



Rig Mass Flow Rate Calculations

Please Enter Parameters in highlighted boxes below

Engine Data File		
Ambient Conditions		
Air Temperature	5	[C]
Atmospheric Pressure	975	[mBar]
Air Humidity	95	[%]
Viper Engine Parameters		
Engine Air Intake Mass Flow	18.7	[Kg/s]
Butane Flow Rate	1732	[Ltr/h]
Engine Speed	12150	[RPM]
ETC	650	[C]
Gas Delivery System Data File		
Gas Delivery System		
Mixed Gas (Fuel) Mass Flow rate	0.017	[Kg/s]
Oxygen Mass Flow rate	0.155	[Kg/s]

Please do not change anything in this box

Test Date and Time = 04.11.2014 14:58:17.7

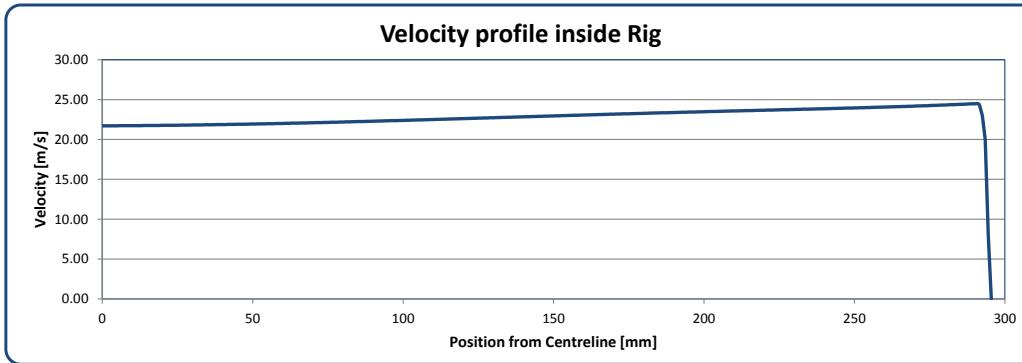
Calculated Parameters		
Air density	1.217898	[Kg/m ³]
Liquid Butane density	584	[Kg/m ³]
Butane mass Flow rate	0.280969	[Kg/s]
Air Fuel Ratio	79.23263	[]
Calculated Exhaust gas properties (Reaction Engines)		
Exhaust products density	0.389	[Kg/m ³]
Pitot Traverse Results		
Rig Gas flow rate - Integrated	2.468033	[Kg/s]
Total Rig Mass flow	2.640033	[Kg/s]
Rig Gas Temperature as read from TC 11		
Gas Temperature	519	[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



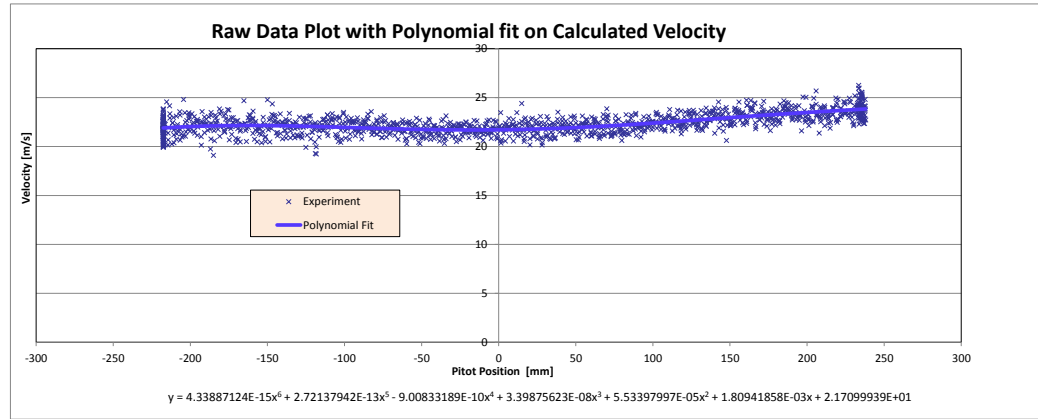
Data Acquisition Parameters

Sampling Rate	1000	[Hz]	
No of samples recorded	100	Samples	
Averaged samples sampling rate	10	[Hz]	
Pitot Traverse speed	7	[mm/s]	Averaged Pitot dp
Distance Travelled every 0.1sec	0.7	[mm]	0.973943881
			Average Vel 22.3532026 [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 %
04.11.2014 14:58:17.7	-217.52	514.4	0.9236	16.41
04.11.2014 14:58:17.8	-217.5	514.3	0.8559	16.39
04.11.2014 14:58:17.9	-217.5	514.4	1.097	16.32
04.11.2014 14:58:18.0	-217.45	514.6	0.906	16.36
04.11.2014 14:58:18.1	-217.43	514.7	0.9303	16.39
04.11.2014 14:58:18.2	-217.4	514.5	1.0534	16.38
04.11.2014 14:58:18.3	-217.5	514.6	1.0984	16.3
04.11.2014 14:58:18.4	-217.49	514.8	0.9648	16.38
04.11.2014 14:58:18.5	-217.46	514.8	0.9116	16.4
04.11.2014 14:58:18.6	-217.53	514.7	0.8438	16.32
04.11.2014 14:58:18.7	-217.48	514.9	0.8973	16.31
04.11.2014 14:58:18.8	-217.46	515	0.7864	16.36
04.11.2014 14:58:18.9	-217.48	515	0.8222	16.45
04.11.2014 14:58:19.0	-217.51	514.9	0.7715	16.28
04.11.2014 14:58:19.1	-217.45	515.1	0.8634	16.31
04.11.2014 14:58:19.2	-217.46	515.1	0.7945	16.37
04.11.2014 14:58:19.3	-217.47	514.9	0.873	16.4
04.11.2014 14:58:19.4	-217.45	514.9	0.7829	16.27
04.11.2014 14:58:19.5	-217.45	515	0.8959	16.28
04.11.2014 14:58:19.6	-217.45	515.1	0.8448	16.39
04.11.2014 14:58:19.7	-217.48	514.8	0.8592	16.4
04.11.2014 14:58:19.8	-217.5	514.7	0.8598	16.27
04.11.2014 14:58:19.9	-217.55	514.9	0.9282	16.31
04.11.2014 14:58:20.0	-217.49	515	0.9351	16.36
04.11.2014 14:58:20.1	-217.5	514.8	0.9197	16.36
04.11.2014 14:58:20.2	-217.53	514.8	0.95	16.29
04.11.2014 14:58:20.3	-217.46	515	0.9925	16.24
04.11.2014 14:58:20.4	-217.41	514.9	0.9146	16.37
04.11.2014 14:58:20.5	-217.45	514.9	0.9108	16.33
04.11.2014 14:58:20.6	-217.47	515	1.0409	16.29
04.11.2014 14:58:20.7	-217.44	515.2	0.9128	16.32
04.11.2014 14:58:20.8	-217.5	515.1	0.9993	16.41
04.11.2014 14:58:20.9	-217.5	515.1	1.0265	16.3
04.11.2014 14:58:21.0	-217.49	515.3	0.934	16.25
04.11.2014 14:58:21.1	-217.5	515.5	0.8209	16.37
04.11.2014 14:58:21.2	-217.48	515.5	0.9672	16.43
04.11.2014 14:58:21.3	-217.51	515.5	0.8652	16.28
04.11.2014 14:58:21.4	-217.51	515.7	0.8244	16.25
04.11.2014 14:58:21.5	-217.47	515.8	0.8799	16.38
04.11.2014 14:58:21.6	-217.45	515.7	0.8128	16.4
04.11.2014 14:58:21.7	-217.47	515.7	0.8266	16.31
04.11.2014 14:58:21.8	-217.44	515.9	0.9333	16.26
04.11.2014 14:58:21.9	-217.45	516	0.8844	16.36
04.11.2014 14:58:22.0	-217.43	515.7	0.8579	16.36
04.11.2014 14:58:22.1	-217.5	515.8	0.9256	16.32
04.11.2014 14:58:22.2	-217.52	516	0.9241	16.3
04.11.2014 14:58:22.3	-217.51	516	0.9976	16.35
04.11.2014 14:58:22.4	-217.47	515.9	1.0057	16.33
04.11.2014 14:58:22.5	-217.51	515.9	0.954	16.25
04.11.2014 14:58:22.6	-217.47	516.1	1.0082	16.25
04.11.2014 14:58:22.7	-217.41	516	1.0283	16.23
04.11.2014 14:58:22.8	-217.46	515.9	0.8953	16.39
04.11.2014 14:58:22.9	-217.47	516.1	0.9171	16.27
04.11.2014 14:58:23.0	-217.45	516.2	0.844	16.39
04.11.2014 14:58:23.1	-217.49	516	0.8678	16.41
04.11.2014 14:58:23.2	-217.51	516	0.9613	16.34
04.11.2014 14:58:23.3	-217.46	516.1	0.777	16.22
04.11.2014 14:58:23.4	-217.48	516.1	0.9438	16.43
04.11.2014 14:58:23.5	-217.48	515.9	0.9473	16.43
04.11.2014 14:58:23.6	-217.49	515.8	0.8015	16.31

Calculated Velocity [m/s]
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23.7489007
21.5826265
21.8701473
23.2721686
23.7640501
22.2719809
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20.8285941
21.4787514
20.1076793
20.5602757
19.9162772
21.0691114
20.2109696
21.1859196
20.0628831
21.4619889
20.8409326
21.0178037
21.025141
21.8454492
21.9264956
21.7451942
22.1004949
22.5894395
21.6848187
21.6397235
23.1336788
21.6634695
22.6666919
22.9731038
21.9135952
20.5440151
22.2996651
21.0910622
20.5877644
21.2694792
20.4424077
20.6152164
21.9053819
21.3237982
21.0018973
21.8148319
21.7971485
22.6474035
22.7391602
22.1469734
22.7674056
22.993237
21.4548009
21.7144355
20.8310624
21.1227287
22.2315462
19.9871424
22.0282595
22.0690666
20.2998094



04.11.2014 14:58:23.7	-217.09	516	0.9081	16.28	21.607625
04.11.2014 14:58:23.8	-216.89	516	0.9375	16.41	21.9546155
04.11.2014 14:58:23.9	-216.86	515.8	0.9736	16.41	22.3733223
04.11.2014 14:58:24.0	-216.67	515.7	0.9681	16.33	22.3100379
04.11.2014 14:58:24.1	-214.3	515.9	0.8315	16.33	20.6762285
04.11.2014 14:58:24.2	-214.35	515.9	0.888	16.36	21.367154
04.11.2014 14:58:24.3	-214.44	515.8	0.7901	16.4	20.1549269
04.11.2014 14:58:24.4	-211.96	515.8	0.7979	16.3	20.254169
04.11.2014 14:58:24.5	-211.52	516	0.9773	16.36	22.415795
04.11.2014 14:58:24.6	-211.42	516	0.9775	16.37	22.4180885
04.11.2014 14:58:24.7	-211.61	515.9	0.9355	16.42	21.9311847
04.11.2014 14:58:24.8	-209.04	516	0.8363	16.25	20.7358215
04.11.2014 14:58:24.9	-208.78	516.1	0.8818	16.38	21.2924308
04.11.2014 14:58:25.0	-209	516.1	1.0387	16.41	23.1092187
04.11.2014 14:58:25.1	-208.46	516	0.9439	16.37	22.0294265
04.11.2014 14:58:25.2	-206.5	516.2	0.8298	16.22	20.6550815
04.11.2014 14:58:25.3	-206.34	516.3	0.9175	16.4	21.7191705
04.11.2014 14:58:25.4	-206.67	516.2	1.048	16.45	23.2124424
04.11.2014 14:58:25.5	-204.35	516.1	1.1965	16.3	24.8025623
04.11.2014 14:58:25.6	-203.53	516.4	1.0692	16.29	23.4460492
04.11.2014 14:58:25.7	-203.17	516.4	0.9494	16.39	22.0935147
04.11.2014 14:58:25.8	-202.28	516.2	0.9982	16.43	22.654213
04.11.2014 14:58:25.9	-200.92	516.2	1.0699	16.3	23.453723
04.11.2014 14:58:26.0	-200.91	516.5	1.0131	16.3	22.822665
04.11.2014 14:58:26.1	-200.68	516.5	1.0459	16.39	23.189174
04.11.2014 14:58:26.2	-199.91	516.3	0.9288	16.37	21.8525086
04.11.2014 14:58:26.3	-198.86	516.3	1.06	16.31	23.3449598
04.11.2014 14:58:26.4	-198.61	516.5	0.9675	16.34	22.3031232
04.11.2014 14:58:26.5	-197.11	516.6	0.8879	16.41	21.3659509
04.11.2014 14:58:26.6	-195.39	516.5	0.9902	16.35	22.5632501
04.11.2014 14:58:26.7	-195.38	516.6	0.8701	16.27	21.1507018
04.11.2014 14:58:26.8	-195.33	516.7	1.0084	16.38	22.7696637
04.11.2014 14:58:26.9	-194.08	516.6	0.9629	16.43	22.2500397
04.11.2014 14:58:27.0	-192.84	516.6	0.7886	16.3	20.1357858
04.11.2014 14:58:27.1	-192.88	516.7	0.8593	16.28	21.0190268
04.11.2014 14:58:27.2	-192.23	516.8	0.9905	16.37	22.5666679
04.11.2014 14:58:27.3	-190.81	516.6	0.8921	16.46	21.4164245
04.11.2014 14:58:27.4	-190.63	516.6	0.9671	16.28	22.2985123
04.11.2014 14:58:27.5	-190.77	516.8	1.0305	16.26	23.0178203
04.11.2014 14:58:27.6	-188.13	516.9	1.0328	16.38	23.043493
04.11.2014 14:58:27.7	-186.6	516.7	0.8388	16.41	20.7667918
04.11.2014 14:58:27.8	-186.91	516.7	0.7588	16.3	19.7516717
04.11.2014 14:58:27.9	-187.22	517	0.9218	16.27	21.770006
04.11.2014 14:58:28.0	-185	517	0.7091	16.39	19.0938691
04.11.2014 14:58:28.1	-184.26	516.7	0.825	16.37	20.5952549
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04.11.2014 14:58:28.5	-181.9	516.8	0.9199	16.34	21.7475584
04.11.2014 14:58:28.6	-182.48	516.8	0.9947	16.29	22.6144618
04.11.2014 14:58:28.7	-180.87	516.9	0.8611	16.33	21.0410298
04.11.2014 14:58:28.8	-177.82	516.8	0.8962	16.42	21.4655819
04.11.2014 14:58:28.9	-178.46	516.7	0.9441	16.29	22.0317602
04.11.2014 14:58:29.0	-177.99	516.8	0.9128	16.27	21.6634695
04.11.2014 14:58:29.1	-175.75	516.9	0.9369	16.37	21.9475889
04.11.2014 14:58:29.2	-175.77	516.7	1.0986	16.43	23.7662135
04.11.2014 14:58:29.3	-176.16	516.6	0.9736	16.27	22.3733223
04.11.2014 14:58:29.4	-174.66	516.7	0.832	16.26	20.6824442
04.11.2014 14:58:29.5	-173.16	516.7	0.8776	16.37	21.2416625
04.11.2014 14:58:29.6	-173.19	516.4	1.0232	16.42	22.936147
04.11.2014 14:58:29.7	-173.55	516.4	0.9466	16.29	22.0609112
04.11.2014 14:58:29.8	-170.37	516.6	0.945	16.25	22.042259
04.11.2014 14:58:29.9	-170.36	516.5	0.8097	16.4	20.403387
04.11.2014 14:58:30.0	-169.97	516.3	0.9924	16.36	22.5883015
04.11.2014 14:58:30.1	-169.2	516.3	0.9986	16.31	22.6587516
04.11.2014 14:58:30.2	-167.41	516.5	0.9175	16.27	21.7191705
04.11.2014 14:58:30.3	-167.6	516.4	0.9055	16.42	21.5766703
04.11.2014 14:58:30.4	-167.56	516.2	0.8155	16.32	20.4763328
04.11.2014 14:58:30.5	-166.41	516.2	0.9583	16.31	22.1968293
04.11.2014 14:58:30.6	-165.16	516.4	1.1857	16.32	24.6903705
04.11.2014 14:58:30.7	-164.58	516.3	0.9743	16.41	22.3813639
04.11.2014 14:58:30.8	-164.07	516.2	0.9098	16.31	21.6278408

04.11.2014 14:58:30.9	-162.2	516.3	0.9367	16.27	21.9452462
04.11.2014 14:58:31.0	-162.45	516.3	1.0241	16.35	22.946232
04.11.2014 14:58:31.1	-161.67	516.2	1.0508	16.41	23.2434307
04.11.2014 14:58:31.2	-161.19	516.1	1.0096	16.3	22.7832076
04.11.2014 14:58:31.3	-159.38	516.1	0.8865	16.23	21.3490998
04.11.2014 14:58:31.4	-159.49	516.2	1.0094	16.39	22.7809509
04.11.2014 14:58:31.5	-159.27	516	1.0845	16.42	23.6132071
04.11.2014 14:58:31.6	-157.59	516	0.9902	16.27	22.5632501
04.11.2014 14:58:31.7	-156.65	516.2	0.8168	16.26	20.4926471
04.11.2014 14:58:31.8	-156.73	516.2	0.9287	16.36	21.8513322
04.11.2014 14:58:31.9	-155.35	515.9	0.939	16.41	21.9721722
04.11.2014 14:58:32.0	-153.77	515.9	0.8078	16.3	20.3794342
04.11.2014 14:58:32.1	-154.02	516	0.8749	16.3	21.2089616
04.11.2014 14:58:32.2	-154.09	516	0.9481	16.37	22.0783834
04.11.2014 14:58:32.3	-151.21	515.7	0.859	16.34	21.0153573
04.11.2014 14:58:32.4	-151.19	515.6	0.8184	16.3	20.5127085
04.11.2014 14:58:32.5	-151.42	515.7	0.8531	16.31	20.9430615
04.11.2014 14:58:32.6	-149.48	515.6	0.9484	16.39	22.0818762
04.11.2014 14:58:32.7	-148.44	515.3	0.8149	16.32	20.4687988
04.11.2014 14:58:32.8	-148.76	515.3	0.9364	16.29	21.9417317
04.11.2014 14:58:32.9	-148.8	515.4	1.0051	16.32	22.7323762
04.11.2014 14:58:33.0	-145.39	515.2	1.0449	16.42	23.1780856
04.11.2014 14:58:33.1	-145.94	515.1	0.9853	16.3	22.5073538
04.11.2014 14:58:33.2	-146.32	515.2	1.0444	16.25	23.1725394
04.11.2014 14:58:33.3	-145.2	515.2	1.0008	16.39	22.6836974
04.11.2014 14:58:33.4	-143.03	515	0.9858	16.44	22.5130639
04.11.2014 14:58:33.5	-143.43	514.9	0.8651	16.29	21.0898433
04.11.2014 14:58:33.6	-143.47	515.1	0.8928	16.25	21.4248252
04.11.2014 14:58:33.7	-140.9	515.2	0.9624	16.37	22.2442621
04.11.2014 14:58:33.8	-140.44	514.9	0.9862	16.42	22.5176309
04.11.2014 14:58:33.9	-140.39	514.9	0.9803	16.28	22.4501733
04.11.2014 14:58:34.0	-140.19	515.1	0.8402	16.31	20.784115
04.11.2014 14:58:34.1	-137.86	515.1	0.8463	16.37	20.8594267
04.11.2014 14:58:34.2	-137.62	514.8	0.988	16.39	22.538171
04.11.2014 14:58:34.3	-138.01	514.8	1.0094	16.3	22.7809509
04.11.2014 14:58:34.4	-137.48	515	0.8809	16.37	21.2815621
04.11.2014 14:58:34.5	-135.07	515	0.8484	16.36	20.8852908
04.11.2014 14:58:34.6	-134.95	514.8	0.9076	16.33	21.6016756
04.11.2014 14:58:34.7	-135.33	514.9	0.9389	16.31	21.9710022
04.11.2014 14:58:34.8	-133.18	515.1	0.8708	16.34	21.159208
04.11.2014 14:58:34.9	-132.03	515	0.9261	16.41	21.8207232
04.11.2014 14:58:35.0	-132.15	515	0.8484	16.28	20.8852908
04.11.2014 14:58:35.1	-131.96	515.1	0.9867	16.31	22.5233384
04.11.2014 14:58:35.2	-129.24	515.2	1.0291	16.37	23.0021794
04.11.2014 14:58:35.3	-128.71	515.1	0.9503	16.41	22.1039842
04.11.2014 14:58:35.4	-129.51	515	0.8646	16.28	21.0837478
04.11.2014 14:58:35.5	-128.02	515.2	0.8643	16.27	21.0800897
04.11.2014 14:58:35.6	-126.89	515.3	0.9461	16.37	22.0550841
04.11.2014 14:58:35.7	-126.47	515.2	1.0188	16.44	22.8867784
04.11.2014 14:58:35.8	-126.69	515.1	0.9374	16.27	21.9534445
04.11.2014 14:58:35.9	-124.99	515.2	0.7712	16.28	19.9124046
04.11.2014 14:58:36.0	-124.08	515.2	0.9582	16.38	22.1956711
04.11.2014 14:58:36.1	-124.13	515	0.871	16.37	21.1616377
04.11.2014 14:58:36.2	-122.96	515	1.0367	16.32	23.0869598
04.11.2014 14:58:36.3	-120.85	515.2	0.9607	16.3	22.2246071
04.11.2014 14:58:36.4	-121.01	515.2	0.8987	16.38	21.4955008
04.11.2014 14:58:36.5	-120.86	515.1	0.8933	16.35	21.4308237
04.11.2014 14:58:36.6	-119.14	515.1	0.8134	16.32	20.4499514
04.11.2014 14:58:36.7	-118.87	515.4	0.7228	16.33	19.277436
04.11.2014 14:58:36.8	-118.29	515.4	0.7755	16.44	19.9678405
04.11.2014 14:58:36.9	-118.23	515.2	0.7192	16.3	19.2293691
04.11.2014 14:58:37.0	-116.37	515.3	0.8538	16.33	20.951652
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04.11.2014 14:58:58.8	49.39	516.2	0.9277	16.35	21.8395646
04.11.2014 14:58:58.9	49.57	516.2	0.9139	16.38	21.6765188
04.11.2014 14:58:59.0	50.34	516.1	0.8329	16.38	20.6936275
04.11.2014 14:58:59.1	52.22	516.2	0.8521	16.28	20.9307832
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04.11.2014 14:58:59.3	52.34	516.3	0.9001	16.39	21.5122372
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04.11.2014 14:58:59.5	54.59	516.3	0.9739	16.22	22.3767691
04.11.2014 14:58:59.6	54.65	516.4	0.9555	16.45	22.1643777

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04.11.2014 14:58:59.8	57.24	516.2	0.8633	16.31	21.0678912
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04.11.2014 14:59:00.2	60.39	516.1	0.8635	16.31	21.0703315
04.11.2014 14:59:00.3	60.33	516.4	0.9404	16.27	21.9885457
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04.11.2014 14:59:00.7	62.57	516.5	0.9025	16.31	21.5408979
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04.11.2014 14:59:02.6	78.81	515.7	0.9095	16.32	21.6242747
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04.11.2014 14:59:02.8	79.19	515.5	0.8717	16.42	21.1701395
04.11.2014 14:59:02.9	79.9	515.5	0.8265	16.26	20.6139694
04.11.2014 14:59:03.0	81.46	515.7	0.8741	16.38	21.1992627
04.11.2014 14:59:03.1	81.59	515.6	0.893	16.35	21.4272248
04.11.2014 14:59:03.2	81.56	515.4	0.8779	16.4	21.2452928
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04.11.2014 14:59:04.6	92.29	515.6	0.855	16.36	20.9663704
04.11.2014 14:59:04.7	94.81	515.4	0.917	16.4	21.7132516
04.11.2014 14:59:04.8	94.84	515.4	0.9555	16.27	22.1643777
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04.11.2014 14:59:05.1	97.97	515.3	0.9919	16.39	22.5826104
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04.11.2014 14:59:05.4	100.22	515.4	0.9681	16.39	22.3100379
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04.11.2014 14:59:05.6	99.86	515.3	0.9413	16.23	21.9990652
04.11.2014 14:59:05.7	101.94	515.4	0.985	16.43	22.5039271
04.11.2014 14:59:05.8	103.28	515.3	1.052	16.42	23.2566987
04.11.2014 14:59:05.9	102.61	515.2	0.9305	16.35	21.872498
04.11.2014 14:59:06.0	102.71	515.3	0.9783	16.22	22.4272603
04.11.2014 14:59:06.1	105.22	515.4	0.9991	16.44	22.6644235
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04.11.2014 14:59:06.3	105.33	515.1	0.9507	16.33	22.1086357
04.11.2014 14:59:06.4	107.49	515.4	1.0056	16.24	22.7380297
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04.11.2014 14:59:06.6	107.96	515.3	0.9047	16.38	21.5671368
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04.11.2014 14:59:07.3	113.56	515.7	1	16.38	22.6746294
04.11.2014 14:59:07.4	113.42	515.6	1.0204	16.37	22.9047429
04.11.2014 14:59:07.5	116.05	515.7	1.093	16.29	23.7055632
04.11.2014 14:59:07.6	115.92	515.8	0.9517	16.41	22.1202602
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04.11.2014 14:59:08.0	118.54	516	0.9131	16.42	21.6670292
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04.11.2014 14:59:13.3	158.27	516.9	1.0766	16.55	23.5270451
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04.11.2014 14:59:13.7	161.05	516.8	1.1394	16.48	24.2035074
04.11.2014 14:59:13.8	164.21	516.7	1.0879	16.4	23.6501928
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04.11.2014 14:59:14.4	166.72	516.9	0.9258	16.27	21.8171886
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04.11.2014 14:59:14.6	169.36	516.7	1.005	16.33	22.7312453
04.11.2014 14:59:14.7	169.25	516.7	1.0037	16.45	22.7165387
04.11.2014 14:59:14.8	170.74	517	1.0207	16.28	22.9081097
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04.11.2014 14:59:15.0	172.27	516.8	0.9634	16.37	22.2558158
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04.11.2014 14:59:15.4	174.7	517	1.0114	16.31	22.8035085
04.11.2014 14:59:15.5	176.31	517.1	1.0562	16.35	23.3030775
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04.11.2014 14:59:15.7	177.21	517.2	0.9659	16.46	22.2846737
04.11.2014 14:59:15.8	177.59	517.2	0.9994	16.3	22.667826
04.11.2014 14:59:15.9	179.57	517.3	0.9967	16.29	22.6371853
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04.11.2014 14:59:16.7	185.22	517.3	1.0788	16.31	23.5510712
04.11.2014 14:59:16.8	185.02	517.3	1.1841	16.38	24.6737061
04.11.2014 14:59:16.9	186.32	517	1.133	16.4	24.1354362
04.11.2014 14:59:17.0	188.03	517	1.1635	16.32	24.458138
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04.11.2014 14:59:17.5	190.01	517.1	1.1016	16.35	23.7986412
04.11.2014 14:59:17.6	192.5	517	1.0637	16.42	23.3856678
04.11.2014 14:59:17.7	193.65	516.9	1.0581	16.32	23.324028
04.11.2014 14:59:17.8	193.11	517	1.0056	16.28	22.7380297
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04.11.2014 14:59:18.3	196.5	517.2	0.9069	16.39	21.5933437
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04.11.2014 14:59:18.5	198.79	516.9	1.0047	16.29	22.7278523
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04.11.2014 14:59:18.8	201.23	517	1.0047	16.4	22.7278523
04.11.2014 14:59:18.9	201.17	517.1	1.0181	16.33	22.8789145
04.11.2014 14:59:19.0	202.22	517.3	0.9882	16.3	22.5404521
04.11.2014 14:59:19.1	203.91	517.3	0.9848	16.42	22.5016423
04.11.2014 14:59:19.2	204.03	517.1	0.9971	16.36	22.6417273
04.11.2014 14:59:19.3	203.77	517.2	1.1114	16.33	23.9042649
04.11.2014 14:59:19.4	206.01	517.4	1.0791	16.34	23.5543456
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04.11.2014 14:59:19.6	206.79	517.1	1.0504	16.31	23.2390063
04.11.2014 14:59:19.7	207.97	517.2	0.8889	16.3	21.3779792
04.11.2014 14:59:19.8	208.91	517.4	0.9878	16.37	22.5358897
04.11.2014 14:59:19.9	209.56	517.3	1.0624	16.47	23.3713731
04.11.2014 14:59:20.0	209.05	517.2	1.107	16.3	23.8568999
04.11.2014 14:59:20.1	211.53	517.5	1.121	16.28	24.0072825
04.11.2014 14:59:20.2	211.39	517.6	1.0557	16.38	23.297561
04.11.2014 14:59:20.3	211.84	517.4	1.0219	16.46	22.9215719
04.11.2014 14:59:20.4	213.69	517.4	1.0727	16.31	23.4843929
04.11.2014 14:59:20.5	214.16	517.6	1.0523	16.28	23.2600146
04.11.2014 14:59:20.6	214.18	517.6	1.0165	16.4	22.8609297
04.11.2014 14:59:20.7	214.96	517.4	0.9299	16.42	21.865445
04.11.2014 14:59:20.8	217.26	517.3	1.1148	16.31	23.940801
04.11.2014 14:59:20.9	216.84	517.6	1.1092	16.31	23.8805941
04.11.2014 14:59:21.0	216.72	517.5	1.0563	16.4	23.3041806
04.11.2014 14:59:21.1	219.56	517.3	0.9821	16.38	22.4707751
04.11.2014 14:59:21.2	219.34	517.4	1.0085	16.32	22.7707926

04.11.2014 14:59:21.3	219.15	517.6	0.9988	16.34	22.6610205
04.11.2014 14:59:21.4	220.39	517.6	1.0079	16.43	22.764018
04.11.2014 14:59:21.5	222.46	517.5	1.0525	16.34	23.2622249
04.11.2014 14:59:21.6	221.75	517.6	1.0356	16.3	23.0747082
04.11.2014 14:59:21.7	221.89	517.8	1.0326	16.38	23.0412617
04.11.2014 14:59:21.8	224.56	517.7	1.1532	16.44	24.3496383
04.11.2014 14:59:21.9	224.84	517.7	1.0685	16.31	23.4383729
04.11.2014 14:59:22.0	224.32	517.9	1.082	16.26	23.5859747
04.11.2014 14:59:22.1	224.82	518	1.0725	16.4	23.4822035
04.11.2014 14:59:22.2	228.14	517.8	1.1689	16.48	24.5148295
04.11.2014 14:59:22.3	227.53	517.8	1.2099	16.28	24.9410616
04.11.2014 14:59:22.4	227.67	518.1	1.1759	16.29	24.5881239
04.11.2014 14:59:22.5	229.08	518.2	1.0698	16.4	23.4526269
04.11.2014 14:59:22.6	230.26	517.9	0.9671	16.45	22.2985123
04.11.2014 14:59:22.7	230.14	517.9	1.0769	16.28	23.5303228
04.11.2014 14:59:22.8	231.04	518.1	1.2338	16.35	25.1861961
04.11.2014 14:59:22.9	232.82	518.1	1.1162	16.38	23.9558291
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04.11.2014 14:59:23.1	232.47	517.9	1.1424	16.32	24.2353499
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04.11.2014 14:59:23.3	232.98	518	1.0271	16.4	22.9798168
04.11.2014 14:59:23.4	233.06	517.8	1.0959	16.42	23.7369908
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04.11.2014 14:59:23.8	233.3	517.9	1.0823	16.36	23.5892442
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04.11.2014 14:59:24.6	233.79	517.8	1.3119	16.3	25.9711131
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04.11.2014 14:59:24.9	233.78	517.7	0.9659	16.47	22.2846737
04.11.2014 14:59:25.0	233.68	517.7	1.0217	16.31	22.9193287
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04.11.2014 14:59:25.6	234.56	517.7	1.0243	16.41	22.9484725
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04.11.2014 14:59:26.0	234.66	517.5	1.0097	16.46	22.7843359
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04.11.2014 14:59:26.2	234.28	517.6	1.1257	16.23	24.0575574
04.11.2014 14:59:26.3	234.39	517.8	1.0709	16.44	23.4646811
04.11.2014 14:59:26.4	234.88	517.6	1.23	16.44	25.1473805
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04.11.2014 14:59:26.7	234.51	518	1.0459	16.51	23.189174
04.11.2014 14:59:26.8	235.01	517.8	1.0742	16.43	23.5008067
04.11.2014 14:59:26.9	234.78	517.8	1.0584	16.32	23.3273343
04.11.2014 14:59:27.0	234.79	518	1.1065	16.32	23.8515115
04.11.2014 14:59:27.1	235.09	518	1.1471	16.4	24.2851526
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04.11.2014 14:59:27.3	235.02	517.9	1.0655	16.32	23.4054462
04.11.2014 14:59:27.4	234.76	518.1	1.1277	16.36	24.0789191
04.11.2014 14:59:27.5	235.67	518	1.2207	16.43	25.0521307
04.11.2014 14:59:27.6	235.42	517.9	1.2685	16.37	25.5379148
04.11.2014 14:59:27.7	235.15	518	1.1825	16.3	24.6570305
04.11.2014 14:59:27.8	235.39	518.1	1.2393	16.4	25.2422708
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04.11.2014 14:59:28.0	235.56	517.8	1.2086	16.33	24.9276588
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04.11.2014 14:59:28.2	235.67	517.9	1.2338	16.41	25.1861961
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04.11.2014 14:59:28.4	235.83	517.7	1.251	16.33	25.3611447

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04.11.2014 14:59:29.3	236.27	518	1.0058	16.32	22.7402907
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04.11.2014 14:59:29.5	237.34	517.8	0.9717	16.35	22.3514807
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04.11.2014 14:59:29.7	236.53	518	0.9873	16.36	22.5301854
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04.11.2014 14:59:29.9	237.13	517.7	1.112	16.3	23.9107165
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04.11.2014 14:59:31.4	232.54	518	1.1032	16.33	23.8159179
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04.11.2014 14:59:31.6	229.61	518.3	0.9872	16.33	22.5290444
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04.11.2014 14:59:31.9	227.03	518.4	1.0618	16.24	23.3647726
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04.11.2014 14:59:34.2	211.02	518.8	1.1097	16.19	23.8859759
04.11.2014 14:59:34.3	208.93	518.8	1.1252	16.52	24.052214
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04.11.2014 14:59:34.7	205.95	518.9	1.1504	16.41	24.3200595
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04.11.2014 14:59:34.9	205.92	518.7	1.2831	16.35	25.6844606
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04.11.2014 14:59:35.1	203.17	519	1.1327	16.37	24.1322406
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04.11.2014 14:59:35.3	203.55	518.7	1.1313	16.31	24.1173225
04.11.2014 14:59:35.4	199.94	519	1.0708	16.34	23.4635855
04.11.2014 14:59:35.5	200.72	518.9	1.0533	16.39	23.2710639
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04.11.2014 14:59:35.8	197.43	518.9	1.2218	16.37	25.0634157
04.11.2014 14:59:35.9	198.33	518.8	1.0892	16.42	23.6643191
04.11.2014 14:59:36.0	197.57	518.7	1.0669	16.32	23.4208178
04.11.2014 14:59:36.1	194.8	518.7	1.1362	16.25	24.1694957
04.11.2014 14:59:36.2	194.97	518.7	1.0549	16.42	23.288732
04.11.2014 14:59:36.3	195.41	518.5	1.0467	16.43	23.1980409
04.11.2014 14:59:36.4	193.67	518.4	1.0301	16.3	23.0133526
04.11.2014 14:59:36.5	192.67	518.6	1.1101	16.22	23.8902805
04.11.2014 14:59:36.6	192.63	518.6	1.1321	16.45	24.1258483
04.11.2014 14:59:36.7	192.01	518.4	1.0477	16.37	23.2091197
04.11.2014 14:59:36.8	189.85	518.4	1.1365	16.35	24.1726864
04.11.2014 14:59:36.9	189.97	518.6	1.0412	16.26	23.1370123
04.11.2014 14:59:37.0	189.95	518.7	1.0764	16.4	23.5248597
04.11.2014 14:59:37.1	187.79	518.4	1.1068	16.34	23.8547447
04.11.2014 14:59:37.2	187.35	518.4	1.1166	16.38	23.9601211
04.11.2014 14:59:37.3	186.97	518.6	1.0781	16.29	23.5434292
04.11.2014 14:59:37.4	186.42	518.5	1.166	16.41	24.4844004
04.11.2014 14:59:37.5	184.77	518.4	1.1048	16.34	23.833182
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04.11.2014 14:59:37.7	184.2	518.6	1.0292	16.36	23.003297
04.11.2014 14:59:37.8	182.5	518.5	1.152	16.47	24.3369661
04.11.2014 14:59:37.9	182.23	518.4	0.994	16.31	22.6065031
04.11.2014 14:59:38.0	182.07	518.6	0.9954	16.28	22.6224176
04.11.2014 14:59:38.1	180.58	518.7	1.0929	16.4	23.7044788
04.11.2014 14:59:38.2	179.98	518.6	1.0176	16.45	22.8732958
04.11.2014 14:59:38.3	179.5	518.6	1.0776	16.3	23.5379691
04.11.2014 14:59:38.4	179.54	518.8	0.9569	16.26	22.1806094
04.11.2014 14:59:38.5	176.71	518.8	1.0704	16.43	23.4592027
04.11.2014 14:59:38.6	177.13	518.6	1.1066	16.44	23.8525893
04.11.2014 14:59:38.7	176.96	518.6	1.0278	16.45	22.9876462
04.11.2014 14:59:38.8	176.24	518.8	0.9097	16.35	21.6266521
04.11.2014 14:59:38.9	174.04	518.8	0.9482	16.46	22.0795477
04.11.2014 14:59:39.0	174.58	518.5	1.0424	16.52	23.1503413
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04.11.2014 14:59:39.4	171.91	518.5	1.1788	16.33	24.6184248
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04.11.2014 14:59:39.6	168.25	518.9	1.0348	16.18	23.0657939
04.11.2014 14:59:39.7	168.98	518.9	1.0673	16.46	23.4252078
04.11.2014 14:59:39.8	168.88	518.8	1.0503	16.32	23.2379001
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04.11.2014 14:59:40.0	166.16	519	1.1642	16.37	24.4654943
04.11.2014 14:59:40.1	166.56	519	1.0611	16.47	23.3570696
04.11.2014 14:59:40.2	164.38	518.9	1.1164	16.28	23.9579752
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04.11.2014 14:59:40.4	163.59	519.2	1.0296	16.38	23.0077667
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04.11.2014 14:59:40.6	160.87	518.9	1.0464	16.27	23.1947162
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04.11.2014 14:59:40.9	158.82	518.9	1.0484	16.46	23.2168718
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04.11.2014 14:59:41.1	158.16	519.1	1.038	16.32	23.1014305
04.11.2014 14:59:41.2	158.05	519.1	1.0625	16.34	23.372473
04.11.2014 14:59:41.3	155.91	518.8	1.1729	16.38	24.5567388
04.11.2014 14:59:41.4	155.73	518.9	1.0914	16.27	23.688206
04.11.2014 14:59:41.5	155.55	519	1.0776	16.33	23.5379691
04.11.2014 14:59:41.6	154.58	519	1.0986	16.36	23.7662135
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04.11.2014 14:59:42.1	150.72	518.8	0.9728	16.33	22.3641285
04.11.2014 14:59:42.2	150.64	519	0.9985	16.2	22.657617
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04.11.2014 14:59:42.4	147.6	518.9	1.1192	16.39	23.9880004
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04.11.2014 14:59:42.6	147.74	519.1	1.0199	16.21	22.8991306
04.11.2014 14:59:42.7	145.21	519.2	1.0997	16.43	23.7781088
04.11.2014 14:59:42.8	145.2	519	1.0621	16.38	23.368073

04.11.2014 14:59:42.9	145.03	519	1.0447	16.28	23.1758672
04.11.2014 14:59:43.0	144.25	519.3	1.0345	16.27	23.0624501
04.11.2014 14:59:43.1	142.25	519.3	1.0595	16.35	23.3394532
04.11.2014 14:59:43.2	142.92	519.1	0.9328	16.32	21.8995134
04.11.2014 14:59:43.3	142.19	519.2	1.0253	16.33	22.9596718
04.11.2014 14:59:43.4	139.78	519.4	1.0455	16.53	23.1847392
04.11.2014 14:59:43.5	139.67	519.4	1.0414	16.47	23.1392343
04.11.2014 14:59:43.6	139.61	519.2	1.0866	16.35	23.636058
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04.11.2014 14:59:43.8	136.58	519.6	1.035	16.35	23.0680228
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04.11.2014 14:59:44.1	134.41	519.6	1.0687	16.25	23.4405664
04.11.2014 14:59:44.2	134.1	519.8	1.0595	16.41	23.3394532
04.11.2014 14:59:44.3	134.7	519.6	0.947	16.46	22.0655718
04.11.2014 14:59:44.4	133.53	519.5	0.9634	16.3	22.2558158
04.11.2014 14:59:44.5	131.41	519.7	0.9919	16.25	22.5826104
04.11.2014 14:59:44.6	131.39	519.8	1.0909	16.42	23.6827793
04.11.2014 14:59:44.7	131.71	519.6	1.0363	16.42	23.0825054
04.11.2014 14:59:44.8	128.81	519.6	1.0552	16.28	23.2920433
04.11.2014 14:59:44.9	129.15	519.8	0.9853	16.29	22.5073538
04.11.2014 14:59:45.0	128.87	519.9	1.0111	16.34	22.8001263
04.11.2014 14:59:45.1	128.26	519.6	0.9595	16.42	22.2107225
04.11.2014 14:59:45.2	126.31	519.7	1.0933	16.31	23.7088163
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04.11.2014 14:59:45.4	126.65	519.8	1.0579	16.38	23.3218236
04.11.2014 14:59:45.5	124.55	519.7	1.0059	16.39	22.7414212
04.11.2014 14:59:45.6	123.61	519.7	1.0673	16.3	23.4252078
04.11.2014 14:59:45.7	123.63	519.8	1.0921	16.36	23.6958014
04.11.2014 14:59:45.8	123.4	519.7	1.0592	16.4	23.3361487
04.11.2014 14:59:45.9	121.04	519.5	1.0772	16.33	23.5336001
04.11.2014 14:59:46.0	120.44	519.5	1.0317	16.27	23.0312183
04.11.2014 14:59:46.1	120.58	519.6	0.9662	16.41	22.2881342
04.11.2014 14:59:46.2	119.44	519.4	0.9823	16.44	22.473063
04.11.2014 14:59:46.3	118.2	519.3	0.932	16.33	21.8901206
04.11.2014 14:59:46.4	118.22	519.5	0.9543	16.23	22.1504554
04.11.2014 14:59:46.5	118.28	519.6	1.0868	16.45	23.6382332
04.11.2014 14:59:46.6	115.77	519.4	0.9974	16.44	22.6451332
04.11.2014 14:59:46.7	115.68	519.4	1.0511	16.31	23.2467484
04.11.2014 14:59:46.8	115.69	519.7	0.9985	16.26	22.657617
04.11.2014 14:59:46.9	114.23	519.7	0.9308	16.43	21.8760237
04.11.2014 14:59:47.0	112.8	519.6	0.9583	16.37	22.1968293
04.11.2014 14:59:47.1	112.72	519.6	1.0166	16.35	22.8620542
04.11.2014 14:59:47.2	112.4	519.9	1.017	16.3	22.8665515
04.11.2014 14:59:47.3	110.29	520	0.9689	16.42	22.319254
04.11.2014 14:59:47.4	110.26	519.9	1.0487	16.37	23.2201933
04.11.2014 14:59:47.5	110.09	520.1	1.0291	16.33	23.0021794
04.11.2014 14:59:47.6	108.15	520.3	0.9935	16.35	22.6008167
04.11.2014 14:59:47.7	107.87	520.2	0.9813	16.42	22.4616211
04.11.2014 14:59:47.8	107.66	520.1	1.0239	16.33	22.9439913
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04.11.2014 14:59:48.0	104.6	520.3	0.9668	16.33	22.2950535
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04.11.2014 14:59:48.2	104.69	520.1	0.9705	16.28	22.337675
04.11.2014 14:59:48.3	102.75	520.2	1.0518	16.29	23.2544879
04.11.2014 14:59:48.4	102.02	520.2	1.0596	16.41	23.3405546
04.11.2014 14:59:48.5	102.29	520	1.0736	16.47	23.4942426
04.11.2014 14:59:48.6	101.93	519.9	0.9874	16.28	22.5313264
04.11.2014 14:59:48.7	99.62	520.1	0.9865	16.3	22.5210556
04.11.2014 14:59:48.8	99.51	520	0.9177	16.4	21.7215375
04.11.2014 14:59:48.9	99.88	519.7	0.9865	16.44	22.5210556
04.11.2014 14:59:49.0	97.2	519.7	0.9809	16.3	22.4570427
04.11.2014 14:59:49.1	96.95	519.9	1.0087	16.34	22.7730504
04.11.2014 14:59:49.2	97.22	519.8	0.9623	16.4	22.2431064
04.11.2014 14:59:49.3	96.66	519.5	0.9298	16.36	21.8642693
04.11.2014 14:59:49.4	94.12	519.6	1.0315	16.4	23.0289859
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04.11.2014 14:59:49.6	94.62	519.6	0.8985	16.33	21.4931088
04.11.2014 14:59:49.7	92.97	519.4	0.9907	16.32	22.5689461
04.11.2014 14:59:49.8	91.49	519.6	0.9736	16.29	22.3733223
04.11.2014 14:59:49.9	91.54	519.7	0.9595	16.37	22.2107225
04.11.2014 14:59:50.0	91.78	519.5	0.9398	16.45	21.98153

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04.11.2014 14:59:50.2	88.84	519.7	1.0502	16.31	23.2367938
04.11.2014 14:59:50.3	88.99	519.8	1.0648	16.38	23.3977566
04.11.2014 14:59:50.4	87.76	519.8	0.9655	16.52	22.280059
04.11.2014 14:59:50.5	86.08	519.8	1.0473	16.26	23.2046888
04.11.2014 14:59:50.6	86.33	520.1	0.9595	16.32	22.2107225
04.11.2014 14:59:50.7	86.21	520.1	0.9637	16.41	22.2592807
04.11.2014 14:59:50.8	84.04	519.9	0.9893	16.54	22.5529939
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04.11.2014 14:59:51.9	75.96	520.3	0.9951	16.32	22.6190083
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04.11.2014 14:59:52.5	71.13	520.5	0.986	16.29	22.5153475
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04.11.2014 14:59:53.6	61.95	520	0.9657	16.31	22.2823665
04.11.2014 14:59:53.7	62.28	520.1	0.994	16.34	22.6065031
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04.11.2014 14:59:56.4	41.27	520	0.9592	16.39	22.20725
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04.11.2014 14:59:56.8	38.14	520	1.0105	16.38	22.7933603
04.11.2014 14:59:56.9	38.43	519.8	1.0746	16.39	23.5051818
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04.11.2014 14:59:57.1	36.23	520	0.9644	16.29	22.2673635
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04.11.2014 14:59:58.0	30.66	519.7	0.9107	16.43	21.6385356
04.11.2014 14:59:58.1	30.07	519.6	0.9477	16.31	22.0737255
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04.11.2014 14:59:58.5	26.43	519.7	0.9695	16.24	22.3261637
04.11.2014 14:59:58.6	24.36	519.9	1.0012	16.3	22.6882301
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04.11.2014 14:59:58.8	24.58	519.7	0.9707	16.43	22.3399765
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04.11.2014 15:00:00.2	13.4	519.8	0.9732	16.35	22.3687259
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04.11.2014 15:00:00.7	8.91	519.7	0.9142	16.45	21.6800763
04.11.2014 15:00:00.8	9.17	519.6	0.9595	16.28	22.2107225
04.11.2014 15:00:00.9	8.87	519.8	0.9615	16.28	22.2338587
04.11.2014 15:00:01.0	6.68	519.9	1.0167	16.37	22.8631786
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04.11.2014 15:00:02.0	-0.15	520.2	0.9338	16.26	21.9112489
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04.11.2014 15:00:02.3	-1.91	520.1	0.9302	16.29	21.8689718
04.11.2014 15:00:02.4	-4.15	520.4	0.9173	16.26	21.7168031
04.11.2014 15:00:02.5	-5.16	520.4	0.9286	16.38	21.8501557
04.11.2014 15:00:02.6	-4.76	520.2	0.844	16.45	20.8310624
04.11.2014 15:00:02.7	-5.04	520.2	0.8905	16.28	21.3972105
04.11.2014 15:00:02.8	-7.73	520.5	0.9696	16.28	22.3273151
04.11.2014 15:00:02.9	-7.5	520.5	0.9956	16.39	22.6246902
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04.11.2014 15:00:03.6	-13.24	520.4	0.9214	16.35	21.7652821
04.11.2014 15:00:03.7	-12.42	520.3	0.9498	16.41	22.0981684
04.11.2014 15:00:03.8	-14.01	520.2	0.9939	16.32	22.605366
04.11.2014 15:00:03.9	-15.88	520.3	0.9998	16.28	22.6723618
04.11.2014 15:00:04.0	-15.61	520.4	0.9439	16.42	22.0294265
04.11.2014 15:00:04.1	-15.22	520.3	0.8729	16.43	21.1847061
04.11.2014 15:00:04.2	-17.8	520.2	0.9418	16.28	22.0049071
04.11.2014 15:00:04.3	-18.32	520.4	0.9477	16.27	22.0737255
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04.11.2014 15:00:04.5	-18.63	520.3	0.9637	16.45	22.2592807
04.11.2014 15:00:04.6	-21.16	520.2	0.9809	16.3	22.4570427
04.11.2014 15:00:04.7	-21.17	520.5	0.9868	16.27	22.5244797
04.11.2014 15:00:04.8	-21.38	520.6	0.8968	16.41	21.4727663
04.11.2014 15:00:04.9	-22.45	520.4	0.9608	16.41	22.2257638
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04.11.2014 15:00:13.5	-87.57	523.1	1.0051	16.34	22.7323762
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04.11.2014 15:00:26.3	-186.42	524.8	1.0436	16.27	23.1636627
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04.11.2014 15:00:26.5	-186.11	525.1	0.9701	16.42	22.3330711
04.11.2014 15:00:26.6	-186.96	524.9	0.9698	16.39	22.3296177
04.11.2014 15:00:26.7	-189.58	524.9	1.0104	16.28	22.7922325
04.11.2014 15:00:26.8	-189.56	525.2	0.9729	16.23	22.3652779
04.11.2014 15:00:26.9	-188.69	525.2	0.9123	16.4	21.6575355
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04.11.2014 15:00:27.1	-192.32	525	1.0808	16.29	23.5728919
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04.11.2014 15:00:27.8	-197.98	525.2	0.9811	16.32	22.459332
04.11.2014 15:00:27.9	-197.71	525.3	0.9075	16.2	21.6004856
04.11.2014 15:00:28.0	-197.37	525.4	1.0328	16.4	23.043493
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04.11.2014 15:00:29.5	-210.6	525.1	0.8074	16.34	20.3743879
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04.11.2014 15:00:29.7	-210.79	524.8	0.9132	16.33	21.6682156
04.11.2014 15:00:29.8	-210.92	524.9	1.0265	16.26	22.9731038
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04.11.2014 15:00:32.3	-217.47	524.9	1.0461	16.42	23.191391
04.11.2014 15:00:32.4	-217.46	524.9	1.0776	16.28	23.5379691
04.11.2014 15:00:32.5	-217.51	525.1	0.9666	16.25	22.2927473
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04.11.2014 15:00:32.9	-217.49	525.3	0.9878	16.32	22.5358897
04.11.2014 15:00:33.0	-217.46	525.2	0.945	16.36	22.042259
04.11.2014 15:00:33.1	-217.48	525	0.9659	16.4	22.2846737
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04.11.2014 15:00:33.3	-217.51	525.3	1.0365	16.35	23.0847327
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04.11.2014 15:00:33.7	-217.5	525.4	1.031	16.34	23.0234038
04.11.2014 15:00:33.8	-217.47	525.3	1.0062	16.43	22.7448121
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04.11.2014 15:00:34.0	-217.49	525.4	1.0084	16.28	22.7696637
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04.11.2014 15:00:34.2	-217.5	525.4	0.9086	16.43	21.6135728
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04.11.2014 15:00:34.5	-217.52	525.7	0.9102	16.38	21.6325947
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04.11.2014 15:00:34.7	-217.47	525.4	0.8946	16.27	21.446412
04.11.2014 15:00:34.8	-217.5	525.7	0.9371	16.38	21.9499313
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04.11.2014 15:00:35.0	-217.47	525.4	0.9581	16.43	22.1945129
04.11.2014 15:00:35.1	-217.47	525.4	0.9132	16.28	21.6682156
04.11.2014 15:00:35.2	-217.49	525.6	1.0159	16.33	22.8541818
04.11.2014 15:00:35.3	-217.51	525.5	0.8477	16.38	20.876673
04.11.2014 15:00:35.4	-217.46	525.3	0.9892	16.36	22.551854
04.11.2014 15:00:35.5	-217.48	525.4	1.0268	16.28	22.9764605
04.11.2014 15:00:35.6	-217.49	525.6	0.933	16.36	21.901861
04.11.2014 15:00:35.7	-217.45	525.5	1.0229	16.4	22.9327843

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

$$y = 4.33887124E-15x^6 + 2.72137942E-13x^5 - 9.00833189E-10x^4 + 3.39875623E-08x^3 + 5.53397997E-05x^2 + 1.80941858E-03x + 2.17099939E+01$$

Please enter below Polynomial Coefficients

Order no	Coeff
6	4.33887124E-15
5	2.72137942E-13
4	-9.00833189E-10
3	3.39875623E-08
2	5.53397997E-05
1	1.80941858E-03
0	2.17099939E+01

Actual Area	0.274324656	[m2]
Integrated area	0.274324656	[m2]
Area Error	0	[%]
Integrated Mass flow	2.468032814	[Kg/s]

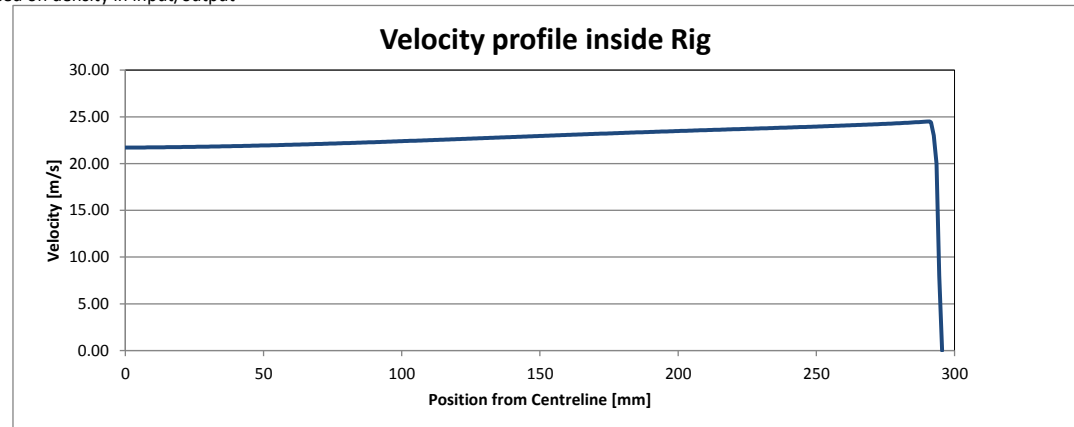
Polynomial curve (dP vs position)

Please do NOT alter any of the figures below

position [mm]	Velocity [m/s]
0	21.709994
1	21.711859
2	21.713834
3	21.715921
4	21.718119
5	21.720428
6	21.722849
7	21.725381
8	21.728025
9	21.730780
10	21.733647
11	21.736626
12	21.739716
13	21.742918
14	21.746231
15	21.749656
16	21.753192
17	21.756839
18	21.760598
19	21.764467
20	21.768447
21	21.772538
22	21.776738
23	21.781049
24	21.785470
25	21.790000
26	21.794639
27	21.799387
28	21.804243
29	21.809208
30	21.814280
31	21.819460
32	21.824746
33	21.830139

Delta Area [m2]	Delta Mass flow [Kg/s]
0	0
3.14159E-06	2.65336E-05
9.42478E-06	7.96081E-05
1.5708E-05	0.000132693
2.19911E-05	0.000185789
2.82743E-05	0.000238897
3.45575E-05	0.000292018
4.08407E-05	0.000345152
4.71239E-05	0.000398301
5.34071E-05	0.000451465
5.96903E-05	0.000504645
6.59734E-05	0.000557842
7.22566E-05	0.000611056
7.85398E-05	0.000664289
8.4823E-05	0.000717542
9.11062E-05	0.000770814
9.73894E-05	0.000824108
0.000103673	0.000877423
0.000109956	0.000930761
0.000116239	0.000984123
0.000122522	0.001037508
0.000128805	0.001090919
0.000135088	0.001144355
0.000141372	0.001197818
0.000147655	0.001251308
0.000153938	0.001304827
0.000160221	0.001358374
0.000166504	0.001411951
0.000172788	0.001465559
0.000179071	0.001519197
0.000185354	0.001572868
0.000191637	0.001626572
0.00019792	0.001680309
0.000204204	0.001734081

Based on density in input/output



34	21.835638
35	21.841242
36	21.846952
37	21.852766
38	21.858684
39	21.864705
40	21.870829
41	21.877055
42	21.883383
43	21.889812
44	21.896341
45	21.902970
46	21.909698
47	21.916524
48	21.923448
49	21.930469
50	21.937585
51	21.944797
52	21.952104
53	21.959505
54	21.966998
55	21.974583
56	21.982260
57	21.990027
58	21.997884
59	22.005830
60	22.013863
61	22.021983
62	22.030189
63	22.038480
64	22.046855
65	22.055313
66	22.063853
67	22.072475
68	22.081176
69	22.089956
70	22.098815
71	22.107750
72	22.116762
73	22.125848
74	22.135008
75	22.144240
76	22.153544
77	22.162919
78	22.172363
79	22.181875
80	22.191455
81	22.201100
82	22.210810
83	22.220584

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188	23.362091
189	23.372166
190	23.382206
191	23.392213
192	23.402186
193	23.412126
194	23.422032
195	23.431907
196	23.441749
197	23.451560
198	23.461340
199	23.471089
200	23.480809
201	23.490499
202	23.500161
203	23.509796
204	23.519404
205	23.528985
206	23.538542
207	23.548074
208	23.557584
209	23.567072
210	23.576538
211	23.585986
212	23.595414
213	23.604826
214	23.614222
215	23.623603
216	23.632971
217	23.642328
218	23.651675
219	23.661014
220	23.670347
221	23.679674
222	23.688999
223	23.698323
224	23.707647
225	23.716974
226	23.726306
227	23.735646
228	23.744994
229	23.754354
230	23.763728
231	23.773118
232	23.782526
233	23.791956

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0.001159248	0.010521351
0.001165531	0.010582992
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0.00118438	0.010768117
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0.001196947	0.010891702
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0.001209513	0.01101542
0.001215796	0.011077328
0.00122208	0.011139269
0.001228363	0.011201244
0.001234646	0.011263251
0.001240929	0.011325291
0.001247212	0.011387365
0.001253495	0.011449471
0.001259779	0.011511611
0.001266062	0.011573784
0.001272345	0.01163599
0.001278628	0.011698231
0.001284911	0.011760505
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0.001297478	0.011885157
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0.001310044	0.012009949
0.001316327	0.012072398
0.001322611	0.012134883
0.001328894	0.012197405
0.001335177	0.012259964
0.00134146	0.012322561
0.001347743	0.012385196
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0.00136031	0.012510585
0.001366593	0.012573339
0.001372876	0.012636135
0.001379159	0.012698973
0.001385442	0.012761855
0.001391726	0.01282478
0.001398009	0.01288775
0.001404292	0.012950766
0.001410575	0.013013829
0.001416858	0.013076941
0.001423141	0.013140102
0.001429425	0.013203313
0.001435708	0.013266577
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0.001448274	0.013393267
0.001454557	0.013456696
0.001460841	0.013520183

234	23.801410
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236	23.820399
237	23.829941
238	23.839517
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252	23.979057
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261	24.077228
262	24.088715
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265	24.123995
266	24.136045
267	24.148250
268	24.160615
269	24.173144
270	24.185844
271	24.198721
272	24.211781
273	24.225029
274	24.238471
275	24.252114
276	24.265963
277	24.280026
278	24.294309
279	24.308818
280	24.323561
281	24.338542
282	24.353771
283	24.369254

0.001467124	0.01358373
0.001473407	0.013647338
0.00147969	0.013711009
0.001485973	0.013774745
0.001492257	0.013838549
0.00149854	0.013902421
0.001504823	0.013966364
0.001511106	0.01403038
0.001517389	0.014094471
0.001523672	0.01415864
0.001529956	0.014222889
0.001536239	0.014287221
0.001542522	0.014351637
0.001548805	0.014416141
0.001555088	0.014480735
0.001561372	0.014545422
0.001567655	0.014610205
0.001573938	0.014675087
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0.001586504	0.014805159
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0.001599071	0.014935664
0.001605354	0.015001087
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0.00161792	0.015132293
0.001624203	0.015198082
0.001630487	0.015264002
0.00163677	0.015330054
0.001643053	0.015396244
0.001649336	0.015462576
0.001655619	0.015529054
0.001661903	0.015595682
0.001668186	0.015662465
0.001674469	0.015729407
0.001680752	0.015796513
0.001687035	0.015863788
0.001693318	0.015931237
0.001699602	0.015998864
0.001705885	0.016066676
0.001712168	0.016134677
0.001718451	0.016202873
0.001724734	0.016271269
0.001731018	0.016339871
0.001737301	0.016408684
0.001743584	0.016477716
0.001749867	0.016546971
0.00175615	0.016616457
0.001762433	0.016686179
0.001768717	0.016756144
0.001775	0.016826359

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286	24.417296
287	24.433866
288	24.450727
289	24.467886
290	24.485351
291	24.503130
291.5	24.400000
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294.5	8.000000
295.5	0.000000

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0.001793849	0.01703857
0.001800133	0.017109853
0.001806416	0.017181421
0.001812699	0.017253283
0.001818982	0.017325444
0.001825265	0.017397914
0.000914989	0.008684708
0.00183469	0.016414972
0.001840973	0.014322772
0.001847256	0.005748662
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 ³)
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	Universal gas constant, 8.314 J/(K·mol)

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

$$0.318090154$$

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
ϕ	Relative humidity
p_{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 ^[1] 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:

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

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

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

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