



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	0.259	[Kg/s]
Oxygen Mass Flow rate	0.155	[Kg/s]

Please do not change anything in this box

Test Date and Time = 01.05.2015 15:47:11.7

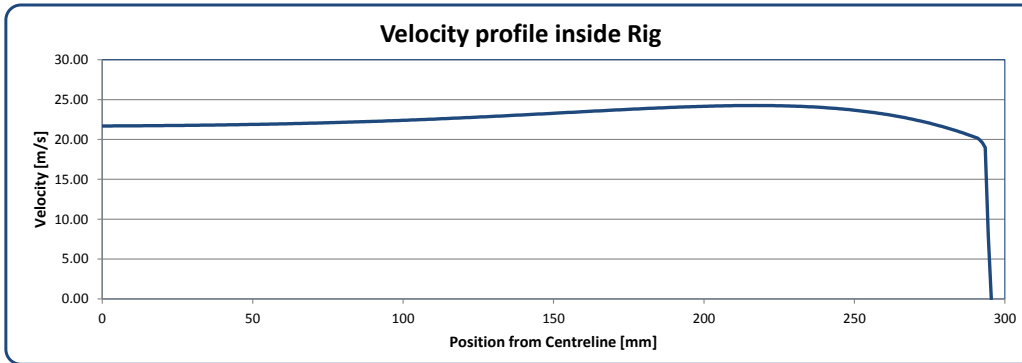
Calculated Parameters		
Air density	1.217898	[Kg/m ³]
Liquid Butane density	584	[Kg/m ³]
Butane mass Flow rate	0.280969	[Kg/s]
Air Fuel Ratio	79.23263	[]
Calculated Exhaust gas properties (Reaction Engines)		
Exhaust products density	0.389	[Kg/m ³]
Pitot Traverse Results		
Rig Gas flow rate - Integrated	2.432206	[Kg/s]
Total Rig Mass flow	2.846206	[Kg/s]
Rig Gas Temperature as read from TC 11		
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]
Distance Travelled every 0.1	0.7	[mm]

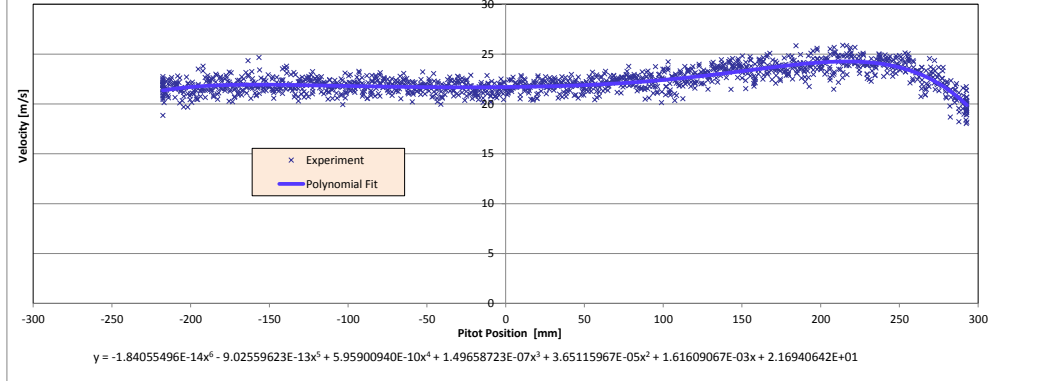
Averaged Pitot dp 0.970535256 Average Vel 22.3041638 [m/s]

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 %
01.05.2015 15:47:11.7	-217.59	511.1	0.9105	17.49
01.05.2015 15:47:11.8	-217.59	511.1	1.0063	17.62
01.05.2015 15:47:11.9	-217.55	511	0.8945	17.64
01.05.2015 15:47:12.0	-217.56	511.1	0.9452	17.55
01.05.2015 15:47:12.1	-217.6	511.2	0.9325	17.5
01.05.2015 15:47:12.2	-217.54	511.3	0.9323	17.59
01.05.2015 15:47:12.3	-217.56	511.3	0.9288	17.62
01.05.2015 15:47:12.4	-217.6	511.4	0.8999	17.56
01.05.2015 15:47:12.5	-217.56	511.5	0.8709	17.51
01.05.2015 15:47:12.6	-217.57	511.5	0.6914	17.6
01.05.2015 15:47:12.7	-217.6	511.4	0.8412	17.59
01.05.2015 15:47:12.8	-217.55	511.5	0.8131	17.53
01.05.2015 15:47:12.9	-216.81	511.5	0.8863	17.56
01.05.2015 15:47:13.0	-216.83	511.4	0.7879	17.59
01.05.2015 15:47:13.1	-216.83	511.4	0.8562	17.48
01.05.2015 15:47:13.2	-216.05	511.4	0.8664	17.49
01.05.2015 15:47:13.3	-214.08	511.4	0.8264	17.54
01.05.2015 15:47:13.4	-214.34	511.2	0.8427	17.63
01.05.2015 15:47:13.5	-214.26	511.2	0.9423	17.58
01.05.2015 15:47:13.6	-212.03	511.2	0.9987	17.44
01.05.2015 15:47:13.7	-211.33	511.2	0.912	17.6
01.05.2015 15:47:13.8	-211.35	511.1	0.9444	17.62
01.05.2015 15:47:13.9	-210.16	511.1	0.948	17.51
01.05.2015 15:47:14.0	-208.67	511.3	0.9299	17.49
01.05.2015 15:47:14.1	-208.84	511.3	0.9525	17.58
01.05.2015 15:47:14.2	-208.88	511.2	0.9436	17.63
01.05.2015 15:47:14.3	-207.35	511.3	0.9542	17.51
01.05.2015 15:47:14.4	-206.15	511.4	0.899	17.52
01.05.2015 15:47:14.5	-206.28	511.4	0.877	17.55
01.05.2015 15:47:14.6	-206.36	511.5	0.8866	17.6
01.05.2015 15:47:14.7	-204.24	511.5	0.9031	17.5
01.05.2015 15:47:14.8	-203.27	511.6	0.9095	17.55
01.05.2015 15:47:14.9	-203.48	511.6	0.9124	17.59
01.05.2015 15:47:15.0	-202.58	511.6	1.0028	17.54
01.05.2015 15:47:15.1	-200	511.7	0.8598	17.53
01.05.2015 15:47:15.2	-200.35	511.7	0.8119	17.56
01.05.2015 15:47:15.3	-200.48	511.7	0.8409	17.6
01.05.2015 15:47:15.4	-199.29	511.7	0.7898	17.56
01.05.2015 15:47:15.5	-197.49	511.8	0.9175	17.49
01.05.2015 15:47:15.6	-197.89	511.8	0.8824	17.59
01.05.2015 15:47:15.7	-197.79	511.8	0.8599	17.65
01.05.2015 15:47:15.8	-195.5	511.8	0.8139	17.47
01.05.2015 15:47:15.9	-195.13	511.9	0.9381	17.52
01.05.2015 15:47:16.0	-195.24	511.9	0.9263	17.59
01.05.2015 15:47:16.1	-195.13	511.9	1.0739	17.6
01.05.2015 15:47:16.2	-192.2	511.9	1.0576	17.55
01.05.2015 15:47:16.3	-192.11	512.1	1.101	17.49
01.05.2015 15:47:16.4	-192.16	512.1	0.8859	17.55
01.05.2015 15:47:16.5	-190.1	512	0.9634	17.56
01.05.2015 15:47:16.6	-189.17	512.1	1.0155	17.5
01.05.2015 15:47:16.7	-189.13	512.2	0.993	17.53
01.05.2015 15:47:16.8	-189.26	512.2	0.8907	17.55
01.05.2015 15:47:16.9	-187.3	512.2	0.8957	17.57
01.05.2015 15:47:17.0	-186.55	512.3	0.8949	17.47
01.05.2015 15:47:17.1	-186.64	512.4	0.8785	17.54
01.05.2015 15:47:17.2	-186.37	512.3	0.9811	17.59
01.05.2015 15:47:17.3	-184.12	512.3	0.9586	17.53
01.05.2015 15:47:17.4	-183.98	512.3	0.9203	17.43
01.05.2015 15:47:17.5	-184.03	512.3	1.0273	17.6

Calculated Velocity [m/s]
21.6361594
22.7459423
21.4452133
22.0445914
21.8959916
21.8936434
21.8525086
21.5098471
21.1604229
18.85406
20.7964798
20.4461799
21.3466914
20.1268471
20.9810785
21.1056834
20.6127223
20.8150134
22.0107476
22.6598861
21.6539743
22.0352604
22.077219
21.865445
22.1295554
22.0259254
22.1492948
21.4990883
21.2344
21.3503039
21.5480571
21.6242747
21.6587224
22.7063517
21.025141
20.4310868
20.7927711
20.1511002
21.7191705
21.2996735
21.0263637
20.4562358
21.9616398
21.8230792
23.4975249
23.3185165
23.7921592
21.3418738
22.2558158
22.849682
22.5951288
21.3996132
21.4595932
21.4500076
21.2525516
22.459332
22.2003034
21.7522862
22.982054

Raw Data Plot with Polynomial fit on Calculated Velocity



01.05.2015 15:47:17.6	-183.51	512.2	1.0175	17.62	22.8721719
01.05.2015 15:47:17.7	-181.07	512.2	1.0049	17.53	22.7301143
01.05.2015 15:47:17.8	-180.99	512.3	0.9037	17.45	21.555214
01.05.2015 15:47:17.9	-181.1	512.2	1	17.59	22.6746294
01.05.2015 15:47:18.0	-178.02	512.1	0.9029	17.62	21.545671
01.05.2015 15:47:18.1	-178.31	512.1	0.9854	17.5	22.508496
01.05.2015 15:47:18.2	-178.14	512.1	0.8863	17.47	21.3466914
01.05.2015 15:47:18.3	-177.13	512.1	0.9979	17.55	22.6508085
01.05.2015 15:47:18.4	-175.4	511.9	0.9571	17.56	22.1829273
01.05.2015 15:47:18.5	-175.56	512	0.7988	17.49	20.2655888
01.05.2015 15:47:18.6	-175.45	512	1.0461	17.5	23.191391
01.05.2015 15:47:18.7	-174.27	512	1.0393	17.52	23.1158922
01.05.2015 15:47:18.8	-172.94	511.9	0.9268	17.54	21.8289683
01.05.2015 15:47:18.9	-172.92	512.1	0.9396	17.5	21.9791909
01.05.2015 15:47:19.0	-172.29	512.1	0.8932	17.49	21.4296242
01.05.2015 15:47:19.1	-169.94	512.1	0.864	17.55	21.0764309
01.05.2015 15:47:19.2	-170.25	512	0.9712	17.51	22.3457293
01.05.2015 15:47:19.3	-169.91	512.1	0.9421	17.47	22.0084116
01.05.2015 15:47:19.4	-168.23	512.1	0.9633	17.53	22.2546607
01.05.2015 15:47:19.5	-167.59	511.9	1.0031	17.61	22.7097479
01.05.2015 15:47:19.6	-167.64	511.9	0.8498	17.51	20.9025158
01.05.2015 15:47:19.7	-167.35	511.9	0.8853	17.49	21.3346454
01.05.2015 15:47:19.8	-165.53	511.9	0.9342	17.67	21.9159413
01.05.2015 15:47:19.9	-164.84	511.8	1.0424	17.62	23.1503413
01.05.2015 15:47:20.0	-164.96	511.7	0.9145	17.48	21.6836332
01.05.2015 15:47:20.1	-164.44	511.8	0.8651	17.45	21.0898433
01.05.2015 15:47:20.2	-161.76	511.8	0.8215	17.57	20.5515216
01.05.2015 15:47:20.3	-161.89	511.7	0.9088	17.6	21.6159515
01.05.2015 15:47:20.4	-161.94	511.9	0.9298	17.52	21.8642693
01.05.2015 15:47:20.5	-160.21	512	0.9319	17.44	21.8889462
01.05.2015 15:47:20.6	-158.83	512	0.9542	17.51	22.1492948
01.05.2015 15:47:20.7	-159.09	512	0.8659	17.56	21.0995925
01.05.2015 15:47:20.8	-158.94	512.1	0.921	17.49	21.7605572
01.05.2015 15:47:20.9	-157.23	512.2	0.9173	17.52	21.7168031
01.05.2015 15:47:21.0	-156.35	512.2	0.8618	17.54	21.0495803
01.05.2015 15:47:21.1	-156.61	512.1	1.1835	17.54	24.6674541
01.05.2015 15:47:21.2	-156.18	512.2	1.0652	17.49	23.4021509
01.05.2015 15:47:21.3	-153.54	512.2	0.9725	17.52	22.3606798
01.05.2015 15:47:21.4	-154	512.1	0.9085	17.57	21.6123834
01.05.2015 15:47:21.5	-153.84	512.2	0.882	17.52	21.2948453
01.05.2015 15:47:21.6	-153.38	512.2	0.9805	17.42	22.4524634
01.05.2015 15:47:21.7	-150.71	512.2	1.0224	17.53	22.9271788
01.05.2015 15:47:21.8	-150.88	512.2	0.9219	17.58	21.7711868
01.05.2015 15:47:21.9	-150.88	512.3	0.9273	17.49	21.8348557
01.05.2015 15:47:22.0	-148.15	512.4	0.9856	17.43	22.5107801
01.05.2015 15:47:22.1	-147.88	512.3	0.8902	17.5	21.3936059
01.05.2015 15:47:22.2	-147.85	512.2	1.005	17.57	22.7312453
01.05.2015 15:47:22.3	-147.97	512.2	0.9005	17.48	21.5170166
01.05.2015 15:47:22.4	-145.33	512.3	0.9993	17.49	22.6666919
01.05.2015 15:47:22.5	-145.34	512.2	0.9544	17.51	22.1516159
01.05.2015 15:47:22.6	-145.35	512.2	0.8929	17.49	21.4260251
01.05.2015 15:47:22.7	-144.61	512.2	0.9257	17.49	21.8160103
01.05.2015 15:47:22.8	-142.45	512.3	0.9755	17.46	22.3951427
01.05.2015 15:47:22.9	-142.83	512.3	0.8979	17.51	21.4859313
01.05.2015 15:47:23.0	-142.87	512.2	0.9077	17.53	21.6028657
01.05.2015 15:47:23.1	-141.43	512.3	0.9786	17.46	22.4306988
01.05.2015 15:47:23.2	-139.55	512.3	0.9376	17.48	21.9557864
01.05.2015 15:47:23.3	-139.85	512.2	0.906	17.56	21.5826265
01.05.2015 15:47:23.4	-139.39	512.2	0.8969	17.47	21.4739634
01.05.2015 15:47:23.5	-136.56	512.2	0.903	17.41	21.5468641
01.05.2015 15:47:23.6	-136.85	512.2	0.9455	17.5	22.0480895
01.05.2015 15:47:23.7	-136.85	512.1	0.9034	17.58	21.5516358
01.05.2015 15:47:23.8	-135.38	512	0.8855	17.45	21.3370552
01.05.2015 15:47:23.9	-134.12	512	0.8339	17.45	20.7060465
01.05.2015 15:47:24.0	-134.33	512	0.9065	17.53	21.5885812
01.05.2015 15:47:24.1	-133.48	511.9	0.9277	17.6	21.8395646
01.05.2015 15:47:24.2	-131.65	511.9	0.9025	17.47	21.5408979
01.05.2015 15:47:24.3	-131.62	512	0.8349	17.46	20.7184579
01.05.2015 15:47:24.4	-131.67	512	0.9594	17.51	22.2095651
01.05.2015 15:47:24.5	-129.72	512	0.8574	17.54	20.9957763
01.05.2015 15:47:24.6	-129.14	512	1.0012	17.5	22.6882301

01.05.2015 15:47:24.7	-129.04	512.1	0.9577	17.45	22.1898793
01.05.2015 15:47:24.8	-129.08	512	0.9004	17.53	21.5158219
01.05.2015 15:47:24.9	-126.94	511.9	0.9764	17.51	22.4054712
01.05.2015 15:47:25.0	-126.43	512	0.8596	17.48	21.0226955
01.05.2015 15:47:25.1	-126.4	512	0.9286	17.47	21.8501557
01.05.2015 15:47:25.2	-124.87	512	0.9948	17.57	22.6155985
01.05.2015 15:47:25.3	-123.62	511.9	0.9811	17.49	22.459332
01.05.2015 15:47:25.4	-123.47	512	1.0229	17.45	22.9327843
01.05.2015 15:47:25.5	-123.52	512	0.9686	17.51	22.3157984
01.05.2015 15:47:25.6	-122.05	512	0.9392	17.53	21.974512
01.05.2015 15:47:25.7	-121.09	512	0.9885	17.53	22.5438732
01.05.2015 15:47:25.8	-120.83	512.2	0.9906	17.42	22.567807
01.05.2015 15:47:25.9	-120.88	512.2	0.9377	17.51	21.9569572
01.05.2015 15:47:26.0	-118.28	512.1	0.9744	17.56	22.3825125
01.05.2015 15:47:26.1	-118.51	512.2	0.9397	17.44	21.9803605
01.05.2015 15:47:26.2	-118.37	512.3	0.9744	17.41	22.3825125
01.05.2015 15:47:26.3	-118.05	512.3	0.9089	17.52	21.6171407
01.05.2015 15:47:26.4	-115.19	512.2	0.9416	17.54	22.0025705
01.05.2015 15:47:26.5	-115.5	512.3	0.9569	17.45	22.1806094
01.05.2015 15:47:26.6	-115.38	512.3	0.8595	17.41	21.0214727
01.05.2015 15:47:26.7	-112.74	512.3	0.8156	17.49	20.4775882
01.05.2015 15:47:26.8	-112.6	512.2	0.8744	17.51	21.2029003
01.05.2015 15:47:26.9	-112.53	512.2	0.9142	17.46	21.6800763
01.05.2015 15:47:27.0	-111.75	512.3	0.9173	17.45	21.7168031
01.05.2015 15:47:27.1	-109.85	512.2	0.8225	17.51	20.5640263
01.05.2015 15:47:27.2	-110.14	512.1	0.8902	17.5	21.3936059
01.05.2015 15:47:27.3	-109.77	512.1	0.9024	17.44	21.5397045
01.05.2015 15:47:27.4	-108.99	512.2	0.9304	17.48	21.8713227
01.05.2015 15:47:27.5	-107.24	512.1	0.9496	17.52	22.0958417
01.05.2015 15:47:27.6	-107.41	512.1	0.8642	17.45	21.0788701
01.05.2015 15:47:27.7	-106.96	512.2	0.9143	17.4	21.681262
01.05.2015 15:47:27.8	-104.25	512.2	0.8576	17.47	20.9982249
01.05.2015 15:47:27.9	-104.31	512.1	0.8454	17.52	20.8483322
01.05.2015 15:47:28.0	-104.43	512.2	0.9863	17.45	22.5187725
01.05.2015 15:47:28.1	-103.05	512.3	0.9227	17.39	21.780631
01.05.2015 15:47:28.2	-101.73	512.4	0.8252	17.49	20.5977511
01.05.2015 15:47:28.3	-101.8	512.3	0.8698	17.55	21.1470552
01.05.2015 15:47:28.4	-101.99	512.4	1.0373	17.44	23.0936397
01.05.2015 15:47:28.5	-100.21	512.5	0.91	17.44	21.6302178
01.05.2015 15:47:28.6	-99.16	512.5	0.9093	17.49	21.6218969
01.05.2015 15:47:28.7	-99.27	512.4	0.9563	17.52	22.1736544
01.05.2015 15:47:28.8	-98.33	512.5	0.9527	17.43	22.1318786
01.05.2015 15:47:28.9	-95.92	512.5	0.9299	17.45	21.865445
01.05.2015 15:47:29.0	-96.32	512.4	0.8842	17.47	21.321387
01.05.2015 15:47:29.1	-96.37	512.4	0.9578	17.46	22.1910378
01.05.2015 15:47:29.2	-94.2	512.5	0.9418	17.41	22.0049071
01.05.2015 15:47:29.3	-93.63	512.5	0.9453	17.46	22.0457575
01.05.2015 15:47:29.4	-93.69	512.4	0.9186	17.5	21.7321862
01.05.2015 15:47:29.5	-93.42	512.4	0.9365	17.44	21.9429032
01.05.2015 15:47:29.6	-90.84	512.5	0.8738	17.39	21.1956245
01.05.2015 15:47:29.7	-91.18	512.5	0.9969	17.46	22.6394564
01.05.2015 15:47:29.8	-91.08	512.4	0.9478	17.54	22.0748901
01.05.2015 15:47:29.9	-89.62	512.4	0.879	17.44	21.2585987
01.05.2015 15:47:30.0	-87.95	512.4	0.8204	17.4	20.5377576
01.05.2015 15:47:30.1	-88.17	512.3	0.9174	17.57	21.7179868
01.05.2015 15:47:30.2	-88.09	512.2	1.0141	17.64	22.833926
01.05.2015 15:47:30.3	-85.59	512.2	0.8829	17.43	21.3057073
01.05.2015 15:47:30.4	-85.56	512.2	0.8455	17.39	20.8495652
01.05.2015 15:47:30.5	-85.53	512.2	0.8631	17.48	21.0654507
01.05.2015 15:47:30.6	-84.63	512.2	0.8741	17.54	21.1992627
01.05.2015 15:47:30.7	-82.75	512.2	0.9823	17.42	22.473063
01.05.2015 15:47:30.8	-82.92	512.2	0.9548	17.46	22.1562574
01.05.2015 15:47:30.9	-82.98	512.2	0.84	17.48	20.7816411
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01.05.2015 15:47:52.8	83.36	510.4	0.9941	17.34	22.6076403
01.05.2015 15:47:52.9	83.47	510.5	0.8836	17.3	21.3141516
01.05.2015 15:47:53.0	84.58	510.5	0.9132	17.34	21.6682156

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01.05.2015 15:47:53.2	85.97	510.4	0.907	17.35	21.5945342
01.05.2015 15:47:53.3	86.56	510.4	0.9031	17.34	21.5480571
01.05.2015 15:47:53.4	88.59	510.3	0.8161	17.39	20.4838641
01.05.2015 15:47:53.5	88.34	510.3	0.8941	17.38	21.4404178
01.05.2015 15:47:53.6	88.65	510.4	0.9128	17.31	21.6634695
01.05.2015 15:47:53.7	90.24	510.4	0.9021	17.39	21.5361238
01.05.2015 15:47:53.8	91.1	510.4	0.9591	17.47	22.2060924
01.05.2015 15:47:53.9	91.1	510.5	0.8253	17.32	20.5989992
01.05.2015 15:47:54.0	91.34	510.6	0.923	17.3	21.7841715
01.05.2015 15:47:54.1	93.76	510.6	0.8638	17.41	21.0739913
01.05.2015 15:47:54.2	93.67	510.6	0.949	17.42	22.08886
01.05.2015 15:47:54.3	93.51	510.6	0.9219	17.31	21.7711868
01.05.2015 15:47:54.4	94.93	510.7	0.9184	17.28	21.7298203
01.05.2015 15:47:54.5	96.4	510.7	0.9208	17.4	21.7581944
01.05.2015 15:47:54.6	96.3	510.7	0.8665	17.38	21.1069014
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01.05.2015 15:47:55.2	102.07	511.1	0.9213	17.3	21.764101
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01.05.2015 15:47:55.4	101.55	511	0.851	17.35	20.9172688
01.05.2015 15:47:55.5	103.75	511	0.8665	17.29	21.1069014
01.05.2015 15:47:55.6	104.58	511	0.8483	17.36	20.8840599
01.05.2015 15:47:55.7	104.29	511	0.8717	17.4	21.1701395
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01.05.2015 15:47:57.1	115.22	511.3	0.9543	17.31	22.1504554
01.05.2015 15:47:57.2	115.97	511.3	1.0653	17.35	23.4032494
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01.05.2015 15:47:57.5	117.77	511.4	0.957	17.34	22.1817684
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01.05.2015 15:47:58.0	122.64	511.5	1.0154	17.43	22.848557
01.05.2015 15:47:58.1	122.84	511.5	1.1018	17.29	23.8008014
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01.05.2015 15:47:58.3	124.62	511.7	0.9479	17.37	22.0760546
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01.05.2015 15:47:58.5	125.73	511.8	1.0639	17.31	23.3878663
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01.05.2015 15:47:58.7	128.46	511.9	0.8968	17.39	21.4727663
01.05.2015 15:47:58.8	128.32	511.7	1.0523	17.4	23.2600146
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01.05.2015 15:47:59.0	129.48	511.9	0.9973	17.32	22.6439979
01.05.2015 15:47:59.1	131.07	511.9	0.9621	17.34	22.2407949
01.05.2015 15:47:59.2	130.88	511.7	1.1245	17.34	24.0447312
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01.05.2015 15:48:00.6	142.03	511.5	1.0643	17.36	23.3922625
01.05.2015 15:48:00.7	141.97	511.4	1.0433	17.38	23.1603331
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01.05.2015 15:48:02.9	158.46	511.2	0.9517	17.38	22.1202602
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01.05.2015 15:48:03.3	162.47	511.1	1.1159	17.32	23.9526096
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01.05.2015 15:48:06.5	187.22	510.9	1.2108	17.28	24.9503363
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01.05.2015 15:48:06.8	189.04	510.9	1.1339	17.34	24.1450203
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01.05.2015 15:48:07.1	189.97	511	1.0024	17.33	22.7018226
01.05.2015 15:48:07.2	192.3	510.9	0.9988	17.35	22.6610205

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01.05.2015 15:48:07.8	195.13	511.2	1.248	17.31	25.3307174
01.05.2015 15:48:07.9	197.82	511	1.2566	17.39	25.4178449
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01.05.2015 15:48:08.5	200.38	510.8	1.1742	17.27	24.5703439
01.05.2015 15:48:08.6	202.72	510.8	1.0281	17.36	22.9910008
01.05.2015 15:48:08.7	203.27	510.7	1.1792	17.35	24.6226013
01.05.2015 15:48:08.8	203.23	510.7	1.1663	17.29	24.48755
01.05.2015 15:48:08.9	203.84	510.7	1.0495	17.29	23.2290484
01.05.2015 15:48:09.0	206.02	510.6	0.9753	17.34	22.3928468
01.05.2015 15:48:09.1	205.79	510.5	1.0926	17.35	23.7012251
01.05.2015 15:48:09.2	205.95	510.6	0.9997	17.3	22.6712279
01.05.2015 15:48:09.3	207.51	510.6	1.0165	17.32	22.8609297
01.05.2015 15:48:09.4	208.41	510.6	1.0279	17.35	22.9887644
01.05.2015 15:48:09.5	208.36	510.6	0.8968	17.29	21.4727663
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01.05.2015 15:48:09.9	211.34	510.9	0.9557	17.28	22.1666973
01.05.2015 15:48:10.0	212.59	511	1.0717	17.23	23.4734439
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01.05.2015 15:48:10.6	216.59	510.7	1.1057	17.37	23.8428876
01.05.2015 15:48:10.7	218.04	510.7	1.1063	17.27	23.8493558
01.05.2015 15:48:10.8	219.28	510.9	1.1409	17.27	24.2194339
01.05.2015 15:48:10.9	219.07	510.8	1.2797	17.34	25.6504083
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01.05.2015 15:48:11.1	221.99	510.8	1.1499	17.3	24.3147738
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01.05.2015 15:48:11.3	221.65	510.8	1.1918	17.33	24.7538006
01.05.2015 15:48:11.4	223.63	510.7	1.1056	17.28	23.8418094
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01.05.2015 15:48:11.6	224.32	510.8	1.1944	17.32	24.780787
01.05.2015 15:48:11.7	225.37	510.7	1.2125	17.36	24.9678456
01.05.2015 15:48:11.8	226.95	510.6	1.21	17.29	24.9420923
01.05.2015 15:48:11.9	226.92	510.7	1.1065	17.22	23.8515115
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01.05.2015 15:48:12.6	232.03	510.6	1.1083	17.28	23.8709039
01.05.2015 15:48:12.7	232.84	510.8	1.1049	17.26	23.8342606
01.05.2015 15:48:12.8	234.75	510.8	1.1011	17.33	23.7932396
01.05.2015 15:48:12.9	234.54	510.8	1.0157	17.32	22.851932
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01.05.2015 15:48:13.6	239.7	510.8	1.1331	17.33	24.1365013
01.05.2015 15:48:13.7	239.75	510.9	1.1132	17.24	23.9236145
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01.05.2015 15:48:14.2	245.5	511.2	1.1466	17.21	24.2798593
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01.05.2015 15:48:15.0	250.5	511.5	1.0672	17.29	23.4241104
01.05.2015 15:48:15.1	250.46	511.4	1.0648	17.34	23.3977566
01.05.2015 15:48:15.2	252	511.3	1.1712	17.27	24.5389361
01.05.2015 15:48:15.3	253.61	511.4	1.2264	17.26	25.1105525
01.05.2015 15:48:15.4	253.47	511.5	1.0906	17.31	23.6795227
01.05.2015 15:48:15.5	253.36	511.5	1.1383	17.33	24.1918213
01.05.2015 15:48:15.6	254.94	511.5	1.1903	17.28	24.7382181
01.05.2015 15:48:15.7	256.15	511.6	1.081	17.2	23.5750729
01.05.2015 15:48:15.8	255.96	511.6	1.141	17.34	24.2204953
01.05.2015 15:48:15.9	256.79	511.5	0.9504	17.39	22.1051472
01.05.2015 15:48:16.0	258.73	511.5	1.0566	17.29	23.3074897
01.05.2015 15:48:16.1	258.67	511.6	0.971	17.19	22.3434284
01.05.2015 15:48:16.2	258.45	511.6	0.9878	17.31	22.5358897
01.05.2015 15:48:16.3	260.65	511.5	1.051	17.38	23.2456425
01.05.2015 15:48:16.4	261.13	511.4	1.038	17.28	23.1014305
01.05.2015 15:48:16.5	261.19	511.5	1.0599	17.22	23.3438586
01.05.2015 15:48:16.6	262.37	511.4	1.0034	17.33	22.7131435
01.05.2015 15:48:16.7	263.88	511.2	1.0452	17.34	23.1814126
01.05.2015 15:48:16.8	263.74	511.2	0.8359	17.27	20.730862
01.05.2015 15:48:16.9	264.36	511.2	0.9755	17.3	22.3951427
01.05.2015 15:48:17.0	266.53	511.2	0.8522	17.32	20.9320114
01.05.2015 15:48:17.1	266.2	511.1	0.897	17.29	21.4751605
01.05.2015 15:48:17.2	266.37	511.1	0.8499	17.27	20.9037456
01.05.2015 15:48:17.3	268.13	511.2	0.9335	17.29	21.9077289
01.05.2015 15:48:17.4	268.9	511.2	1.0072	17.32	22.7561116
01.05.2015 15:48:17.5	268.81	511.2	0.9203	17.3	21.7522862
01.05.2015 15:48:17.6	269.18	511.3	1.0216	17.25	22.9182071
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01.05.2015 15:48:17.8	271.43	511.4	1.0397	17.35	23.1203401
01.05.2015 15:48:17.9	271.46	511.4	1.0003	17.3	22.6780303
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01.05.2015 15:48:18.1	274.18	511.6	1.0029	17.34	22.7074838
01.05.2015 15:48:18.2	274.08	511.4	0.9354	17.37	21.9300125
01.05.2015 15:48:18.3	274.05	511.4	0.999	17.29	22.6632892
01.05.2015 15:48:18.4	276.88	511.5	0.9418	17.24	22.0049071
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01.05.2015 15:48:18.7	277.68	511.4	0.9495	17.28	22.0946783
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01.05.2015 15:48:18.9	279.53	511.4	0.8989	17.32	21.4978925
01.05.2015 15:48:19.0	279.52	511.3	0.8347	17.29	20.7159762
01.05.2015 15:48:19.1	281.56	511.3	0.8836	17.3	21.3141516
01.05.2015 15:48:19.2	282.33	511.3	0.8909	17.32	21.4020156
01.05.2015 15:48:19.3	282.05	511.2	0.7618	17.37	19.7906784
01.05.2015 15:48:19.4	282.36	511.1	0.6786	17.28	18.6787206
01.05.2015 15:48:19.5	285.42	511.1	0.8304	17.28	20.6625476
01.05.2015 15:48:19.6	285.1	511	0.8197	17.32	20.5289939
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01.05.2015 15:48:19.8	286.43	510.8	0.8081	17.31	20.3832181
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01.05.2015 15:48:20.0	287.67	510.8	0.7438	17.34	19.5554712
01.05.2015 15:48:20.1	287.75	510.7	0.6452	17.4	18.213247
01.05.2015 15:48:20.2	290.16	510.8	0.809	17.27	20.3945655
01.05.2015 15:48:20.3	290.27	510.9	0.7421	17.23	19.5331108
01.05.2015 15:48:20.4	290.25	510.9	0.777	17.39	19.9871424
01.05.2015 15:48:20.5	291	510.8	0.6998	17.36	18.9682457
01.05.2015 15:48:20.6	292.75	510.8	0.7999	17.32	20.2795375
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01.05.2015 15:48:20.8	292.54	511	0.7195	17.29	19.2333793
01.05.2015 15:48:20.9	292.44	510.9	0.7325	17.33	19.4063568
01.05.2015 15:48:21.0	292.62	511.1	0.8069	17.28	20.3680783
01.05.2015 15:48:21.1	292.75	511.2	0.8327	17.29	20.6911429
01.05.2015 15:48:21.2	292.46	511.2	0.7294	17.35	19.3652486
01.05.2015 15:48:21.3	292.38	511.1	0.793	17.32	20.1918816
01.05.2015 15:48:21.4	292.82	511.2	0.6428	17.24	18.1793408

01.05.2015 15:48:21.5	292.76	511.3	0.6959	17.32	18.9153166
01.05.2015 15:48:21.6	292.45	511.2	0.7972	17.38	20.2452825
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01.05.2015 15:48:21.8	292.82	511.3	0.7796	17.26	20.020555
01.05.2015 15:48:21.9	292.45	511.4	0.9181	17.34	21.7262709
01.05.2015 15:48:22.0	292.59	511.3	0.8869	17.36	21.3539157
01.05.2015 15:48:22.1	292.46	511.3	0.8049	17.26	20.3428202
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01.05.2015 15:48:22.3	292.53	511.3	0.7495	17.33	19.6302584
01.05.2015 15:48:22.4	292.59	511.3	0.7864	17.36	20.1076793
01.05.2015 15:48:22.5	292.43	511.3	0.7841	17.27	20.0782531
01.05.2015 15:48:22.6	292.66	511.4	0.7455	17.25	19.577806
01.05.2015 15:48:22.7	292.55	511.3	0.731	17.33	19.3864766
01.05.2015 15:48:22.8	292.45	511.2	0.6329	17.35	18.0388042
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01.05.2015 15:48:23.3	292.77	511.2	0.714	17.31	19.1597264
01.05.2015 15:48:23.4	291.62	511.2	0.7951	17.3	20.2185997
01.05.2015 15:48:23.5	290.51	511.1	0.9075	17.37	21.6004856
01.05.2015 15:48:23.6	290.74	511.1	0.8464	17.31	20.860659
01.05.2015 15:48:23.7	290.08	511.2	0.8109	17.24	20.4185006
01.05.2015 15:48:23.8	287.61	511.1	0.8167	17.33	20.4913926
01.05.2015 15:48:23.9	287.9	511.1	0.836	17.38	20.732102
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01.05.2015 15:48:24.2	285.6	511.1	0.8929	17.34	21.4260251
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01.05.2015 15:48:24.5	282.65	511.2	0.8948	17.24	21.4488091
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01.05.2015 15:48:24.7	282.75	511.2	0.8304	17.34	20.6625476
01.05.2015 15:48:24.8	280.23	511.2	0.9225	17.29	21.7782703
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01.05.2015 15:48:25.2	277.44	511.2	1.0576	17.29	23.3185165
01.05.2015 15:48:25.3	277.75	511.2	1.0894	17.29	23.6664917
01.05.2015 15:48:25.4	277.34	511	0.9896	17.32	22.5564131
01.05.2015 15:48:25.5	274.83	511.1	1.0273	17.33	22.982054
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01.05.2015 15:48:25.7	275.01	511.3	1.0893	17.31	23.6654054
01.05.2015 15:48:25.8	273.77	511.2	0.9492	17.35	22.0911875
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01.05.2015 15:48:26.1	272.36	511.5	1.1537	17.35	24.3549164
01.05.2015 15:48:26.2	270.03	511.4	0.9819	17.38	22.4684869
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01.05.2015 15:48:26.4	269.93	511.6	1.0485	17.23	23.217979
01.05.2015 15:48:26.5	269.15	511.6	1.1733	17.34	24.5609258
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01.05.2015 15:48:28.3	255.58	512.1	1.2187	17.22	25.0315996
01.05.2015 15:48:28.4	253.76	512.1	1.1301	17.31	24.1045282
01.05.2015 15:48:28.5	253.98	512	1.0484	17.35	23.2168718

01.05.2015 15:48:28.6	253.75	512.2	1.0498	17.3	23.2323682
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01.05.2015 15:48:28.8	251.01	512.3	1.098	17.34	23.7597227
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01.05.2015 15:48:29.1	248.37	512.5	1.1233	17.27	24.0318983
01.05.2015 15:48:29.2	248.42	512.5	1.1167	17.33	23.961194
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01.05.2015 15:48:29.4	245.78	512.4	1.0435	17.25	23.1625529
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01.05.2015 15:48:29.6	245.78	512.4	1.0093	17.34	22.7798224
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01.05.2015 15:48:30.1	240.5	512.4	1.1106	17.26	23.8956601
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01.05.2015 15:48:30.3	240.62	512.6	1.1459	17.33	24.2724467
01.05.2015 15:48:30.4	239.45	512.5	1.1598	17.36	24.4192179
01.05.2015 15:48:30.5	237.54	512.5	1.18	17.27	24.6309522
01.05.2015 15:48:30.6	237.83	512.7	1.1906	17.25	24.7413354
01.05.2015 15:48:30.7	237.72	512.7	1.2024	17.33	24.8636384
01.05.2015 15:48:30.8	235.39	512.6	1.1653	17.37	24.4770497
01.05.2015 15:48:30.9	235.21	512.7	1.0836	17.29	23.603407
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01.05.2015 15:48:31.2	232.24	512.8	1.1718	17.35	24.5452208
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01.05.2015 15:48:32.5	224.07	512.9	1.1589	17.25	24.4097414
01.05.2015 15:48:32.6	221.58	512.9	1.1266	17.37	24.0671725
01.05.2015 15:48:32.7	221.86	512.7	1.123	17.38	24.0286889
01.05.2015 15:48:32.8	221.81	512.8	1.2816	17.3	25.6694431
01.05.2015 15:48:32.9	219.39	512.9	1.2273	17.3	25.1197645
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01.05.2015 15:48:33.1	219	512.8	1.2099	17.33	24.9410616
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01.05.2015 15:48:33.7	214.09	513.1	1.1383	17.34	24.1918213
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01.05.2015 15:48:34.2	211.2	513	1.1971	17.4	24.8087803
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01.05.2015 15:48:34.7	205.88	513.2	1.0697	17.29	23.4515307
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01.05.2015 15:48:34.9	206.01	513.4	1.2666	17.33	25.5187818
01.05.2015 15:48:35.0	204.68	513.3	1.1681	17.31	24.506439
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01.05.2015 15:48:35.8	197.82	513.7	1.0718	17.28	23.4745391
01.05.2015 15:48:35.9	198.03	513.9	1.1731	17.23	24.5588324
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01.05.2015 15:48:36.4	193.42	514	1.0983	17.33	23.7629683
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01.05.2015 15:48:36.7	191.68	514.2	1.0558	17.27	23.2986644
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01.05.2015 15:49:20.6	-139.03	517.2	1.0367	17.74	23.0869598
01.05.2015 15:49:20.7	-139.07	517.2	1.1004	17.68	23.7856754
01.05.2015 15:49:20.8	-140.4	517.3	1.0869	17.64	23.6393206
01.05.2015 15:49:20.9	-141.68	517.3	0.9688	17.71	22.3181022
01.05.2015 15:49:21.0	-141.66	517.3	1.0754	17.82	23.5139296
01.05.2015 15:49:21.1	-141.72	517.3	0.8623	17.69	21.0556857
01.05.2015 15:49:21.2	-144.13	517.5	0.8808	17.63	21.2803541
01.05.2015 15:49:21.3	-144.16	517.5	0.9407	17.79	21.9920528
01.05.2015 15:49:21.4	-144.11	517.4	0.907	17.81	21.5945342
01.05.2015 15:49:21.5	-145.33	517.4	0.8979	17.66	21.4859313
01.05.2015 15:49:21.6	-147.31	517.6	0.8864	17.66	21.3478956
01.05.2015 15:49:21.7	-147.18	517.6	0.8228	17.74	20.5677762
01.05.2015 15:49:21.8	-147.18	517.5	0.8681	17.75	21.1263794
01.05.2015 15:49:21.9	-148.42	517.6	0.8986	17.73	21.4943049
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01.05.2015 15:49:22.1	-149.7	517.7	0.9219	17.8	21.7711868
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01.05.2015 15:49:22.3	-152.06	517.7	0.8856	17.75	21.3382599
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01.05.2015 15:49:22.6	-153.34	517.7	0.9058	17.73	21.5802442
01.05.2015 15:49:22.7	-155.37	517.7	0.9928	17.69	22.5928533
01.05.2015 15:49:22.8	-155.13	517.7	0.9248	17.75	21.8054025
01.05.2015 15:49:22.9	-155.49	517.6	0.921	17.85	21.7605572
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01.05.2015 15:49:23.2	-158.32	517.7	0.8432	17.77	20.8211875
01.05.2015 15:49:23.3	-158.24	517.6	0.8511	17.86	20.9184977
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01.05.2015 15:49:24.5	-169.54	517.7	0.8849	17.76	21.3298251
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01.05.2015 15:49:24.7	-169.2	517.8	0.9199	17.79	21.7475584
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01.05.2015 15:49:25.0	-171.78	517.9	0.8992	17.71	21.5014796
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01.05.2015 15:49:25.7	-177.52	517.9	1.0175	17.84	22.8721719
01.05.2015 15:49:25.8	-177.36	518	0.9212	17.78	21.7629198
01.05.2015 15:49:25.9	-178.19	518	0.9098	17.8	21.6278408
01.05.2015 15:49:26.0	-180.5	518	0.9813	17.78	22.4616211
01.05.2015 15:49:26.1	-180.29	518	0.9622	17.81	22.2419507
01.05.2015 15:49:26.2	-180.26	518.1	0.9006	17.78	21.5182113
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01.05.2015 15:49:26.4	-183.04	518	0.8562	17.8	20.9810785
01.05.2015 15:49:26.5	-182.87	518.1	0.8143	17.77	20.4612619
01.05.2015 15:49:26.6	-184.01	518.1	0.9124	17.79	21.6587224
01.05.2015 15:49:26.7	-185.68	518	0.9954	17.86	22.6224176
01.05.2015 15:49:26.8	-185.55	517.9	0.8473	17.81	20.8717469
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01.05.2015 15:49:27.0	-187.85	517.9	0.9751	17.85	22.3905507
01.05.2015 15:49:27.1	-188.12	517.8	0.9776	17.92	22.4192352
01.05.2015 15:49:27.2	-188.18	517.8	0.9659	17.78	22.2846737
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01.05.2015 15:49:27.4	-190.69	517.9	0.8291	17.87	20.6463676
01.05.2015 15:49:27.5	-190.67	517.8	0.8886	17.89	21.3743714
01.05.2015 15:49:27.6	-190.76	517.9	0.9982	17.82	22.654213
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01.05.2015 15:49:28.1	-196.3	518	0.8157	17.84	20.4788436
01.05.2015 15:49:28.2	-196.32	517.9	0.8298	17.86	20.6550815
01.05.2015 15:49:28.3	-196.39	517.9	0.8851	17.96	21.3322354
01.05.2015 15:49:28.4	-196.53	518	0.9115	17.8	21.6480376
01.05.2015 15:49:28.5	-199.02	517.9	0.8663	17.92	21.1044653
01.05.2015 15:49:28.6	-198.84	517.8	0.9579	17.95	22.1921962
01.05.2015 15:49:28.7	-198.9	517.8	0.9354	17.85	21.9300125
01.05.2015 15:49:28.8	-201.59	517.9	0.95	17.78	22.1004949
01.05.2015 15:49:28.9	-201.79	517.9	0.8601	17.89	21.0288087
01.05.2015 15:49:29.0	-201.81	517.8	0.7535	17.96	19.6825709
01.05.2015 15:49:29.1	-201.76	517.8	0.9435	17.81	22.0247582
01.05.2015 15:49:29.2	-204.41	517.8	0.8718	17.78	21.1713538
01.05.2015 15:49:29.3	-204.32	517.7	0.8391	17.91	20.7705051
01.05.2015 15:49:29.4	-204.43	517.6	0.7543	17.94	19.6930168
01.05.2015 15:49:29.5	-205.28	517.5	0.8042	17.81	20.3339725
01.05.2015 15:49:29.6	-207.08	517.6	0.9006	17.82	21.5182113
01.05.2015 15:49:29.7	-206.92	517.5	0.7861	17.88	20.1038435
01.05.2015 15:49:29.8	-206.94	517.3	0.9939	17.89	22.605366
01.05.2015 15:49:29.9	-208.24	517.3	1.0114	17.84	22.8035085
01.05.2015 15:49:30.0	-209.91	517.4	0.8297	17.85	20.6538369
01.05.2015 15:49:30.1	-209.77	517.3	0.8954	17.9	21.4559991
01.05.2015 15:49:30.2	-209.84	517.2	0.927	17.89	21.8313235
01.05.2015 15:49:30.3	-212.57	517.3	0.9785	17.83	22.4295527
01.05.2015 15:49:30.4	-212.75	517.2	0.9456	17.86	22.0492554
01.05.2015 15:49:30.5	-212.78	517.2	0.8968	17.94	21.4727663
01.05.2015 15:49:30.6	-214.45	517.2	0.9804	17.89	22.4513184
01.05.2015 15:49:30.7	-215.32	517.2	0.9679	17.84	22.3077332
01.05.2015 15:49:30.8	-215.28	517.3	0.9074	17.92	21.5992954
01.05.2015 15:49:30.9	-215.3	517.3	0.8579	17.97	21.0018973
01.05.2015 15:49:31.0	-217	517.3	0.9047	17.87	21.5671368
01.05.2015 15:49:31.1	-217.59	517.4	0.8254	17.81	20.6002471
01.05.2015 15:49:31.2	-217.58	517.4	0.9552	17.94	22.160898
01.05.2015 15:49:31.3	-217.6	517.3	0.9779	17.96	22.4226749
01.05.2015 15:49:31.4	-217.56	517.4	0.9347	17.88	21.9218054
01.05.2015 15:49:31.5	-217.57	517.6	0.9326	17.84	21.8971656
01.05.2015 15:49:31.6	-217.55	517.6	0.9282	17.92	21.8454492
01.05.2015 15:49:31.7	-217.57	517.5	0.9886	17.93	22.5450135
01.05.2015 15:49:31.8	-217.6	517.6	0.8508	17.89	20.9148107
01.05.2015 15:49:31.9	-217.61	517.8	0.8937	17.89	21.4356213
01.05.2015 15:49:32.0	-217.57	517.7	0.9648	17.95	22.2719809

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

$$y = -1.84055496E-14x^6 - 9.02559623E-13x^5 + 5.95900940E-10x^4 + 1.49658723E-07x^3 + 3.65115967E-05x^2 + 1.61609067E-03x + 2.16940642E+01$$

Please enter below Polynomial Coefficients

Order no	Coeff
6	-1.84055496E-14
5	-9.02559623E-13
4	5.95900940E-10
3	1.49658723E-07
2	3.65115967E-05
1	1.61609067E-03
0	2.16940642E+01

Actual Area	0.274324656	[m2]
Integrated area	0.274324656	[m2]
Area Error	0	[%]
Integrated Mass flow	2.432206294	[Kg/s]

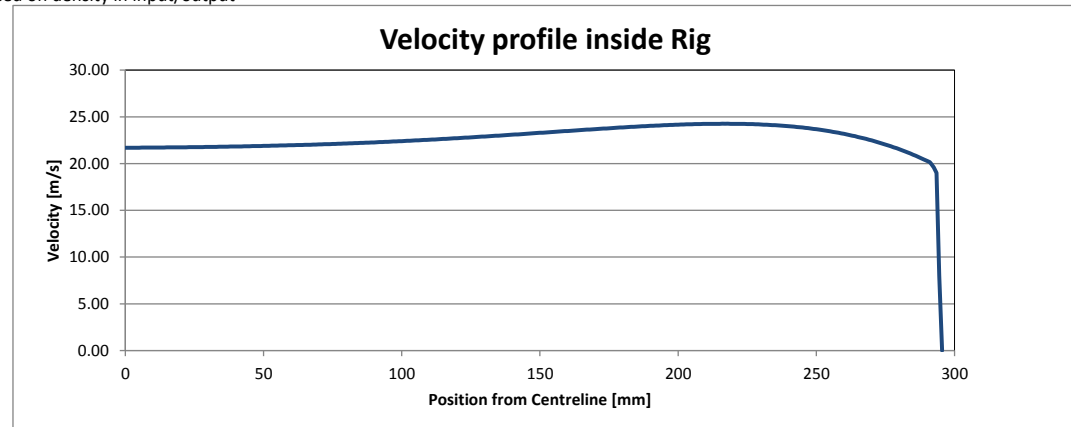
Polynomial curve (dP vs position)

Please do NOT alter any of the figures below

position [mm]	Velocity [m/s]
0	21.694064
1	21.695717
2	21.697444
3	21.699245
4	21.701122
5	21.703077
6	21.705108
7	21.707219
8	21.709409
9	21.711679
10	21.714032
11	21.716467
12	21.718986
13	21.721589
14	21.724279
15	21.727055
16	21.729919
17	21.732873
18	21.735917
19	21.739052
20	21.742279
21	21.745600
22	21.749016
23	21.752528
24	21.756137
25	21.759844
26	21.763651
27	21.767558
28	21.771567
29	21.775679
30	21.779895
31	21.784217
32	21.788646
33	21.793182

Delta Area [m2]	Delta Mass flow [Kg/s]
0	0
3.14159E-06	2.65139E-05
9.42478E-06	7.9548E-05
1.5708E-05	0.000132591
2.19911E-05	0.000185643
2.82743E-05	0.000238706
3.45575E-05	0.000291779
4.08407E-05	0.000344863
4.71239E-05	0.000397959
5.34071E-05	0.000451068
5.96903E-05	0.000504189
6.59734E-05	0.000557324
7.22566E-05	0.000610474
7.85398E-05	0.000663638
8.4823E-05	0.000716818
9.11062E-05	0.000770013
9.73894E-05	0.000823226
0.000103673	0.000876457
0.000109956	0.000929706
0.000116239	0.000982973
0.000122522	0.001036261
0.000128805	0.001089569
0.000135088	0.001142898
0.000141372	0.001196249
0.000147655	0.001249623
0.000153938	0.001303021
0.000160221	0.001356443
0.000166504	0.001409889
0.000172788	0.001463362
0.000179071	0.001516862
0.000185354	0.001570389
0.000191637	0.001623945
0.00019792	0.00167753
0.000204204	0.001731145

Based on density in input/output



34	21.797828
35	21.802584
36	21.807451
37	21.812432
38	21.817526
39	21.822736
40	21.828062
41	21.833506
42	21.839070
43	21.844753
44	21.850558
45	21.856486
46	21.862538
47	21.868715
48	21.875019
49	21.881450
50	21.888010
51	21.894700
52	21.901521
53	21.908475
54	21.915563
55	21.922785
56	21.930144
57	21.937639
58	21.945273
59	21.953046
60	21.960960
61	21.969015
62	21.977213
63	21.985555
64	21.994041
65	22.002673
66	22.011452
67	22.020379
68	22.029455
69	22.038680
70	22.048056
71	22.057583
72	22.067262
73	22.077095
74	22.087082
75	22.097223
76	22.107520
77	22.117973
78	22.128583
79	22.139351
80	22.150277
81	22.161361
82	22.172605
83	22.184009

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0.000417832	0.003579117
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181	23.887233
182	23.904496
183	23.921517

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0.000851372	0.007620877
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0.000870221	0.007809204
0.000876504	0.007872226
0.000882788	0.007935369
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0.000920487	0.008316728
0.00092677	0.008380693
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0.000951903	0.008637651
0.000958186	0.008702156
0.000964469	0.008766764
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0.000977035	0.008896276
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0.000989602	0.009026169
0.000995885	0.009091251
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0.001027301	0.009417902
0.001033584	0.009483457
0.001039867	0.009549079
0.00104615	0.009614763
0.001052434	0.009680506
0.001058717	0.009746303
0.001065	0.009812151
0.001071283	0.009878044
0.001077566	0.009943977
0.001083849	0.010009947
0.001090133	0.010075947
0.001096416	0.010141973
0.001102699	0.010208019
0.001108982	0.010274079
0.001115265	0.010340148
0.001121549	0.01040622
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0.001140398	0.01060439
0.001146681	0.010670409

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191	24.047544
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193	24.075763
194	24.089305
195	24.102448
196	24.115180
197	24.127485
198	24.139347
199	24.150752
200	24.161683
201	24.172125
202	24.182062
203	24.191477
204	24.200353
205	24.208673
206	24.216420
207	24.223577
208	24.230125
209	24.236045
210	24.241321
211	24.245933
212	24.249861
213	24.253087
214	24.255590
215	24.257351
216	24.258350
217	24.258565
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219	24.256561
220	24.254300
221	24.251169
222	24.247147
223	24.242211
224	24.236338
225	24.229505
226	24.221689
227	24.212865
228	24.203008
229	24.192096
230	24.180101
231	24.167000
232	24.152765
233	24.137372

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0.001165531	0.010868255
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0.001178097	0.010999901
0.00118438	0.011065625
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0.001196947	0.011196833
0.00120323	0.011262299
0.001209513	0.011327662
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0.00122208	0.011458037
0.001228363	0.011523031
0.001234646	0.011587882
0.001240929	0.01165258
0.001247212	0.011717113
0.001253495	0.011781472
0.001259779	0.011845644
0.001266062	0.011909619
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0.001278628	0.012036926
0.001284911	0.012100234
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0.001297478	0.012226096
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0.001310044	0.012350863
0.001316327	0.012412801
0.001322611	0.012474423
0.001328894	0.012535715
0.001335177	0.01259666
0.00134146	0.012657245
0.001347743	0.012717453
0.001354026	0.012777268
0.00136031	0.012836673
0.001366593	0.012895652
0.001372876	0.012954187
0.001379159	0.01301226
0.001385442	0.013069854
0.001391726	0.01312695
0.001398009	0.01318353
0.001404292	0.013239574
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0.001416858	0.013349975
0.001423141	0.013404291
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0.001441991	0.013563453
0.001448274	0.013615172
0.001454557	0.013666186
0.001460841	0.013716472

234	24.120794
235	24.103003
236	24.083973
237	24.063677
238	24.042085
239	24.019170
240	23.994903
241	23.969255
242	23.942196
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246	23.819251
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253	23.542603
254	23.496166
255	23.447898
256	23.397763
257	23.345725
258	23.291747
259	23.235794
260	23.177828
261	23.117811
262	23.055705
263	22.991472
264	22.925073
265	22.856468
266	22.785617
267	22.712479
268	22.637015
269	22.559181
270	22.478937
271	22.396240
272	22.311047
273	22.223315
274	22.132999
275	22.040056
276	21.944440
277	21.846106
278	21.745008
279	21.641100
280	21.534334
281	21.424662
282	21.312038
283	21.196411

0.001467124	0.013766006
0.001473407	0.013814764
0.001479669	0.013862722
0.001485973	0.013909855
0.001492257	0.013956136
0.00149854	0.014001541
0.001504823	0.014046043
0.001511106	0.014089614
0.001517389	0.014132226
0.001523672	0.014173853
0.001529956	0.014214465
0.001536239	0.014254034
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0.001548805	0.014329919
0.001555088	0.014366176
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0.001573938	0.014467821
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0.001605354	0.014611497
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0.00161792	0.01465915
0.001624203	0.014680726
0.001630487	0.014700753
0.00163677	0.01471919
0.001643053	0.014735999
0.001649336	0.014751139
0.001655619	0.014764571
0.001661903	0.014776251
0.001668186	0.014786139
0.001674469	0.014794191
0.001680752	0.014800364
0.001687035	0.014804614
0.001693318	0.014806896
0.001699602	0.014807163
0.001705885	0.01480537
0.001712168	0.014801469
0.001718451	0.014795412
0.001724734	0.014787151
0.001731018	0.014776636
0.001737301	0.014763817
0.001743584	0.014748642
0.001749867	0.01473106
0.00175615	0.014711018
0.001762433	0.014688462
0.001768717	0.014663338
0.001775	0.014635591

284	21.077734
285	20.955956
286	20.831026
287	20.702895
288	20.571510
289	20.436820
290	20.298773
291	20.157314
291.5	20.000000
292.5	19.600000
293.5	19.000000
294.5	8.000000
295.5	0.000000

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0.001793849	0.014536045
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0.001806416	0.014455513
0.001812699	0.014410817
0.001818982	0.014363088
0.001825265	0.014312262
0.000914989	0.007118613
0.00183469	0.013988411
0.001840973	0.013606634
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:

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

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

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

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