



### 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	0.359	[Kg/s]
Oxygen Mass Flow rate	0.15	[Kg/s]

Please do not change anything in this box

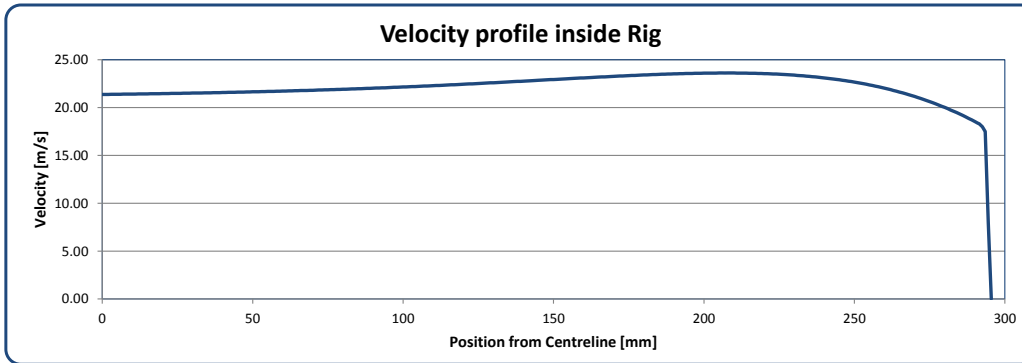
Test Date and Time = 24.04.2015 15:14:37.5

Calculated Parameters		
Air density	1.217898	[Kg/m3]
Liquid Butane density	584	[Kg/m3]
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/m3]
<b>Pitot Traverse Results</b>		
Rig Gas flow rate - Integrated	2.353767	[Kg/s]
Total Rig Mass flow	2.862767	[Kg/s]
<b>Rig Gas Temperature as read from TC 11</b>		
Gas Temperature	513	[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



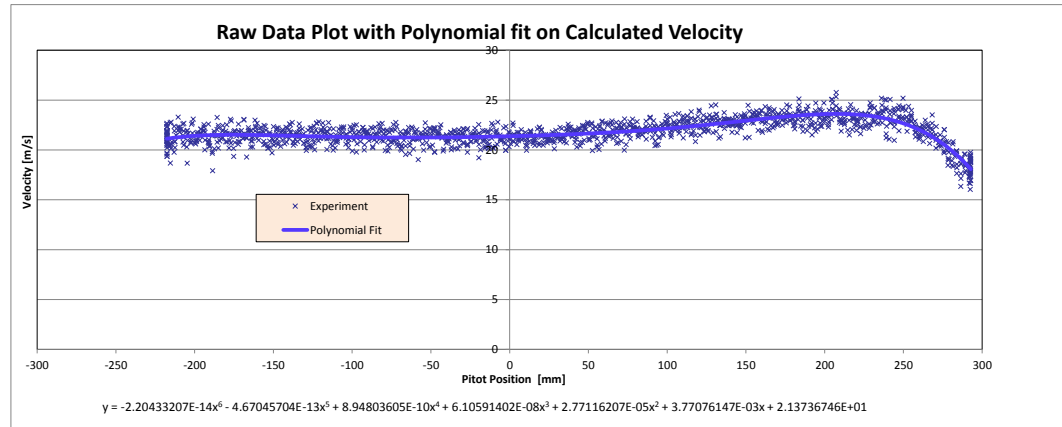
**Data Acquisition Parameters**

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]	0.926770056	Average Vel 21.7893452 [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 %
24.04.2015 15:14:37.5	-217.5	510.4	0.7302	16.08
24.04.2015 15:14:37.6	-217.51	510.4	0.8181	16.13
24.04.2015 15:14:37.7	-217.57	510.4	0.8549	16.11
24.04.2015 15:14:37.8	-217.57	510.4	0.7535	16.07
24.04.2015 15:14:37.9	-217.52	510.5	0.7456	16.19
24.04.2015 15:14:38.0	-217.57	510.5	0.9993	16.17
24.04.2015 15:14:38.1	-217.58	510.5	0.8162	16.25
24.04.2015 15:14:38.2	-217.5	510.6	0.9694	16.14
24.04.2015 15:14:38.3	-217.55	510.6	0.9165	16.23
24.04.2015 15:14:38.4	-217.55	510.5	0.9207	16.26
24.04.2015 15:14:38.5	-217.53	510.5	0.796	16.07
24.04.2015 15:14:38.6	-217.57	510.6	0.844	16.09
24.04.2015 15:14:38.7	-217.57	510.7	0.9648	16.23
24.04.2015 15:14:38.8	-217.56	510.6	0.85	16.28
24.04.2015 15:14:38.9	-217.55	510.5	0.7285	16.09
24.04.2015 15:14:39.0	-217.57	510.8	0.9361	16.17
24.04.2015 15:14:39.1	-216.83	510.8	0.8161	16.2
24.04.2015 15:14:39.2	-215.39	510.6	0.6786	16.25
24.04.2015 15:14:39.3	-215.57	510.7	0.8075	16.17
24.04.2015 15:14:39.4	-215.57	510.8	0.8201	16.22
24.04.2015 15:14:39.5	-214.35	510.8	0.8404	16.2
24.04.2015 15:14:39.6	-212.85	510.7	0.9337	16.22
24.04.2015 15:14:39.7	-213.02	510.7	0.7599	16.23
24.04.2015 15:14:39.8	-212.96	510.7	0.9735	16.19
24.04.2015 15:14:39.9	-210.59	510.7	0.9668	16.26
24.04.2015 15:14:40.0	-210.43	510.7	1.0552	16.14
24.04.2015 15:14:40.1	-210.41	510.9	0.9388	16.18
24.04.2015 15:14:40.2	-208.5	511	0.9481	16.19
24.04.2015 15:14:40.3	-207.41	511.1	0.8956	16.33
24.04.2015 15:14:40.4	-207.51	511.2	0.9923	16.13
24.04.2015 15:14:40.5	-207.4	511.4	0.8417	16.09
24.04.2015 15:14:40.6	-204.73	511.5	0.6783	16.17
24.04.2015 15:14:40.7	-204.96	511.4	0.8019	16.23
24.04.2015 15:14:40.8	-204.9	511.5	0.9318	16.1
24.04.2015 15:14:40.9	-204.63	511.6	0.9376	15.97
24.04.2015 15:14:41.0	-202.17	511.7	0.8617	16.17
24.04.2015 15:14:41.1	-202.34	511.7	0.8321	16.21
24.04.2015 15:14:41.2	-202.35	511.7	0.8431	16.14
24.04.2015 15:14:41.3	-199.74	511.9	0.8338	16.07
24.04.2015 15:14:41.4	-199.39	512	0.8256	16.2
24.04.2015 15:14:41.5	-199.39	511.9	0.8482	16.16
24.04.2015 15:14:41.6	-198.79	512	0.8479	16.2
24.04.2015 15:14:41.7	-196.62	512.1	0.9155	16.17
24.04.2015 15:14:41.8	-196.82	512.1	0.8554	16.18
24.04.2015 15:14:41.9	-196.82	512.1	0.8964	16.14
24.04.2015 15:14:42.0	-196.05	512.2	0.9494	16.05
24.04.2015 15:14:42.1	-194.04	512.3	0.9311	16.12
24.04.2015 15:14:42.2	-194.28	512.3	0.9395	16.15
24.04.2015 15:14:42.3	-194.06	512.3	0.9667	16.05
24.04.2015 15:14:42.4	-191.16	512.4	0.8428	16
24.04.2015 15:14:42.5	-191.31	512.5	0.8395	16.11
24.04.2015 15:14:42.6	-191.29	512.5	0.993	16.25
24.04.2015 15:14:42.7	-190.95	512.4	0.8262	16.06
24.04.2015 15:14:42.8	-188.59	512.6	0.624	16.06
24.04.2015 15:14:42.9	-188.76	512.5	0.7652	16.18
24.04.2015 15:14:43.0	-188.73	512.4	0.7521	16.2
24.04.2015 15:14:43.1	-187.09	512.3	0.8928	16.09
24.04.2015 15:14:43.2	-185.69	512.4	1.0518	16.01
24.04.2015 15:14:43.3	-185.74	512.4	0.8403	16.17

Calculated Velocity [m/s]
19.3758655
20.5089485
20.9651443
19.6825709
19.579119
22.6666919
20.4851191
22.3250122
21.7073312
21.7570129
20.2300395
20.8310624
22.2719809
20.9049754
19.3532976
21.9382166
20.4838641
18.6787206
20.3756496
20.5340021
20.7865885
21.9100756
19.7659831
22.3721733
22.2950535
23.2920433
21.9698321
22.0783834
21.4583952
22.5871634
20.8026595
18.6745913
20.3048742
21.8877717
21.9557864
21.0483591
20.6836871
20.8199529
20.7048049
20.6027427
20.882829
20.8791356
21.6954854
20.9712743
21.467977
22.0935147
21.8795487
21.9780213
22.2939004
20.8162484
20.7754552
22.5951288
20.6102278
17.911522
19.8347932
19.6642774
21.4248252
23.2544879
20.7853518



24.04.2015 15:14:43.4	-185.78	512.2	0.9452	16.16	22.0445914
24.04.2015 15:14:43.5	-184.08	512.2	0.8499	16.1	20.9037456
24.04.2015 15:14:43.6	-183.15	512.3	0.8954	16.07	21.4559991
24.04.2015 15:14:43.7	-183.2	512.3	0.8687	16.24	21.1336791
24.04.2015 15:14:43.8	-182.22	512.2	0.9802	16.18	22.4490282
24.04.2015 15:14:43.9	-180.05	512.3	0.9051	16.14	21.571904
24.04.2015 15:14:44.0	-180.3	512.3	0.9317	16.17	21.8865972
24.04.2015 15:14:44.1	-180.25	512.2	0.8431	16.24	20.8199529
24.04.2015 15:14:44.2	-178.17	512.2	0.7927	16.18	20.1880618
24.04.2015 15:14:44.3	-177.68	512.2	0.8541	16.05	20.9553326
24.04.2015 15:14:44.4	-177.7	512.2	0.9019	16.23	21.5337363
24.04.2015 15:14:44.5	-177.74	512.1	0.9126	16.18	21.6610961
24.04.2015 15:14:44.6	-175.33	512	0.7908	16.19	20.1638532
24.04.2015 15:14:44.7	-175.16	512.1	0.7283	16	19.3506408
24.04.2015 15:14:44.8	-175.15	512	0.9262	16.16	21.8219012
24.04.2015 15:14:44.9	-173.27	511.8	0.8897	16.27	21.387597
24.04.2015 15:14:45.0	-172.1	511.7	0.9925	16.1	22.5894395
24.04.2015 15:14:45.1	-172.21	511.8	0.8446	16.11	20.8384655
24.04.2015 15:14:45.2	-172.17	511.7	0.9309	16.09	21.8771988
24.04.2015 15:14:45.3	-170.32	511.6	0.9369	16.23	21.9475889
24.04.2015 15:14:45.4	-169.62	511.5	0.8966	16.13	21.4703718
24.04.2015 15:14:45.5	-169.67	511.7	0.905	16.18	21.5707123
24.04.2015 15:14:45.6	-169.35	511.7	0.87	16.1	21.1494863
24.04.2015 15:14:45.7	-166.89	511.7	0.8728	16.14	21.1834926
24.04.2015 15:14:45.8	-167.15	511.7	0.8763	16.13	21.2259239
24.04.2015 15:14:45.9	-167.03	511.8	0.7239	16.09	19.2920992
24.04.2015 15:14:46.0	-164.44	511.8	0.8008	16.15	20.2909429
24.04.2015 15:14:46.1	-164.15	511.8	0.8488	16.06	20.8902137
24.04.2015 15:14:46.2	-164.12	511.8	0.9317	15.98	21.8865972
24.04.2015 15:14:46.3	-163.54	511.7	0.8722	16.06	21.1762102
24.04.2015 15:14:46.4	-161.38	511.6	0.9615	16.14	22.2338587
24.04.2015 15:14:46.5	-161.62	511.5	1.0276	16.08	22.9854095
24.04.2015 15:14:46.6	-161.53	511.5	0.9337	15.96	21.9100756
24.04.2015 15:14:46.7	-159.75	511.5	0.9156	16.07	21.6966703
24.04.2015 15:14:46.8	-158.91	511.3	0.9166	16.11	21.7085154
24.04.2015 15:14:46.9	-158.98	511.2	0.905	16.04	21.5707123
24.04.2015 15:14:47.0	-158.78	511.3	0.9558	16.03	22.1678569
24.04.2015 15:14:47.1	-155.87	511.2	0.9816	16.2	22.4650543
24.04.2015 15:14:47.2	-156.08	511	0.82	16.18	20.5327502
24.04.2015 15:14:47.3	-156.08	510.9	0.8463	16.09	20.8594267
24.04.2015 15:14:47.4	-154.8	511.1	0.9027	16.14	21.5432846
24.04.2015 15:14:47.5	-153.31	511	0.7919	16.11	20.1778723
24.04.2015 15:14:47.6	-153.46	510.9	0.8129	16.24	20.4436651
24.04.2015 15:14:47.7	-153.46	510.9	0.792	16.12	20.1791463
24.04.2015 15:14:47.8	-151.98	511	0.7985	16.13	20.2617829
24.04.2015 15:14:47.9	-150.83	510.9	0.7557	16.18	19.7112837
24.04.2015 15:14:48.0	-150.91	510.8	0.8702	16.14	21.1519171
24.04.2015 15:14:48.1	-150.12	510.8	0.8606	16.05	21.0349202
24.04.2015 15:14:48.2	-147.73	510.9	0.8668	16.05	21.1105549
24.04.2015 15:14:48.3	-147.99	510.8	0.9426	16.13	22.0142511
24.04.2015 15:14:48.4	-147.95	510.7	0.9178	16.06	21.722721
24.04.2015 15:14:48.5	-146.04	510.8	0.8886	15.99	21.3743714
24.04.2015 15:14:48.6	-145.34	510.8	0.9208	16.09	21.7581944
24.04.2015 15:14:48.7	-145.37	510.7	0.8063	16.22	20.3605041
24.04.2015 15:14:48.8	-145.1	510.7	0.8983	16.06	21.4907166
24.04.2015 15:14:48.9	-142.7	510.8	0.9273	16.1	21.8348557
24.04.2015 15:14:49.0	-142.85	510.8	0.8273	16.15	20.6239435
24.04.2015 15:14:49.1	-142.77	510.7	0.91	16.18	21.6302178
24.04.2015 15:14:49.2	-141.28	510.6	0.9586	16.08	22.2003034
24.04.2015 15:14:49.3	-139.76	510.8	0.9936	16.06	22.6019541
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24.04.2015 15:14:49.5	-139.87	510.7	0.8706	16.15	21.156778
24.04.2015 15:14:49.6	-137.39	510.8	0.8371	16.15	20.745737
24.04.2015 15:14:49.7	-137.33	510.9	0.9036	16.11	21.5540213
24.04.2015 15:14:49.8	-137.28	510.8	0.8159	16.19	20.481354
24.04.2015 15:14:49.9	-137.26	510.7	0.8406	16.15	20.7890618
24.04.2015 15:14:50.0	-134.6	510.8	0.8933	16.06	21.4308237
24.04.2015 15:14:50.1	-134.7	510.8	0.9192	16.07	21.7392824
24.04.2015 15:14:50.2	-134.72	510.8	0.8444	16.17	20.8359981
24.04.2015 15:14:50.3	-133.52	510.7	0.8876	16.14	21.362341
24.04.2015 15:14:50.4	-131.64	510.8	0.9506	16	22.1074729

24.04.2015 15:14:50.5	-131.77	510.7	0.8929	16.18	21.4260251
24.04.2015 15:14:50.6	-131.42	510.6	0.8984	16.2	21.4919127
24.04.2015 15:14:50.7	-129.07	510.5	0.7741	16.08	19.9498085
24.04.2015 15:14:50.8	-129.22	510.5	0.8414	16.04	20.7989519
24.04.2015 15:14:50.9	-129.24	510.6	0.7969	16.19	20.2414729
24.04.2015 15:14:51.0	-126.73	510.4	0.9591	16.16	22.2060924
24.04.2015 15:14:51.1	-126.69	510.3	0.8161	16.11	20.4838641
24.04.2015 15:14:51.2	-126.68	510.4	0.8002	16.04	20.28334
24.04.2015 15:14:51.3	-125.93	510.4	0.9609	16.17	22.2269204
24.04.2015 15:14:51.4	-123.86	510.2	0.7794	16.12	20.0179868
24.04.2015 15:14:51.5	-124.13	510.1	0.9745	16.03	22.383661
24.04.2015 15:14:51.6	-124.1	510.2	0.9141	16.03	21.6788905
24.04.2015 15:14:51.7	-123.08	510.1	0.9434	16.05	22.023591
24.04.2015 15:14:51.8	-121.32	510	0.8506	16.1	20.9123523
24.04.2015 15:14:51.9	-121.54	510	0.9156	16.07	21.6966703
24.04.2015 15:14:52.0	-121.15	510.1	1.013	15.99	22.8215386
24.04.2015 15:14:52.1	-118.37	510.1	0.9655	16.17	22.280059
24.04.2015 15:14:52.2	-118.62	510	1.0023	16.08	22.7006902
24.04.2015 15:14:52.3	-118.6	510.1	0.9246	16.17	21.8030445
24.04.2015 15:14:52.4	-118.03	510.1	0.8723	16.16	21.1774241
24.04.2015 15:14:52.5	-115.79	510.1	0.9293	16.26	21.8583898
24.04.2015 15:14:52.6	-116.03	510.1	0.8671	16.14	21.1142077
24.04.2015 15:14:52.7	-116	510.2	0.782	16.03	20.051348
24.04.2015 15:14:52.8	-114.31	510.2	0.9545	16.2	22.1527764
24.04.2015 15:14:52.9	-113.37	510.1	0.8986	16.15	21.4943049
24.04.2015 15:14:53.0	-113.46	510	0.8226	16.11	20.5652763
24.04.2015 15:14:53.1	-112.45	510.1	0.8127	16.1	20.4411501
24.04.2015 15:14:53.2	-110.24	510.1	0.8454	16.32	20.8483322
24.04.2015 15:14:53.3	-110.49	509.9	0.9012	16.27	21.5253781
24.04.2015 15:14:53.4	-110.51	510	0.871	16.23	21.1616377
24.04.2015 15:14:53.5	-108.4	510.1	0.9499	16.12	22.0993317
24.04.2015 15:14:53.6	-107.87	510.1	0.8769	16.19	21.2331893
24.04.2015 15:14:53.7	-107.92	510	0.9113	16.25	21.6456625
24.04.2015 15:14:53.8	-107.94	510	0.8834	16.14	21.3117393
24.04.2015 15:14:53.9	-105.58	510.2	0.8804	16.17	21.2755215
24.04.2015 15:14:54.0	-105.35	510.1	0.9569	16.21	22.1806094
24.04.2015 15:14:54.1	-105.35	510	0.9677	16.2	22.3054283
24.04.2015 15:14:54.2	-103.55	510	0.9054	16.08	21.5754788
24.04.2015 15:14:54.3	-102.3	510	0.7968	16.18	20.2402028
24.04.2015 15:14:54.4	-102.4	509.9	0.832	16.21	20.6824442
24.04.2015 15:14:54.5	-102.37	509.9	0.8686	16.09	21.1324626
24.04.2015 15:14:54.6	-99.74	510	0.9392	15.99	21.974512
24.04.2015 15:14:54.7	-99.88	510	0.9582	16.15	22.1956711
24.04.2015 15:14:54.8	-99.81	510	0.7702	16.26	19.8994904
24.04.2015 15:14:54.9	-97.85	510.1	0.8999	16.1	21.5098471
24.04.2015 15:14:55.0	-97.28	510.2	0.8763	15.99	21.2259239
24.04.2015 15:14:55.1	-97.23	510.3	0.7612	16.23	19.7828832
24.04.2015 15:14:55.2	-96.86	510.3	0.8267	16.25	20.6164633
24.04.2015 15:14:55.3	-94.56	510.3	0.8453	16.2	20.8470991
24.04.2015 15:14:55.4	-94.75	510.5	0.8794	16.1	21.2634352
24.04.2015 15:14:55.5	-94.66	510.5	0.8891	16.2	21.3803841
24.04.2015 15:14:55.6	-92.28	510.4	0.7774	16.12	19.9922864
24.04.2015 15:14:55.7	-92.15	510.4	0.9224	16.07	21.7770899
24.04.2015 15:14:55.8	-92.15	510.5	0.8189	16.1	20.5189736
24.04.2015 15:14:55.9	-91.36	510.5	0.9005	16.23	21.5170166
24.04.2015 15:14:56.0	-89.32	510.4	0.8519	16.15	20.9283267
24.04.2015 15:14:56.1	-89.61	510.5	0.882	16.21	21.2948453
24.04.2015 15:14:56.2	-89.47	510.5	0.9083	16.19	21.6100043
24.04.2015 15:14:56.3	-86.86	510.4	0.7957	16.2	20.226227
24.04.2015 15:14:56.4	-87.01	510.4	0.8696	16.06	21.1446238
24.04.2015 15:14:56.5	-86.99	510.5	0.8036	15.99	20.3263857
24.04.2015 15:14:56.6	-85.84	510.6	0.8607	16.11	21.0361422
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24.04.2015 15:15:18.2	76.43	509.8	0.9775	16.1	22.4180885
24.04.2015 15:15:18.3	76.48	509.9	1.014	16.06	22.8328001
24.04.2015 15:15:18.4	78.46	509.9	0.9607	16.13	22.2246071
24.04.2015 15:15:18.5	79.04	509.9	0.9638	16.12	22.2604356
24.04.2015 15:15:18.6	79.04	509.9	0.9522	16.02	22.1260702
24.04.2015 15:15:18.7	79.43	510	0.9566	16.15	22.1771322
24.04.2015 15:15:18.8	81.76	510	0.9022	16.22	21.5373174

24.04.2015 15:15:18.9	81.58	510.1	0.9135	16.09	21.6717745
24.04.2015 15:15:19.0	81.65	510.3	0.8839	15.98	21.3177696
24.04.2015 15:15:19.1	84.05	510.4	0.9009	16.19	21.521795
24.04.2015 15:15:19.2	84.15	510.3	0.9017	16.22	21.5313486
24.04.2015 15:15:19.3	84.17	510.3	0.9496	16.13	22.0958417
24.04.2015 15:15:19.4	84.9	510.6	0.9367	16.05	21.9452462
24.04.2015 15:15:19.5	86.96	510.6	0.952	16.23	22.1237464
24.04.2015 15:15:19.6	86.75	510.5	0.8646	16.25	21.0837478
24.04.2015 15:15:19.7	86.78	510.5	0.9407	16.2	21.9920528
24.04.2015 15:15:19.8	88.71	510.7	0.9454	16.15	22.0469236
24.04.2015 15:15:19.9	89.35	510.7	0.9796	16.24	22.4421564
24.04.2015 15:15:20.0	89.32	510.5	0.9302	16.19	21.8689718
24.04.2015 15:15:20.1	90.63	510.5	0.8801	16.08	21.2718963
24.04.2015 15:15:20.2	92.42	510.6	0.8482	16.09	20.882829
24.04.2015 15:15:20.3	92.26	510.6	0.9155	16.17	21.6954854
24.04.2015 15:15:20.4	92.26	510.6	0.8129	16.12	20.4436651
24.04.2015 15:15:20.5	93.44	510.7	0.8159	16	20.481354
24.04.2015 15:15:20.6	94.58	510.7	0.8756	16.13	21.2174444
24.04.2015 15:15:20.7	94.44	510.7	0.8222	16.19	20.5602757
24.04.2015 15:15:20.8	95.16	510.7	0.8825	16.04	21.3008804
24.04.2015 15:15:20.9	97.65	510.9	0.8972	16.11	21.4775545
24.04.2015 15:15:21.0	97.37	511	0.9374	16.17	21.9534445
24.04.2015 15:15:21.1	97.43	510.9	0.97	16.3	22.33192
24.04.2015 15:15:21.2	100.09	511	1.0367	16.12	23.0869598
24.04.2015 15:15:21.3	99.97	511.1	0.9985	16.19	22.657617
24.04.2015 15:15:21.4	100.02	511.2	0.9725	16.24	22.3606798
24.04.2015 15:15:21.5	100.99	511	0.9725	16.17	22.3606798
24.04.2015 15:15:21.6	102.72	511	0.9027	16.15	21.5432846
24.04.2015 15:15:21.7	102.54	511.1	0.883	16.08	21.3069138
24.04.2015 15:15:21.8	102.52	511.1	0.9373	16.19	21.9522735
24.04.2015 15:15:21.9	104.79	510.9	0.9757	16.13	22.3974383
24.04.2015 15:15:22.0	105.14	510.9	1.0797	16.1	23.560893
24.04.2015 15:15:22.1	105.14	511.1	0.969	16.07	22.3204058
24.04.2015 15:15:22.2	106.57	511.1	0.9904	16.1	22.5655287
24.04.2015 15:15:22.3	107.8	511	0.962	16.16	22.239639
24.04.2015 15:15:22.4	107.68	511.1	0.9138	16.1	21.6753328
24.04.2015 15:15:22.5	107.68	511.2	1.0151	16.24	22.8451814
24.04.2015 15:15:22.6	110.29	511.2	1.0408	16.25	23.1325675
24.04.2015 15:15:22.7	110.23	511.2	0.8743	16.21	21.2016879
24.04.2015 15:15:22.8	110.27	511.3	0.9986	16.01	22.6587516
24.04.2015 15:15:22.9	112.17	511.3	0.9272	16.15	21.8336784
24.04.2015 15:15:23.0	112.88	511.2	1.024	16.26	22.9451117
24.04.2015 15:15:23.1	112.85	511.3	1.0663	16.17	23.4142312
24.04.2015 15:15:23.2	113.13	511.4	0.9627	16.15	22.2477289
24.04.2015 15:15:23.3	115.56	511.5	0.9121	16.22	21.6551614
24.04.2015 15:15:23.4	115.36	511.3	0.9008	16.29	21.5206005
24.04.2015 15:15:23.5	115.4	511.3	1.0454	16.17	23.1836304
24.04.2015 15:15:23.6	116.77	511.5	0.9343	16.16	21.9171143
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24.04.2015 15:15:23.8	117.98	511.5	0.8456	16.15	20.8507982
24.04.2015 15:15:23.9	117.98	511.4	0.9765	16.15	22.4066186
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24.04.2015 15:15:24.1	120.88	511.6	0.9643	16.19	22.266209
24.04.2015 15:15:24.2	120.88	511.4	0.8976	16.21	21.4823416
24.04.2015 15:15:24.3	121.72	511.5	0.9616	16.13	22.2350149
24.04.2015 15:15:24.4	123.71	511.5	0.9261	16.14	21.8207232
24.04.2015 15:15:24.5	123.45	511.4	0.9343	16.27	21.9171143
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24.04.2015 15:15:24.7	126.25	511.4	1.0253	16.18	22.9596718
24.04.2015 15:15:24.8	126.04	511.4	0.9366	16.24	21.9440747
24.04.2015 15:15:24.9	126.01	511.3	0.9297	16.33	21.8630935
24.04.2015 15:15:25.0	127.32	511.2	1.0143	16.11	22.8361775
24.04.2015 15:15:25.1	128.76	511.2	1.0533	16.06	23.2710639
24.04.2015 15:15:25.2	128.58	511.2	1.0276	16.19	22.9854095
24.04.2015 15:15:25.3	129.15	511	0.9186	16.25	21.7321862
24.04.2015 15:15:25.4	131.43	510.8	1.0817	16.12	23.5827047
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24.04.2015 15:15:25.6	131.2	510.9	1.0448	16.18	23.1769764
24.04.2015 15:15:25.7	132.92	510.7	0.8726	16.27	21.1810654
24.04.2015 15:15:25.8	133.78	510.7	0.9802	16.17	22.4490282
24.04.2015 15:15:25.9	133.73	510.8	1.0031	16.13	22.7097479



24.04.2015 15:15:26.0	133.89	510.8	0.8852	16.23	21.3334404
24.04.2015 15:15:26.1	136.47	510.6	1.0197	16.16	22.8968852
24.04.2015 15:15:26.2	136.3	510.6	1.0103	16.22	22.7911046
24.04.2015 15:15:26.3	136.38	510.7	0.9548	16.16	22.1562574
24.04.2015 15:15:26.4	137.65	510.6	1.0343	16.22	23.0602207
24.04.2015 15:15:26.5	139.42	510.6	1.0342	16.16	23.0591059
24.04.2015 15:15:26.6	139.25	510.6	1.0356	16.21	23.0747082
24.04.2015 15:15:26.7	139.3	510.7	0.9786	16.21	22.4306988
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24.04.2015 15:15:27.1	143.31	510.6	1.0767	16.23	23.5281377
24.04.2015 15:15:27.2	144.48	510.5	1.0574	16.24	23.3163116
24.04.2015 15:15:27.3	144.42	510.4	0.9797	16.23	22.4433019
24.04.2015 15:15:27.4	144.48	510.5	0.9183	16.04	21.7286372
24.04.2015 15:15:27.5	147.08	510.6	0.9626	16.23	22.2465733
24.04.2015 15:15:27.6	146.96	510.4	1.005	16.26	22.7312453
24.04.2015 15:15:27.7	146.98	510.4	1.0701	16.2	23.455915
24.04.2015 15:15:27.8	149	510.6	1.05	16.1	23.2345811
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24.04.2015 15:15:28.6	154.82	510.7	1.0013	16.2	22.6893631
24.04.2015 15:15:28.7	154.69	510.6	1.0813	16.29	23.5783439
24.04.2015 15:15:28.8	154.68	510.6	1.0445	16.17	23.1736487
24.04.2015 15:15:28.9	157.78	510.6	0.9382	16.15	21.9628104
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24.04.2015 15:15:29.1	157.62	510.6	1.0628	16.27	23.3757724
24.04.2015 15:15:29.2	158.56	510.5	1.0843	16.1	23.6110296
24.04.2015 15:15:29.3	160.42	510.5	1.0114	16.12	22.8035085
24.04.2015 15:15:29.4	160.19	510.5	0.9348	16.21	21.9229781
24.04.2015 15:15:29.5	160.53	510.3	0.9214	16.29	21.7652821
24.04.2015 15:15:29.6	162.93	510.2	1.0123	16.19	22.8136522
24.04.2015 15:15:29.7	162.77	510.3	1.0865	16.07	23.6349704
24.04.2015 15:15:29.8	162.75	510.2	1.0693	16.26	23.4471456
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24.04.2015 15:15:30.0	165.33	510	1.0636	16.19	23.3845686
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24.04.2015 15:15:30.8	170.48	510	1.0848	16.19	23.6164728
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24.04.2015 15:15:31.2	173.09	510.1	1.033	16.13	23.0457241
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24.04.2015 15:15:31.4	176	510.1	1.1133	16.32	23.924689
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24.04.2015 15:15:31.8	178.17	510.1	1.0218	16.21	22.9204503
24.04.2015 15:15:31.9	178.19	510.1	1.0661	16.15	23.4120352
24.04.2015 15:15:32.0	180.2	510.3	1.0418	16.14	23.1436778
24.04.2015 15:15:32.1	181.2	510.2	1.0859	16.24	23.6284435
24.04.2015 15:15:32.2	181.13	510.1	1.06	16.26	23.3449598
24.04.2015 15:15:32.3	181.26	510.2	1.0078	16.19	22.7628887
24.04.2015 15:15:32.4	183.85	510.3	1.1678	16.27	24.5032918
24.04.2015 15:15:32.5	183.65	510.2	1.227	16.22	25.1166942
24.04.2015 15:15:32.6	183.7	510.1	1.1106	16.26	23.8956601
24.04.2015 15:15:32.7	184.89	510.2	0.9752	16.17	22.3916988
24.04.2015 15:15:32.8	186.45	510.2	1.0791	16.2	23.5543456
24.04.2015 15:15:32.9	186.22	510.1	1.0253	16.22	22.9596718
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24.04.2015 15:15:33.2	189.16	510.3	1.0452	16.3	23.1814126
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24.04.2015 15:15:33.4	189.86	510.2	0.9746	16.22	22.3848094
24.04.2015 15:15:33.5	192	510.4	0.9002	16.09	21.5134322
24.04.2015 15:15:33.6	191.77	510.4	1.0036	16.27	22.715407
24.04.2015 15:15:33.7	191.81	510.2	0.9808	16.26	22.4558979
24.04.2015 15:15:33.8	193.62	510.2	0.9606	16.21	22.2234504
24.04.2015 15:15:33.9	194.4	510.3	0.9302	16.17	21.8689718
24.04.2015 15:15:34.0	194.34	510.3	1.0013	16.25	22.6893631
24.04.2015 15:15:34.1	195.56	510.1	0.9498	16.22	22.0981684
24.04.2015 15:15:34.2	197.46	510.2	0.9749	16.15	22.3882544
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24.04.2015 15:15:34.7	199.51	510.2	1.1891	16.15	24.725745
24.04.2015 15:15:34.8	200.12	510.1	1.0757	16.16	23.5172091
24.04.2015 15:15:34.9	202.65	510.1	1.0098	16.02	22.7854642
24.04.2015 15:15:35.0	202.41	510.1	0.9671	16.02	22.2985123
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24.04.2015 15:15:35.3	205.07	509.8	1.1266	16.08	24.0671725
24.04.2015 15:15:35.4	205.02	509.9	1.1857	16.08	24.6903705
24.04.2015 15:15:35.5	205.17	510	1.1292	16.24	24.0949279
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24.04.2015 15:15:35.7	207.52	509.9	1.0904	15.98	23.6773513
24.04.2015 15:15:35.8	207.55	510.1	1.0671	16.07	23.4230129
24.04.2015 15:15:35.9	210.05	510.1	1.0413	16.21	23.1381233
24.04.2015 15:15:36.0	210.55	510	1.0211	16.22	22.912598
24.04.2015 15:15:36.1	210.49	510	0.9984	16.16	22.6564824
24.04.2015 15:15:36.2	210.53	510.2	0.9312	16.15	21.8807236
24.04.2015 15:15:36.3	212.58	510.2	1.0447	16.22	23.1758672
24.04.2015 15:15:36.4	212.69	510.2	1.0239	16.18	22.9439913
24.04.2015 15:15:36.5	212.68	510.3	0.9895	16.1	22.5552734
24.04.2015 15:15:36.6	214.61	510.4	0.941	16.13	21.9955593
24.04.2015 15:15:36.7	215.7	510.4	0.8999	16.15	21.5098471
24.04.2015 15:15:36.8	215.61	510.3	1.0258	16.1	22.9652694
24.04.2015 15:15:36.9	216.52	510.4	1.1715	16.08	24.5420787
24.04.2015 15:15:37.0	218.45	510.5	1.0448	16.26	23.1769764
24.04.2015 15:15:37.1	218.16	510.4	1.049	16.28	23.2235144
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24.04.2015 15:15:37.6	221.23	510.4	1.0127	16.1	22.818159
24.04.2015 15:15:37.7	223.56	510.6	1.0748	16.09	23.5073691
24.04.2015 15:15:37.8	223.31	510.6	1.0911	16.12	23.6849502
24.04.2015 15:15:37.9	223.36	510.4	1.0425	16.16	23.1514517
24.04.2015 15:15:38.0	224.94	510.5	0.9559	16.06	22.1690166
24.04.2015 15:15:38.1	225.96	510.6	0.988	16.11	22.538171
24.04.2015 15:15:38.2	225.88	510.6	0.972	16.11	22.3549308
24.04.2015 15:15:38.3	225.95	510.4	1.0829	16.13	23.5957819
24.04.2015 15:15:38.4	228.99	510.4	1.1885	16.08	24.7195062
24.04.2015 15:15:38.5	228.84	510.6	1.1405	16.14	24.2151878
24.04.2015 15:15:38.6	228.88	510.5	1.1481	16.29	24.2957358
24.04.2015 15:15:38.7	229.89	510.4	1.1542	16.1	24.3601934
24.04.2015 15:15:38.8	231.61	510.5	1.1411	16.14	24.2215566
24.04.2015 15:15:38.9	231.42	510.5	1.1402	16.24	24.2120028
24.04.2015 15:15:39.0	231.75	510.4	1.0137	16.26	22.8294222
24.04.2015 15:15:39.1	234.14	510.4	1.0996	15.97	23.7770276
24.04.2015 15:15:39.2	233.96	510.5	1.0448	15.92	23.1769764
24.04.2015 15:15:39.3	234.01	510.5	1.0849	16.52	23.6175613
24.04.2015 15:15:39.4	236.41	510.5	1.1141	16.21	23.9332834
24.04.2015 15:15:39.5	236.55	510.5	1.0485	16.15	23.217979
24.04.2015 15:15:39.6	236.59	510.6	1.0044	16.08	22.7244588
24.04.2015 15:15:39.7	237.24	510.6	1.1096	16.19	23.8848997
24.04.2015 15:15:39.8	239.35	510.5	0.9748	16.27	22.3871061
24.04.2015 15:15:39.9	239.09	510.5	0.8759	16.17	21.2210789
24.04.2015 15:15:40.0	239.13	510.7	0.9084	16.28	21.6111939
24.04.2015 15:15:40.1	241.01	510.7	0.8646	16.17	21.0837478

24.04.2015 15:15:40.2	241.75	510.5	1.0067	16.33	22.7504626
24.04.2015 15:15:40.3	241.72	510.6	1.0021	16.15	22.6984253
24.04.2015 15:15:40.4	242	510.8	1.0399	16.27	23.1225638
24.04.2015 15:15:40.5	244.4	510.7	1.0036	16.18	22.715407
24.04.2015 15:15:40.6	244.24	510.7	0.8552	16.25	20.9688225
24.04.2015 15:15:40.7	244.29	510.7	0.9704	16.15	22.3365241
24.04.2015 15:15:40.8	246.93	510.8	1.0183	16.21	22.8811616
24.04.2015 15:15:40.9	247.19	510.7	0.9342	16.31	21.9159413
24.04.2015 15:15:41.0	247.24	510.6	1.0625	16.13	23.372473
24.04.2015 15:15:41.1	247.23	510.6	1.1611	15.93	24.4328996
24.04.2015 15:15:41.2	249.75	510.6	1.2346	16.12	25.1943602
24.04.2015 15:15:41.3	249.76	510.5	1.1416	16.15	24.2268627
24.04.2015 15:15:41.4	249.77	510.4	1.1502	16.03	24.3179454
24.04.2015 15:15:41.5	251.58	510.6	1.1177	16.04	23.9719202
24.04.2015 15:15:41.6	252.4	510.6	0.9888	16.16	22.5472939
24.04.2015 15:15:41.7	252.32	510.5	0.9308	16.2	21.8760237
24.04.2015 15:15:41.8	253.34	510.4	1.1552	16.08	24.370744
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24.04.2015 15:15:42.4	257.45	510.4	1.0176	16.12	22.8732958
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24.04.2015 15:15:49.9	291.87	511.6	0.6089	16.2	17.6934769
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24.04.2015 15:16:00.4	212.54	515.6	1.0036	16.07	22.715407
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24.04.2015 15:16:02.4	196.59	515.2	1.0563	16.14	23.3041806
24.04.2015 15:16:02.5	196.81	515.3	1.1313	16.16	24.1173225
24.04.2015 15:16:02.6	196.77	515.3	1.0453	16.14	23.1825216
24.04.2015 15:16:02.7	194.44	515.3	1.1868	16.18	24.7018208
24.04.2015 15:16:02.8	194.2	515.3	1.0869	16.09	23.6393206
24.04.2015 15:16:02.9	194.19	515.5	1.1148	16.19	23.940801
24.04.2015 15:16:03.0	193.47	515.4	1.088	16.25	23.6512797
24.04.2015 15:16:03.1	190.99	515.4	0.9878	16.1	22.5358897
24.04.2015 15:16:03.2	191.34	515.5	1.0768	16.04	23.5292303
24.04.2015 15:16:03.3	191.28	515.5	1.0365	16.18	23.0847327
24.04.2015 15:16:03.4	189.45	515.3	1.1577	16.19	24.3971004
24.04.2015 15:16:03.5	188.64	515.3	1.1222	16.01	24.0201287
24.04.2015 15:16:03.6	188.7	515.3	1.0857	15.94	23.6262675
24.04.2015 15:16:03.7	188.44	515.3	1.1252	16.11	24.052214
24.04.2015 15:16:03.8	185.96	515.1	1.1	16.23	23.7813519
24.04.2015 15:16:03.9	186.16	515	0.9721	16.11	22.3560807
24.04.2015 15:16:04.0	186.12	515.1	1.0308	16.08	23.0211705
24.04.2015 15:16:04.1	183.59	515.1	1.1061	16.17	23.8472
24.04.2015 15:16:04.2	183.19	514.9	1.1298	16.2	24.1013285
24.04.2015 15:16:04.3	183.19	514.8	1.0328	16.17	23.043493
24.04.2015 15:16:04.4	183.2	514.9	1.0664	16.08	23.4153291
24.04.2015 15:16:04.5	181.04	514.7	0.9503	16.23	22.1039842
24.04.2015 15:16:04.6	180.99	514.6	0.9852	16.15	22.5062117
24.04.2015 15:16:04.7	180.99	514.6	1.0155	16.14	22.849682
24.04.2015 15:16:04.8	180.18	514.6	0.9786	16.12	22.4306988
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24.04.2015 15:16:05.0	178.08	514.6	1.0821	16.11	23.5870646
24.04.2015 15:16:05.1	177.92	514.6	1.0309	16.14	23.0222872
24.04.2015 15:16:05.2	174.96	514.6	1.0365	16.15	23.0847327
24.04.2015 15:16:05.3	175.13	514.5	1.0346	16.25	23.0635648
24.04.2015 15:16:05.4	175.09	514.5	1.0752	16.13	23.511743
24.04.2015 15:16:05.5	174.16	514.6	1.0462	16.07	23.1924995
24.04.2015 15:16:05.6	172.76	514.6	1.0763	16.2	23.5237669
24.04.2015 15:16:05.7	172.93	514.5	1.0555	16.18	23.2953541
24.04.2015 15:16:05.8	172.92	514.5	1.1172	16.15	23.9665577
24.04.2015 15:16:05.9	170.25	514.7	1.0571	16.1	23.3130038
24.04.2015 15:16:06.0	169.96	514.7	0.9839	16.16	22.491358
24.04.2015 15:16:06.1	169.96	514.6	1.0127	16.12	22.818159
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24.04.2015 15:16:06.3	167.31	514.8	0.96	16.13	22.2165088
24.04.2015 15:16:06.4	167.4	514.9	1.0454	16.14	23.1836304
24.04.2015 15:16:06.5	167.35	514.8	1.1071	16.03	23.8579774
24.04.2015 15:16:06.6	164.74	514.9	1.1413	16.01	24.2236792
24.04.2015 15:16:06.7	164.89	515	1.1232	16.05	24.0308285
24.04.2015 15:16:06.8	164.81	515	0.9409	16.18	21.9943905
24.04.2015 15:16:06.9	163.77	515	0.9478	16.06	22.0748901
24.04.2015 15:16:07.0	162.09	515.1	1.0258	15.98	22.9652694
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24.04.2015 15:16:07.2	162.28	515.2	1.1522	16.2	24.3390786
24.04.2015 15:16:07.3	160.02	515.3	1.1177	16.03	23.9719202
24.04.2015 15:16:07.4	159.73	515.4	1.1151	15.99	23.9440221
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24.04.2015 15:16:07.6	159.04	515.3	1.0893	16.13	23.6654054
24.04.2015 15:16:07.7	156.51	515.3	1.076	16.09	23.5204883
24.04.2015 15:16:07.8	156.77	515.4	1.0556	16.02	23.2964576
24.04.2015 15:16:07.9	156.74	515.4	1.111	16.08	23.8999629
24.04.2015 15:16:08.0	155	515.2	1.1009	16.14	23.7910787
24.04.2015 15:16:08.1	154.15	515.2	1.0792	16.04	23.555437
24.04.2015 15:16:08.2	154.23	515.3	1.0459	16.03	23.189174
24.04.2015 15:16:08.3	153.25	515.3	1.0468	16.11	23.199149
24.04.2015 15:16:08.4	151.44	515.1	1.165	16.09	24.4738988
24.04.2015 15:16:08.5	151.65	515.1	1.0323	16.01	23.0379144

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24.04.2015 15:16:08.7	149.44	515.1	1.0657	16.05	23.4076427
24.04.2015 15:16:08.8	149.05	515	1.0553	15.98	23.2931469
24.04.2015 15:16:08.9	149.09	515.1	1.0847	15.91	23.6153843
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24.04.2015 15:16:09.2	146.49	514.8	0.9862	16.02	22.5176309
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24.04.2015 15:16:09.4	143.67	515	0.9993	16.16	22.6666919
24.04.2015 15:16:09.5	143.94	514.9	0.9765	16.16	22.4066186
24.04.2015 15:16:09.6	143.9	514.9	1.0241	16.05	22.946232
24.04.2015 15:16:09.7	142.09	515.1	0.9849	16.02	22.5027847
24.04.2015 15:16:09.8	141.35	515.1	1.0199	16.12	22.8991306
24.04.2015 15:16:09.9	141.34	515	0.981	16.16	22.4581874
24.04.2015 15:16:10.0	140.3	515	1.024	16.1	22.9451117
24.04.2015 15:16:10.1	138.61	515.1	0.9809	16.08	22.4570427
24.04.2015 15:16:10.2	138.78	515	1.0354	16.14	23.07248
24.04.2015 15:16:10.3	138.76	514.9	1.0007	16.14	22.6825641
24.04.2015 15:16:10.4	136.54	514.9	1.0326	16.18	23.0412617
24.04.2015 15:16:10.5	136.22	514.9	1.0456	16.13	23.185848
24.04.2015 15:16:10.6	136.19	514.8	1.096	16.28	23.7380737
24.04.2015 15:16:10.7	135.66	514.8	0.9863	16.14	22.5187725
24.04.2015 15:16:10.8	133.46	514.8	0.9813	16.11	22.4616211
24.04.2015 15:16:10.9	133.66	514.8	1.0353	16.1	23.0713658
24.04.2015 15:16:11.0	133.61	514.7	0.9845	16.29	22.4982147
24.04.2015 15:16:11.1	131.89	514.7	1.0254	16.05	22.9607914
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24.04.2015 15:16:11.3	131.06	514.8	1.0092	16.18	22.7786939
24.04.2015 15:16:11.4	130.9	514.7	1.1692	16.27	24.5179751
24.04.2015 15:16:11.5	127.99	514.8	1.16	16.1	24.4213232
24.04.2015 15:16:11.6	128.17	514.9	0.9915	16.03	22.5780565
24.04.2015 15:16:11.7	128.13	514.9	1.0539	16.2	23.277691
24.04.2015 15:16:11.8	126.94	514.8	1.074	16.14	23.4986189
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24.04.2015 15:16:12.4	123.02	515	1.0209	16.03	22.910354
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24.04.2015 15:16:13.1	117.67	515.2	1.037	15.95	23.0903
24.04.2015 15:16:13.2	115.13	515.2	0.9746	16.11	22.3848094
24.04.2015 15:16:13.3	115.3	515.1	1.1042	16.21	23.8267094
24.04.2015 15:16:13.4	115.29	515.1	0.9824	16.03	22.4742069
24.04.2015 15:16:13.5	114.01	515.3	1.0176	16.11	22.8732958
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24.04.2015 15:16:15.3	99.71	514.5	1.008	16.06	22.7651472
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24.04.2015 15:16:16.2	94.38	514.3	0.9678	16.19	22.3065808
24.04.2015 15:16:16.3	92.35	514.2	0.9722	16.16	22.3572306
24.04.2015 15:16:16.4	91.73	514.1	0.9377	16.16	21.9569572
24.04.2015 15:16:16.5	91.79	514.1	0.9802	16.22	22.4490282
24.04.2015 15:16:16.6	91.41	514.1	1.0229	16.1	22.9327843
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24.04.2015 15:16:16.8	89.23	513.8	1.0543	16.12	23.2821081
24.04.2015 15:16:16.9	89.26	513.8	1.0473	16.14	23.2046888
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24.04.2015 15:16:17.1	86.55	513.8	0.973	16.26	22.3664273
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24.04.2015 15:16:17.3	86.66	513.9	0.924	16.05	21.7959691
24.04.2015 15:16:17.4	83.92	513.9	0.9417	16.26	22.0037389
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24.04.2015 15:16:17.6	84.08	513.8	0.9382	16.2	21.9628104
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24.04.2015 15:16:18.1	78.95	514.1	0.9361	16.18	21.9382166
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24.04.2015 15:16:18.4	78.05	514.1	1.0374	16.15	23.0947529
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24.04.2015 15:16:18.8	74.12	514.2	0.9595	16.11	22.2107225
24.04.2015 15:16:18.9	72.99	514.3	1.0389	16.28	23.1114434
24.04.2015 15:16:19.0	73.04	514.2	0.9427	16.25	22.0154188
24.04.2015 15:16:19.1	72.96	514.2	0.9926	16.17	22.5905775
24.04.2015 15:16:19.2	70.39	514.4	1.0062	16.13	22.7448121
24.04.2015 15:16:19.3	70.51	514.4	0.9311	16.32	21.8795487
24.04.2015 15:16:19.4	70.51	514.3	0.9509	16.27	22.1109611
24.04.2015 15:16:19.5	69.42	514.3	0.9804	16.1	22.4513184
24.04.2015 15:16:19.6	67.74	514.4	1.0073	16.17	22.7572413
24.04.2015 15:16:19.7	67.92	514.4	0.9523	16.26	22.127232
24.04.2015 15:16:19.8	67.96	514.3	0.9182	16.25	21.7274541
24.04.2015 15:16:19.9	65.27	514.2	0.9416	16.13	22.0025705
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24.04.2015 15:16:20.7	59.9	514.2	0.8919	16.19	21.4140237
24.04.2015 15:16:20.8	59.88	514.2	0.9411	16.22	21.996728
24.04.2015 15:16:20.9	58.81	514.2	1.0195	16.32	22.8946396
24.04.2015 15:16:21.0	57.13	514.2	0.9689	16.15	22.319254
24.04.2015 15:16:21.1	57.35	514.4	0.9803	16.1	22.4501733
24.04.2015 15:16:21.2	56.92	514.4	0.9348	16.22	21.9229781
24.04.2015 15:16:21.3	54.55	514.4	0.8964	16.24	21.467977
24.04.2015 15:16:21.4	54.75	514.5	0.9312	16.11	21.8807236
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24.04.2015 15:16:21.8	52.18	514.4	0.9917	16.18	22.5803336
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24.04.2015 15:16:22.3	48.54	514.3	0.9482	16.18	22.0795477
24.04.2015 15:16:22.4	46.43	514.2	0.9752	16.3	22.3916988
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24.04.2015 15:16:22.8	44.12	513.8	0.9433	16.31	22.0224237
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24.04.2015 15:16:46.2	-130.61	515.5	0.8317	16.1	20.678715
24.04.2015 15:16:46.3	-130.61	515.6	0.8334	16.2	20.6998379
24.04.2015 15:16:46.4	-133.17	515.5	0.8624	16.2	21.0569066
24.04.2015 15:16:46.5	-133.53	515.5	0.9561	16.14	22.1713356
24.04.2015 15:16:46.6	-133.53	515.6	0.9298	16.02	21.8642693
24.04.2015 15:16:46.7	-133.52	515.7	0.9944	16.29	22.6110513
24.04.2015 15:16:46.8	-135.98	515.7	0.9176	16.32	21.720354
24.04.2015 15:16:46.9	-136.13	515.7	0.8291	16.19	20.6463676
24.04.2015 15:16:47.0	-136.12	515.8	0.866	16.06	21.1008108
24.04.2015 15:16:47.1	-138.08	515.9	1.0074	16.19	22.7583709
24.04.2015 15:16:47.2	-139.07	515.7	0.9864	16.25	22.5199141
24.04.2015 15:16:47.3	-139.05	515.7	0.9169	16.08	21.7120677
24.04.2015 15:16:47.4	-139.19	515.9	0.9259	16.26	21.8183668
24.04.2015 15:16:47.5	-141.68	515.9	0.8942	16.23	21.4416168
24.04.2015 15:16:47.6	-141.58	515.7	0.8396	16.3	20.7766925
24.04.2015 15:16:47.7	-141.63	515.8	0.8806	16.21	21.2779379
24.04.2015 15:16:47.8	-141.98	516	0.9658	16.27	22.2835201
24.04.2015 15:16:47.9	-144.35	516	0.9311	16.21	21.8795487
24.04.2015 15:16:48.0	-144.16	515.9	0.8579	16.23	21.0018973
24.04.2015 15:16:48.1	-144.16	516	0.9438	16.19	22.0282595
24.04.2015 15:16:48.2	-146.91	516.1	0.9592	16.24	22.20725
24.04.2015 15:16:48.3	-147.05	516	0.8373	16.26	20.7482151
24.04.2015 15:16:48.4	-147.07	515.9	0.8205	16.15	20.5390092
24.04.2015 15:16:48.5	-147.83	516	0.9593	16.13	22.2084076
24.04.2015 15:16:48.6	-149.9	516.1	0.9708	16.27	22.3411272
24.04.2015 15:16:48.7	-149.65	516	0.8397	16.27	20.7779298
24.04.2015 15:16:48.8	-149.69	516	0.8157	16.09	20.4788436
24.04.2015 15:16:48.9	-150.59	516.2	0.8999	16	21.5098471
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24.04.2015 15:16:49.1	-152.21	516.1	0.9032	16.27	21.5492501
24.04.2015 15:16:49.2	-152.26	516.1	0.9196	16.21	21.744012
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24.04.2015 15:16:49.5	-155.19	516.1	0.9732	16.22	22.3687259
24.04.2015 15:16:49.6	-156.55	516.1	0.9297	16.18	21.8630935
24.04.2015 15:16:49.7	-157.84	516.3	0.9013	16.04	21.5265723
24.04.2015 15:16:49.8	-157.71	516.3	0.9054	16.12	21.5754788
24.04.2015 15:16:49.9	-157.75	516.2	0.962	16.12	22.239639
24.04.2015 15:16:50.0	-159.35	516.3	0.8562	16.09	20.9810785
24.04.2015 15:16:50.1	-160.39	516.5	0.8707	16.14	21.157993
24.04.2015 15:16:50.2	-160.31	516.5	1.0008	16.22	22.6836974
24.04.2015 15:16:50.3	-161.28	516.5	0.9734	16.2	22.3710242
24.04.2015 15:16:50.4	-163.49	516.7	0.8481	16.12	20.8815979
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24.04.2015 15:16:50.9	-165.79	517.2	0.9409	16.29	21.9943905
24.04.2015 15:16:51.0	-165.81	517.1	0.9618	16.27	22.2373271
24.04.2015 15:16:51.1	-168.44	517.2	0.9092	16.18	21.620708

24.04.2015 15:16:51.2	-168.76	517.5	0.8785	16.1	21.2525516
24.04.2015 15:16:51.3	-168.73	517.6	1.0296	16.2	23.0077667
24.04.2015 15:16:51.4	-168.74	517.5	1.0345	16.25	23.0624501
24.04.2015 15:16:51.5	-171.24	517.7	0.8437	16.21	20.8273599
24.04.2015 15:16:51.6	-171.3	517.9	0.9232	16.18	21.7865315
24.04.2015 15:16:51.7	-171.31	518	0.8961	16.18	21.4643843
24.04.2015 15:16:51.8	-172.22	518	0.8216	16.19	20.5527724
24.04.2015 15:16:51.9	-174.49	518.1	0.9361	16.02	21.9382166
24.04.2015 15:16:52.0	-174.2	518.3	0.9276	16.08	21.8383875
24.04.2015 15:16:52.1	-174.39	518.3	0.8378	16.13	20.7544092
24.04.2015 15:16:52.2	-176.92	518.3	0.8318	16.08	20.6799581
24.04.2015 15:16:52.3	-176.77	518.4	1.021	16.05	22.911476
24.04.2015 15:16:52.4	-176.79	518.5	0.8877	16.14	21.3635444
24.04.2015 15:16:52.5	-177.16	518.5	1.0362	16.23	23.0813917
24.04.2015 15:16:52.6	-179.6	518.6	0.9872	16.1	22.5290444
24.04.2015 15:16:52.7	-179.39	518.7	0.842	16.1	20.8063664
24.04.2015 15:16:52.8	-179.37	518.8	0.912	16.24	21.6539743
24.04.2015 15:16:52.9	-182.12	518.7	0.9403	16.2	21.9873766
24.04.2015 15:16:53.0	-182.33	518.8	0.9314	16.07	21.8830732
24.04.2015 15:16:53.1	-182.31	518.8	0.8798	15.99	21.2682705
24.04.2015 15:16:53.2	-182.32	518.9	0.8751	16.13	21.2113856
24.04.2015 15:16:53.3	-184.98	518.8	0.9812	16.2	22.4604766
24.04.2015 15:16:53.4	-184.89	518.8	0.9616	16.11	22.2350149
24.04.2015 15:16:53.5	-184.9	519	0.7929	16.13	20.1906084
24.04.2015 15:16:53.6	-185.8	518.9	0.8892	16.19	21.3815864
24.04.2015 15:16:53.7	-187.63	518.8	0.9299	16.26	21.865445
24.04.2015 15:16:53.8	-187.44	518.8	0.9095	16.19	21.6242747
24.04.2015 15:16:53.9	-187.45	519	0.7875	16.2	20.1217375
24.04.2015 15:16:54.0	-188.8	518.9	0.8941	16.2	21.4404178
24.04.2015 15:16:54.1	-190.55	518.8	0.8038	16.31	20.3289149
24.04.2015 15:16:54.2	-190.39	518.9	0.8118	16.15	20.4298285
24.04.2015 15:16:54.3	-190.92	518.9	0.8602	16.28	21.0300312
24.04.2015 15:16:54.4	-193.54	518.8	0.7785	16.27	20.0064257
24.04.2015 15:16:54.5	-193.32	518.8	0.8557	16.2	20.9749514
24.04.2015 15:16:54.6	-193.32	518.8	0.9209	16.16	21.7593758
24.04.2015 15:16:54.7	-193.98	518.8	0.988	16.29	22.538171
24.04.2015 15:16:54.8	-196.11	518.7	0.9482	16.31	22.0795477
24.04.2015 15:16:54.9	-195.93	518.6	0.9158	16.18	21.6990398
24.04.2015 15:16:55.0	-195.9	518.8	0.8883	16.14	21.370763
24.04.2015 15:16:55.1	-198.02	518.8	0.9217	16.21	21.7688251
24.04.2015 15:16:55.2	-198.91	518.7	0.85	16.24	20.9049754
24.04.2015 15:16:55.3	-198.84	518.7	0.9132	16.16	21.6682156
24.04.2015 15:16:55.4	-198.82	518.9	0.8631	16.25	21.0654507
24.04.2015 15:16:55.5	-200.93	518.9	1.0376	16.18	23.096979
24.04.2015 15:16:55.6	-201.41	518.7	0.9145	16.23	21.6836332
24.04.2015 15:16:55.7	-201.44	518.8	1.0035	16.16	22.7142753
24.04.2015 15:16:55.8	-201.93	518.9	0.9914	16.26	22.5769179
24.04.2015 15:16:55.9	-204.52	518.9	0.8531	16.26	20.9430615
24.04.2015 15:16:56.0	-204.29	518.8	0.9091	16.18	21.6195189
24.04.2015 15:16:56.1	-204.34	518.9	0.9087	16.19	21.6147622
24.04.2015 15:16:56.2	-206.82	518.9	0.9999	16.2	22.6734956
24.04.2015 15:16:56.3	-206.88	518.8	0.9331	16.28	21.9030347
24.04.2015 15:16:56.4	-206.94	518.8	0.8165	16.16	20.4888834
24.04.2015 15:16:56.5	-206.99	518.9	0.8795	16.07	21.2646441
24.04.2015 15:16:56.6	-209.54	518.9	0.9663	16.26	22.2892875
24.04.2015 15:16:56.7	-209.49	518.7	0.9479	16.2	22.0760546
24.04.2015 15:16:56.8	-209.5	518.7	0.9225	16.22	21.7782703
24.04.2015 15:16:56.9	-211.76	518.9	0.897	16.03	21.4751605
24.04.2015 15:16:57.0	-212.41	518.9	0.8454	16.31	20.8483322
24.04.2015 15:16:57.1	-212.43	518.7	0.7962	16.21	20.2325808
24.04.2015 15:16:57.2	-212.78	518.7	0.8429	16.13	20.8174833
24.04.2015 15:16:57.3	-215.17	518.9	0.8291	16.14	20.6463676
24.04.2015 15:16:57.4	-214.96	518.9	0.7898	16.2	20.1511002
24.04.2015 15:16:57.5	-214.95	518.7	1.0098	16.25	22.7854642
24.04.2015 15:16:57.6	-215.55	518.7	1.0038	16.09	22.7176703
24.04.2015 15:16:57.7	-217.71	518.9	0.9904	16.17	22.5655287
24.04.2015 15:16:57.8	-217.5	518.8	0.931	16.1	21.8783738
24.04.2015 15:16:57.9	-217.53	518.7	0.9161	16.18	21.7025936
24.04.2015 15:16:58.0	-217.58	518.8	0.8668	16.08	21.1105549
24.04.2015 15:16:58.1	-217.52	518.9	0.8717	16.25	21.1701395
24.04.2015 15:16:58.2	-217.55	518.8	0.8314	16.2	20.6749852

24.04.2015 15:16:58.3	-217.58	518.8	0.8658	16.13	21.0983741
24.04.2015 15:16:58.4	-217.51	518.9	0.9716	16.08	22.3503305
24.04.2015 15:16:58.5	-217.5	518.9	0.9323	16.18	21.8936434
24.04.2015 15:16:58.6	-217.55	518.8	0.9703	16.31	22.3353732
24.04.2015 15:16:58.7	-217.55	518.8	0.8922	16.03	21.4176248
24.04.2015 15:16:58.8	-217.53	519	0.9085	16.1	21.6123834
24.04.2015 15:16:58.9	-217.53	519	0.8889	16.18	21.3779792
24.04.2015 15:16:59.0	-217.56	518.9	0.9286	16.33	21.8501557

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

$$y = -2.20433207E-14x^6 - 4.67045704E-13x^5 + 8.94803605E-10x^4 + 6.10591402E-08x^3 + 2.77116207E-05x^2 + 3.77076147E-03x + 2.13736746E+01$$

Please enter below Polynomial Coefficients

Order no	Coeff
6	-2.20433207E-14
5	-4.67045704E-13
4	8.94803605E-10
3	6.10591402E-08
2	2.77116207E-05
1	3.77076147E-03
0	2.13736746E+01

Actual Area	0.274324656	[m2]
Integrated area	0.274324656	[m2]
Area Error	0	[%]
Integrated Mass flow	2.353767492	[Kg/s]

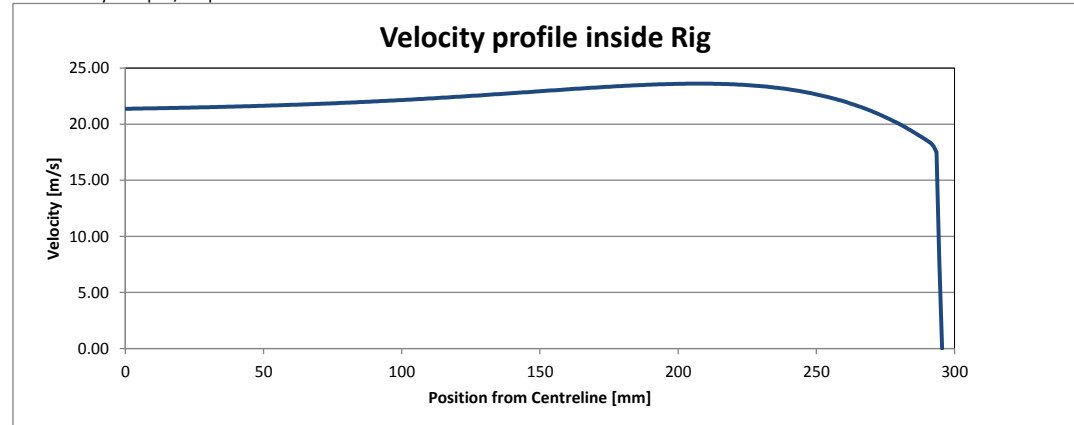
Polynomial curve (dP vs position)

Please do NOT alter any of the figures below

position [mm]	Velocity [m/s]
0	21.373675
1	21.377473
2	21.381327
3	21.385238
4	21.389205
5	21.393229
6	21.397311
7	21.401451
8	21.405649
9	21.409906
10	21.414223
11	21.418600
12	21.423038
13	21.427537
14	21.432098
15	21.436722
16	21.441409
17	21.446160
18	21.450975
19	21.455856
20	21.460803
21	21.465817
22	21.470899
23	21.476049
24	21.481268
25	21.486557
26	21.491917
27	21.497349
28	21.502854
29	21.508432
30	21.514084
31	21.519812
32	21.525615
33	21.531496

Delta Area [m2]	Delta Mass flow [Kg/s]
0	0
3.14159E-06	2.6125E-05
9.42478E-06	7.8389E-05
1.5708E-05	0.000130672
2.19911E-05	0.000182975
2.82743E-05	0.000235298
3.45575E-05	0.000287641
4.08407E-05	0.000340006
4.71239E-05	0.000392391
5.34071E-05	0.000444798
5.96903E-05	0.000497228
6.59734E-05	0.00054968
7.22566E-05	0.000602155
7.85398E-05	0.000654654
8.4823E-05	0.000707177
9.11062E-05	0.000759724
9.73894E-05	0.000812296
0.000103673	0.000864894
0.000109956	0.000917518
0.000116239	0.000970168
0.000122522	0.001022846
0.000128805	0.00107555
0.000135088	0.001128283
0.000141372	0.001181045
0.000147655	0.001233835
0.000153938	0.001286656
0.000160221	0.001339506
0.000166504	0.001392388
0.000172788	0.001445301
0.000179071	0.001498246
0.000185354	0.001551223
0.000191637	0.001604234
0.00019792	0.001657279
0.000204204	0.001710358

Based on density in input/output



34	21.537455
35	21.543494
36	21.549612
37	21.555811
38	21.562092
39	21.568456
40	21.574904
41	21.581437
42	21.588056
43	21.594762
44	21.601556
45	21.608439
46	21.615412
47	21.622476
48	21.629633
49	21.636882
50	21.644226
51	21.651665
52	21.659201
53	21.666834
54	21.674565
55	21.682396
56	21.690327
57	21.698359
58	21.706494
59	21.714733
60	21.723076
61	21.731524
62	21.740079
63	21.748742
64	21.757512
65	21.766392
66	21.775383
67	21.784484
68	21.793698
69	21.803024
70	21.812464
71	21.822019
72	21.831689
73	21.841475
74	21.851378
75	21.861399
76	21.871539
77	21.881797
78	21.892176
79	21.902675
80	21.913294
81	21.924036
82	21.934899
83	21.945885

0.000210487	0.001763472
0.00021677	0.001816623
0.000223053	0.001869809
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0.000235619	0.001976294
0.000241903	0.002029594
0.000248186	0.002082934
0.000254469	0.002136313
0.000260752	0.002189733
0.000267035	0.002243194
0.000273319	0.002296697
0.000279602	0.002350244
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0.000317301	0.002672466
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0.000329867	0.002780252
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0.000355	0.002996435
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0.000386416	0.003267877
0.000392699	0.003322337
0.000398982	0.003376855
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0.000411549	0.003486074
0.000417832	0.003540776
0.000424115	0.00359554
0.000430398	0.003650369
0.000436681	0.003705263
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0.000480664	0.004091418
0.000486947	0.004146867
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0.000499513	0.004257986
0.000505796	0.004313659
0.00051208	0.004369409
0.000518363	0.004425237



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85	21.968227
86	21.979584
87	21.991064
88	22.002670
89	22.014400
90	22.026255
91	22.038235
92	22.050341
93	22.062572
94	22.074928
95	22.087409
96	22.100016
97	22.112748
98	22.125605
99	22.138587
100	22.151693
101	22.164923
102	22.178276
103	22.191752
104	22.205351
105	22.219072
106	22.232913
107	22.246875
108	22.260957
109	22.275157
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111	22.303908
112	22.318457
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114	22.347895
115	22.362782
116	22.377778
117	22.392883
118	22.408094
119	22.423409
120	22.438827
121	22.454346
122	22.469964
123	22.485678
124	22.501486
125	22.517386
126	22.533376
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128	22.565611
129	22.581853
130	22.598172
131	22.614566
132	22.631032
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0.000625177	0.005387155
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0.00065031	0.005617298
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0.000669159	0.005790927
0.000675442	0.005849002
0.000681726	0.005907177
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0.000744557	0.006494556
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0.000826239	0.00727377
0.000832522	0.007334439

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145	22.849957
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152	22.969399
153	22.986403
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155	23.020307
156	23.037193
157	23.054026
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159	23.087502
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161	23.120679
162	23.137135
163	23.153492
164	23.169743
165	23.185878
166	23.201890
167	23.217768
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169	23.249091
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171	23.279771
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223	23.514153
224	23.499833
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226	23.467887
227	23.450207
228	23.431355
229	23.411301
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231	23.367481
232	23.343657
233	23.318519

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271	21.057905
272	20.954056
273	20.847349
274	20.737735
275	20.625163
276	20.509583
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283	19.611919

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0.001523672	0.013625295
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0.001536239	0.013686901
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0.001548805	0.013743507
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0.001768717	0.013588624
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286	19.176776
287	19.024596
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289	18.709189
290	18.545844
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0.00183469	0.0128465
0.001840973	0.012532426
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 <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:

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

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

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

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