



### Rig Mass Flow Rate Calculations

Please Enter Parameters in highlighted boxes below

Engine Data File		
<b>Ambient Conditions</b>		
Air Temperature	5	[C]
Atmospheric Pressure	975	[mBar]
Air Humidity	95	[%]
<b>Viper Engine Parameters</b>		
Engine Air Intake Mass Flow	18.7	[Kg/s]
Butane Flow Rate	1732	[Ltr/h]
Engine Speed	12150	[RPM]
ETC	650	[C]
<b>Gas Delivery System Data File</b>		
<b>Gas Delivery System</b>		
Mixed Gas (Fuel) Mass Flow rate	0.076	[Kg/s]
Oxygen Mass Flow rate	0.154	[Kg/s]

Please do not change anything in this box

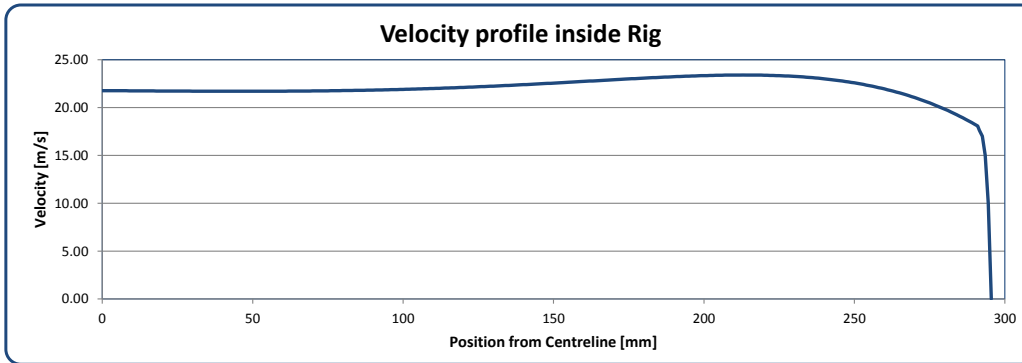
Test Date and Time = 16.04.2015 14:00:46.6

Calculated Parameters		
Air density	1.217898	[Kg/m <sup>3</sup> ]
Liquid Butane density	584	[Kg/m <sup>3</sup> ]
Butane mass Flow rate	0.280969	[Kg/s]
Air Fuel Ratio	79.23263	[ ]
<b>Calculated Exhaust gas properties (Reaction Engines)</b>		
Exhaust products density	0.389	[Kg/m <sup>3</sup> ]
<b>Pitot Traverse Results</b>		
Rig Gas flow rate - Integrated	2.331616	[Kg/s]
Total Rig Mass flow	2.561616	[Kg/s]
<b>Rig Gas Temperature as read from TC 11</b>		
Gas Temperature	516	[C]

Bruce Ewan to fill in

Note

Manual for viper 201 gives figures for fuel flow rate to be as follows at maximum power					
Fuel Flow	2035	lb/hr	to	2920	lb/hr
	925	Kg/hr		1327.273	Kg/hr
	1156.25	ltr/hr		1659.091	ltr/hr



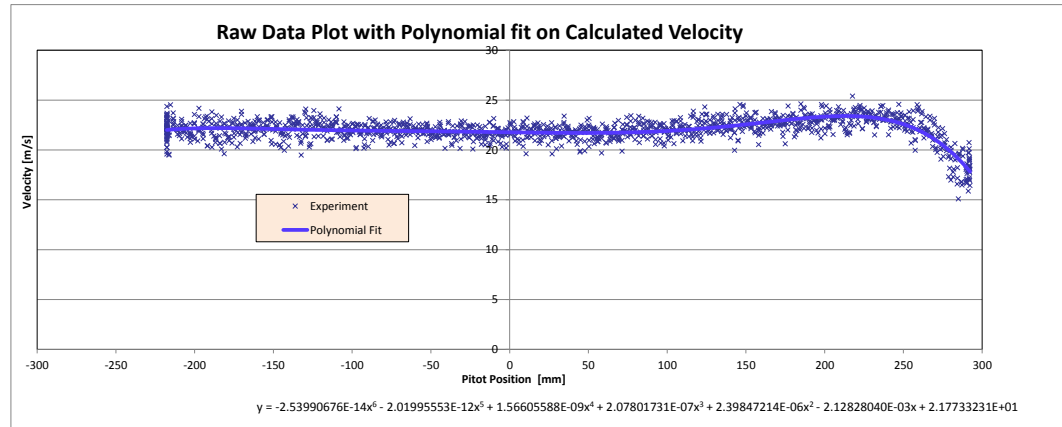
**Data Acquisition Parameters**

Sampling Rate	1000	[Hz]		
No of samples recorded	100	Samples		
Averaged samples sampling	10	[Hz]		
Pitot Traverse speed	7	[mm/s]	Averaged Pitot dp	
Distance Travelled every 0.1	0.7	[mm]	0.944779062	Average Vel 22.00551 [m/s]

**Raw Data from CSV File**

Date and time [dd:mm:yyyy hh:mm:ss.ms]	Pitot Position from rig centre [mm]	TC11 - Pitot [deg C]	Pitot dP [mBar]	O2 %
16.04.2015 14:00:46.6	-217.6	515.7	1.0155	16.25
16.04.2015 14:00:46.7	-217.6	515.6	0.8612	16
16.04.2015 14:00:46.8	-217.57	515.6	0.9189	16.07
16.04.2015 14:00:46.9	-217.55	515.5	0.9627	16.28
16.04.2015 14:00:47.0	-217.56	515.4	0.7648	16.24
16.04.2015 14:00:47.1	-217.59	515.4	0.7982	16.01
16.04.2015 14:00:47.2	-217.58	515.5	0.9506	16.17
16.04.2015 14:00:47.3	-217.57	515.5	0.7991	16.33
16.04.2015 14:00:47.4	-217.58	515.3	0.7468	16.16
16.04.2015 14:00:47.5	-217.59	515.3	0.8469	16.07
16.04.2015 14:00:47.6	-217.57	515.4	0.8839	16.17
16.04.2015 14:00:47.7	-217.54	515.4	0.9897	16.2
16.04.2015 14:00:47.8	-217.57	515.2	0.9521	16.06
16.04.2015 14:00:47.9	-217.17	515.2	0.9462	16.02
16.04.2015 14:00:48.0	-216.15	515.4	0.9233	16.24
16.04.2015 14:00:48.1	-216.3	515.4	0.7447	16.2
16.04.2015 14:00:48.2	-216.27	515.3	0.7387	16
16.04.2015 14:00:48.3	-215.3	515.3	1.1705	16.01
16.04.2015 14:00:48.4	-213.56	515.4	1.0936	16.2
16.04.2015 14:00:48.5	-213.74	515.3	1.0407	16.31
16.04.2015 14:00:48.6	-213.72	515.3	0.9564	16.08
16.04.2015 14:00:48.7	-211.53	515.4	0.9523	16.12
16.04.2015 14:00:48.8	-211.19	515.5	0.947	16.37
16.04.2015 14:00:48.9	-211.19	515.5	0.9459	16.32
16.04.2015 14:00:49.0	-209.55	515.5	0.9128	16.01
16.04.2015 14:00:49.1	-208.11	515.6	0.9283	16.09
16.04.2015 14:00:49.2	-208.27	515.7	1.0141	16.3
16.04.2015 14:00:49.3	-208.28	515.6	0.9829	16.18
16.04.2015 14:00:49.4	-206.6	515.6	0.9417	15.99
16.04.2015 14:00:49.5	-205.57	515.7	0.9824	16.17
16.04.2015 14:00:49.6	-205.8	515.8	0.9807	16.22
16.04.2015 14:00:49.7	-205.64	515.6	0.9531	16.04
16.04.2015 14:00:49.8	-202.71	515.6	1.0001	16.02
16.04.2015 14:00:49.9	-202.76	515.8	0.8947	16.16
16.04.2015 14:00:50.0	-202.87	515.8	0.9211	16.2
16.04.2015 14:00:50.1	-202.57	515.7	0.9031	16.04
16.04.2015 14:00:50.2	-199.97	515.7	0.8641	16.03
16.04.2015 14:00:50.3	-200.15	515.8	1.0801	16.24
16.04.2015 14:00:50.4	-200.22	515.8	0.9981	16.24
16.04.2015 14:00:50.5	-197.64	515.7	0.9571	15.96
16.04.2015 14:00:50.6	-197.15	515.8	0.947	16.02
16.04.2015 14:00:50.7	-197.25	515.8	1.0603	16.32
16.04.2015 14:00:50.8	-197.25	515.8	1.1373	16.31
16.04.2015 14:00:50.9	-194.71	515.7	0.9956	16.04
16.04.2015 14:00:51.0	-194.52	515.8	0.9012	16.21
16.04.2015 14:00:51.1	-194.62	515.8	0.9907	16.36
16.04.2015 14:00:51.2	-193.75	515.7	1.041	16.3
16.04.2015 14:00:51.3	-191.89	515.7	0.9648	16.12
16.04.2015 14:00:51.4	-191.97	515.8	0.8103	16.23
16.04.2015 14:00:51.5	-191.75	515.8	0.8114	16.4
16.04.2015 14:00:51.6	-188.92	515.5	0.7989	16.22
16.04.2015 14:00:51.7	-189.14	515.5	0.9155	16.19
16.04.2015 14:00:51.8	-189.01	515.6	0.9956	16.3
16.04.2015 14:00:51.9	-187.8	515.5	0.8894	16.4
16.04.2015 14:00:52.0	-186.55	515.4	0.8617	16.11
16.04.2015 14:00:52.1	-186.51	515.4	0.8825	16.16
16.04.2015 14:00:52.2	-186.5	515.5	0.8721	16.33
16.04.2015 14:00:52.3	-184.14	515.5	0.8931	16.36
16.04.2015 14:00:52.4	-184.13	515.4	0.8317	16.04

Calculated Velocity [m/s]
22.849682
21.0422515
21.7357346
22.2477289
19.8296084
20.2579763
22.1074729
20.2693939
19.5948684
20.8668197
21.3177696
22.5575528
22.1249083
22.0562497
21.7877114
19.5672987
19.488313
24.5316018
23.7120689
23.1314562
22.1748138
22.127232
22.0655718
22.0527528
21.6634695
21.8466259
22.833926
22.4799253
22.0037389
22.4742069
22.4547531
22.1365243
22.6757631
21.4476106
21.7617386
21.5480571
21.0776505
23.565257
22.6530782
22.1829273
22.0655718
23.3482631
24.1811926
22.6246902
21.5253781
22.5689461
23.13479
22.2719809
20.4109452
20.4247947
20.2668572
21.6954854
22.6246902
21.3839908
21.0483591
21.3008804
21.1749962
21.4284245
20.678715



16.04.2015 14:00:52.5	-183.82	515.4	0.8288	16.07	20.6426319
16.04.2015 14:00:52.6	-182.96	515.4	0.7847	16.25	20.0859336
16.04.2015 14:00:52.7	-180.96	515.3	0.8383	16.24	20.7606014
16.04.2015 14:00:52.8	-181.19	515.2	0.7488	16.03	19.6210893
16.04.2015 14:00:52.9	-180.91	515.2	0.9162	16.04	21.7037781
16.04.2015 14:00:53.0	-179.06	515.3	0.8768	16.36	21.2319786
16.04.2015 14:00:53.1	-178.47	515.1	1.0207	16.23	22.9081097
16.04.2015 14:00:53.2	-178.6	515.1	0.9642	15.99	22.2650544
16.04.2015 14:00:53.3	-178.29	515.2	0.878	16.05	21.2465028
16.04.2015 14:00:53.4	-176.22	515.3	0.8326	16.28	20.6899004
16.04.2015 14:00:53.5	-175.86	515.2	0.9969	16.17	22.6394564
16.04.2015 14:00:53.6	-175.87	515.2	1.0101	16.06	22.7888486
16.04.2015 14:00:53.7	-174.19	515.4	0.9457	16.22	22.0504213
16.04.2015 14:00:53.8	-172.84	515.4	1.0289	16.31	22.9999441
16.04.2015 14:00:53.9	-172.96	515.3	0.9687	16.18	22.3169503
16.04.2015 14:00:54.0	-172.93	515.3	0.8014	16.16	20.298543
16.04.2015 14:00:54.1	-171.2	515.4	0.9016	16.38	21.5301546
16.04.2015 14:00:54.2	-170.29	515.4	0.9232	16.38	21.7865315
16.04.2015 14:00:54.3	-170.46	515.3	0.9837	16.09	22.4890719
16.04.2015 14:00:54.4	-170.16	515.4	0.9914	16.11	22.5769179
16.04.2015 14:00:54.5	-167.56	515.4	0.9097	16.36	21.6266521
16.04.2015 14:00:54.6	-167.74	515.4	0.9587	16.31	22.2014613
16.04.2015 14:00:54.7	-167.77	515.3	0.8719	16.1	21.172568
16.04.2015 14:00:54.8	-165.26	515.4	0.9514	16.09	22.1167735
16.04.2015 14:00:54.9	-164.69	515.4	0.9985	16.43	22.657617
16.04.2015 14:00:55.0	-164.77	515.3	0.9786	16.28	22.4306988
16.04.2015 14:00:55.1	-164.83	515.3	0.9524	16.11	22.1283937
16.04.2015 14:00:55.2	-162.39	515.3	0.9905	16.07	22.5666679
16.04.2015 14:00:55.3	-162.25	515.4	0.978	16.32	22.4238213
16.04.2015 14:00:55.4	-162.21	515.2	0.9269	16.16	21.8301459
16.04.2015 14:00:55.5	-161.66	515.2	0.8755	16.05	21.2162328
16.04.2015 14:00:55.6	-159.39	515.2	0.8657	16.19	21.0971556
16.04.2015 14:00:55.7	-159.68	515.3	0.9394	16.3	21.9768516
16.04.2015 14:00:55.8	-159.57	515.1	1.02	16.08	22.9002531
16.04.2015 14:00:55.9	-156.67	515.1	0.9654	16.04	22.2789051
16.04.2015 14:00:56.0	-156.66	515.2	0.9564	16.23	22.1748138
16.04.2015 14:00:56.1	-156.71	515.2	0.9455	16.32	22.0480895
16.04.2015 14:00:56.2	-155.86	515	0.9035	16.04	21.5528286
16.04.2015 14:00:56.3	-153.93	515	1.0273	16.14	22.982054
16.04.2015 14:00:56.4	-154.01	515	0.9815	16.31	22.4639099
16.04.2015 14:00:56.5	-154.23	515	0.9756	16.3	22.3962905
16.04.2015 14:00:56.6	-152.2	514.9	0.9456	16.05	22.0492554
16.04.2015 14:00:56.7	-151.46	515	1.0589	16.11	23.3328437
16.04.2015 14:00:56.8	-151.45	515	0.8535	16.35	20.9479708
16.04.2015 14:00:56.9	-151.04	515	0.825	16.3	20.5952549
16.04.2015 14:00:57.0	-148.52	515	0.8226	16.09	20.5652763
16.04.2015 14:00:57.1	-148.51	515.1	0.9313	16.1	21.8818985
16.04.2015 14:00:57.2	-148.63	515.1	1.0122	16.28	22.8125253
16.04.2015 14:00:57.3	-147.88	515	0.9666	16.16	22.2927473
16.04.2015 14:00:57.4	-145.93	515	1.0043	16	22.7233275
16.04.2015 14:00:57.5	-146.06	515.1	0.8168	16.1	20.4926471
16.04.2015 14:00:57.6	-146.07	515.2	0.8168	16.26	20.4926471
16.04.2015 14:00:57.7	-144.09	515	0.9002	16.16	21.5134322
16.04.2015 14:00:57.8	-143.48	515	0.8463	16.04	20.8594267
16.04.2015 14:00:57.9	-143.42	515.2	0.9178	16.22	21.722721
16.04.2015 14:00:58.0	-143.05	515.2	0.7759	16.22	19.9729895
16.04.2015 14:00:58.1	-140.32	515	0.8093	16.02	20.3983466
16.04.2015 14:00:58.2	-140.49	515	0.9048	16.04	21.5683287
16.04.2015 14:00:58.3	-140.46	515.1	0.9533	16.21	22.1388467
16.04.2015 14:00:58.4	-138.85	515.1	0.9905	16.23	22.5666679
16.04.2015 14:00:58.5	-137.54	515	1.0581	15.99	23.324028
16.04.2015 14:00:58.6	-137.51	515	0.9472	16	22.0679018
16.04.2015 14:00:58.7	-137.44	515	1.0441	16.29	23.169211
16.04.2015 14:00:58.8	-135.04	515	1.0325	16.3	23.040146
16.04.2015 14:00:58.9	-135.13	514.9	0.8961	16	21.4643843
16.04.2015 14:00:59.0	-134.88	515	0.9911	16.03	22.5735018
16.04.2015 14:00:59.1	-134.88	515	1.0079	16.36	22.764018
16.04.2015 14:00:59.2	-132.3	514.8	0.8477	16.29	20.876673
16.04.2015 14:00:59.3	-132.61	514.8	0.8318	16.15	20.6799581
16.04.2015 14:00:59.4	-132.32	514.9	0.7386	16.23	19.4869939
16.04.2015 14:00:59.5	-130.1	514.9	1.1012	16.43	23.79432

16.04.2015 14:00:59.6	-129.49	514.8	1.1306	16.25	24.10986
16.04.2015 14:00:59.7	-129.64	514.7	1.0897	16.21	23.6697501
16.04.2015 14:00:59.8	-129.44	514.9	0.8941	16.3	21.4404178
16.04.2015 14:00:59.9	-127.17	514.9	0.8018	16.39	20.3036081
16.04.2015 14:01:00.0	-126.92	514.8	1.0099	16.12	22.7865924
16.04.2015 14:01:00.1	-126.97	514.8	0.8213	16.28	20.5490197
16.04.2015 14:01:00.2	-126.23	515	0.8284	16.36	20.63765
16.04.2015 14:01:00.3	-124.14	514.9	0.8849	16.39	21.3298251
16.04.2015 14:01:00.4	-124.49	514.9	0.97	16.07	22.33192
16.04.2015 14:01:00.5	-124.25	514.9	1.0507	16.19	23.2423247
16.04.2015 14:01:00.6	-122.18	515	1.0091	16.33	22.7775653
16.04.2015 14:01:00.7	-121.41	514.9	0.9818	16.31	22.4673428
16.04.2015 14:01:00.8	-121.48	514.9	0.8897	16.01	21.387597
16.04.2015 14:01:00.9	-121.04	515	0.9858	16.06	22.5130639
16.04.2015 14:01:01.0	-118.27	515.1	0.8901	16.29	21.3924043
16.04.2015 14:01:01.1	-118.43	515	0.9535	16.18	22.1411689
16.04.2015 14:01:01.2	-118.47	515	0.9618	15.96	22.2373271
16.04.2015 14:01:01.3	-117.03	515.1	0.9558	16.13	22.1678569
16.04.2015 14:01:01.4	-115.77	515.2	0.853	16.27	20.941834
16.04.2015 14:01:01.5	-115.84	515	0.8589	16.15	21.0141341
16.04.2015 14:01:01.6	-115.9	515.1	0.9313	16	21.8818985
16.04.2015 14:01:01.7	-113.4	515.2	0.9493	16.14	22.0923512
16.04.2015 14:01:01.8	-113.29	515.3	1.0118	16.3	22.8080174
16.04.2015 14:01:01.9	-113.26	515.1	0.8646	16.1	21.0837478
16.04.2015 14:01:02.0	-112.51	515.2	0.8647	16.05	21.084967
16.04.2015 14:01:02.1	-110.07	515.3	1.0564	16.24	23.3052837
16.04.2015 14:01:02.2	-110.42	515.3	1.0059	16.23	22.7414212
16.04.2015 14:01:02.3	-110.57	515.2	1.0184	16.08	22.8822851
16.04.2015 14:01:02.4	-108.39	515.3	1.1313	16.1	24.1173225
16.04.2015 14:01:02.5	-107.65	515.4	0.8845	16.41	21.3250037
16.04.2015 14:01:02.6	-107.87	515.4	0.933	16.33	21.901861
16.04.2015 14:01:02.7	-106.77	515.3	0.9482	16.14	22.0795477
16.04.2015 14:01:02.8	-104.97	515.3	0.9019	16.11	21.5337363
16.04.2015 14:01:02.9	-105.16	515.2	1.0126	16.39	22.8170324
16.04.2015 14:01:03.0	-105.3	515.1	0.8554	16.3	20.9712743
16.04.2015 14:01:03.1	-102.93	515.1	0.9188	16.11	21.7345519
16.04.2015 14:01:03.2	-102.54	515.2	0.9832	16.17	22.4833557
16.04.2015 14:01:03.3	-102.72	515.2	0.8719	16.42	21.172568
16.04.2015 14:01:03.4	-100.97	515.1	0.9011	16.26	21.5241838
16.04.2015 14:01:03.5	-100.03	515.1	0.9421	16.07	22.0084116
16.04.2015 14:01:03.6	-100.01	515.3	0.9498	16.18	22.0981684
16.04.2015 14:01:03.7	-99.95	515.4	0.9924	16.35	22.5883015
16.04.2015 14:01:03.8	-97.33	515.2	0.7973	16.16	20.2465523
16.04.2015 14:01:03.9	-97.57	515.2	0.7882	16.03	20.1306785
16.04.2015 14:01:04.0	-97.46	515.4	0.9697	16.17	22.3284664
16.04.2015 14:01:04.1	-95.42	515.5	0.9241	16.25	21.7971485
16.04.2015 14:01:04.2	-94.91	515.4	0.9038	16.02	21.5564065
16.04.2015 14:01:04.3	-94.88	515.5	0.9019	16.03	21.5337363
16.04.2015 14:01:04.4	-94.4	515.5	0.9386	16.21	21.9674918
16.04.2015 14:01:04.5	-92.16	515.5	0.8676	16.23	21.1202945
16.04.2015 14:01:04.6	-92.48	515.4	0.7916	15.96	20.1740499
16.04.2015 14:01:04.7	-92.24	515.4	0.818	16.02	20.507695
16.04.2015 14:01:04.8	-90.74	515.4	0.9096	16.26	21.6254634
16.04.2015 14:01:04.9	-89.74	515.3	0.8046	16.3	20.3390288
16.04.2015 14:01:05.0	-89.83	515.3	0.9632	15.99	22.2535055
16.04.2015 14:01:05.1	-89.6	515.4	0.96	16.19	22.2165088
16.04.2015 14:01:05.2	-86.75	515.5	1.0214	16.34	22.9159636
16.04.2015 14:01:05.3	-86.86	515.4	1.0115	16.31	22.8046358
16.04.2015 14:01:05.4	-86.96	515.3	0.8538	16.04	20.951652
16.04.2015 14:01:05.5	-85.73	515.5	0.96	16.25	22.2165088
16.04.2015 14:01:05.6	-84.12	515.5	0.9269	16.28	21.8301459
16.04.2015 14:01:05.7	-84.3	515.4	0.982	16.19	22.469631
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21.9182871
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22.538171
20.7395404

16.04.2015 14:01:28.0	82.94	514.9	0.925	16.28	21.8077602
16.04.2015 14:01:28.1	85.11	514.9	0.935	16.25	21.9253231
16.04.2015 14:01:28.2	84.87	514.8	0.8915	16.07	21.4092213
16.04.2015 14:01:28.3	85.01	514.8	0.8907	16.17	21.3996132
16.04.2015 14:01:28.4	86.65	515	0.9134	16.31	21.6705883
16.04.2015 14:01:28.5	87.57	515	0.8656	16.3	21.0959371
16.04.2015 14:01:28.6	87.41	515	0.9237	16.09	21.7924305
16.04.2015 14:01:28.7	88.6	515.1	1.0097	16.12	22.7843359
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16.04.2015 14:01:30.1	98.96	515.1	0.9536	16.1	22.14233
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16.04.2015 14:01:30.4	100.7	515.2	0.8564	16.22	20.9835289
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16.04.2015 14:01:30.7	103.46	515.3	0.9752	16.25	22.3916988
16.04.2015 14:01:30.8	104.35	515.2	0.8282	16.27	20.6351586
16.04.2015 14:01:30.9	105.9	515.1	0.9169	16.01	21.7120677
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16.04.2015 14:01:33.5	124.32	515.3	0.9554	16.33	22.1632179
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16.04.2015 14:01:33.7	127.14	515.6	0.968	16.27	22.3088856
16.04.2015 14:01:33.8	126.81	515.6	0.939	16.3	21.9721722
16.04.2015 14:01:33.9	127.12	515.5	0.914	16.24	21.6777047
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16.04.2015 14:01:34.2	129.38	515.7	1.0641	16.28	23.3900645
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16.04.2015 14:01:34.4	132.22	515.7	1.0813	16.07	23.5783439
16.04.2015 14:01:34.5	132.1	515.8	0.9878	16.31	22.5358897
16.04.2015 14:01:34.6	131.91	515.7	0.9367	16.25	21.9452462
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16.04.2015 14:01:34.9	134.59	515.8	0.9285	16.45	21.8489792
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16.04.2015 14:01:35.3	137.56	515.6	0.9339	16.34	21.9124221
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16.04.2015 14:01:35.8	142.81	515.5	0.9184	16.2	21.7298203
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16.04.2015 14:01:36.0	142.78	515.7	0.7757	16.17	19.9704151
16.04.2015 14:01:36.1	145.16	515.8	0.8502	16.21	20.9074346
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16.04.2015 14:01:36.7	148.94	515.9	0.9696	16.16	22.3273151
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16.04.2015 14:01:37.4	153.53	515.5	0.9761	16.12	22.4020289
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16.04.2015 14:01:37.8	158.07	515.3	0.9362	16.12	21.9393883
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16.04.2015 14:01:38.0	158.14	515.5	0.8205	16.35	20.5390092
16.04.2015 14:01:38.1	158.76	515.4	0.9101	16.22	21.6314063
16.04.2015 14:01:38.2	161.04	515.4	0.9606	16.17	22.2234504
16.04.2015 14:01:38.3	160.85	515.7	1.0079	16.3	22.764018
16.04.2015 14:01:38.4	160.83	515.7	0.9153	16.27	21.6931155
16.04.2015 14:01:38.5	163.27	515.7	1.0036	15.99	22.715407
16.04.2015 14:01:38.6	163.4	515.8	1.0366	16.08	23.0858463
16.04.2015 14:01:38.7	163.3	515.9	0.9591	16.36	22.2060924
16.04.2015 14:01:38.8	165.47	515.9	1.0407	16.37	23.1314562
16.04.2015 14:01:38.9	165.84	515.9	0.9489	16.1	22.0876962
16.04.2015 14:01:39.0	166.02	516	0.9808	16.2	22.4558979
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16.04.2015 14:01:39.3	168.42	515.9	1.0283	15.99	22.993237
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16.04.2015 14:01:39.5	170.15	516.1	0.9759	16.26	22.3997337
16.04.2015 14:01:39.6	171.11	515.9	1.0456	16.16	23.185848
16.04.2015 14:01:39.7	170.99	515.8	1.046	16.07	23.1902825
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16.04.2015 14:01:39.9	173.66	516	1.0717	16.28	23.4734439
16.04.2015 14:01:40.0	173.4	515.8	0.9232	16.09	21.7865315
16.04.2015 14:01:40.1	173.61	515.8	0.8877	16.07	21.3635444
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16.04.2015 14:01:40.3	176.66	515.9	0.9416	16.25	22.0025705
16.04.2015 14:01:40.4	176.36	515.8	0.9932	16.04	22.5974041
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16.04.2015 14:01:41.0	181.72	515.8	0.902	16.36	21.5349301
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16.04.2015 14:01:41.6	186.31	515.5	0.9908	16.19	22.5700851
16.04.2015 14:01:41.7	186.94	515.6	0.9554	16.29	22.1632179
16.04.2015 14:01:41.8	186.77	515.6	1.1462	16.36	24.2756238
16.04.2015 14:01:41.9	187.11	515.4	1.1336	16.24	24.141826
16.04.2015 14:01:42.0	189.54	515.4	0.9641	16.18	22.2638998
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16.04.2015 14:01:42.3	190.66	515.3	1.083	16.21	23.5968714
16.04.2015 14:01:42.4	192.19	515.3	1.0855	16.18	23.6240912
16.04.2015 14:01:42.5	192.07	515.4	1.0044	16.44	22.7244588
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16.04.2015 14:01:44.5	207.64	515.8	1.1162	16.41	23.9558291
16.04.2015 14:01:44.6	207.55	515.8	1.082	16.12	23.5859747
16.04.2015 14:01:44.7	208.19	515.9	1.0576	16.15	23.3185165
16.04.2015 14:01:44.8	210.56	516	1.0592	16.41	23.3361487
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16.04.2015 14:01:45.8	217.67	515.7	1.0593	16.09	23.3372503
16.04.2015 14:01:45.9	218.61	515.9	1.13	16.33	24.1034617
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16.04.2015 14:01:47.3	229.26	515.7	1.0817	16.11	23.5827047
16.04.2015 14:01:47.4	229.2	515.9	1.077	16.21	23.5314153
16.04.2015 14:01:47.5	229.13	515.9	1.0432	16.39	23.1592231
16.04.2015 14:01:47.6	231.77	515.8	0.8996	16.22	21.5062614
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16.04.2015 14:01:47.9	232.74	515.8	1.0672	16.31	23.4241104
16.04.2015 14:01:48.0	234.35	515.6	1.0518	16.19	23.2544879
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16.04.2015 14:01:48.2	234.77	515.7	1.0342	16.45	23.0591059
16.04.2015 14:01:48.3	237	515.6	1.1634	16.39	24.4570869
16.04.2015 14:01:48.4	236.64	515.4	1.0416	16.12	23.1414561
16.04.2015 14:01:48.5	236.97	515.5	1.0268	16.09	22.9764605
16.04.2015 14:01:48.6	239.42	515.5	1.0522	16.37	23.2589093
16.04.2015 14:01:48.7	239.28	515.4	1.0952	16.23	23.7294086
16.04.2015 14:01:48.8	239.3	515.4	1.0752	16.07	23.511743
16.04.2015 14:01:48.9	240.31	515.5	1.1057	16.06	23.8428876
16.04.2015 14:01:49.0	242.15	515.6	1.0117	16.35	22.8068902
16.04.2015 14:01:49.1	241.92	515.5	0.956	16.22	22.1701761
16.04.2015 14:01:49.2	241.97	515.5	1.0183	16.05	22.8811616

16.04.2015 14:01:49.3	244.06	515.6	1.0794	16.15	23.5576196
16.04.2015 14:01:49.4	244.57	515.6	1.022	16.4	22.9226934
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16.04.2015 14:02:33.5	26.66	517.4	1.0047	16.35	22.7278523
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16.04.2015 14:02:33.8	24.06	517.2	0.9525	16.14	22.1295554
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16.04.2015 14:02:36.9	0.6	516.6	0.9824	16.2	22.4742069
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16.04.2015 14:02:39.6	-20.52	516.9	0.9842	16.35	22.4947866
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16.04.2015 14:02:54.9	-133.98	519.8	1.0148	16.3	22.8418054
16.04.2015 14:02:55.0	-133.98	519.7	1.0106	16.14	22.7944881
16.04.2015 14:02:55.1	-136.42	519.8	0.9771	16.11	22.4135013
16.04.2015 14:02:55.2	-136.87	520.1	1.0024	16.29	22.7018226
16.04.2015 14:02:55.3	-136.94	520.1	0.9921	16.29	22.584887
16.04.2015 14:02:55.4	-138.49	520	1.0556	16.17	23.2964576
16.04.2015 14:02:55.5	-139.92	520.1	1.0319	16.18	23.0334506
16.04.2015 14:02:55.6	-139.77	520.3	0.8798	16.46	21.2682705
16.04.2015 14:02:55.7	-139.94	520.2	1.018	16.44	22.8777909
16.04.2015 14:02:55.8	-141.52	520.2	0.9588	16.11	22.2026192
16.04.2015 14:02:55.9	-142.41	520.2	0.983	16.17	22.4810689
16.04.2015 14:02:56.0	-142.41	520.3	0.9524	16.47	22.1283937
16.04.2015 14:02:56.1	-142.53	520.2	0.8908	16.4	21.4008144
16.04.2015 14:02:56.2	-145.28	520.2	0.9069	16.07	21.5933437
16.04.2015 14:02:56.3	-144.91	520.3	0.9247	16.24	21.8042235
16.04.2015 14:02:56.4	-145.07	520.3	0.9217	16.39	21.7688251
16.04.2015 14:02:56.5	-145.28	520.2	0.7966	16.35	20.2376625
16.04.2015 14:02:56.6	-148.22	520.1	0.98	16.13	22.4467379
16.04.2015 14:02:56.7	-147.89	520.3	0.9674	16.36	22.3019706
16.04.2015 14:02:56.8	-147.94	520.4	0.9551	16.4	22.1597379
16.04.2015 14:02:56.9	-150.47	520.1	0.9415	16.2	22.0014022
16.04.2015 14:02:57.0	-150.97	520.2	1.0593	16.2	23.3372503
16.04.2015 14:02:57.1	-150.84	520.4	1.0116	16.34	22.805763
16.04.2015 14:02:57.2	-151.43	520.4	1.0477	16.36	23.2091197
16.04.2015 14:02:57.3	-153.65	520.3	1.0309	16.16	23.0222872
16.04.2015 14:02:57.4	-153.36	520.3	1.0295	16.15	23.0066493
16.04.2015 14:02:57.5	-153.4	520.5	0.9612	16.35	22.2303898
16.04.2015 14:02:57.6	-154.25	520.5	0.9646	16.34	22.2696723
16.04.2015 14:02:57.7	-156.39	520.4	1.0067	16.12	22.7504626
16.04.2015 14:02:57.8	-155.97	520.5	0.9076	16.16	21.6016756
16.04.2015 14:02:57.9	-156.12	520.6	0.939	16.42	21.9721722
16.04.2015 14:02:58.0	-159.21	520.5	0.9711	16.31	22.3445789
16.04.2015 14:02:58.1	-159.18	520.5	1.0303	16	23.0155865
16.04.2015 14:02:58.2	-158.85	520.7	1.0238	16.14	22.9428708
16.04.2015 14:02:58.3	-160.2	520.7	1.0592	16.31	23.3361487
16.04.2015 14:02:58.4	-161.68	520.6	1.0187	16.18	22.8856552
16.04.2015 14:02:58.5	-161.61	520.6	0.9328	16.05	21.8995134
16.04.2015 14:02:58.6	-161.52	520.8	0.9421	16.15	22.0084116
16.04.2015 14:02:58.7	-162.95	520.8	0.8451	16.27	20.8446328
16.04.2015 14:02:58.8	-164.16	520.6	0.9073	16.1	21.5981052
16.04.2015 14:02:58.9	-164.17	520.6	0.9799	16.15	22.4455926
16.04.2015 14:02:59.0	-164.08	520.8	0.9567	16.26	22.1782913
16.04.2015 14:02:59.1	-166.02	520.8	1.0172	16.3	22.8687998
16.04.2015 14:02:59.2	-167.26	520.6	0.8908	16.13	21.4008144
16.04.2015 14:02:59.3	-167.05	520.7	0.9067	16.21	21.5909626
16.04.2015 14:02:59.4	-168	520.8	1.0036	16.37	22.715407
16.04.2015 14:02:59.5	-170.27	520.8	1.1086	16.35	23.8741344
16.04.2015 14:02:59.6	-170.21	520.7	1.0792	16.06	23.555437
16.04.2015 14:02:59.7	-169.88	520.7	0.929	16.14	21.8548613
16.04.2015 14:02:59.8	-171.07	520.8	0.8299	16.33	20.656326
16.04.2015 14:02:59.9	-172.85	520.7	0.9874	16.38	22.5313264
16.04.2015 14:03:00.0	-172.67	520.6	0.9192	16.01	21.7392824
16.04.2015 14:03:00.1	-172.48	520.7	0.9824	16.15	22.4742069
16.04.2015 14:03:00.2	-174.96	520.7	0.9125	16.33	21.6599093

16.04.2015 14:03:00.3	-175.11	520.5	0.8804	16.24	21.2755215
16.04.2015 14:03:00.4	-175.17	520.5	0.949	16.05	22.088886
16.04.2015 14:03:00.5	-175.07	520.6	1.0442	16.18	23.1703205
16.04.2015 14:03:00.6	-178.03	520.6	0.8526	16.24	20.9369233
16.04.2015 14:03:00.7	-178.02	520.4	0.9721	16.11	22.3560807
16.04.2015 14:03:00.8	-178.18	520.4	0.8871	16.03	21.3563233
16.04.2015 14:03:00.9	-180.15	520.5	0.9082	16.29	21.6088147
16.04.2015 14:03:01.0	-181.08	520.5	0.9989	16.31	22.6621549
16.04.2015 14:03:01.1	-181.16	520.3	0.9632	16.08	22.2535055
16.04.2015 14:03:01.2	-181.03	520.3	0.9941	16.05	22.6076403
16.04.2015 14:03:01.3	-182.94	520.5	1.0562	16.26	23.3030775
16.04.2015 14:03:01.4	-183.69	520.5	0.9712	16.24	22.3457293
16.04.2015 14:03:01.5	-183.88	520.4	1.0167	15.99	22.8631786
16.04.2015 14:03:01.6	-183.91	520.4	0.9563	16.09	22.1736544
16.04.2015 14:03:01.7	-186.3	520.5	0.9985	16.31	22.657617
16.04.2015 14:03:01.8	-186.21	520.4	1.0716	16.26	23.4723488
16.04.2015 14:03:01.9	-186.26	520.4	0.9726	16.03	22.3618294
16.04.2015 14:03:02.0	-186.78	520.6	0.8375	16.11	20.750693
16.04.2015 14:03:02.1	-189.31	520.6	0.9381	16.37	21.9616398
16.04.2015 14:03:02.2	-189.01	520.6	1.1035	16.25	23.8191558
16.04.2015 14:03:02.3	-189.15	520.6	1.0417	16.01	23.142567
16.04.2015 14:03:02.4	-191.09	520.8	1.0163	16.17	22.8586806
16.04.2015 14:03:02.5	-192.11	520.8	1.0359	16.28	23.0780502
16.04.2015 14:03:02.6	-192.07	520.7	1.0631	16.06	23.3790713
16.04.2015 14:03:02.7	-193.07	520.8	1.0558	16.16	23.2986644
16.04.2015 14:03:02.8	-194.77	521	0.9668	16.25	22.2950535
16.04.2015 14:03:02.9	-194.63	521.1	0.868	16.29	21.1251626
16.04.2015 14:03:03.0	-194.79	521	0.9132	16.03	21.6682156
16.04.2015 14:03:03.1	-195.86	521.1	0.9497	16.06	22.0970051
16.04.2015 14:03:03.2	-197.24	521.3	0.9293	16.3	21.8583898
16.04.2015 14:03:03.3	-197.34	521.3	0.9403	16.28	21.9873766
16.04.2015 14:03:03.4	-198.02	521.2	0.8496	16.01	20.900056
16.04.2015 14:03:03.5	-200.23	521.3	0.8888	16.1	21.3767767
16.04.2015 14:03:03.6	-200.12	521.3	0.9956	16.31	22.6246902
16.04.2015 14:03:03.7	-200.21	521.3	1.0045	16.36	22.72559
16.04.2015 14:03:03.8	-201.91	521.2	0.8881	15.98	21.3683571
16.04.2015 14:03:03.9	-202.73	521.3	0.9083	16.08	21.6100043
16.04.2015 14:03:04.0	-202.77	521.3	0.8684	16.3	21.1300296
16.04.2015 14:03:04.1	-202.71	521.2	0.8387	16.22	20.7655538
16.04.2015 14:03:04.2	-204.66	521.2	0.8806	15.96	21.2779379
16.04.2015 14:03:04.3	-205.25	521.3	0.9159	16.11	21.7002245
16.04.2015 14:03:04.4	-205.27	521.3	0.9618	16.32	22.2373271
16.04.2015 14:03:04.5	-206.61	521.2	0.927	16.2	21.8313235
16.04.2015 14:03:04.6	-208.37	521.2	0.9715	16.09	22.3491803
16.04.2015 14:03:04.7	-208.22	521.3	0.8673	16.29	21.1166426
16.04.2015 14:03:04.8	-208.26	521.3	1.0356	16.32	23.0747082
16.04.2015 14:03:04.9	-209.63	521.1	0.8937	16.13	21.4356213
16.04.2015 14:03:05.0	-210.83	521.1	0.9055	16.05	21.5766703
16.04.2015 14:03:05.1	-210.76	521.3	0.9366	16.29	21.9440747
16.04.2015 14:03:05.2	-210.8	521.3	0.9808	16.35	22.4558979
16.04.2015 14:03:05.3	-213.38	521.2	0.9954	16.02	22.6224176
16.04.2015 14:03:05.4	-213.32	521.3	1.0159	16.08	22.8541818
16.04.2015 14:03:05.5	-213.39	521.4	1.0416	16.34	23.1414561
16.04.2015 14:03:05.6	-213.5	521.4	0.984	16.31	22.4925009
16.04.2015 14:03:05.7	-216.43	521.4	1.0234	16.04	22.9383885
16.04.2015 14:03:05.8	-216.18	521.6	0.8945	16.13	21.4452133
16.04.2015 14:03:05.9	-216.23	521.7	0.9001	16.46	21.5122372
16.04.2015 14:03:06.0	-217.33	521.6	0.8978	16.4	21.4847348
16.04.2015 14:03:06.1	-217.59	521.6	1.0131	16.06	22.822665
16.04.2015 14:03:06.2	-217.57	521.8	1.0119	16.23	22.8091444
16.04.2015 14:03:06.3	-217.56	521.8	0.9505	16.4	22.1063101
16.04.2015 14:03:06.4	-217.6	521.7	0.8377	16.27	20.7531705
16.04.2015 14:03:06.5	-217.53	521.7	0.891	16.08	21.4032167
16.04.2015 14:03:06.6	-217.58	522	0.95	16.26	22.1004949
16.04.2015 14:03:06.7	-217.54	522	0.908	16.27	21.6064353
16.04.2015 14:03:06.8	-217.58	521.8	0.9349	16.12	21.9241506
16.04.2015 14:03:06.9	-217.56	521.8	0.9657	16.05	22.2823665
16.04.2015 14:03:07.0	-217.6	522	0.8698	16.3	21.1470552
16.04.2015 14:03:07.1	-217.56	521.9	1.0017	16.3	22.6938946
16.04.2015 14:03:07.2	-217.58	521.8	1.0533	16.2	23.2710639
16.04.2015 14:03:07.3	-217.57	521.8	1.066	16.11	23.4109372

16.04.2015 14:03:07.4	-217.54	522	1.0778	16.42	23.5401533
16.04.2015 14:03:07.5	-217.55	522	0.9301	16.28	21.8677963
16.04.2015 14:03:07.6	-217.61	522	0.9853	16.06	22.5073538
16.04.2015 14:03:07.7	-217.57	522.1	0.9534	16.04	22.1400079
16.04.2015 14:03:07.8	-217.58	522.2	0.9956	16.34	22.6246902
16.04.2015 14:03:07.9	-217.61	522.1	1.069	16.27	23.4438563
16.04.2015 14:03:08.0	-217.58	522.1	0.9494	16.01	22.0935147
16.04.2015 14:03:08.1	-217.56	522.3	0.9737	16.16	22.3744713
16.04.2015 14:03:08.2	-217.59	522.4	1.1541	16.33	24.3591381
16.04.2015 14:03:08.3	-217.55	522.2	0.9644	16.21	22.2673635
16.04.2015 14:03:08.4	-217.58	522.3	0.9702	16.08	22.3342222
16.04.2015 14:03:08.5	-217.63	522.5	1.039	16.33	23.1125557
16.04.2015 14:03:08.6	-217.58	522.5	0.918	16.36	21.7250877
16.04.2015 14:03:08.7	-217.59	522.4	0.8899	16.26	21.3900008
16.04.2015 14:03:08.8	-217.59	522.4	0.9317	16.15	21.8865972
16.04.2015 14:03:08.9	-217.57	522.6	1.0397	16.4	23.1203401
16.04.2015 14:03:09.0	-217.53	522.6	1.0905	16.33	23.678437
16.04.2015 14:03:09.1	-217.6	522.5	1.0772	16.21	23.5336001
16.04.2015 14:03:09.2	-217.58	522.6	1.0532	16.18	23.2699592
16.04.2015 14:03:09.3	-217.56	522.6	0.9949	16.5	22.6167352

Calculation of mass flow rate based on polynomial equation fitted to the experimental data

$$y = -2.53990676E-14x^6 - 2.01995553E-12x^5 + 1.56605588E-09x^4 + 2.07801731E-07x^3 + 2.39847214E-06x^2 - 2.12828040E-03x + 2.17733231E+01$$

Please enter below Polynomial Coefficients

Order no	Coeff
6	-2.53990676E-14
5	-2.01995553E-12
4	1.56605588E-09
3	2.07801731E-07
2	2.39847214E-06
1	-2.12828040E-03
0	2.17733231E+01

Actual Area	0.274324656	[m2]
Integrated area	0.274324656	[m2]
Area Error	0	[%]
Integrated Mass flow	2.331615581	[Kg/s]

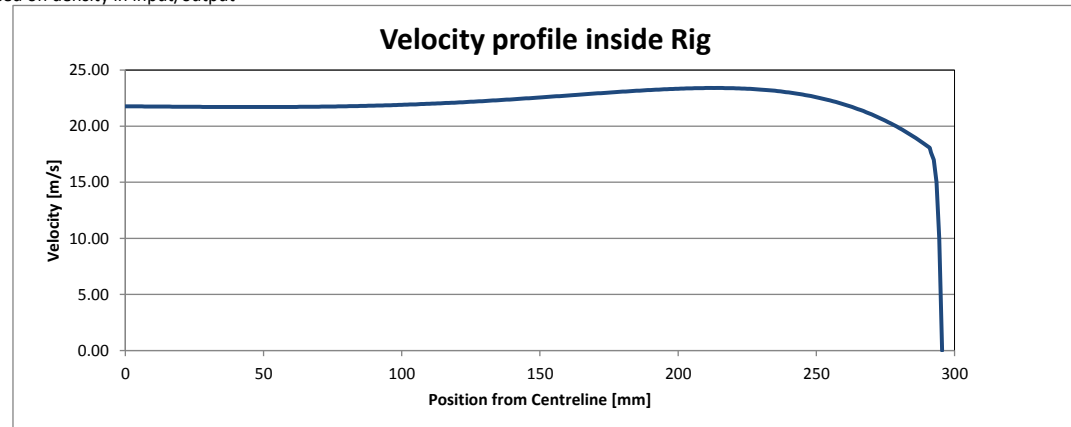
Polynomial curve (dP vs position)

Please do NOT alter any of the figures below

position [mm]	Velocity [m/s]
0	21.773323
1	21.771197
2	21.769078
3	21.766966
4	21.764862
5	21.762769
6	21.760687
7	21.758618
8	21.756563
9	21.754524
10	21.752503
11	21.750501
12	21.748520
13	21.746561
14	21.744626
15	21.742717
16	21.740836
17	21.738984
18	21.737163
19	21.735375
20	21.733622
21	21.731906
22	21.730228
23	21.728591
24	21.726997
25	21.725448
26	21.723945
27	21.722492
28	21.721089
29	21.719739
30	21.718445
31	21.717208
32	21.716030
33	21.714915

Delta Area [m2]	Delta Mass flow [Kg/s]
0	0
3.14159E-06	2.66061E-05
9.42478E-06	7.98106E-05
1.5708E-05	0.000133005
2.19911E-05	0.000186189
2.82743E-05	0.000239363
3.45575E-05	0.000292526
4.08407E-05	0.00034568
4.71239E-05	0.000398824
5.34071E-05	0.000451958
5.96903E-05	0.000505082
6.59734E-05	0.000558198
7.22566E-05	0.000611304
7.85398E-05	0.000664401
8.4823E-05	0.000717489
9.11062E-05	0.000770569
9.73894E-05	0.00082364
0.000103673	0.000876703
0.000109956	0.000929759
0.000116239	0.000982807
0.000122522	0.001035848
0.000128805	0.001088883
0.000135088	0.001141911
0.000141372	0.001194933
0.000147655	0.00124795
0.000153938	0.001300961
0.000160221	0.001353968
0.000166504	0.00140697
0.000172788	0.001459969
0.000179071	0.001512965
0.000185354	0.001565958
0.000191637	0.001618949
0.00019792	0.001671939
0.000204204	0.001724928

Based on density in input/output



34	21.713863
35	21.712878
36	21.711962
37	21.711116
38	21.710343
39	21.709646
40	21.709027
41	21.708488
42	21.708032
43	21.707660
44	21.707376
45	21.707181
46	21.707079
47	21.707072
48	21.707161
49	21.707350
50	21.707640
51	21.708035
52	21.708537
53	21.709148
54	21.709870
55	21.710707
56	21.711660
57	21.712732
58	21.713925
59	21.715243
60	21.716686
61	21.718258
62	21.719962
63	21.721798
64	21.723771
65	21.725882
66	21.728133
67	21.730527
68	21.733066
69	21.735753
70	21.738590
71	21.741578
72	21.744721
73	21.748020
74	21.751478
75	21.755097
76	21.758878
77	21.762825
78	21.766938
79	21.771220
80	21.775674
81	21.780300
82	21.785101
83	21.790079

0.000210487	0.001777917
0.00021677	0.001830906
0.000223053	0.001883896
0.000229336	0.001936888
0.000235619	0.001989882
0.000241903	0.00204288
0.000248186	0.002095882
0.000254469	0.002148889
0.000260752	0.002201902
0.000267035	0.002254921
0.000273319	0.002307948
0.000279602	0.002360983
0.000285885	0.002414028
0.000292168	0.002467082
0.000298451	0.002520148
0.000304734	0.002573226
0.000311018	0.002626318
0.000317301	0.002679424
0.000323584	0.002732545
0.000329867	0.002785682
0.00033615	0.002838837
0.000342434	0.002892011
0.000348717	0.002945205
0.000355	0.002998419
0.000361283	0.003051657
0.000367566	0.003104917
0.00037385	0.003158203
0.000380133	0.003211514
0.000386416	0.003264853
0.000392699	0.003318221
0.000398982	0.003371618
0.000405265	0.003425047
0.000411549	0.003478509
0.000417832	0.003532006
0.000424115	0.003585537
0.000430398	0.003639106
0.000436681	0.003692714
0.000442965	0.003746361
0.000449248	0.00380005
0.000455531	0.003853783
0.000461814	0.003907559
0.000468097	0.003961382
0.00047438	0.004015253
0.000480664	0.004069173
0.000486947	0.004123144
0.00049323	0.004177168
0.000499513	0.004231245
0.000505796	0.004285379
0.00051208	0.00433957
0.000518363	0.00439382



84	21.795235
85	21.800572
86	21.806090
87	21.811792
88	21.817680
89	21.823754
90	21.830016
91	21.836468
92	21.843112
93	21.849948
94	21.856978
95	21.864202
96	21.871623
97	21.879241
98	21.887058
99	21.895073
100	21.903288
101	21.911705
102	21.920323
103	21.929143
104	21.938165
105	21.947391
106	21.956820
107	21.966453
108	21.976290
109	21.986331
110	21.996577
111	22.007026
112	22.017679
113	22.028535
114	22.039595
115	22.050857
116	22.062321
117	22.073987
118	22.085853
119	22.097918
120	22.110182
121	22.122643
122	22.135300
123	22.148151
124	22.161195
125	22.174431
126	22.187856
127	22.201468
128	22.215265
129	22.229245
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273	20.720170
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0.000914989	0.006282176
0.00183469	0.012132806
0.001840973	0.010742079
0.001847256	0.007185828
0.00185354	0

Please do not change any of the values in this sheet

Patm	Atmospheric air pressure - (As recorded from engine data)	975 [mBar]
Patm		97500 [Pa]
Tatm		5 [C]
Tatm		278 [K]
Relative Humidity		95 [%]

$$\rho_{\text{humid air}}^{[1]} = \frac{p_d}{R_d T} + \frac{p_v}{R_v T} = \frac{p_d M_d + p_v M_v}{RT}$$

where:

$\rho_{\text{humid air}}$	=	Density of the humid air (kg/m <sup>3</sup> )
$p_d$	=	Partial pressure of dry air (Pa)
$R_d$	=	Specific gas constant for dry air, 287.058 J/(kg·K)
$T$	=	Temperature (K)
$p_v$	=	Pressure of water vapor (Pa)
$R_v$	=	Specific gas constant for water vapor, 461.495 J/(kg·K)
$M_d$	=	Molar mass of dry air, 0.028964 (kg/mol)
$M_v$	=	Molar mass of water vapor, 0.018016 (kg/mol)
$R$	=	<a href="#">Universal gas constant, 8.314 J/(K·mol)</a>

$$\rho_{\text{humid air}} = 1.217898 \text{ Kg/m}^3$$

$$0.318090154$$

The vapor pressure of water may be calculated from the [saturation vapor pressure](#) and [relative humidity](#). It is found by:

$$p_v = \phi p_{\text{sat}}$$

$$p_u = 828.6578 \text{ [Pa]}$$

Where:

$p_v$	=	Vapor pressure of water
$\phi$	=	Relative humidity
$p_{\text{sat}}$	=	Saturation vapor pressure

The [saturation vapor pressure of water](#) at any given temperature is the vapor pressure when relative humidity is 100%. One formula <sup>[1]</sup> used to find the saturation vapor pressure is:

$$p_{\text{sat}} = 6.1078 \times 10^{\frac{7.5T}{T+237.3}}$$

$$p_{\text{sat}} = 8.722714 \text{ hPa}$$

$$p_{\text{sat}} = 872.2714 \text{ [Pa]}$$

where T is in degrees C. Note:

$$\rho = \frac{p}{R_{\text{specific}} T} \quad 1.22177 \text{ [kg/m}^3\text{]}$$

$$R = 287.058 \text{ J/Kg K}$$

$$T = \text{Temperature in degrees Kelvin}$$

$$P = \text{Absolute Pressure in Pa}$$