049124
104.3518036	104.54732	2.088599662
104.2908351	104.54732	6.02148578
103.8555179	104.5469534	10.58555301
103.1890932	104.5469534	20.6533905
143.77	132.8490271	16.78766329
143.77	132.8490271	236.6046412
87.18	104.909414	6826.754223
87.18	104.909414	6826.754223
143.77	132.8490271	236.6046412
143.77	132.8490271	16.78766329
236.0058344	131.6430257	304.0940525
252.8335734	134.059865	0.507672429
96.08896951	104.547221	21.90978779
256.1068423	108.4275757	0.20673503
256.2840038	108.4558231	0.203417072
256.0449511	108.41712	0.207983788
268.937347	134.0657486	3.853157589
269.8680826	104.9503016	0.206687756
269.8269711	104.9503016	0.203370213
269.8883345	104.9503016	0.207936358
265.8278775	134.0657486	3.673143529
237.8452274	135.4317704	299.4426252
267.18418	134.0657486	3.620465667
269.8470613	134.0657486	3.74562183
280.2953228	104.9657839	40.73836567
279.8440436	104.9607624	38.94796467
277.5697746	104.9571702	41.10668958
94.95482638	104.547221	22.91696886
263.0408521	122.6402543	23.98449003
96.67679489	104.547221	23.12412523

TABLE 298: CONTROL VALVE WITH ITERATIVE SCRIPT RESULTS - S

Flow Element Results	Control Valve Loss Data	
Forces		
Forces From Velocity Change		
Magnitude (N)	Expansion factor	Valve Resistance coefficient (K)
-6.95017E-07	0	0.16
-3.47793E-07	0	0.16
-8.20658E-06	0	0.16
-1.16954E-10	0	0.16
-0.015301569	0	13.3
5.69965E-05	0	0.16
-0.000111482	0	0.16
-2.68677E-07	0	0.16
-8.0942E-07	0	0.16
-8.00775E-07	0	0.16
-2.43125E-07	0	0.16
-2.02082E-06	0	0.16
-6.24521E-06	0	0.16
-2.3774E-05	0	0.16
-1.76667E-05	0	0.16
-0.000248996	0	2.255034205
0	0	0
0	0	0
-0.000248996	0	2.255034205
-1.76667E-05	0	0.16
-0.00061231	0	0.16
-4.73278E-07	0	0.16
-2.40881E-05	0	0.16
-5.5695E-07	0	0.16
-5.39145E-07	0	0.16
-5.63726E-07	0	0.16
-3.71537E-06	0	0.16
-5.65883E-07	0	0.16
-5.47862E-07	4180.3	0.16
-5.7274E-07	0.00078067	0.16
-2.48446E-06	0	0.16
-0.000515226	0.60028	0.16
-2.1467E-06	0	0.16
-2.96568E-06	0	0.16
-0.000152667	0	0.16
-0.000139546	0	0.16
-0.000155443	0	0.16
-2.63536E-05	0	0.16
-4.92289E-05	0	0.16
-2.68322E-05	0	0.16

VARIABLE SPEED PUMPS

TABLE 299: VARIABLE SPEED PUMP RESULTS - A

General	Flow Element Results		
	Generic Results		
Identifier	Check valve active	Flashing/cavitating	Pressure drop excluding elevation (kPa)
P-601	False	False	-202.8642456
P-604	False	False	-204.5183535
P-605	False	False	-207.1054866
P-606	False	False	-174.9390066

TABLE 300: VARIABLE SPEED PUMP RESULTS - B

Flow Element Results			
Generic Results			
Static temperature (°C)	Incondensable Mass Flow Rate (kg/s)	Element is choked	Mass Flux (kg/m^2.s)
24.91748244	0	False	0
24.91736522	0	False	0
24.91782024	0	False	0
25.00707329	0	False	0

TABLE 301: VARIABLE SPEED PUMP RESULTS - C

Flow Element Results	
Flow and Geometry variables	
Total mass flow (kg/s)	Total volume flow (m^3/s)
190.2958916	0.19087972
185.2319023	0.185800145
189.4415133	0.190022868
0	0

TABLE 302: VARIABLE SPEED PUMP RESULTS - D

Flow Element Results		
Flow and Geometry variables		
Volume flow based on ambient conditions (m^3/s)	Maximum velocity (m/s)	Mean pressure (kPa)
0.190881772	0	185.1644072
0.185802192	0	186.5227004
0.190024764	0	185.7541792
0	0	192.6372473

TABLE 303: VARIABLE SPEED PUMP RESULTS - E

Flow Element Results			
Flow and Geometry variables			
Node pressure drop (kPa)	Pressure head (m)	Pressure ratio (up/down)	Pressure ratio (down/up)
-217.5282563	22.25123743	0.259928077	3.847218087
-219.1823682	22.42043259	0.259803813	3.849058211
-221.769486	22.68509564	0.25239249	3.962083024
-189.6028082	19.39498495	0.340371216	2.937968764

TABLE 304: VARIABLE SPEED PUMP RESULTS - F

Flow Element Results				
Flow and Geometry variables				
Total temperature (°C)	Quality	Total volume (m^3)	Total mass (kg)	Static pressure (kPa)
24.94429883	0	0	0	76.40027904
24.94442992	0	0	0	76.9315163
24.94520039	0	0	0	74.86943622
24.98618261	0	0	0	97.83584323

TABLE 305: VARIABLE SPEED PUMP RESULTS - G

Flow Element Results		
Energy and Heat Transfer variables		Non-dimensional variables
Total heat transfer (kW)	Total power (kW)	Total non-dimensional mass flow
31.97285471	-46.03878757	4300.230815
31.39473433	-45.20633262	4156.891689
32.49808959	-46.79509092	4368.457725
0	0	0

TABLE 306: VARIABLE SPEED PUMP RESULTS - H

Flow Element Results				
Non-dimensional variables	Fluid variables			
Mach number	Density (kg/m^3)	Conductivity (W/m.K)	Viscosity (kg/m.s)	Static enthalpy (kJ/kg)
0	996.9413784	0.606838304	0.00090043	104.547221
0	996.9416456	0.606838342	0.000900432	104.547221
0	996.9406085	0.606838194	0.000900424	104.547221
0	996.9271637	0.606998971	0.000898659	104.9415779

TABLE 307: VARIABLE SPEED PUMP RESULTS - I

Flow Element Results		
Fluid variables		
Specific heat (kJ/kg.K)	Total gas mass fraction - Incondensable + Vapour	Gas constant (kJ/kg.K)
4.181858706	-1	0
4.181856025	-1	0
4.181866431	-1	0
4.181686497	-1	0

TABLE 308: VARIABLE SPEED PUMP RESULTS - J

Flow Element Results		
Convergence	Upstream Results	
Pressure convergence (kPa)	Velocity (m/s)	Junction pressure loss (kPa)
-1.21883E-08	0	0
6.1483E-09	0	0
1.46097E-08	0	0
0	0	0

TABLE 309: VARIABLE SPEED PUMP RESULTS - K

Flow Element Results	
Upstream Results	
Upstream Node Total Pressure (kPa)	Upstream Node Static Pressure (kPa)
76.40027904	76.40027904
76.9315163	76.9315163
74.86943622	74.86943622
97.83584323	97.83584323

TABLE 310: VARIABLE SPEED PUMP RESULTS - L

Flow Element Results			
Upstream Results			
Upstream Node Total Temperature (°C)	Upstream Node Static Temperature (°C)	Elevation (m)	Quality
24.91748244	24.91748244	1.5	0
24.91736522	24.91736522	1.5	0
24.91782024	24.91782024	1.5	0
25.00707329	25.00707329	1.5	0

TABLE 311: VARIABLE SPEED PUMP RESULTS - M

Flow Element Results				
Upstream Results				
Mach number	Area (m^2)	Total enthalpy (kJ/kg)	Static enthalpy (kJ/kg)	Element Inlet Pressure (kPa)
0	0	104.547221	104.547221	76.40027904
0	0	104.547221	104.547221	76.9315163
0	0	104.547221	104.547221	74.86943622
0	0	104.9415779	104.9415779	97.83584323

TABLE 312: VARIABLE SPEED PUMP RESULTS - O

Flow Element Results		
Flow Element Results	Downstream Results	
Element Inlet Enthalpy (kJ/kg)	Velocity (m/s)	Junction pressure loss (kPa)
104.547221	0	0
104.547221	0	0
104.547221	0	0
104.9415779	0	0

TABLE 313: VARIABLE SPEED PUMP RESULTS - P

Flow Element Results	
Downstream Results	
Downstream Node Total Pressure (kPa)	Downstream Node Static Pressure (kPa)
293.9285354	293.9285354
296.1138845	296.1138845
296.6389223	296.6389223
287.4386514	287.4386514

TABLE 314: VARIABLE SPEED PUMP RESULTS - Q

Flow Element Results		
Downstream Results		
Downstream Node Total Temperature (°C)	Downstream Node Static Temperature (°C)	Elevation (m)
24.97111521	24.97111521	0
24.97149463	24.97149463	0
24.97258053	24.97258053	0
24.96529192	24.96529192	0

TABLE 315: VARIABLE SPEED PUMP RESULTS - R

Flow Element Results				
Downstream Results				
Quality	Mach number	Area (m^2)	Total enthalpy (kJ/kg)	Static enthalpy (kJ/kg)
0	0	0	104.9718792	104.9718792
0	0	0	104.9754714	104.9754714
0	0	0	104.9804929	104.9804929
0	0	0	104.9415779	104.9415779

TABLE 316: VARIABLE SPEED PUMP RESULTS - S

Flow Element Results		
Downstream Results		Forces
		Forces From Pressure Difference
Element Exit Pressure (kPa)	Element Exit Enthalpy (kJ/kg)	Magnitude (N)
293.9285354	104.9718792	0
296.1138845	104.9754714	0
296.6389223	104.9804929	0
287.4386514	104.9415779	0

TABLE 317: VARIABLE SPEED PUMP RESULTS - T

Flow Element Results	Variable Speed Pump Results	
Downstream Results	Variable Speed Pump Results	Net Positive Suction Head
Forces From Velocity Change		
Magnitude (N)	Rotational speed	NPSH actual (m)
0	1475	7.491483277
0	1475	7.545824483
0	1475	7.334890473
0	0	0

TABLE 318: VARIABLE SPEED PUMP RESULTS - U

Variable Speed Pump Results			
Net Positive Suction Head		Variable Speed Pump Results	
NPSH required (m)	NPSH available (m)	Electrical power (kW)	Hydraulic efficiency
4.578994758	2.912488525	83.65391076	0.841087972
4.483752718	3.062071763	82.14131419	0.840580014
4.562928768	2.771961698	85.02813749	0.841002287
0	0	0	0

ITERATIVE SCRIPT

TABLE 319: ITERATIVE SCRIPT RESULTS - A

General	Script		
	General		
	Transition Loss Data		
Identifier	Transition Angle (°)	Loss factor (forward)	Loss factor (reverse)
Gate Val - Iterative Script - 32 - 12			
Gate Val - Iterative Script - 32 - 16			
Gate Val - Iterative Script - 32 - 18			
Gate Val - Iterative Script - 32 - 185			
Gate Val - Iterative Script - 32 - 20			
Gate Val - Iterative Script - 32 - 224			
Gate Val - Iterative Script - 32 - 225			
Gate Val - Iterative Script - 32 - 226			
Gate Val - Iterative Script - 32 - 227			
Gate Val - Iterative Script - 32 - 228			
Gate Val - Iterative Script - 32 - 229			
Gate Val - Iterative Script - 32 - 230			
Gate Val - Iterative Script - 32 - 231			
Gate Val - Iterative Script - 32 - 232			
Gate Val - Iterative Script - 32 - 233			
Gate Val - Iterative Script - 32 - 234			
Gate Val - Iterative Script - 32 - 235			
Gate Val - Iterative Script - 32 - 251			
Gate Val - Iterative Script - 32 - 33			
Gate Val - Iterative Script - 32 - 337			
Gate Val - Iterative Script - 32 - 357			
Gate Val - Iterative Script - 32 - 368			
Gate Val - Iterative Script - 32 - 4			
Gate Val - Iterative Script - 32 - 411			
Gate Val - Iterative Script - 32 - 42			
Gate Val - Iterative Script - 32 - 423			
Gate Val - Iterative Script - 32 - 431			
Gate Val - Iterative Script - 32 - 46			
Gate Val - Iterative Script - 32 - 49			
Gate Val - Iterative Script - 32 - 5			
Gate Val - Iterative Script - 32 - 50			
Gate Val - Iterative Script - 32 - 54			
Gate Val - Iterative Script - 32 - 57			
Gate Val - Iterative Script - 32 - 572			
Gate Val - Iterative Script - 32 - 58			
Gate Val - Iterative Script - 32 - 59			
Gate Val - Iterative Script - 32 - 6			
Gate Val - Iterative Script - 32 - 67			
Gate Val - Iterative Script - 32 - 7			

TABLE 319 CONTINUED: ITERATIVE SCRIPT RESULTS - A

General	Script		
	General		
	Transition Loss Data		
Identifier	Transition Angle (°)	Loss factor (forward)	Loss factor (reverse)
Gate Val - Iterative Script - 32 - 74			
Gradual - Iterative Script - 45 - 10	14.2500327	0.030109049	0.030319602
Gradual - Iterative Script - 45 - 112	41.11209044	0.171172678	0.339002139
Gradual - Iterative Script - 45 - 113	28.07248694	0.118236117	0.234162935
Gradual - Iterative Script - 45 - 114	53.13010235	0.4096	0.213996898
Gradual - Iterative Script - 45 - 125	28.07248694	0.194627353	0.107793611
Gradual - Iterative Script - 45 - 126	148.1092082	0.350827327	0.512019753
Gradual - Iterative Script - 45 - 166	28.07248694	0.118236117	0.234162935
Gradual - Iterative Script - 45 - 186	53.13010235	0.4096	0.213996898
Gradual - Iterative Script - 45 - 219	14.2500327	0.055126549	0.099534046
Gradual - Iterative Script - 45 - 22	0.028647889	0.000200617	0.000111111
Gradual - Iterative Script - 45 - 254	9.527283381	0.012622913	0.007794649
Gradual - Iterative Script - 45 - 257	28.07248694	0.194627353	0.107793611
Gradual - Iterative Script - 45 - 258	9.527283381	0.007794649	0.012622913
Gradual - Iterative Script - 45 - 31	28.07248694	0.118236117	0.234162935
Gradual - Iterative Script - 45 - 32	53.13010235	0.4096	0.213996898
Gradual - Iterative Script - 45 - 49	14.2500327	0.030109049	0.030319602
Gradual - Iterative Script - 45 - 5	36.86989765	0.140545674	0.253763022
Gradual - Iterative Script - 45 - 546	38.58009244	0.439779452	0.189107265
Gradual - Iterative Script - 45 - 548	38.58009244	0.439779452	0.189107265
Gradual - Iterative Script - 45 - 550	38.58009244	0.189107265	0.439779452
Gradual - Iterative Script - 45 - 551	38.58009244	0.189107265	0.439779452
Gradual - Iterative Script - 45 - 72	28.07248694	0.118236117	0.234162935
Gradual - Iterative Script - 45 - 73	53.13010235	0.4096	0.213996898
Gradual - Iterative Script - 45 - 8	14.2500327	0.030109049	0.030319602
Gradual - Iterative Script - 45 - 88	9.527283381	0.041328102	0.029065918
Gradual - Iterative Script - 45 - 9	14.2500327	0.030109049	0.030319602
Gradual - Iterative Script - 45 - 95	38.58009244	0.439779452	0.189107265
Iterative Script - 0			
Iterative Script - 1			
Type A B - TABV IS - 131			
Type A B - TABV IS - 136			
Type A B - TABV IS - 250			
Type A B - TABV IS - 252			
Type A B - TABV IS - 255			
Type A B - TABV IS - 256			
Type A B - TABV IS - 259			
Type A B - TABV IS - 260			
Type A B - TABV IS - 547			
Type A B - TABV IS - 549			
Type A B - TABV IS - 553			

TABLE 319 CONTINUED: ITERATIVE SCRIPT RESULTS - A

General	Script		
	General		
	Transition Loss Data		
Identifier	Transition Angle (°)	Loss factor (forward)	Loss factor (reverse)
Type A B - TABV IS - 554			
Type A B - TABV IS - 668			
Type A B - TABV IS - 673			
Type A B - TABV IS - 96			
Type A B - TABV IS - 97			

TABLE 320: ITERATIVE SCRIPT RESULTS - B

Script			
General			
Transition Loss Data			Flownex® Element Input
Minimum Diameter (m)	Minimum Area (m^2)	Script Inputs And Outputs	Ck

TABLE 320 CONTINUED: ITERATIVE SCRIPT RESULTS - B

Script			
General			
Transition Loss Data			Flownex® Element Input
Minimum Diameter (m)	Minimum Area (m^2)	Script Inputs And Outputs	Ck
0.25	0.049087385		6.247801821
0.125	0.012271846		568.3091315
0.25	0.049087385		48.59016349
0.3	0.070685835		21.41473478
0.1	0.007853982		1577.589905
0.08	0.005026548		6942.625011
0.25	0.049087385		24.53467821
0.3	0.070685835		40.98879686
0.1	0.007853982		446.8389732
0.1	0.007853982		1.626142403
0.45	0.159043128		0.249516789
0.3	0.070685835		19.47641859
0.45	0.159043128		0.154076617
0.25	0.049087385		24.53467821
0.3	0.070685835		40.98879686
0.25	0.049087385		6.291492743
0.4	0.125663706		4.450079382
0.08	0.005026548		8702.924721
0.08	0.005026548		8702.924721
0.08	0.005026548		3742.299211
0.08	0.005026548		3742.299211
0.25	0.049087385		24.53467821
0.3	0.070685835		40.98879686
0.25	0.049087385		6.247801821
0.15	0.017671459		66.17145238
0.25	0.049087385		6.247801821
0.08	0.005026548		8702.924721

TABLE 320 CONTINUED: ITERATIVE SCRIPT RESULTS - B

Script			
General			
Transition Loss Data			Flownex® Element Input
Minimum Diameter (m)	Minimum Area (m^2)	Script Inputs And Outputs	Ck

TABLE 321: ITERATIVE SCRIPT RESULTS - C

Script					
General					
General				K Factors	
Valve_Re	Reynolds_Number_in_Pipe	Orifice_Loss_Factor	Ck	K1	K2
295547.3543					
45486.0726					
545870.6727					
363913.576					
454918.1417					
273059.4391					
272327.4366					
202148.7884					
343237.9762					
455092.931					
635681.9085					
668552.0907					
668547.31					
0					
0					
668547.31					
668552.0907					

TABLE 321 CONTINUED: ITERATIVE SCRIPT RESULTS - C

Script					
General					
General				K Factors	
Valve_Re	Reynolds_Number_in_Pipe	Orifice_Loss_Factor	Ck	K1	K2
860905.8103					
654752.2132					
64864.39635					
64351.36765					
65056.41369					
128603.1613					
63679.50941					
128596.5625					
63166.39845					
63871.55645					
108160.0695					
800984.3469					
108164.0352					
101402.1858					
116817.5304					
894044.5035					
669635.571					
874156.7882					
898047.0847					
101405.6897					
400158.6687					
116822.0544					
672650.4202					

TABLE 321 CONTINUED: ITERATIVE SCRIPT RESULTS - C

Script					
General					
General				K Factors	
Valve_Re	Reynolds_Number_in_Pipe	Orifice_Loss_Factor	Ck	K1	K2
				0.352708284	0.58208762
	0	35918.19966	0		
	0	35918.19966	0		
	718720.1168	0.672976664	67.34497987		
	659536.7408	0.672976664	67.34497987		
	654629.761	0.672976664	67.34497987		
	633515.3434	0.672976664	67.34497987		
	766634.1414	0.672976664	67.34497987		
	791860.2792	0.672976664	67.34497987		
	0	35918.19966	0		
	206766.955	0.672976664	13317.73284		
	0	35918.19966	0		
	183749.4644	13.67376627	270594.1764		
	271956.7341	0.672977034	340.9341485		
	363877.9522	0.672976664	1077.519678		
	129625.8229	0.672976664	1077.519678		
	129778.4877	0.672976664	1077.519678		

TABLE 322: ITERATIVE SCRIPT RESULTS - D

Script
General
Script

TABLE 322 CONTINUED: ITERATIVE SCRIPT RESULTS - D

Script
General
Script

TABLE 322 CONTINUED: ITERATIVE SCRIPT RESULTS - D

Script
General
Script

PIPE TRANSITION

TABLE 323: PIPE TRANSITION RESULTS - A

General	Flow Element Results	
	Upstream Results	
Identifier	Element Inlet Enthalpy (kJ/kg)	Element Inlet Pressure (kPa)
Gradual Pipe Transition - 101	104.9800138	336.2982279
Gradual Pipe Transition - 11	104.9804929	296.6389223
Gradual Pipe Transition - 115	104.548888	85.11270784
Gradual Pipe Transition - 116	104.9415779	97.83584323
Gradual Pipe Transition - 119	104.9415779	272.7734012
Gradual Pipe Transition - 127	104.5494764	99.29539562
Gradual Pipe Transition - 128	105.5503544	487.7871938
Gradual Pipe Transition - 14	104.9754714	296.1138845
Gradual Pipe Transition - 169	104.547221	75.75264076
Gradual Pipe Transition - 17	104.9718792	293.9285354
Gradual Pipe Transition - 189	104.9657839	279.6342479
Gradual Pipe Transition - 223	105.5379008	446.5404158
Gradual Pipe Transition - 25	105.5418232	279.1355921
Gradual Pipe Transition - 272	104.9759452	285.5960374
Gradual Pipe Transition - 281	133.9218806	236.0569725
Gradual Pipe Transition - 284	134.7081966	233.0181929
Gradual Pipe Transition - 34	104.547221	77.77590441
Gradual Pipe Transition - 37	104.9607624	279.4735552
Gradual Pipe Transition - 50	104.9415779	287.4386514
Gradual Pipe Transition - 556	105.2148611	146.7511023
Gradual Pipe Transition - 562	126.0903873	147.7736857
Gradual Pipe Transition - 568	104.8777372	229.8806095
Gradual Pipe Transition - 571	104.9976646	229.9847542
Gradual Pipe Transition - 75	104.547221	77.29146733
Gradual Pipe Transition - 78	104.9571702	277.1792128
Gradual Pipe Transition - 8	104.56193	112.5164697
Gradual Pipe Transition - 91	122.4101274	216.2280322

TABLE 324: PIPE TRANSITION RESULTS - B

Flow Element Results		
Upstream Results		
Static enthalpy (kJ/kg)	Junction pressure loss (kPa)	Total enthalpy (kJ/kg)
104.9800138	0	104.9800138
104.9804929	0	104.9804929
104.548888	0	104.548888
104.9415779	0	104.9415779
104.9415779	0	104.9415779
104.5494764	0	104.5494764
105.5503544	0	105.5503544
104.9754714	0	104.9754714
104.547221	0	104.547221
104.9718792	0	104.9718792
104.9657839	0	104.9657839
105.5379008	0	105.5379008
105.5418232	0	105.5418232
104.9759452	0	104.9759452
133.9218806	0	133.9218806
134.7081966	0	134.7081966
104.547221	0	104.547221
104.9607624	0	104.9607624
104.9415779	0	104.9415779
105.2148611	0	105.2148611
126.0903873	0	126.0903873
104.8777372	0	104.8777372
104.9976646	0	104.9976646
104.547221	0	104.547221
104.9571702	0	104.9571702
104.56193	0	104.56193
122.4101274	0	122.4101274

TABLE 325: PIPE TRANSITION RESULTS - C

Flow Element Results	
Upstream Results	
Upstream Node Static Temperature (°C)	Upstream Node Total Temperature (°C)
24.96370205	24.96370205
24.97258053	24.97258053
24.91595862	24.91595862
25.00707329	25.00707329
24.96851259	24.96851259
24.91296973	24.91296973
25.06666676	25.06666676
24.97149463	24.97149463
24.91762535	24.91762535
24.97111521	24.97111521
24.97279626	24.97279626
25.07280175	25.07280175
25.11070226	25.11070226
24.97391775	24.97391775
31.9091719	31.9091719
32.09798522	32.09798522
24.91717889	24.91717889
24.97163036	24.97163036
24.96529192	24.96529192
25.06162936	25.06162936
30.05458219	30.05458219
24.96266135	24.96266135
24.99132574	24.99132574
24.91728579	24.91728579
24.9712749	24.9712749
24.91302546	24.91302546
29.15945836	29.15945836

TABLE 326: PIPE TRANSITION RESULTS - D

Flow Element Results				
Upstream Results				
Upstream Node Static Pressure (kPa)	Elevation (m)	Area (m^2)	Mach number	Quality
336.2982279	1.8	0	0	0
296.6389223	0	0	0	0
85.11270784	1.33	0	0	0
97.83584323	1.5	0	0	0
272.7734012	1.5	0	0	0
99.29539562	1.27	0	0	0
487.7871938	1.33	0	0	0
296.1138845	0	0	0	0
75.75264076	1.5	0	0	0
293.9285354	0	0	0	0
279.6342479	1.5	0	0	0
446.5404158	2.6	0	0	0
279.1355921	2.2	0	0	0
285.5960374	0	0	0	0
236.0569725	4	0	0	0
233.0181929	4	0	0	0
77.77590441	1.5	0	0	0
279.4735552	1.5	0	0	0
287.4386514	0	0	0	0
146.7511023	12.73	0	0	0
147.7736857	12.73	0	0	0
229.8806095	12.23	0	0	0
229.9847542	12.23	0	0	0
77.29146733	1.5	0	0	0
277.1792128	1.5	0	0	0
112.5164697	0	0	0	0
216.2280322	4.83	0	0	0

TABLE 327: PIPE TRANSITION RESULTS - E

Flow Element Results		
Upstream Results		Downstream Results
Upstream Node Total Pressure (kPa)	Velocity (m/s)	Downstream Node Static Pressure (kPa)
336.2982279	0	333.6698042
296.6389223	0	281.7487423
85.11270784	0	84.26911924
97.83584323	0	97.83584323
272.7734012	0	272.7734012
99.29539562	0	97.97843213
487.7871938	0	485.4457903
296.1138845	0	281.2335874
75.75264076	0	74.86943622
293.9285354	0	279.0363347
279.6342479	0	278.1588468
446.5404158	0	447.8326795
279.1355921	0	278.1555332
285.5960374	0	285.5534158
236.0569725	0	235.6551371
233.0181929	0	232.9901611
77.77590441	0	76.9315163
279.4735552	0	278.0629962
287.4386514	0	272.7734012
146.7511023	0	146.7511023
147.7736857	0	146.8311125
229.8806095	0	229.4758633
229.9847542	0	229.9847542
77.29146733	0	76.40027904
277.1792128	0	275.6904726
112.5164697	0	112.5042974
216.2280322	0	216.0468369

TABLE 328: PIPE TRANSITION RESULTS - F

Flow Element Results		
Downstream Results		
Downstream Node Total Pressure (kPa)	Velocity (m/s)	Downstream Node Total Temperature (°C)
333.6698042	0	24.96404863
281.7487423	0	24.9723319
84.26911924	0	24.91614477
97.83584323	0	25.00707329
272.7734012	0	24.96863468
97.97843213	0	24.91326034
485.4457903	0	25.06718416
281.2335874	0	24.97124384
74.86943622	0	24.91782024
279.0363347	0	24.97086706
278.1588468	0	24.97312027
447.8326795	0	25.07298541
278.1555332	0	25.11068282
285.5534158	0	24.97392711
235.6551371	0	31.90946368
232.9901611	0	32.09799126
76.9315163	0	24.91736522
278.0629962	0	24.97194013
272.7734012	0	24.96851259
146.7511023	0	24.98004657
146.8311125	0	30.05478595
229.4758633	0	24.96275025
229.9847542	0	25.01459303
76.40027904	0	24.91748244
275.6904726	0	24.97160184
112.5042974	0	24.91302815
216.0468369	0	29.15949761

TABLE 329: PIPE TRANSITION RESULTS - G

Flow Element Results			
Downstream Results			
Junction pressure loss (kPa)	**Element Exit Enthalpy (kJ/kg)**	**Element Exit Pressure (kPa)**	**Quality**
0	104.9790332	333.6698042	0
0	104.9657839	281.7487423	0
0	104.548888	84.26911924	0
0	104.9415779	97.83584323	0
0	104.9420883	272.7734012	0
0	104.5494764	97.97843213	0
0	105.5503544	485.4457903	0
0	104.9607624	281.2335874	0
0	104.547221	74.86943622	0
0	104.9571702	279.0363347	0
0	104.9657839	278.1588468	0
0	105.539862	447.8326795	0
0	105.5408426	278.1555332	0
0	104.9759452	285.5534158	0
0.953007003	133.9218806	235.6551371	0
0	134.7081966	232.9901611	0
0	104.547221	76.9315163	0
0	104.9607624	278.0629962	0
0	104.9415779	272.7734012	0
0	104.8737786	146.7511023	0
0	126.0903873	146.8311125	0
0	104.8777372	229.4758633	0
0	105.0949337	229.9847542	0
0	104.547221	76.40027904	0
0	104.9571702	275.6904726	0
0	104.56193	112.5042974	0
0	122.4101274	216.0468369	0

TABLE 330: PIPE TRANSITION RESULTS -H

Flow Element Results			
Downstream Results			
Elevation (m)	**Downstream Node Static Temperature (°C)**	**Mach number**	**Static enthalpy (kJ/kg)**
1.9	24.96404863	0	104.9790332
1.5	24.9723319	0	104.9657839
1.33	24.91614477	0	104.548888
1.5	25.00707329	0	104.9415779
1.5	24.96863468	0	104.9420883
1.27	24.91326034	0	104.5494764
1.33	25.06718416	0	105.5503544
1.5	24.97124384	0	104.9607624
1.5	24.91782024	0	104.547221
1.5	24.97086706	0	104.9571702
1.5	24.97312027	0	104.9657839
2.4	25.07298541	0	105.539862
2.3	25.11068282	0	105.5408426
0	24.97392711	0	104.9759452
4	31.90925844	0	133.9218806
4	32.09799126	0	134.7081966
1.5	24.91736522	0	104.547221
1.5	24.97194013	0	104.9607624
1.5	24.96851259	0	104.9415779
12.73	24.98004657	0	104.8737786
12.73	30.05478595	0	126.0903873
12.23	24.96275025	0	104.8777372
12.23	25.01459303	0	105.0949337
1.5	24.91748244	0	104.547221
1.5	24.97160184	0	104.9571702
0	24.91302815	0	104.56193
4.83	29.15949761	0	122.4101274

TABLE 331: PIPE TRANSITION RESULTS – I

Flow Element Results			
Downstream Results		Forces	
		Forces From Pressure Difference	Forces From Velocity Change
Total enthalpy (kJ/kg)	Area (m^2)	Magnitude (N)	Magnitude (N)
104.9790332	0	-2924.767315	0
104.9657839	0	0	0
104.548888	0	-300.0170747	0
104.9415779	0	0	0
104.9420883	0	-21544.84129	0
104.5494764	0	-19.04441487	0
105.5503544	0	-3752.70768	0
104.9607624	0	0	0
104.547221	0	0	0
104.9571702	0	0	0
104.9657839	0	-22117.30633	0
105.539862	0	0	0
105.5408426	0	-1728.332321	0
104.9759452	0	6881.269991	0
133.9218806	0	0	0
134.7081966	0	-4907.496524	0
104.547221	0	0	0
104.9607624	0	-22109.84481	0
104.9415779	0	0	0
104.8737786	0	-574.408984	0
126.0903873	0	-570.6828165	0
104.8777372	0	1627.608624	0
105.0949337	0	1626.891047	0
104.547221	0	0	0
104.9571702	0	-21806.17842	0
104.56193	0	1759.48121	0
122.4101274	0	-1573.588603	0

TABLE 332: PIPE TRANSITION RESULTS – J

Flow Element Results			
Flow and Geometry variables			
Total pressure drop (kPa)	**Mean pressure (kPa)**	**Maximum velocity (m/s)**	**Pressure ratio (up/down)**
2.628423789	334.9840161	0	1.007877
14.89017999	289.1938323	0	1.0528491
0.843588592	84.69091354	0	1.0100106
0	97.83584323	0	1
0	272.7734012	0	1
1.316963493	98.63691388	0	1.0134413
2.341403519	486.616492	0	1.0048232
14.88029712	288.6737359	0	1.0529108
0.883204539	75.31103849	0	1.0117965
14.89220063	286.482435	0	1.0533701
1.475401069	278.8965473	0	1.0053041
-1.292263697	447.1865476	0	0.9971144
0.980058932	278.6455627	0	1.0035234
0.042621605	285.5747266	0	1.000149
1.354842442	235.3795513	0	1.0057726
0.028031872	233.004177	0	1.0001203
0.84438811	77.35371036	0	1.0109758
1.410558975	278.7682757	0	1.0050728
14.66525023	280.1060263	0	1.0537634
-2.91038E-14	146.7511023	0	1
0.942573153	147.3023991	0	1.0064194
0.404746133	229.6782364	0	1.0017637
0	229.9847542	0	1
0.891188288	76.84587319	0	1.0116647
1.488740235	276.4348427	0	1.0054000
0.012172382	112.5103835	0	1.0001081
0.181195312	216.1374345	0	1.0008386

TABLE 333: PIPE TRANSITION RESULTS - K

Flow Element Results			
Flow and Geometry variables			
Quality	**Total temperature (°C)**	**Pressure ratio (down/up)**	**Total volume flow (m^3/s)**
0	24.96387534	0.992184247	0.013792554
0	24.97245622	0.949803688	0.190006145
0	24.9160517	0.990088571	0.038586673
0	25.00707329	1	0
0	24.96857364	1	0
0	24.91311504	0.986736913	0.013793923
0	25.06692546	0.995199949	0.038580995
0	24.97136923	0.94974806	0.185783978
0	24.9177228	0.988340941	0.190022825
0	24.97099113	0.949333941	0.190863233
0	24.97295827	0.994723818	0.190007073
0	25.07289358	1.002893946	0.038581743
0	25.11069254	0.99648895	0.038585074
0	24.97392243	0.999850763	0.413915514
0	31.90931779	0.994260528	0.143992397
0	32.09798824	0.999879701	0.427604646
0	24.91727205	0.98914332	0.185800105
0	24.97178524	0.9949528	0.185784848
0	24.96690226	0.948979547	-2.08928E-06
0	25.02083796	1	-1.8315E-09
0	30.05468407	0.993621509	0.010429882
0	24.9627058	0.99823932	0.010415347
0	25.00295939	1	0
0	24.91738411	0.988469771	0.190879677
0	24.97143837	0.994628961	0.190864142
0	24.91302681	0.999891817	0.052379964
0	29.15947799	0.999162017	0.052436496

TABLE 334: PIPE TRANSITION RESULTS –L

Flow Element Results			
Flow and Geometry variables			
Total mass flow (kg/s)	**Total volume (m^3)**	**Static pressure (kPa)**	**Total mass (kg)**
13.75188495	0	334.9840161	0
189.4415133	0	289.1938323	0
38.46880791	0	84.69091354	0
0	0	97.83584323	0
0	0	272.7734012	0
13.75188495	0	98.63691388	0
38.46880791	0	486.616492	0
185.2319023	0	288.6737359	0
189.4415133	0	75.31103849	0
190.2958916	0	286.482435	0
189.4415133	0	278.8965473	0
38.46880791	0	447.1865476	0
38.46880791	0	278.6455627	0
412.6846521	0	285.5747266	0
143.2846829	0	235.8560548	0
425.473923	0	233.004177	0
185.2319023	0	77.35371036	0
185.2319023	0	278.7682757	0
0	0	280.1060263	0
0	0	146.7511023	0
10.38413803	0	147.3023991	0
10.38413803	0	229.6782364	0
0	0	229.9847542	0
190.2958916	0	76.84587319	0
190.2958916	0	276.4348427	0
52.22069286	0	112.5103835	0
52.22069286	0	216.1374345	0

TABLE 335: PIPE TRANSITION RESULTS - M

Flow Element Results		
Generic Results		
Static temperature (°C)	**Pressure drop excluding elevation (kPa)**	**Check valve active**
24.96387534	1.650715234	False
24.97245621	0.224889949	False
24.9160517	0.843588592	False
25.00707329	0	False
24.96857364	0	False
24.91311504	1.316963493	False
25.06692546	2.341403519	False
24.97136922	0.215006351	False
24.9177228	0.883204539	False
24.97099113	0.226923218	False
24.97295827	1.475401069	False
25.07289358	0.663195565	False
25.11069254	0.002413719	False
24.97392243	0.042621605	False
31.90921517	0.401835439	False
32.09798824	0.028031872	False
24.91727205	0.84438811	False
24.97178524	1.410558975	False
24.96690226	-2.73812E-11	False
25.02083796	-2.91038E-14	False
30.05468407	0.942573153	False
24.9627058	0.404746133	False
25.00295939	0	False
24.91738411	0.891188288	False
24.97143837	1.488740235	False
24.91302681	0.012172382	False
29.15947799	0.181195312	False

TABLE 336: PIPE TRANSITION RESULTS - N

Flow Element Results			
Generic Results			Fluid variables
Incondensable Mass Flow Rate (kg/s)	Mass Flux (kg/m^2.s)	Element is choked	Specific heat (kJ/kg.K)
0	0	False	4.180866441
0	0	False	4.181032259
0	0	False	4.181816604
0	0	False	4.181686497
0	0	False	4.181085858
0	0	False	4.181746161
0	0	False	4.180196731
0	0	False	4.181034613
0	0	False	4.181864203
0	0	False	4.18104167
0	0	False	4.181063866
0	0	False	4.180348509
0	0	False	4.180970691
0	0	False	4.181042489
0	0	False	4.179610522
0	0	False	4.179585687
0	0	False	4.181853894
0	0	False	4.181065064
0	0	False	4.181064244
0	0	False	4.181483403
0	0	False	4.180076572
0	0	False	4.18122362
0	0	False	4.181195014
0	0	False	4.181856457
0	0	False	4.181072541
0	0	False	4.18169046
0	0	False	4.180061367

TABLE 337: PIPE TRANSITION RESULTS - O

Flow Element Results		
Fluid variables		
Static enthalpy (kJ/kg)	Viscosity (kg/m.s)	Total gas mass fraction - Incondensable + Vapour
104.9795235	0.000899453	-1
104.9731384	0.000899297	-1
104.548888	0.000900456	-1
104.9415779	0.000898659	-1
104.9418331	0.000899378	-1
104.5494764	0.000900509	-1
105.5503544	0.000897383	-1
104.9681169	0.000899319	-1
104.547221	0.000900426	-1
104.9645247	0.000899327	-1
104.9657839	0.00089929	-1
105.5388814	0.000897276	-1
105.5413329	0.000896579	-1
104.9759452	0.000899269	-1
133.9218806	0.00076796	-1
134.7081966	0.000765322	-1
104.547221	0.000900434	-1
104.9607624	0.000899313	-1
104.9415779	0.000899409	-1
105.0443199	0.000898379	-1
126.0903873	0.00079928	-1
104.8777372	0.000899506	-1
105.0462991	0.000898713	-1
104.547221	0.000900432	-1
104.9571702	0.000899321	-1
104.56193	0.000900508	-1
122.4101274	0.000816898	-1

TABLE 338: PIPE TRANSITION RESULTS - P

Flow Element Results			
		Fluid variables	Convergence
Gas constant (kJ/kg.K)	Conductivity (W/m.K)	Density (kg/m^3)	Pressure convergence (kPa)
0	0.607032801	997.051352	-6.11405E-09
0	0.607026131	997.0283528	2.99776E-10
0	0.606839575	996.9454423	-1.16191E-09
0	0.606998971	996.9271637	0
0	0.60701137	997.0218266	0
0	0.606840819	996.9524187	-4.87583E-09
0	0.607274881	997.0921752	-3.22477E-09
0	0.607024037	997.0284025	8.07945E-11
0	0.606838225	996.9408306	1.30421E-09
0	0.607022303	997.0274944	-3.547E-10
0	0.607021829	997.0234798	2.17916E-09
0	0.607267205	997.0728443	-9.09228E-10
0	0.607254061	996.9867564	-4.8342E-12
0	0.607026795	997.0262972	-1.4516E-11
0	0.618524151	995.0846247	-3.53536E-07
0	0.618804338	995.0170722	-5.94964E-12
0	0.606838373	996.9418579	4.47873E-10
0	0.607019786	997.0237325	7.48396E-10
0	0.607012217	997.0256462	-2.73812E-11
0	0.607041854	996.9478535	-2.91038E-14
0	0.615534173	995.6141599	-3.533E-09
0	0.606979924	997.003546	-1.52325E-09
0	0.607047985	996.9930079	0
0	0.606838336	996.9416025	-1.27766E-09
0	0.607018034	997.0227507	-2.13453E-09
0	0.60684628	996.9593031	-2.42067E-11
0	0.614053108	995.8844903	-3.59793E-10

TABLE 339: PIPE TRANSITION RESULTS - Q

Flow Element Results		
Energy and Heat Transfer variables		Non-dimensional variables
Total heat transfer (kW)	Total power (kW)	Mach number
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	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	0	0
0	0	0

TABLE 340: PIPE TRANSITION RESULTS - R

Flow Element Results	Transition Loss Data		
Non-dimensional variables			
Total non-dimensional mass flow	Loss factor (reverse)	Loss factor (forward)	Transition Angle (°)
70.60388847	0.189107265	0.439779452	38.58009244
1102.667198	0.030319602	0.030109049	14.2500327
780.3159969	0.339002139	0.171172678	41.11209044
0	0.234162935	0.118236117	28.07248694
0	0.213996898	0.4096	53.13010235
239.1041598	0.512019753	0.350827327	148.1092082
136.1897084	0.107793611	0.194627353	28.07248694
1080.07437	0.030319602	0.030109049	14.2500327
4317.524205	0.234162935	0.118236117	28.07248694
1117.851284	0.030319602	0.030109049	14.2500327
1169.721271	0.213996898	0.4096	53.13010235
148.7710331	0.099534046	0.055126549	14.2500327
238.0079864	0.000111111	0.000200617	0.028647889
2494.965531	0.007794649	0.012622913	9.527283381
1060.168698	0.107793611	0.194627353	28.07248694
3190.13837	0.012622913	0.007794649	9.527283381
4111.760361	0.234162935	0.118236117	28.07248694
1144.384089	0.213996898	0.4096	53.13010235
0	0.030319602	0.030109049	14.2500327
0	0.189107265	0.439779452	38.58009244
122.3604956	0.189107265	0.439779452	38.58009244
77.99348445	0.439779452	0.189107265	38.58009244
0	0.439779452	0.189107265	38.58009244
4250.646769	0.234162935	0.118236117	28.07248694
1185.400865	0.213996898	0.4096	53.13010235
801.2731404	0.253763022	0.140545674	36.86989765
419.9102746	0.029065918	0.041328102	9.527283381

GATE VALVES

TABLE 341: GATE VALVE RESULTS - A

General	Flow Element Results		
	Flow and Geometry variables		
Identifier	Total volume (m^3)	Total pressure drop (kPa)	Total mass flow (kg/s)
TCV-054	0	158.0499604	38.46880791
TV-0001	0	0.414257192	17.82838433
TV-0002	0	0.000232061	17.82838433
TV-0003	0	2.320663972	17.82838433
TV-004	0	1.128774423	4.577561551
TV-005	0	1.091057679	3.973461047
TV-006	0	1.106932545	4.238248318
TV-007	0	1.161181127	5.039113412
TV-008	0	0.185398478	5.039113412
TV-009	0	0.131150666	4.238248318
TV-010	0	0.115274805	3.973461047
TV-011	0	0.152991315	4.577561551
V-269	0	0.576328898	189.4415133
V-602	0	0.581539599	190.2958916
V-604	0	4.302046479	157.3237684
V-605	0	0.147248265	154.2974695
V-606	0	0.147248265	154.2974695
V-607	0	0.184015836	190.2958916
V-612	0	1.357243105	38.46880791
V-614	0	-1.575233877	38.46880791
V-622	0	0.550999999	185.2319023
V-624	0	4.236242929	143.9833336
V-627	0	0.174352455	185.2319023
V-630	0	0.182367338	189.4415133
V-632	0	0.084237129	128.7521448
V-634	0	0.016620547	57.190704
V-635	0	0.030163768	77.04520318
V-636	0	0.030326143	77.25229682
V-640	0	0.047917453	97.106796
V-643	0	0.164354365	179.8428552
V-647	0	59.87898649	0
V-648	0	59.87898649	0
V-649	0	2.075311059	154.2975305
V-650	0	2.075311059	154.2975305
V-677	0	0.42360389	1.127863524
V-678	0	0.423700523	1.127863524
V-679	0	0.414301839	1.115411221
V-680	0	0.414397308	1.115411221
V-681	0	0.421060267	1.12447217
V-682	0	0.421156583	1.12447217

TABLE 342: GATE VALVE RESULTS - B

Flow Element Results			
Flow and Geometry variables			
Total temperature (°C)	Pressure ratio (down/up)	Maximum velocity (m/s)	Quality
25.09067526	0.647078099	4.91240511	0
31.90207615	0.998377588	2.281171636	0
31.92223755	0.999999338	0.053990345	0
31.93007621	0.992638859	5.399168478	0
31.93631697	0.995834409	1.386294925	0
31.93689452	0.995933066	1.203347143	0
31.93718491	0.995853173	1.283537822	0
31.9365094	0.995700898	1.526074708	0
31.93941817	0.999277619	1.526084712	0
31.9392668	0.99949033	1.283543835	0
31.93883128	0.999562852	1.203350227	0
31.93856089	0.999395259	1.386306277	0
24.9725878	0.99794807	2.688051871	0
24.97112527	0.997909269	2.700177321	0
31.36387789	0.982097772	2.236237338	0
31.67230626	0.998976855	1.360007263	0
31.67230626	0.998976855	1.360007263	0
24.91298783	0.998100203	1.518957644	0
29.20433726	0.994866668	2.185869221	0
25.07274119	1.003540128	2.183284402	0
24.97148849	0.998034915	2.628319848	0
32.27010399	0.982500755	2.047266854	0
24.91311861	0.998188797	1.478536866	0
24.91336799	0.998083112	1.512139233	0
24.91134903	0.999189558	1.02770617	0
24.91133446	0.999840751	0.456498914	0
24.91134515	0.999711879	0.614978396	0
24.9113452	0.999710328	0.616631428	0
24.91134448	0.999540751	0.775111143	0
24.91148753	0.998409783	1.435515647	0
24.99554906	0.592823343	0	0
24.99554906	0.592823343	0	0
31.67209864	0.985770464	1.360006301	0
31.67209864	0.985770464	1.360006301	0
24.97118648	0.998432907	2.304534967	0
25.80352347	0.998347944	2.30506068	0
24.97120098	0.998466919	2.279091515	0
25.81273029	0.998385665	2.279616695	0
24.97119121	0.998442186	2.297605509	0
25.80601131	0.998358243	2.298131075	0

TABLE 343: GATE VALVE RESULTS - C

Flow Element Results			
Flow and Geometry variables			
Pressure ratio (up/down)	Total volume flow (m^3/s)	Static pressure (kPa)	Total mass (kg)
1.545408508	0.038581939	368.8076993	0
1.001625048	0.01791628	255.1270395	0
1.000000662	0.017915655	350.49589	0
1.007415729	0.0179161	314.0984098	0
1.004183015	0.004600152	270.4114485	0
1.004083541	0.003993076	267.7297088	0
1.004164095	0.004259173	266.3813438	0
1.004317664	0.005063985	269.5179375	0
1.000722904	0.005064018	256.5563427	0
1.00050993	0.004259193	257.2592222	0
1.000437339	0.003993086	263.6396993	0
1.000605107	0.00460019	252.9100691	0
1.002056149	0.19000719	280.5834872	0
1.002095111	0.190864288	277.8605444	0
1.01822856	0.158070303	238.1568576	0
1.001024193	0.155053317	143.8436241	0
1.001024193	0.155053317	143.8436241	0
1.001903413	0.190877847	96.76880281	0
1.005159819	0.038627498	263.7194736	0
0.99647236	0.03858182	445.7527988	0
1.001968954	0.185784982	280.1195436	0
1.017810923	0.144712767	239.9633488	0
1.00181449	0.185798422	96.17614574	0
1.001920569	0.19002102	95.04601005	0
1.000811099	0.129145366	103.8976365	0
1.000159274	0.057365345	104.3601139	0
1.000288204	0.077280464	104.6764054	0
1.000289756	0.077488191	104.6761702	0
1.00045946	0.097403339	104.3147938	0
1.001592749	0.180392216	103.2712704	0
1.686843158	0	117.1194932	0
1.686843158	0	117.1194932	0
1.014434938	0.155053207	144.8076555	0
1.014434938	0.155053207	144.8076555	0
1.001569552	0.001131236	270.1001365	0
1.00165479	0.001131494	256.2568013	0
1.001535435	0.001118746	270.034122	0
1.001616946	0.001119004	256.4912025	0
1.001560245	0.001127834	270.0786127	0
1.001644457	0.001128092	256.3174206	0

TABLE 344: GATE VALVE RESULTS - D

Flow Element Results				
Downstream Results				
Quality	Total pressure (kPa)	Total temperature (°C)	Velocity (m/s)	Mach number
0	289.7827191	25.10836512	4.912802875	0
0	254.9199109	31.90212076	2.281172097	0
0	350.4957739	31.92223758	0.053990345	0
0	312.9380778	31.9303261	5.399174731	0
0	269.8470613	31.9363212	1.386295573	0
0	267.18418	31.93689468	1.203347683	0
0	265.8278775	31.93718678	1.283538408	0
0	268.937347	31.93651712	1.526075445	0
0	256.4636434	31.93943813	1.52608485	0
0	257.1936468	31.93928092	1.283543917	0
0	263.5820619	31.93884369	1.203350294	0
0	252.8335734	31.93857737	1.38630638	0
0	280.2953228	24.97265108	2.688052677	0
0	277.5697746	24.97118913	2.700178138	0
0	236.0058344	31.36387184	2.23624123	0
0	143.77	31.67232212	1.360007378	0
0	143.77	31.67232212	1.360007378	0
0	96.67679489	24.91300813	1.518957785	0
0	263.0408521	29.20436695	2.1858705	0
0	446.5404158	25.07280175	2.18328292	0
0	279.8440436	24.971549	2.628320602	0
0	237.8452274	32.27009086	2.047270433	0
0	96.08896951	24.91313784	1.478536996	0
0	94.95482638	24.91338811	1.512139372	0
0	103.8555179	24.91135835	1.027706218	0
0	104.3518036	24.91133629	0.456498918	0
0	104.6613235	24.91134848	0.614978407	0
0	104.6610071	24.91134855	0.616631438	0
0	104.2908351	24.91134977	0.775111164	0
0	103.1890932	24.9115057	1.435515779	0
0	87.18	25.00173058	0	0
0	87.18	25.00173058	0	0
0	143.77	31.67232212	1.360007915	0
0	143.77	31.67232212	1.360007915	0
0	269.8883345	24.971233	2.304535475	0
0	256.0449511	25.80356987	2.30506118	0
0	269.8269711	24.97124647	2.279092007	0
0	256.2840038	25.81277567	2.279617179	0
0	269.8680826	24.97123745	2.297606012	0
0	256.1068423	25.80605743	2.29813157	0

TABLE 345: GATE VALVE RESULTS - E

Flow Element Results				
Downstream Results				
Total enthalpy (kJ/kg)	Static enthalpy (kJ/kg)	Area (m^2)	Static temperature (°C)	Height (m)
105.5418232	105.5297554	0.007853982	25.10811935	2.2
133.9093906	133.9067887	0.007853982	31.90205575	1
134.079477	134.0794756	0.331830724	31.92223754	1
134.079477	134.0649015	0.003318307	31.92996195	1
134.0657486	134.0647877	0.003318307	31.93629719	2.4
134.0657486	134.0650246	0.003318307	31.93687659	2.4
134.0657486	134.0649249	0.003318307	31.9371662	2.4
134.0657486	134.0645842	0.003318307	31.93648802	2.4
134.0667292	134.0655648	0.003318307	31.93940904	2.3
134.0667292	134.0659055	0.003318307	31.93926033	2.3
134.0706516	134.0699276	0.003318307	31.9388256	1.9
134.059865	134.0589041	0.003318307	31.93855336	3
104.9657839	104.962171	0.070685835	24.97257789	1.5
104.9571702	104.9535247	0.070685835	24.97111528	1.5
131.6430257	131.6405253	0.070685835	31.36380947	3.7
132.8490271	132.8481023	0.114009183	31.67229902	10.2376
132.8490271	132.8481023	0.114009183	31.67229902	10.2376
104.547221	104.5460674	0.125663706	24.912986	1.5
122.6402543	122.6378653	0.017671459	29.20431074	2.7
105.5379008	105.5355174	0.017671459	25.07275666	2.6
104.9607624	104.9573084	0.070685835	24.97147903	1.5
135.4317704	135.4296748	0.070685835	32.27003844	3.7
104.547221	104.546128	0.125663706	24.91311687	1.5
104.547221	104.5460777	0.125663706	24.91336618	1.5
104.5469534	104.5464254	0.125663706	24.91134845	1.5
104.54732	104.5472158	0.125663706	24.91133434	1.5
104.5476571	104.547468	0.125663706	24.91134494	1.5
104.5476571	104.547467	0.125663706	24.91134499	1.5
104.54732	104.5470196	0.125663706	24.91134414	1.5
104.5469534	104.5459231	0.125663706	24.91148638	1.5
104.909414	104.909414	0.114009183	25.00173058	10.2376
104.909414	104.909414	0.114009183	25.00173058	10.2376
132.8490271	132.8481023	0.114009183	31.67229902	10.2376
132.8490271	132.8481023	0.114009183	31.67229902	10.2376
104.9503016	104.9476461	0.000490874	24.97117921	4.83
108.41712	108.4144633	0.000490874	25.80351435	4.83
104.9503016	104.9477045	0.000490874	24.97119387	4.83
108.4558231	108.4532247	0.000490874	25.81272136	4.83
104.9503016	104.9476621	0.000490874	24.97118398	4.83
108.4275757	108.424935	0.000490874	25.80600225	4.83

TABLE 346: GATE VALVE RESULTS - F

Flow Element Results		
Downstream Results	**Non-dimensional variables**	
Static pressure (kPa)	**Mach number**	**Total non-dimensional mass flow**
277.751263	0	148.3417859
252.330803	0	121.9523051
350.4943236	0	88.84444074
298.4339112	0	98.77603634
268.8908729	0	29.50631607
266.463714	0	25.87022153
265.0081893	0	27.73276473
267.7786135	0	32.58692731
255.3049028	0	34.29478177
256.3739551	0	28.76856591
262.8615943	0	26.31942289
251.8773776	0	31.6045554
276.6932661	0	1164.567434
273.935151	0	1181.257626
233.5172601	0	1142.430729
142.8496983	0	1871.842562
142.8496983	0	1871.842562
95.52669581	0	3391.839729
260.6616531	0	252.9929893
444.1640332	0	149.2976714
276.4002927	0	1140.622806
235.7601362	0	1039.440168
94.99926657	0	3322.07206
93.81503041	0	3437.788109
103.3290358	0	2138.580527
104.2479252	0	946.0392079
104.4727999	0	1270.536253
104.4714687	0	1273.953264
103.991351	0	1606.78145
102.1618783	0	3004.146722
87.18	0	0
87.18	0	0
142.8496975	0	1847.096432
142.8496975	0	1847.096432
267.2408096	0	7.204232352
253.3968222	0	7.603684137
267.237584	0	7.126556446
253.6940201	0	7.513120222
267.2364553	0	7.183175885
253.4746131	0	7.579098471

TABLE 347: GATE VALVE RESULTS - G

Flow Element Results		
Energy and Heat Transfer variables		Convergence
Total power (kW)	Total heat transfer (kW)	Pressure difference error (kPa)
0	0	-2.20395E-07
0	0	3.90192E-10
0	0	1.97217E-13
0	0	2.18663E-09
0	0	6.90399E-10
0	0	-2.99086E-10
0	0	1.23246E-09
0	0	-1.22778E-09
0	0	-1.22817E-09
0	0	1.23178E-09
0	0	-2.98601E-10
0	0	6.90731E-10
0	0	8.5121E-10
0	0	-8.33847E-10
0	0	5.65815E-10
0	0	3.1334E-10
0	0	3.1334E-10
0	0	-2.6381E-10
0	0	-5.2774E-10
0	0	-5.19464E-10
0	0	2.92291E-10
0	0	6.75557E-10
0	0	9.24806E-11
0	0	2.69288E-10
0	0	2.23949E-13
0	0	5.55644E-14
0	0	1.62387E-13
0	0	4.95106E-14
0	0	1.60341E-13
0	0	5.49448E-13
0	0	0
0	0	0
0	0	-4.41746E-09
0	0	-4.41746E-09
0	0	-1.91326E-09
0	0	-1.9125E-09
0	0	-7.46246E-10
0	0	-7.45941E-10
0	0	-1.7754E-09
0	0	-1.77469E-09

TABLE 348: GATE VALVE RESULTS - H

Flow Element Results			
Generic Results			
Mass Flux (kg/m².s)	Static temperature (°C)	Element is choked	Incondensable Mass Flow Rate (kg/s)
4898.000747	25.07275714	False	0
2269.980394	31.90196654	False	0
53.72734661	31.92223749	False	0
5372.734661	31.92946217	False	0
1379.486955	31.93628874	False	0
1197.43615	31.93687627	False	0
1277.232037	31.93716245	False	0
1518.579519	31.93647259	False	0
1518.579519	31.93936911	False	0
1277.232037	31.93923209	False	0
1197.43615	31.93880077	False	0
1379.486955	31.93852041	False	0
2680.049179	24.97245133	False	0
2692.136159	24.97098757	False	0
2225.676037	31.36382156	False	0
1353.377559	31.6722673	False	0
1353.377559	31.6722673	False	0
1514.32659	24.91294539	False	0
2176.889221	29.20425137	False	0
2176.889221	25.07263554	False	0
2620.495366	24.97135802	False	0
2036.947491	32.27006471	False	0
1474.028643	24.9130784	False	0
1507.527663	24.91332593	False	0
1024.577014	24.91132982	False	0
455.1091621	24.91133067	False	0
613.1062464	24.91133827	False	0
614.7542452	24.91133828	False	0
772.7513295	24.91133355	False	0
1431.143969	24.91145004	False	0
0	24.98936755	False	0
0	24.98936755	False	0
1353.378094	31.67185207	False	0
1353.378094	31.67185207	False	0
2297.664705	24.97108618	False	0
2297.664705	25.80342156	False	0
2272.297081	24.97110288	False	0
2272.297081	25.8126306	False	0
2290.755893	24.97109151	False	0
2290.755893	25.80591001	False	0

TABLE 349: GATE VALVE RESULTS - I

Flow Element Results					
Upstream Results					
Height (m)	Area (m^2)	Static enthalpy (kJ/kg)	Quality	Velocity (m/s)	Total enthalpy (kJ/kg)
2.4	0.007853982	105.5277961	0	4.91240511	105.53986
1	0.007853982	133.9067887	0	2.281171636	133.909390
1	0.331830724	134.0794756	0	0.053990345	134.07947
1	0.003318307	134.0649015	0	5.399168478	134.07947
2.3	0.003318307	134.0657683	0	1.386294925	134.066729
2.3	0.003318307	134.0660052	0	1.203347143	134.066729
2.3	0.003318307	134.0659055	0	1.283537822	134.066729
2.3	0.003318307	134.0655648	0	1.526074708	134.066729
2.3	0.003318307	134.0655648	0	1.526084712	134.066729
2.3	0.003318307	134.0659055	0	1.283543835	134.066729
1.9	0.003318307	134.0699276	0	1.203350227	134.070651
3	0.003318307	134.0589041	0	1.386306277	134.05986
1.5	0.070685835	104.962171	0	2.688051871	104.965783
1.5	0.070685835	104.9535247	0	2.700177321	104.957170
3.3	0.070685835	131.6444477	0	2.236237338	131.646948
10.2376	0.114009183	132.8481023	0	1.360007263	132.849027
10.2376	0.114009183	132.8481023	0	1.360007263	132.849027
1.5	0.125663706	104.5460674	0	1.518957644	104.54722
2.6	0.017671459	122.6388459	0	2.185869221	122.641234
2.8	0.017671459	105.5335562	0	2.183284402	105.535939
1.5	0.070685835	104.9573084	0	2.628319848	104.960762
3.3	0.070685835	135.4335972	0	2.047266854	135.435692
1.5	0.125663706	104.546128	0	1.478536866	104.54722
1.5	0.125663706	104.5460777	0	1.512139233	104.54722
1.5	0.125663706	104.5464254	0	1.02770617	104.546953
1.5	0.125663706	104.5472158	0	0.456498914	104.5473
1.5	0.125663706	104.547468	0	0.614978396	104.547657
1.5	0.125663706	104.547467	0	0.616631428	104.547657
1.5	0.125663706	104.5470196	0	0.775111143	104.5473
1.5	0.125663706	104.5459231	0	1.435515647	104.546953
10.2376	0.114009183	104.9130324	0	0	104.913032
10.2376	0.114009183	104.9130324	0	0	104.913032
10.2376	0.114009183	132.8481023	0	1.360006301	132.849027
10.2376	0.114009183	132.8481023	0	1.360006301	132.849027
4.83	0.000490874	104.9476461	0	2.304534967	104.950301
4.83	0.000490874	108.4144633	0	2.30506068	108.4171
4.83	0.000490874	104.9477045	0	2.279091515	104.950301
4.83	0.000490874	108.4532247	0	2.279616695	108.455823
4.83	0.000490874	104.9476621	0	2.297605509	104.950301
4.83	0.000490874	108.424935	0	2.298131075	108.427575

TABLE 350: GATE VALVE RESULTS - J

Flow Element Results			
Upstream Results			
Static pressure (kPa)	Static temperature (°C)	Total pressure (kPa)	Total temperature (°C)
435.8021975	25.07275714	447.8326795	25.07298541
252.7450607	31.90196654	255.3341681	31.90203155
350.4945556	31.92223749	350.496006	31.92223753
300.754592	31.92946217	315.2587418	31.92982631
270.0196478	31.93628874	270.9758357	31.93631275
267.554772	31.93687627	268.2752377	31.93689436
266.1151222	31.93716245	266.9348101	31.93718304
268.9397952	31.93647259	270.0985281	31.93650169
255.4903014	31.93936911	256.6490419	31.93939821
256.5051058	31.93923209	257.3247975	31.93925267
262.9768692	31.93880077	263.6973367	31.93881886
252.030369	31.93852041	252.9865647	31.93854442
277.2695961	24.97245133	280.8716517	24.97252452
274.5166917	24.97098757	278.1513142	24.97106142
237.8193109	31.36382156	240.3078809	31.36388394
142.9969466	31.6722673	143.9172483	31.67229041
142.9969466	31.6722673	143.9172483	31.67229041
95.71071175	24.91294539	96.86081073	24.91296752
262.0188976	29.20425137	264.3980952	29.20430757
442.5887978	25.07263554	444.9651819	25.07268063
276.9512937	24.97135802	280.3950436	24.97142799
239.9963828	32.27006471	242.0814703	32.27011713
95.17361912	24.9130784	96.26332197	24.91309937
93.99739785	24.91332593	95.13719372	24.91334787
103.413273	24.91132982	103.9397551	24.91133972
104.2645458	24.91133067	104.3684242	24.91133262
104.5029637	24.91133827	104.6914873	24.91134181
104.5017949	24.91133828	104.6913333	24.91134184
104.0392684	24.91133355	104.3387525	24.91133918
102.3262328	24.91145004	103.3534476	24.91146936
147.0589865	24.98936755	147.0589865	24.98936755
147.0589865	24.98936755	147.0589865	24.98936755
144.9250097	31.67185207	145.8453111	31.67187517
144.9250097	31.67185207	145.8453111	31.67187517
267.6644141	24.97108618	270.3119384	24.97113997
253.8205233	25.80342156	256.4686516	25.80347707
267.6518864	24.97110288	270.2412729	24.97115549
254.1084179	25.8126306	256.6984011	25.81268492
267.6575161	24.97109151	270.2891428	24.97114498
253.8957703	25.80591001	256.5279989	25.80596519

TABLE 351: GATE VALVE RESULTS - K

Flow Element Results				
Upstream Results	**Fluid variables**			
Mach number	**Total enthalpy (kJ/kg)**	**Conductivity (W/m.K)**	**Gas constant (kJ/kg.K)**	**Viscosity (kg/m.s)**
0	105.5277961	0.607261852	0	0.00089728
0	133.9067887	0.618521631	0	0.0007680
0	134.0794756	0.618597779	0	0.00076776
0	134.0649015	0.618586168	0	0.00076767
0	134.0657683	0.618581297	0	0.00076757
0	134.0660052	0.618580964	0	0.00076757
0	134.0659055	0.618580684	0	0.00076756
0	134.0655648	0.618581041	0	0.00076757
0	134.0655648	0.618578763	0	0.00076753
0	134.0659055	0.618579056	0	0.00076753
0	134.0699276	0.618581588	0	0.00076754
0	134.0589041	0.618575799	0	0.00076754
0	104.962171	0.60702016	0	0.00089930
0	104.9535247	0.607016314	0	0.0008993
0	131.6444477	0.617711594	0	0.00077558
0	132.8481023	0.618129838	0	0.00077127
0	132.8481023	0.618129838	0	0.00077127
0	104.5460674	0.606839233	0	0.00090051
0	122.6388459	0.614151582	0	0.0008160
0	105.5335562	0.607264701	0	0.00089728
0	104.9573084	0.607018157	0	0.00089932
0	135.4335972	0.619064427	0	0.00076291
0	104.546128	0.606839218	0	0.00090051
0	104.5460777	0.606839113	0	0.00090050
0	104.5464254	0.606839779	0	0.00090054
0	104.5472158	0.606840121	0	0.00090054
0	104.547468	0.606840229	0	0.00090054
0	104.547467	0.606840228	0	0.00090054
0	104.5470196	0.606840035	0	0.00090054
0	104.5459231	0.606839547	0	0.00090054
0	104.9130324	0.606988887	0	0.00089899
0	104.9130324	0.606988887	0	0.00089899
0	132.8481023	0.618130003	0	0.0007712
0	132.8481023	0.618130003	0	0.0007712
0	104.9476461	0.607013055	0	0.0008993
0	108.4144633	0.608410282	0	0.00088295
0	104.9477045	0.607013077	0	0.0008993
0	108.4532247	0.608425962	0	0.0008827
0	104.9476621	0.60701306	0	0.0008993
0	108.424935	0.608414518	0	0.00088290

TABLE 352: GATE VALVE RESULTS - L

Flow Element Results		
Fluid variables		
Total gas mass fraction - Incondensable + Vapour	Density (kg/m^3)	Specific heat (kJ/kg.K)
-1	997.0677576	4.180393612
-1	995.0940815	4.17959084
-1	995.1287844	4.179447747
-1	995.1040948	4.179527941
-1	995.0890898	4.179564832
-1	995.0878744	4.179567755
-1	995.0871845	4.17956947
-1	995.0885832	4.179566123
-1	995.0820595	4.179582103
-1	995.0825231	4.179580887
-1	995.0853241	4.179573063
-1	995.0809413	4.179586441
-1	997.0228657	4.18106926
-1	997.0219876	4.181078801
-1	995.2772001	4.179689187
-1	995.1252436	4.179791115
-1	995.1252436	4.179791115
-1	996.9511631	4.181761472
-1	995.8917946	4.17996088
-1	997.0708439	4.180366864
-1	997.0230098	4.181070994
-1	994.9594438	4.179552034
-1	996.9508892	4.181764171
-1	996.9503008	4.181770112
-1	996.9552042	4.181727014
-1	996.9556296	4.181723701
-1	996.9557468	4.181722768
-1	996.9557463	4.181722773
-1	996.9555162	4.181724576
-1	996.9546289	4.181731162
-1	996.9563471	4.18150375
-1	996.9563471	4.18150375
-1	995.1263406	4.179787853
-1	995.1263406	4.179787853
-1	997.0188074	4.181099995
-1	996.7914183	4.18057312
-1	997.0187972	4.181100023
-1	996.7891031	4.180565946
-1	997.0188028	4.181100013
-1	996.7907916	4.180571189

TABLE 353: GATE VALVE RESULTS - M

Control Valve Loss Data	
Expansion factor	**Valve Resistance coefficient (K)**
0	13.3
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0.60028	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0.16
0	0
0	0
0	2.255034205
0	2.255034205
0.00078067	0.16
0	0.16
4180.3	0.16
0	0.16
0	0.16
0	0.16

BUTTERFLY VALVES

TABLE 354: BUTTERFLY VALVE RESULTS - A

General	Flow Element Results			
	Upstream Results			
Identifier	Static pressure (kPa)	Velocity (m/s)	Total enthalpy (kJ/kg)	Static enthalpy (kJ/kg)
V-603	260.9260078	0	104.9563332	104.9563332
V-608	98.69985601	0	104.548888	104.548888
V-610	484.3995181	0	105.5503544	105.5503544
V-615	99.50810675	0	104.5494764	104.5494764
V-617	328.6787724	0	104.9741302	104.9741302
V-623	261.4203326	0	104.9563332	104.9563332
V-625	271.6207171	0	104.964178	104.964178
V-626	247.914699	0	134.7824575	134.7824575
V-651	266.812096	0	104.959275	104.959275
V-652	240.6974977	0	133.9248224	133.9248224
V-674	97.83584323	0	104.9415779	104.9415779
V-676	272.7734012	0	104.9415779	104.9415779
V-683	239.7612964	0	104.9849496	104.9849496
V-684	242.0097814	0	105.0350291	105.0350291
V-687	235.7024701	0	104.8875432	104.8875432
V-688	171.3511984	0	126.1073517	126.1073517

TABLE 355: BUTTERFLY VALVE RESULTS - B

Flow Element Results					
Upstream Results					
Mach number	Static temperature (°C)	Area (m^2)	Total pressure (kPa)	Quality	Elevation (m)
0	24.97464406	0	260.9260078	0	2
0	24.91296042	0	98.69985601	0	1.33
0	25.06741536	0	484.3995181	0	1.33
0	24.91292279	0	99.50810675	0	1.27
0	24.96397926	0	328.6787724	0	2.4
0	24.9745355	0	261.4203326	0	2
0	24.97417196	0	271.6207171	0	1.2
0	32.11254708	0	247.914699	0	3
0	24.97405512	0	266.812096	0	1.7
0	31.90887645	0	240.6974977	0	3.7
0	25.00707329	0	97.83584323	0	1.5
0	24.96851259	0	272.7734012	0	1.5
0	24.98613728	0	239.7612964	0	11.23
0	24.99762288	0	242.0097814	0	11
0	24.96372839	0	235.7024701	0	11.23
0	30.0535431	0	171.3511984	0	11

TABLE 356: BUTTERFLY VALVE RESULTS - C

Flow Element Results			
Upstream Results	**Convergence**	**Fluid variables**	
Total temperature (°C)	**Pressure convergence (kPa)**	**Gas constant (kJ/kg.K)**	**Viscosity (kg/m.s)**
24.97464406	2.32194E-09	0	0.00089926
24.91296042	-6.9701E-10	0	0.000900511
25.06741536	-2.20258E-09	0	0.000897371
24.91292279	-7.56749E-10	0	0.000900512
24.96397926	-7.58795E-10	0	0.000899453
24.9745355	2.3323E-09	0	0.000899262
24.97417196	1.48376E-09	0	0.000899268
32.11254708	1.46555E-09	0	0.000765116
24.97405512	-5.26627E-09	0	0.000899274
31.90887645	-5.08462E-09	0	0.000767963
25.00707329	0	0	0.000898659
24.96851259	0	0	0.000899379
24.98613728	0.000128834	0	0.000899041
24.99762288	-0.000128519	0	0.00089903
24.96372839	-1.10144E-07	0	0.000899424
30.0535431	-5.44426E-09	0	0.000799299

TABLE 357: BUTTERFLY VALVE RESULTS - D

		Flow Element Results
		Fluid variables
Conductivity (W/m.K)	**Density (kg/m^3)**	**Total gas mass fraction - Incondensable + Vapour**
0.607014803	997.0136875	-1
0.606840568	996.9523604	-1
0.607274648	997.0906405	-1
0.606840875	996.9528054	-1
0.607029895	997.0482174	-1
0.607014883	997.014008	-1
0.607018331	997.0179364	-1
0.618832466	995.0171789	-1
0.607014158	997.0143987	-1
0.618525389	995.085997	-1
0.606998971	996.9271637	-1
0.607011267	997.0218428	-1
0.607025106	997.0024789	-1
0.607025993	997.0023392	-1
0.606983367	996.9989707	-1
0.615541348	995.6255306	-1

TABLE 358: BUTTERFLY VALVE RESULTS - E

Flow Element Results			
Fluid variables		Downstream Results	
Specific heat (kJ/kg.K)	Static enthalpy (kJ/kg)	Total pressure (kPa)	Static enthalpy (kJ/kg)
4.181125353	104.9548623	256.4265434	104.9533914
4.181747215	104.548888	98.19378256	104.548888
4.180208197	105.5503544	482.8002988	105.5503544
4.181742282	104.5494764	99.30370949	104.5494764
4.180893589	104.9736399	327.4966892	104.9731496
4.181123529	104.9548623	257.1682188	104.9533914
4.181098073	104.9607459	263.5599118	104.9573138
4.179568558	134.7809866	243.6947678	134.7795157
4.181122334	104.9529011	252.8027809	104.9465272
4.179606662	133.9238418	237.3564811	133.9228612
4.181686497	104.9415779	97.83584323	104.9415779
4.1810859	104.9415779	272.7734012	104.9415779
4.181172743	104.9861036	242.009787	104.9872576
4.181172382	104.9883035	239.7612908	104.9415779
4.18124392	104.8886709	208.684996	104.8897986
4.18002394	126.106224	167.6633195	126.1050963

TABLE 359: BUTTERFLY VALVE RESULTS - F

Flow Element Results				
Downstream Results				
Mach number	Static temperature (°C)	Static pressure (kPa)	Quality	Elevation (m)
0	24.97492848	256.4265434	0	2.3
0	24.9130721	98.19378256	0	1.33
0	25.06776875	482.8002988	0	1.33
0	24.9129679	99.30370949	0	1.27
0	24.96400604	327.4966892	0	2.5
0	24.9747656	257.1682188	0	2.3
0	24.97430019	263.5599118	0	1.9
0	32.11275195	243.6947678	0	3.3
0	24.97408231	252.8027809	0	3
0	31.90912668	237.3564811	0	3.9
0	25.00707329	97.83584323	0	1.5
0	24.96851259	272.7734012	0	1.5
0	24.98619559	242.009787	0	11
0	24.97576247	239.7612908	0	11.23
0	24.97020151	208.684996	0	11
0	30.05380084	167.6633195	0	11.23

TABLE 360: BUTTERFLY VALVE RESULTS - G

Flow Element Results				
Downstream Results				Forces
				Forces From Velocity Change
Total temperature (°C)	Velocity (m/s)	Total enthalpy (kJ/kg)	Area (m^2)	Magnitude (N)
24.97492861	0	104.9533914	0	0
24.9130721	0	104.548888	0	0
25.06776875	0	105.5503544	0	0
24.9129679	0	104.5494764	0	0
24.96400604	0	104.9731496	0	0
24.9747657	0	104.9533914	0	0
24.97430029	0	104.9573138	0	0
32.11275195	0	134.7795157	0	0
24.97408243	0	104.9465272	0	0
31.90912668	0	133.9228612	0	0
25.00707329	0	104.9415779	0	0
24.96851259	0	104.9415779	0	0
24.98619559	0	104.9872576	0	0
24.97576247	0	104.9415779	0	0
24.97020151	0	104.8897986	0	0
30.05380084	0	126.1050963	0	0

TABLE 361: BUTTERFLY VALVE RESULTS - H

Flow Element Results		
Forces	Flow and Geometry variables	
Forces From Pressure Difference		
Magnitude (N)	Mean pressure (kPa)	Maximum velocity (m/s)
0	258.6759673	0
0	98.44681929	0
28.26053796	483.5999085	0
3.611997699	99.40590812	0
20.88913407	328.0877308	0
0	259.2940383	0
0	267.5901008	0
0	245.8047334	0
0	259.8071833	0
0	239.0269894	0
0	97.83584323	0
0	272.7734012	0
-11.30214656	240.8855417	0
11.30214656	240.8855361	0
-403.8455578	222.1937331	0
370.5273614	169.507259	0

TABLE 362: BUTTERFLY VALVE RESULTS - I

Flow Element Results		
Flow and Geometry variables		
Total volume flow (m^3/s)	Pressure ratio (down/up)	Pressure ratio (up/down)
0.152740787	0.982753421	1.017549244
0.038586405	0.994872602	1.005153824
0.038581054	0.996698553	1.003312383
0.013793918	0.997945924	1.002058304
0.013792598	0.99640353	1.003609451
0.140163613	0.983732755	1.016536244
0.134633932	0.970321732	1.030586008
0.138898011	0.982978294	1.017316462
0.139122485	0.947491791	1.055418115
0.143992261	0.986119438	1.014075944
0	1	1
0	1	1
0	1.009378038	0.990709092
0	0.990709092	1.009378039
0.010415395	0.885374667	1.129465341
0.010429763	0.978477659	1.021995741

TABLE 363: BUTTERFLY VALVE RESULTS - J

Flow Element Results			
Flow and Geometry variables			
Total pressure drop (kPa)	Total mass flow (kg/s)	Total temperature (°C)	Total mass (kg)
4.500081064	152.284655	24.97478633	0
0.50607345	38.46880791	24.91301626	0
1.599219316	38.46880791	25.06759205	0
0.20439726	13.75188495	24.91294535	0
1.182083182	13.75188495	24.96399265	0
4.252588556	139.7450853	24.9746506	0
8.061232531	134.2324454	24.97423613	0
4.219931158	138.2059065	32.11264952	0
14.00982531	138.7071214	24.97406878	0
3.341016566	143.2846829	31.90900157	0
0	0	25.00707329	0
0	0	24.96851259	0
-2.248490616	0	24.98616644	0
2.248490616	0	24.98669267	0
27.01747409	10.38413803	24.96696495	0
3.687878914	10.38413803	30.05367197	0

TABLE 364: BUTTERFLY VALVE RESULTS - K

Flow Element Results			
Flow and Geometry variables			Generic Results
Total volume (m^3)	Quality	Static pressure (kPa)	Static temperature (°C)
0	0	258.6762756	24.97478627
0	0	98.44681929	24.91301626
0	0	483.5999085	25.06759205
0	0	99.40590812	24.91294535
0	0	328.0877308	24.96399265
0	0	259.2942757	24.97465055
0	0	267.5903145	24.97423608
0	0	245.8047334	32.11264952
0	0	259.8074384	24.97406871
0	0	239.0269894	31.90900157
0	0	97.83584323	25.00707329
0	0	272.7734012	24.96851259
0	0	240.8855417	24.98616644
0	0	240.8855361	24.98669267
0	0	222.1937331	24.96696495
0	0	169.507259	30.05367197

TABLE 365: BUTTERFLY VALVE RESULTS - L

Flow Element Results			
Generic Results			
Pressure drop excluding elevation (kPa)	Check Valve Active	Mass Flux ($kg/m^2.s$)	Element is choked
1.566449488	False	0	False
0.50607345	False	0	False
1.599219316	False	0	False
0.20439726	False	0	False
0.2043777	False	0	False
1.319097977	False	0	False
1.217074774	False	0	False
1.292789621	False	0	False
1.299574894	False	0	False
1.389453909	False	0	False
0	False	0	False
0	False	0	False
0.000128834	False	0	False
-0.000128519	False	0	False
29.26608563	False	0	False
1.442365005	False	0	False

TABLE 366: BUTTERFLY VALVE RESULTS - M

Flow Element Results		
Generic Results	Non-dimensional variables	
Incondensable Mass Flow Rate (kg/s)	Reynolds number (pipe)	Mach number
0	718720.1168	0
0	271956.7341	0
0	363877.9522	0
0	129625.8229	0
0	129778.4877	0
0	659536.7408	0
0	633515.3434	0
0	766634.1414	0
0	654629.761	0
0	791860.2792	0
0	0	0
0	0	0
0	0	0
0	0	0
0	183749.4644	0
0	206766.955	0

TABLE 367: BUTTERFLY VALVE RESULTS - N

Flow Element Results	Butterfly Valve Loss Data
Non-dimensional variables	
Total non-dimensional mass flow	Valve resistance coefficient (k)
1007.714977	0.672976664
672.8933164	0.672977034
137.142331	0.672976664
238.5930258	0.672976664
72.24066662	0.672976664
922.9879692	0.672976664
853.2832212	0.672976664
974.0047808	0.672976664
897.6184161	0.672976664
1039.728682	0.672976664
0	35918.19966
0	35918.19966
0	35918.19966
0	35918.19966
76.06717833	13.67376627
105.5238049	0.672976664

Appendix IV

Methodology of temperature control

SAFARI-1, as established in the introduction, is a 20MW MTR type tank-in-pool research reactor currently running on LEU fuel.

The majority of the fission energy in the reactor core is converted to heat during the nuclear fission reaction. Additionally, ancillary systems produce heat such as the primary reactor pumps, part of which is also deposited in the water which is being pumped around. All of this energy has to be managed to avoid exceeding the temperature design specifications of individual components.

The reactor coolant system comprise of three main sub-systems namely:

- The reactor primary system which circulates water through the reactor vessel and the core to cool the fuel elements and surrounding components in the reactor vessel (19).

- The pool primary system which circulates and cools the water in the pools. The two systems operate independently and are completely separate from each other during operation, except for a pressure equalising connection, which allows the pool system to act as a “head tank” to define the pressure in the reactor primary system. It provides a constant reference pressure in the reactor primary system of 53 kPa gauge at the connection point between the two systems. Demineralised light water is used in the reactor and pool circuits, and both these systems are provided with offline purification installations to maintain the purity of the water to a high degree (19).

- The secondary cooling system that removes the heat from the reactor, pool and air-conditioning circuits flows through the tubes of the reactor, pool and air-conditioning heat exchangers*. The heat load is dissipated in the induced draught cooling towers situated south east of the reactor building (P-1800). The secondary cooling system uses Rand Water Board (RWB) water supplied from a

reservoir on the Necsa site, which feeds directly into the cooling towers of the secondary cooling system. Alternatively, purified river water which is chemically treated to prevent corrosion, scaling and the formation of algae can also be used. All the pipe work is of carbon steel, some of the components being galvanised to prolong their lifespan (19).

**It should be noted that the primary sides of the secondary system heat exchangers is on the shell side.*

Secondary cooling system

Apart from start-ups and shut downs, the core operates at near constant power levels, as does ancillary systems. Under normal operating conditions, the only variance experienced by the system is the ambient temperature. This can vary over the course of a year from roughly -2°C to 34°C. This is considered significant as if this temperature variance was directly transferred to the primary water which enters the core, it would have a significant effect on the cooling of the core. Therefore it is essential to maintain relatively constant conditions within the core and affected systems by means of varying the heat removal characteristics of the secondary cooling system (94) (95).

The thermal inertia of the system is increased directly by control of the system and indirectly by the relatively large volume of water in the combined systems being the reactor primary system, the pool primary system and the secondary cooling system. It is therefore easy to react and accommodate any changes in operational conditions through managing the energy content in any of the three systems (19).

There are multiple ways of controlling the temperature of the secondary cooling system. The main control mechanisms are the control valves in the system and the cooling tower fans. The water in the cooling tower basin is the feed to the secondary system, and its temperature is directly linked to the internal energy (u_0) of the coolant. If the coolant temperature (and therefore its internal energy) is low, the control valves in the system would typically limit the flow of coolant, limiting heat transfer through the reactor primary coolant heat exchangers, and so maintaining

constant temperatures within the primary system. If the energy of the secondary coolant is too high, the control valves are typically “opened up” to increase fluid flow through the secondary side of the reactor primary coolant heat exchangers and so maintaining constant temperatures within the primary system. As stated before, the reactor normally operates at virtually constant power levels and due to the inherent thermal inertia of the entire cooling system, it can be regarded as a quasi-steady state system.

The main method of controlling the secondary cooling system is by controlling the number of active cooling towers, and whether the fans in the individual cooling towers are on or off. The fan’s status, along with other function such as whether the secondary flow is evenly distributed between the operating cooling towers, is controlled either manually or by PLC controllers (19).

The specific arrangement of the cooling towers can be motivated by the following points:

After the water reaches the base of the cooling tower, it has to be raised to the top of the cooling tower, from where it can fall to the basin of the tower and be pumped back to the heat exchangers. As the water falls in the cooling tower, the pressure drops to atmospheric pressure. The static head at the suction of the pumps is created by the elevation of the basin relative to that of the pumps.

If the system was in series (II in **Figure 51**), additional pumps would be required to pump fluid from the first cooling tower’s basin (at atmospheric + static head in the basin) to overcome the static head of the riser within the second cooling tower. For this operation, multiple additional pumps would be required to allow effective bypassing of certain towers for maintenance reasons etc.

By having a parallel system (I in **Figure 51**), all of the above mentioned is easily averted, with all towers receiving sufficient pressure head from just the reactor secondary coolant supply pumps and support pumps to operate effectively. The arrangement also allows for easy isolation of any specific cell.

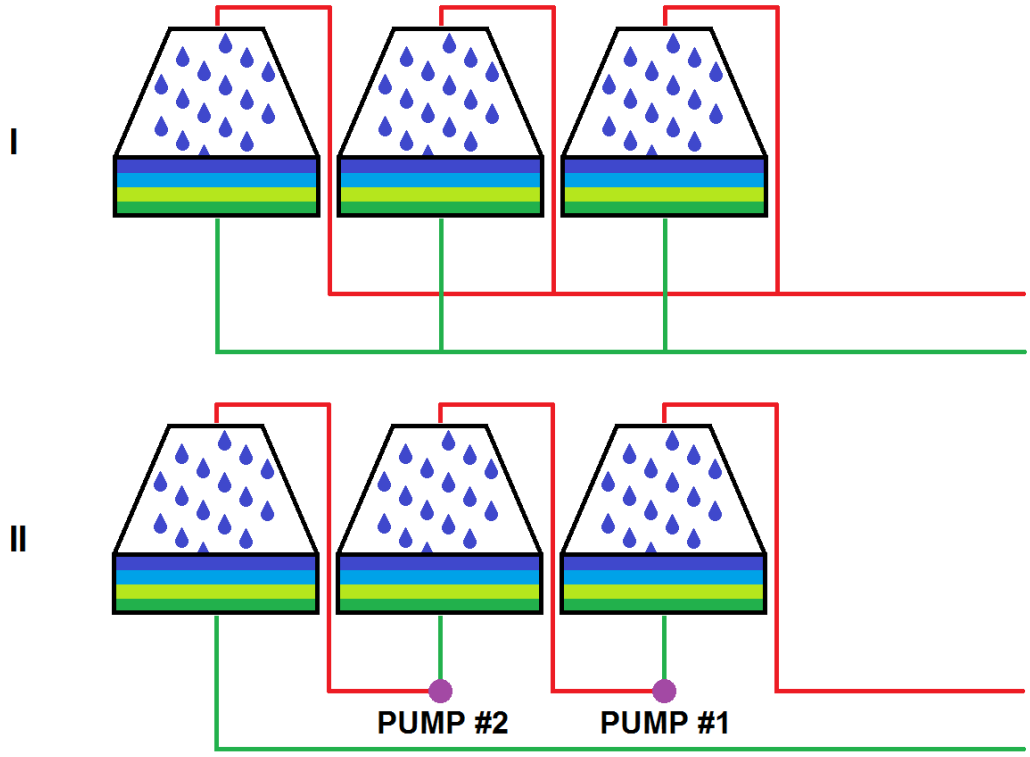

Figure 51: Cooling tower arrangement: parallel vs. series

Appendix V

Heat exchanger arrangement

The primary heat exchangers* are arranged in a parallel, and due to no backup data on the current system, it was enquired to why the system is arranged the way it is.

** It should be noted that the shell side of the shell and tube heat exchangers E-101, E-103, E-104, and E-105 form part of the primary system. The tube side of the shell and tube heat exchangers E-101, E-103, E-104, and E-105 forms part of the secondary system.*

This was investigated and determined as follows:

The efficiency of the heat exchangers could be equated to the heat transfer effectiveness, denoted "ε", which is defined as the actual heat transfer rate over the maximum possible heat transfer rate, denoted (6) below.

$$\varepsilon = \frac{\dot{Q}}{\dot{Q}_{max}} \quad [25]$$

Where

$$\dot{Q} = C_c(T_{c,out} - T_{c,in}) = C_h(T_{h,in} - T_{h,out}) \quad [26]$$

$$\dot{Q}_{max} = C_{min}(T_{h,in} - T_{c,in}) \quad [27]$$

Where

C = Heat capacity rate (W/K)

$\dot{Q}$ = Heat transfer rate (kW)

$\dot{m}$ = Mass flow rate (kg/s)

T = Temperature (K)

To calculate the associated pressure drop, the following formula below was employed (8).

$$\Delta p_0 = C_k \rho^{\beta} Q^{\alpha} \phi \quad [28]$$

Where:

$C_k, \beta \; and \; \alpha$ = empirical pressure loss constants

ρ = mean density (kg.m^3) based on mean pressure and temperature

Q = Volume flow rate (m^3/s) based on mean density

ϕ = two-phase pressure drop multiplier

From the above one can determine the effectiveness and the associated pressure drops with the various arrangements of heat exchangers.

The following information is considered constant within the systems:

- Heat exchanger geometry and thermal capabilities.
- The feed pumps' resultant flow rate (independent of pump curve i.e. pressure).
- The pressure provided by the pump.

Four different arrangement scenarios are possible as seen in **Figure 52** and is listed as:

#I: Shell side in series – Tube side in series

#II: Shell side in parallel – Tube side in series

#III: Shell side in series – Tube side in parallel

#IV: Shell side in parallel – Tube side in parallel

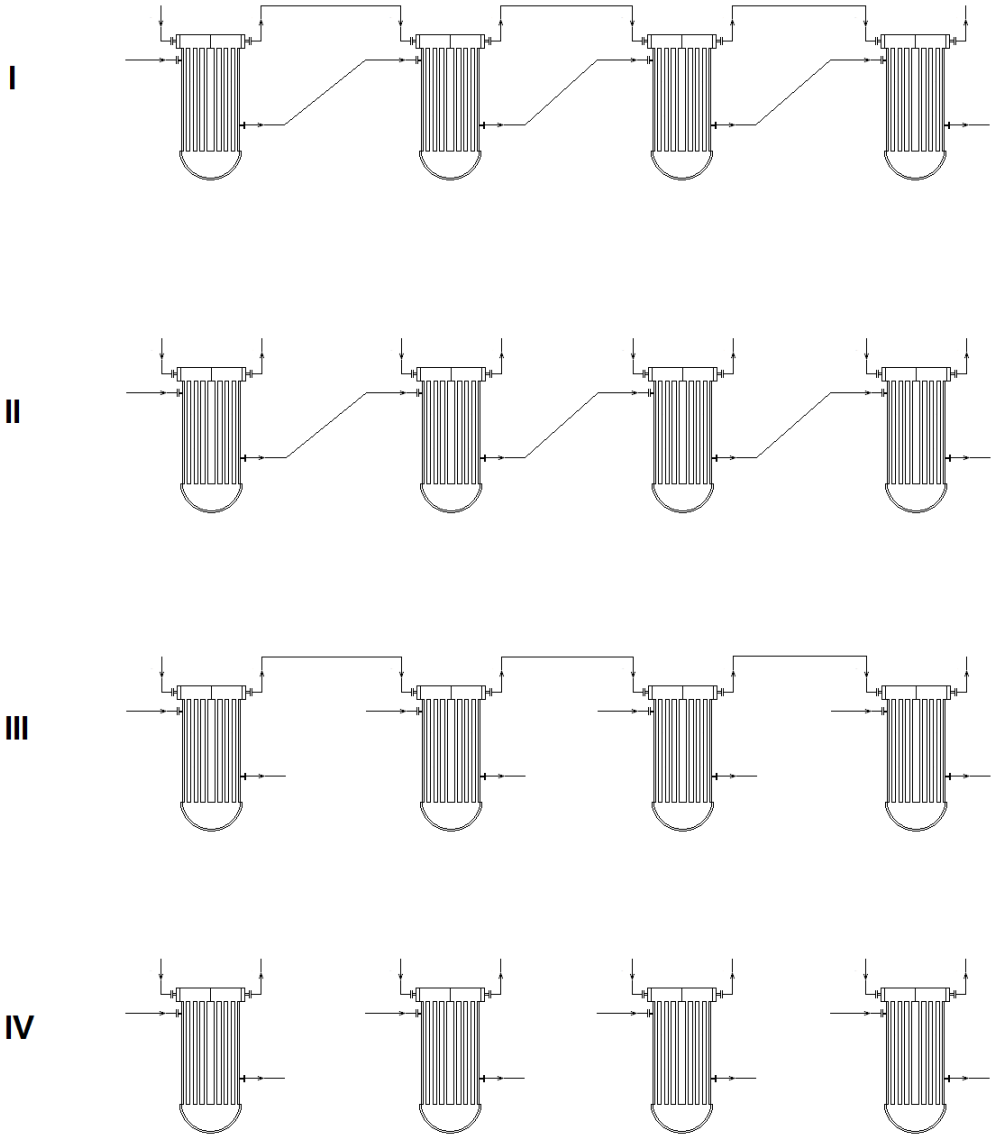

Figure 52: Schematic possible arrangements of primary heat exchangers

The boundary conditions as based on the available data from the equipment employed such as the pumps, interconnecting piping and valves was employed and superimposed on the current and non-existing arrangements for each scenario as seen in **Table 368 – 371**.

Table 368: Heat exchanger arrangement #1: boundary conditions

ARRANGEMENT #1	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	420	-
E-101 TS	24	289	-
E-103 SS	-	-	-
E-103 TS	-	-	-
E-104 SS	-	-	-
E-104 TS	-	-	-
E-105 SS	-	-	548
E-105 TS	-	-	582

Table 369: Heat exchanger arrangement #2: boundary conditions

ARRANGEMENT #2	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	420	137
E-101 TS	24	289	-
E-103 SS	44.5	420	137
E-103 TS	-	-	-
E-104 SS	44.5	420	137
E-104 TS	-	-	-
E-105 SS	44.5	420	137
E-105 TS	-	-	582

Table 370: Heat exchanger arrangement #3: boundary conditions

ARRANGEMENT #3	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	420	-
E-101 TS	24	289	145.5
E-103 SS	-	-	-
E-103 TS	24	289	145.5
E-104 SS	-	-	-
E-104 TS	24	289	145.5
E-105 SS	-	-	548
E-105 TS	24	289	145.5

Table 371: Heat exchanger arrangement #4: boundary conditions

ARRANGEMENT #4	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	420	137
E-101 TS	24	289	145.5
E-103 SS	44.5	420	137
E-103 TS	24	289	145.5
E-104 SS	44.5	420	137
E-104 TS	24	289	145.5
E-105 SS	44.5	420	137
E-105 TS	24	289	145.5

RESULTS:

The results of the superimposed values are listed as in **Table 372**.

Table 372: Heat exchanger arrangement #1; #2; #3; #4: results

ARRANGEMENT	SS T_{outlet} (°C)	SS P_{outlet} (kPa)	TS T_{outlet} (°C)	TS P_{outlet} (kPa)
#1	N/R	N/R	N/R	N/R
#2	N/R	N/R	N/R	N/R
#3	N/R	N/R	N/R	N/R
#4	37.102	399.46	30.97	264.4

N/R (no result) is prevalent in all scenarios where a series configuration is encountered. This is due to the associated pressure drop falling below 0kPa, which in turn implies a phase change, something not accounted for by the employed formula. The result becomes unrealistic and shall be disregarded for the current process design parameters with regards to pressure and temperature.

Hypothetical scenario:

Due to the associated pressure drop in series systems, a hypothetical situation has to be postulated to generate comparable results. The pressure of the system is therefore increased by a factor of 8 in all scenarios.

The boundary conditions are adapted and superimposed on the current and non-existing arrangements for each scenario as seen in **Table 373 – 376**.

Table 373: Hypothetical heat exchanger arrangement #1: boundary conditions

ARRANGEMENT #1	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	3360	-
E-101 TS	24	2312	-
E-103 SS	-	-	-
E-103 TS	-	-	-
E-104 SS	-	-	-
E-104 TS	-	-	-
E-105 SS	-	-	548
E-105 TS	-	-	582

Table 374: Hypothetical heat exchanger arrangement #2: boundary conditions

ARRANGEMENT #2	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	3360	137
E-101 TS	24	2312	-
E-103 SS	44.5	3360	137
E-103 TS	-	-	-
E-104 SS	44.5	3360	137
E-104 TS	-	-	-
E-105 SS	44.5	3360	137
E-105 TS	-	-	582

Table 375: Hypothetical heat exchanger arrangement #3: boundary conditions

ARRANGEMENT #3	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	3360	-
E-101 TS	24	2312	145.5
E-103 SS	-	-	-
E-103 TS	24	2312	145.5
E-104 SS	-	-	-
E-104 TS	24	2312	145.5
E-105 SS	-	-	548
E-105 TS	24	2312	145.5

Table 376: Hypothetical heat exchanger arrangement #4: boundary conditions

ARRANGEMENT #4	BOUNDARY CONDITIONS		
HEAT EXCHANGER	T_{inlet} (°C)	P_{inlet} (kPa)	M_{outlet} (kg/s)
E-101 SS	44.5	3360	137
E-101 TS	24	2312	145.5
E-103 SS	44.5	3360	137
E-103 TS	24	2312	145.5
E-104 SS	44.5	3360	137
E-104 TS	24	2312	145.5
E-105 SS	44.5	3360	137
E-105 TS	24	2312	145.5

Results:

The temperature and pressure results of the superimposed values are listed as in **Table 377** and the associated heat transfer, together with the actual heat transfer of the original arrangement (under #4 low pressure) is listed in **Table 378**.

Table 377: Hypothetical heat exchanger arrangement #1; #2; #3; #4: temperature and pressure results

ARRANGEMENT	SS T_{outlet} (°C)	SS P_{outlet} (kPa)	TS T_{outlet} (°C)	TS P_{outlet} (kPa)
#1	37.598	2047.03	31.1012	738.076
#2	38.286	3339.48	31.2916	738.185
#3	37.3017	2046.91	31.0425	2287.42
#4	37.093	3339.49	30.9778	2287.42

Table 378: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: heat transfer results

ARRANGEMENT	Heat Transfer E-101 (kW)	Heat Transfer E-103 (kW)	Heat Transfer E-104 (kW)	Heat Transfer E-105 (kW)	Tot Heat Transfer (kW)
#1	5999.8	4504.07	3380.5	2536.29	16420.66
#2	4936.63	4426.51	3967.18	3553.53	16883.85
#3	4994.12	4478.95	4018.91	3607.92	17099.9
#4	4235.69	4235.69	4235.69	4235.69	16942.76
#4 (low pressure)	4238.4	4238.4	4238.4	4238.4	16953.6

From the above results, it can be seen that the reasoning for the current layout becomes self-evident. Not only does a full parallel system have the benefit of being able to operate at a lower pressure (saving costs in pumping power) it also shows a slight improvement in heat transfer when compared to a full series systems.

It is therefore noted that whatever benefit can be achieved from a series oriented system, is far negatively outweighed by the pressure requirements of such a system. Splitting the flow into parallel systems also decreases the flow velocity, which in turn decreases erosion of the heat exchangers. Fouling would then be more prevalent, but its effect is easily counteracted by water management and periodic cleaning of the tubes.

To determine the effectiveness of the various heat exchanger arrangements, the mass flow as seen in **Table 379**; the specific heat as in **Table 380**; and the minimum and maximum temperatures as seen in **Table 381** and **Table 382** respectively, was taken into account. The resultant effectiveness is then listed in **Table 383**.

Table 379: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: mass flow rate results

SCENARIO	$\dot{m}_{min}$ E-101 (kg/s)	$\dot{m}_{min}$ E-103 (kg/s)	$\dot{m}_{min}$ E-104 (kg/s)	$\dot{m}_{min}$ E-105 (kg/s)	Tot $\dot{m}_{min}$ (kg/s)
#1	548	548	548	548	548
#2	137	137	137	137	548
#3	145.5	145.5	145.5	145.5	582
#4	137	137	137	137	548
#4 (low pressure)	137	137	137	137	548

Table 380: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: specific heat results

SCENARIO	$c_{p,min}$ E-101 (kJ/kg.K)	$c_{p,min}$E-103 (kJ/kg.K)	$c_{p,min}$ E-104 (kJ/kg.K)	$c_{p,min}$ E-105 (kJ/kg.K)
#1	4.1723	4.17283	4.17341	4.17396
#2	4.17162	4.17167	4.17172	4.17176
#3	4.17484	4.17491	4.17498	4.17504
#4	4.17798	4.17798	4.17798	4.17798
#4 (low pressure)	4.17922	4.17922	4.17922	4.17922

Table 381: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: temperature minimum results

SCENARIO	$T_{i,min}$ E-101 (°C)	$T_{i,min}$ E-103 (°C)	$T_{i,min}$ E-104 (°C)	$T_{i,min}$ E-105 (°C)
#1	24	26.5558	28.4953	29.718
#2	24	26.1184	28.026	29.7439
#3	24	24	24	24
#4	24	24	24	24
#4 (low pressure)	24	24	24	24

Table 382: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: temperature maximum results

ARRANGEMENT	$T_{i,max}$ E-101 (°C)	$T_{i,max}$ E-103 (°C)	$T_{i,max}$ E-104 (°C)	$T_{i,max}$ E-105 (°C)
#1	44.4999	41.945	40.0452	38.6372
#2	44.5	44.5	44.5	44.5
#3	44.4999	42.3848	40.4961	38.8088
#4	44.5	44.5	44.5	44.5
#4 (low pressure)	44.5	44.5	44.5	44.5

Table 383: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: effectiveness

ARRANGEMENT	ε E-101	ε E-103	ε E-104	ε E-105
#1	0.128006	0.127991	0.127977	0.124321
#2	0.421358	0.421354	0.421354	0.421355
#3	0.401055	0.401058	0.40106	0.401064
#4	0.36098	0.36098	0.36098	0.36098
#4 (low pressure)	0.361104	0.361104	0.361104	0.361104

The fact that the heat transfer effectiveness is virtually unchanged from one heat exchanger to the next within a specific scenario, attests to the fact that the heat exchangers are all virtually identical geometrically and thermodynamically.

It is noted that the effectiveness varies greatly (up to 30%) between the different evaluated arrangements, even though the total heat transferred only varies by roughly 4%. As heat transferred is the main area of concern with such systems and not the effectiveness, the only usable data one could get from this is the maximum potential heat transfer rate that a specific arrangement could achieve under ideal conditions as listed in **Table 384**. The total maximum potential heat transfer rate is not the mere addition of the series heat exchangers as the maximum possible heat transfer is achieved once the outlet temperatures are equal, resulting in no further heat transfer in the other subsequent heat exchangers in a pure series system, or gradually less heat transfer rates in series-parallel hybrid systems.

Table 384: Hypothetical heat exchanger arrangement #1; #2; #3; #4; #4lp: maximum duty results

ARRANGEMENT	$\dot{Q}_{max}$ E-101 (kW)	$\dot{Q}_{max}$E-103 (kW)	$\dot{Q}_{max}$E-104 (kW)	$\dot{Q}_{max}$ E-105 (kW)	Tot $\dot{Q}_{max}$ (kW)
#1	46871.39	-	-	-	46871.39
#2	11715.99	1210.565	1090.116	981.743	14998.42
#3	12452.44	1284.607	1147.122	1024.837	15909.01
#4	11733.86	11733.86	11733.86	11733.86	46935.43
#4 (low pressure)	11737.34	11737.34	11737.34	11737.34	46949.36

Appendix VI

Statistical Method Example: Y-Strainer

The values attained from the Sure Flow Inc. pressure loss graphs, yielded the following pressure drop values for specific flow rates as seen in **Table 385**: (36)

Table 385: Sure Flow Inc.: pressure loss graphs

Delta P (psi)	Delta P (Pa)	Flow rate (GPM)	Flow rate (m^3/s)	Density (kg/m)	Flow rate (kg/s)
0.155	1068.687	400	0.0252	997.561	25.138
0.315	2171.849*	600	0.0378*	997.561*	37.707
0.45	3102.642	700	0.0441	997.561	43.992
0.56	3861.065**	800	0.0504**	997.561**	50.277
0.9	6205.284	1000	0.063	997.561	62.846
3.2	22063.232***	2000	0.126***	997.561***	125.692
17.5	120658.3	5000	0.315	997.561	314.231

The data employed to define the three data points employed to set up the equation in the form of equation 4 are denoted by asterisks (*,**,***) respectively. Rearranging equation 4 to solve for the constant C_k, whilst varying the value of α until the standard deviation of the three values of C_k is at a minimum, yields the following results as seen in **Table 386**:

Table 386: Empirical pressure loss constants

Delta P (Pa)		α					
		2	…	1.9188	1.9187	1.9186	1.9185
		C_k (Iterated)					
2171.849		1523.725	…	1167.882	1167.500	1167.117	1166.735
3861.065		1523.725	…	1195.485	1195.128	1194.771	1194.414
22063.232		1393.120	…	1177.440	1177.196	1176.952	1176.708
	Std. dev.	75.405	…	14.017	14.017	14.017	14.018
	C_k (Final)				1179.941		

From the table above, the empirical pressure loss constants were found to be as noted in **Table 387**:

Table 387: Pressure loss constants

PRESSURE LOSS CONSTANTS	VALUE
C_k	1179.941
α	1.9187

One can solve for the flow rates as in **Table 388** which yields the corresponding pressure drop.

Table 388: Flow rate vs pressure drop

Flow rate (m^3/s)	Delta P (Pa) Empirical Formula	Delta P (Pa)	Error %
0.0252	1008.247047	1068.687	5.66
0.0378	2194.993596	2171.849	1.07
0.0441	2950.42149	3102.642	4.91
0.0504	3812.002803	3861.065	1.27
0.063	5849.172821	6205.284	5.74
0.126	22114.68237	22063.232	0.23
0.315	128294.5479	120658.3	6.33

A graph depicting the data from the original manufacturer against that of the generated empirical formula can be seen in **Figure 53**.

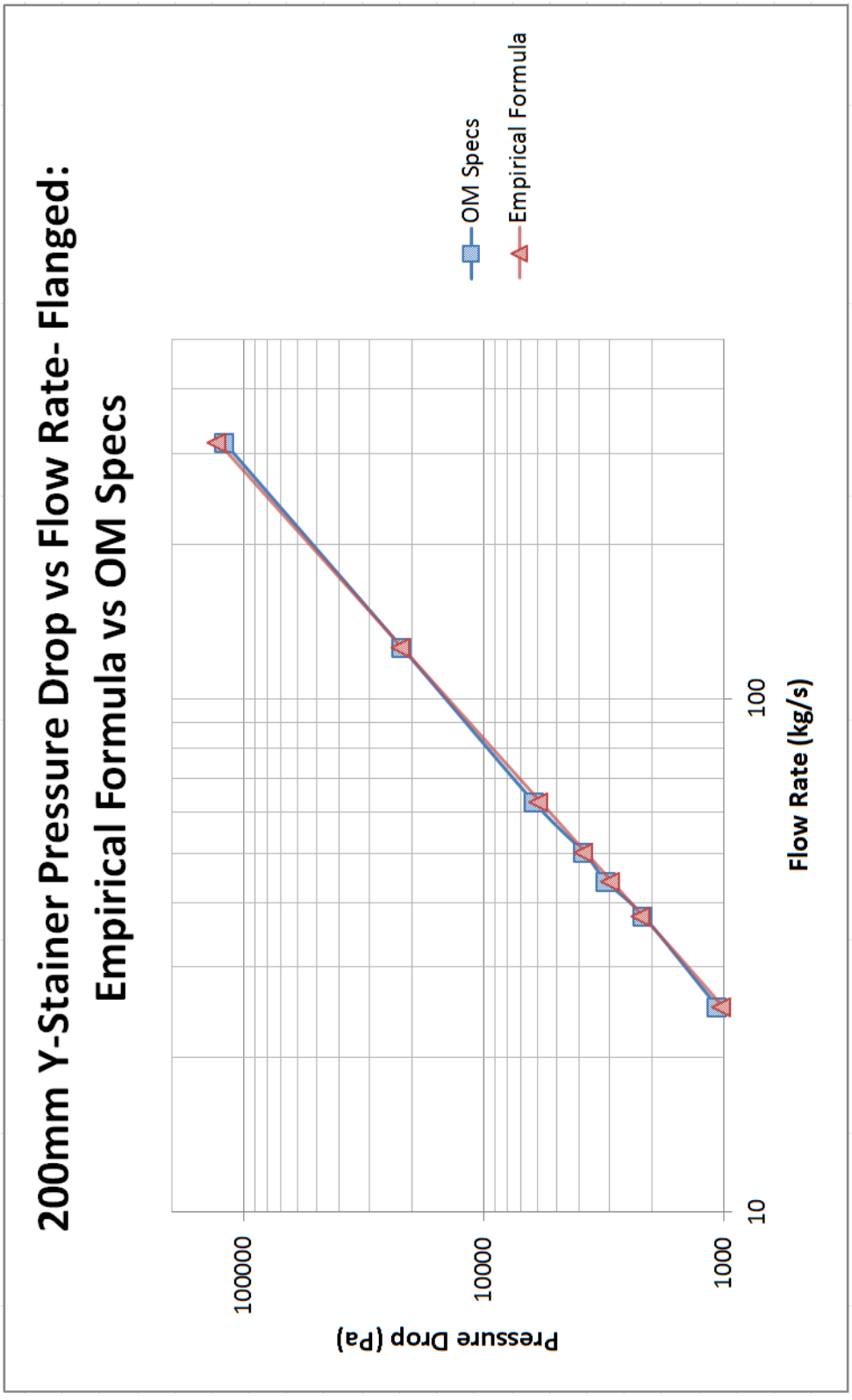

Figure 53: Y-strainer pressure drop vs flow rate

From **Figure 53** it can clearly be seen that the empirical formula accurately represents the original data.

Appendix VII

Cooling tower analysis and validation

The following is a catalogue of the process followed to determine the characteristics of the cooling towers employed at Pelindaba. The process describes the validation of a single cell, of a two cell mechanical draft, counterflow wet-cooling tower.

The first step is to determine a suitable fan equivalent. Listed below is the data from the currently installed fan assembly from Cofimco S.p.A. (40) with the specifications of the closest possible fan from Howden's cooling fans selection program (CF-P20 V6.07). An alternative was chosen as there was insufficient data from the original manufacturer (OM) to complete the analysis. The comparable data is listed in **Table 389** (28) (40).

Table 389: Original fan specifications vs. modelled fan specifications

	OM Specs	**Alternative Specs**
INPUTS		
Air Flow	148 m^3/s	
Fan Static Pressure	112 Pa	
Inlet Temperature	32.5 °C	
Air Density	0.979 Pa	
Inlet Shape	Bell, L/D = 0.15	
Fan Mounting Orientation	Vertical Shaft, Hub at Inlet	
Tip Speed	55 m/s	
Rotor Diameter	5486 mm	4950 mm
Number of Blades	4	4
Obstacle at Inlet Side (Obstacle frontal area/ fan housing area)	0.89	0.9
Obstacle Distance / Fan Diameter	0.13	
OUTPUTS		
Fan Speed	206 rpm	212.2 rpm
Blade Tip Angle	5.2°	8.8°
Static Efficiency	67%	69.1%
Total Efficiency	78%	85.9%
Fan Shaft Power	24.8 kW	24.5 kW
Pressure Margin	42%	48.6%
Fan Static Pressure	112.4%	114.5 Pa

The relevant fan curves of fan static pressure vs. volume flow rate and shaft power vs. volume flow rate from the alternative fan assembly is depicted in **Figure 54** and **Figure 55**.

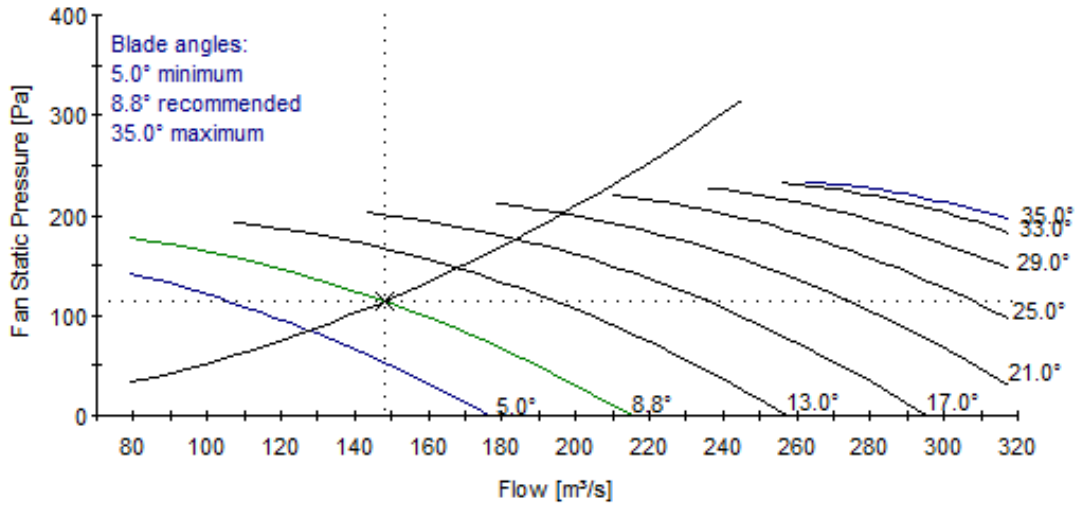

Figure 54: Fan static pressure vs. volume flow rate

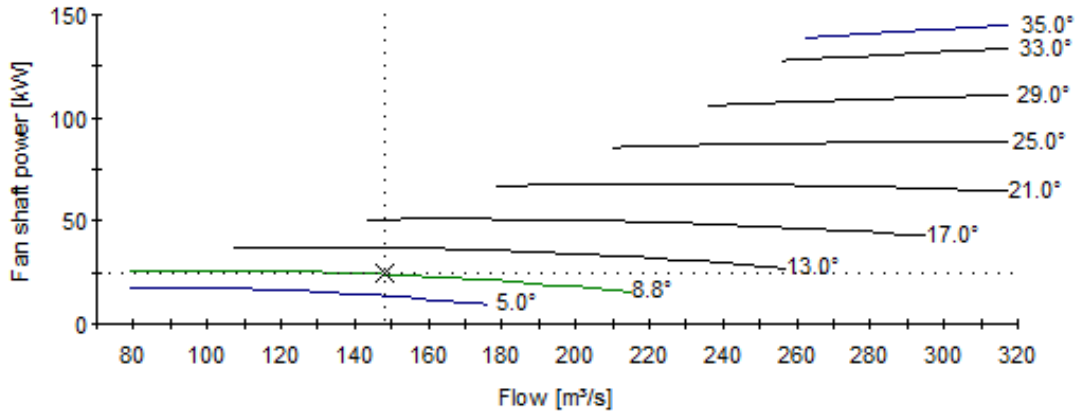

Figure 55: Fan shaft power vs. volume flow rate

To complete the analysis, the fan efficiency is required. The fan efficiency graph was not available, but could be determined as the ratio between the transferred power to the airflow and the power used by the fan. Fan efficiency is independent of the air density and is easily calculated through the following formula (96):

$$\mu_f = \frac{dp\ q}{P} \quad [29]$$

Where:

μ_f is the fan efficiency as a fraction

dp is the total pressure (Pa)

q is the delivered air volume (m^3/s)

P is the power used by the fan (W)

From the above curves and formula, the fan power, the fan static pressure and the fan efficiency could be determined and are represented by the following formulas generated by polynomial fits to the performance graphs.

$$P = -4 \times 10^{-11} q^6 + 4 \times 10^{-08} q^5 - 1 \times 10^{-05} q^4 + 0.002 q^3 - 0.1855 q^2 + 8.7737 q + 141.97 \quad [30]$$

$$dp = -2 \times 10^{-09} q5 + 1 \times 10^{-06} q4 - 0.0004 q3 + 0.0453 q2 - 3.1078 q + 273.49 \quad [31]$$

$$\mu_f = -7 \times 10^{-09} q4 + 3 \times 10^{-06} q3 - 0.0006 q2 + 0.0545 q - 1.3279 \quad [32]$$

The above information could then be employed in the actual cooling tower evaluation program at a set data point from existing literature (45). The input variables employed can be seen in **Table 390**.

Table 390: Cooling tower input variables

INPUT		
VARIABLE	UNIT	VALUE
Atmospheric Pressure [pa1]	[Pa]	86000
Ambient Temperature [Ta1]	[°C]	26.6
Wetbulb Temperature [Twb]	[°C]	21.1
Atmospheric Profile		Temp: Dry Adiabatic Lapse Rate (DALR); Humidity: Uniform
Water inlet temperature [Twi]	[°C]	32.2
Inlet water mass flow rate [Mwi]	[kg/s]	131.984
[H6]	[m]	12.5
Height of the plenum chamber [Hpl]	[m]	2.413
Height of the spray zone [Lsp]	[m]	0.5
Fill Height [Lfi]	[m]	2
Height of the air inlet [H3]	[m]	2.4638
Frontal area of the fill [Afr]	[m^2]	65.419
Inlet rounding radius [Kct]		0.3
Total Height of the Cooling Tower [H9]	[m]	13.4874
Loss Coefficient due to the tower supports [Kts]		0*
Drift eliminator losses empirical relation coefficient[Ade]		27.4892*
Drift eliminator losses empirical relation coefficient [Bde]		-0.14247*
Inlet louver losses[Kil]		2.5*
Fill Support losses [Kfs]		0.5*
Water distribution system losses [Kwd]		0.5*
Fan upstream losses [Kup]		0.52*
Fan downstream losses [Kdo]		0*
Plenum losses [Kpl]		0*
Diffuser losses [Kdif]		0*
Contraction losses [Kctc]		0.25*
Transfer coefficient of the rain zone [Dd]		0.0035*
Fill database number		33**
Heat transfer model		Merkel
Integration model		Chebychev
Energy equation		Merkel Common Energy Equation
Number of fans		1
Fan Speed	[rpm]	206

INPUT		
VARIABLE	UNIT	VALUE
Fan Diameter	[m]	5.486
Fan Casing Diameter	[m]	5.541
Fan Hub Diameter	[m]	0
Fan Diffuser Diameter	[m]	5.541
Alphae8		0*
AlphaeF		0*
Fan Model Diameter	[m]	1.536*
Reference Desity	[kg/m^3]	1.2*
Reference Speed	[rpm]	750*

(45) (97) (19) (94) (95)

* *Values unavailable for current setup and alternative values from a similar cooling tower were employed* (26) (27).

Refers to louvers with the dimensions and loss coefficients as found in* ***Table 392 (26).

The louver arrangement that best described the current employed setup is asbestos louvers in alternative layers turned through 90° as seen in **Table 391** and **Figure 56** (26).

Table 391: Louver constants

Fill type	Description	Dimensions				Mass Transfer constants		Pressure loss coefficient contstants	
		a_a [m]	P_a [m]	P_t [m]	P_l [m]	a_d	b_d	a_p	b_p
33	Asbestos Louvers	0.0381	0.1334	0.0381	0.5144	0.33	-0.63	2.22	6.2

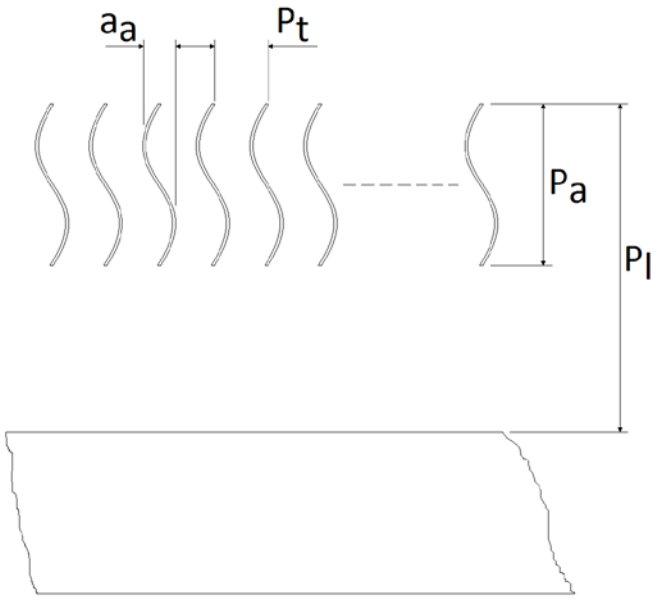

Figure 56: Louver fill arrangement

The fan static pressure, fan power and fan efficiency is then specified as a sixth order polynomial with VFr designating the flow rate in m^3/s, as seen in **Table 391**.

Table 392: Fan static pressure, fan power and fan efficiency: mathematical representation

	FAN STATIC PRESS.	FAN POWER	FAN EFF.
VFr^6	0	-4.00E-11	0
VFr^5	-2.00E-09	4.00E-08	0
VFr^4	1.00E-06	-1.00E-05	-7.00E-09
VFr^3	-0.0004	0.002	3.00E-06
VFr^2	0.045	-0.1855	-0.0006
VFr^1	-3.1078	8.7737	0.0545
(Constant)	273.49	141.97	-1.3279

The results from the Wet-Cooling Tower Performance Evaluation (WCTPE) software program are tabulated in **Table 393**.

Table 393: Cooling tower model results

RESULTS				
MERKEL				
VARIABLE	VARIABLE	UNIT	VALUE	
Air inlet temperature	[Ta1]	[K]	299.750	
Wetbulb temperature	[Twb]	[K]	294.250	
Atmospheric pressure	[pa1]	[Pa]	86000.000	
Mean air-water vapour Mass flow rate through the fill	[mav15]	[kg/s]	224.613	
Air Pressure above the fill	[pa5]	[Pa]	85807.805	
Dry-bulb Temperature above the fill	[Ta5]	[K]	298.406	
Water Outlet Temperature	[Two]	[K]	297.837	
Air Pressure At Cooling Tower Outlet	[pa6]	[Pa]	85878.867	
Humidity	[w5]		0.024	
Evaporation rate	[mwvap]	[kg/s]	1.746	
Heat rejected	[Q]	[kJ]	4.144	
Water specific heat	[cpwm]	[kJ/kg.K]	4179.284	
Outlet water density	[rhowo]	[kg/m^3]	997.119	
Water mass velocity	[Gw]		2.018	
Water outlet temp	[Two]	[K]	297.837	
Inlet louver	[Kilfi]		5.463	17.930
Fill support structure	[Kfsfi]		0.496	1.626
Contraction losses	[Kctcfi]		0.248	0.813
Expansion losses	[Kctefi]		0.002	0.005
Spray zone	[Kspfi]		0.625	2.053
Water distribution	[Kwdfi]		0.504	1.656
Drift eliminator	[Kdefi]		4.909	16.111
Fill	[Kfi]		8.880	29.144
Rain zone	[Krzfi]		1.052	3.454
Cooling tower entrance	[Kctfi]		4.429	14.536
Tower supports	[Ktsfi]		0.000	0.000
TOTAL	[KTOTAL]		30.470	
Spray Zone Me	[Mesp]		0.129	10.253
Rain Zone Me	[Merz]		0.219	17.426
Fill Merkel Number	[Mefi]		0.911	72.322
TOTAL MERKEL NUMBER	[LINKS]		1.260	
Mass flow rate	[ma]	[kg/s]	220.128	
Mass flow rate	[mav1]	[kg/s]	223.739	

RESULTS				
MERKEL				
VARIABLE	VARIABLE	UNIT	VALUE	
Mass flow rate	[mav5]	[kg/s]	225.486	
Mass flow rate	[mav15]	[kg/s]	224.613	
Vapor pressure	[pv1]	[Pa]	2501.056	
Humidity	[w1]		0.016	
Air-vapor density	[rhoav1]	[kg/m^3]	0.990	
Specific heat of air	[cpa1]	[kJ/kg.K]	1006.554	
Specific heat of vapor	[cpv1]	[kJ/kg.K]	1873.888	
Air-vapor enthalpy	[ima1]	[kJ/kg]	68633.172	
Vapor pressure	[pv5]	[Pa]	3215.319	
Humidity	[w5]		0.024	
Humidity	[wsa5]		0.030	
Air-vapor density	[rhoav5]	[kg/m^3]	0.987	
Specific heat of air	[cpa5]	[kJ/kg.K]	1006.538	
Specific heat of vapor	[cpv5]	[kJ/kg.K]	1873.318	
Air-vapor enthalpy	[ima5]	[kJ/kg]	87459.953	
pa1 - pa7	[pa1-7]	[Pa]	0.000	
pa1 - pa34	[pa1-34]	[Pa]	0.000	
pa34- pa6	[pa34-6]	[Pa]	0.000	
pa6 - pa7	[pa6-7]	[Pa]	0.000	
LHS Draft Equation	[LHS]		0.000	
RHS Draft Equation	[RHS]		-0.005	
Fan effectiveness	[Ef]		-0.516	
Fan power	[PF]	[W]	2491.532	
Twi	[Twi]	[K]	305.350	
Relative humidity	[RH1]		0.635	
Height of inversion top	[zit]	[m]	0.000	
Dry air mass velocity	[Ga]	[m/s]	3.365	
	OM SPECS		**ALTERNATIVE SPECS**	
Two	25°C		24.69°C	
Duty	4.00 MW		4.14 MW	

From the above it can be seen that the model is accurate with regard to temperature distribution to within 1.26%, and the duty of the modelled cooling tower is accurate to within 3.38%. This is considered sufficiently accurate, even though the system has only been validated at one set point. The error values achieved in the study as a whole, could serve as additional partial validation.