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LAMPIRAN

Lampiran 1. Tabel Hasil Pengamatan Pengujian

No	Head (m)	Beban (Kg)	Putaran (RPM)	Temperatur Air (^oC)	Debit (m^3/s)
1	Head 1,25m	0.1	110	27	0.00074
2		0.2	106	27	0.00074
3		0.3	103	27	0.00074
4		0.4	98	27	0.00074
5		0.5	94	27	0.00074
6		0.6	92	27	0.00074
7		0.7	88	27	0.00074
8		0.8	84	27	0.00074
9		0.9	78	27	0.00074
10		1	74	27	0.00074
11		1.1	68	27	0.00074
12		1.2	62	27	0.00074
13		1.3	55	27	0.00074
14		1.4	47	27	0.00074
15	Head 1,35m	0.1	116	27	0.00081
16		0.2	112	27	0.00081
17		0.3	108	27	0.00081
18		0.4	104	27	0.00081
19		0.5	100	27	0.00081
20		0.6	98	27	0.00081
21		0.7	94	27	0.00081
22		0.8	90	27	0.00081
23		0.9	84	27	0.00081
24		1	78	27	0.00081
25		1.1	72	27	0.00081
26		1.2	66	27	0.00081
27		1.3	59	27	0.00081
28		1.4	52	27	0.00081

29	Head 1,45m	0.1	122	27	0.00087
30		0.2	118	27	0.00087
31		0.3	114	27	0.00087
32		0.4	110	27	0.00087
33		0.5	106	27	0.00087
34		0.6	102	27	0.00087
35		0.7	99	27	0.00087
36		0.8	96	27	0.00087
37		0.9	90	27	0.00087
38		1	84	27	0.00087
39		1.1	79	27	0.00087
40		1.2	72	27	0.00087
41		1.3	65	27	0.00087
42		1.4	57	27	0.00087
43	Head 1,55m	0.1	126	27	0.00091
44		0.2	124	27	0.00091
45		0.3	120	27	0.00091
46		0.4	116	27	0.00091
47		0.5	112	27	0.00091
48		0.6	108	27	0.00091
49		0.7	104	27	0.00091
50		0.8	100	27	0.00091
51		0.9	96	27	0.00091
52		1	90	27	0.00091
53		1.1	84	27	0.00091
54		1.2	77	27	0.00091
55		1.3	70	27	0.00091
56		1.4	62	27	0.00091
57	Head 1,65 m	0.1	132	27	0.00094
58		0.2	128	27	0.00094
59		0.3	124	27	0.00094
60		0.4	120	27	0.00094
61		0.5	116	27	0.00094
62		0.6	112	27	0.00094
63		0.7	108	27	0.00094

64		0.8	104	27	0.00094
65		0.9	100	27	0.00094
66		1	94	27	0.00094
67		1.1	88	27	0.00094
68		1.2	82	27	0.00094
69		1.3	75	27	0.00094
70		1.4	66	27	0.00094

Lampiran 2. Tabel Hasil Perhitungan

No	Head (m)	Beban (Kg)	Kecepatan Aliran (m/s)	Torsi (Nm)	Kecepatan Sudut (Rad/s)	Daya Air (Watt)	Daya Kincir (Watt)	Efisiensi Turbin (%)
1	Head 1,25m	0.1	2.360	0.044	11.513	9.054	0.508	5.613
2		0.2	2.360	0.088	11.095	9.054	0.980	10.819
3		0.3	2.360	0.132	10.781	9.054	1.428	15.769
4		0.4	2.360	0.177	10.257	9.054	1.811	20.004
5		0.5	2.360	0.221	9.839	9.054	2.172	23.985
6		0.6	2.360	0.265	9.629	9.054	2.551	28.169
7		0.7	2.360	0.309	9.211	9.054	2.846	31.435
8		0.8	2.360	0.353	8.792	9.054	3.105	34.293
9		0.9	2.360	0.397	8.164	9.054	3.244	35.824
10		1	2.360	0.441	7.745	9.054	3.419	37.763
11		1.1	2.360	0.486	7.117	9.054	3.456	38.172
12		1.2	2.360	0.530	6.489	9.054	3.438	37.968
13		1.3	2.360	0.574	5.757	9.054	3.304	36.488
14		1.4	2.360	0.618	4.919	9.054	3.040	33.579
15	Head 1,35m	0.1	2.580	0.044	12.141	10.693	0.536	5.012
16		0.2	2.580	0.088	11.723	10.693	1.035	9.679
17		0.3	2.580	0.132	11.304	10.693	1.497	14.000
18		0.4	2.580	0.177	10.885	10.693	1.922	17.976
19		0.5	2.580	0.221	10.467	10.693	2.310	21.605
20		0.6	2.580	0.265	10.257	10.693	2.717	25.408
21		0.7	2.580	0.309	9.839	10.693	3.040	28.433
22		0.8	2.580	0.353	9.420	10.693	3.327	31.112

23		0.9	2.580	0.397	8.792	10.693	3.493	32.667
24		1	2.580	0.441	8.164	10.693	3.604	33.704
25		1.1	2.580	0.486	7.536	10.693	3.659	34.223
26		1.2	2.580	0.530	6.908	10.693	3.659	34.223
27		1.3	2.580	0.574	6.175	10.693	3.544	33.143
28		1.4	2.580	0.618	5.443	10.693	3.364	31.457
29		0.1	2.771	0.044	12.769	12.333	0.564	4.571
30		0.2	2.771	0.088	12.351	12.333	1.090	8.842
31		0.3	2.771	0.132	11.932	12.333	1.580	12.813
32		0.4	2.771	0.177	11.513	12.333	2.033	16.485
33		0.5	2.771	0.221	11.095	12.333	2.449	19.857
34		0.6	2.771	0.265	10.676	12.333	2.828	22.929
35	Head	0.7	2.771	0.309	10.362	12.333	3.202	25.964
36	1,45m	0.8	2.771	0.353	10.048	12.333	3.549	28.774
37		0.9	2.771	0.397	9.420	12.333	3.743	30.347
38		1	2.771	0.441	8.792	12.333	3.881	31.471
39		1.1	2.771	0.486	8.269	12.333	4.015	32.558
40		1.2	2.771	0.530	7.536	12.333	3.992	32.371
41		1.3	2.771	0.574	6.803	12.333	3.904	31.659
42		1.4	2.771	0.618	5.966	12.333	3.687	29.898
43		0.1	2.910	0.044	13.188	13.847	0.582	4.204
44		0.2	2.910	0.088	12.979	13.847	1.146	8.275
45		0.3	2.910	0.132	12.560	13.847	1.663	12.012
46		0.4	2.910	0.177	12.141	13.847	2.144	15.483
47		0.5	2.910	0.221	11.723	13.847	2.587	18.686
48		0.6	2.910	0.265	11.304	13.847	2.994	21.622
49	Head	0.7	2.910	0.309	10.885	13.847	3.364	24.292
50	1,55m	0.8	2.910	0.353	10.467	13.847	3.696	26.694
51		0.9	2.910	0.397	10.048	13.847	3.992	28.830
52		1	2.910	0.441	9.420	13.847	4.158	30.031
53		1.1	2.910	0.486	8.792	13.847	4.269	30.832
54		1.2	2.910	0.530	8.059	13.847	4.269	30.832
55		1.3	2.910	0.574	7.327	13.847	4.205	30.365
56		1.4	2.910	0.618	6.489	13.847	4.011	28.963
57		0.1	2.985	0.044	13.816	15.120	0.610	4.034

58	Head 1,65m	0.2	2.985	0.088	13.397	15.120	1.183	7.823
59		0.3	2.985	0.132	12.979	15.120	1.719	11.368
60		0.4	2.985	0.177	12.560	15.120	2.218	14.668
61		0.5	2.985	0.221	12.141	15.120	2.680	17.724
62		0.6	2.985	0.265	11.723	15.120	3.105	20.536
63		0.7	2.985	0.309	11.304	15.120	3.493	23.103
64		0.8	2.985	0.353	10.885	15.120	3.844	25.425
65		0.9	2.985	0.397	10.467	15.120	4.158	27.503
66		1	2.985	0.441	9.839	15.120	4.343	28.726
67		1.1	2.985	0.486	9.211	15.120	4.473	29.581
68		1.2	2.985	0.530	8.583	15.120	4.547	30.070
69		1.3	2.985	0.574	7.850	15.120	4.505	29.795
70		1.4	2.985	0.618	6.908	15.120	4.269	28.237

Lampiran 3. Tabel Hasil Perhitungan Segitiga Kecepatan

No	Head (m)	Beban (Kg)	Kecepatan Masuk (m/s)	Kecepatan Putar Turbin (m/s)	Kecepatan Keluar (m/s)
1	Head 1,25m	0.1	2.360	1.497	0.863
2		0.2	2.360	1.442	0.917
3		0.3	2.360	1.401	0.958
4		0.4	2.360	1.333	1.026
5		0.5	2.360	1.279	1.081
6		0.6	2.360	1.252	1.108
7		0.7	2.360	1.197	1.162
8		0.8	2.360	1.143	1.217
9		0.9	2.360	1.061	1.298
10		1	2.360	1.007	1.353
11		1.1	2.360	0.925	1.434
12		1.2	2.360	0.844	1.516
13		1.3	2.360	0.748	1.611
14		1.4	2.360	0.640	1.720
15	Head 1,35m	0.1	2.580	1.578	1.002
16		0.2	2.580	1.524	1.056
17		0.3	2.580	1.470	1.111
18		0.4	2.580	1.415	1.165
19		0.5	2.580	1.361	1.220
20		0.6	2.580	1.333	1.247
21		0.7	2.580	1.279	1.301
22		0.8	2.580	1.225	1.356
23		0.9	2.580	1.143	1.437
24		1	2.580	1.061	1.519
25		1.1	2.580	0.980	1.601
26		1.2	2.580	0.898	1.682
27		1.3	2.580	0.803	1.778
28		1.4	2.580	0.708	1.873
29	Head 1,45m	0.1	2.771	1.660	1.111
30		0.2	2.771	1.606	1.165

31		0.3	2.771	1.551	1.220
32		0.4	2.771	1.497	1.274
33		0.5	2.771	1.442	1.328
34		0.6	2.771	1.388	1.383
35		0.7	2.771	1.347	1.424
36		0.8	2.771	1.306	1.465
37		0.9	2.771	1.225	1.546
38		1	2.771	1.143	1.628
39		1.1	2.771	1.075	1.696
40		1.2	2.771	0.980	1.791
41		1.3	2.771	0.884	1.886
42		1.4	2.771	0.776	1.995
43	Head 1,55m	0.1	2.910	1.714	1.196
44		0.2	2.910	1.687	1.223
45		0.3	2.910	1.633	1.278
46		0.4	2.910	1.578	1.332
47		0.5	2.910	1.524	1.386
48		0.6	2.910	1.470	1.441
49		0.7	2.910	1.415	1.495
50		0.8	2.910	1.361	1.550
51		0.9	2.910	1.306	1.604
52		1	2.910	1.225	1.686
53		1.1	2.910	1.143	1.767
54		1.2	2.910	1.048	1.863
55		1.3	2.910	0.952	1.958
56		1.4	2.910	0.844	2.067
57	Head 1,65m	0.1	2.985	1.796	1.189
58		0.2	2.985	1.742	1.244
59		0.3	2.985	1.687	1.298
60		0.4	2.985	1.633	1.352
61		0.5	2.985	1.578	1.407
62		0.6	2.985	1.524	1.461
63		0.7	2.985	1.470	1.516
64		0.8	2.985	1.415	1.570
65		0.9	2.985	1.361	1.625

66		1	2.985	1.279	1.706
67		1.1	2.985	1.197	1.788
68		1.2	2.985	1.116	1.870
69		1.3	2.985	1.021	1.965
70		1.4	2.985	0.898	2.087

Lampiran 4. Tabel Densitas Air Berdasarkan Temperatur (Pell & Dunson, 1997)

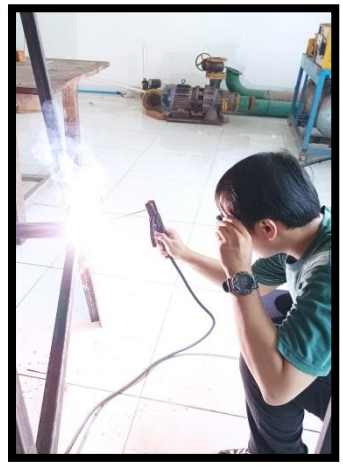
TABLE 2-28 Density (kg/m³) of Water from 0 to 100°C*

	ρ, kg/m³									
t, °C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	999.839	999.846	999.852	999.859	999.865	999.871	999.877	999.882	999.888	999.893
1	999.898	999.903	999.908	999.913	999.917	999.921	999.925	999.929	999.933	999.936
2	999.940	999.943	999.946	999.949	999.952	999.954	999.956	999.959	999.961	999.962
3	999.964	999.966	999.967	999.968	999.969	999.970	999.971	999.971	999.972	999.972
4	999.972	999.972	999.972	999.971	999.971	999.970	999.969	999.968	999.967	999.965
5	999.964	999.962	999.960	999.958	999.956	999.954	999.951	999.949	999.946	999.943
6	999.940	999.937	999.934	999.930	999.926	999.923	999.919	999.915	999.910	999.906
7	999.901	999.897	999.892	999.887	999.882	999.877	999.871	999.866	999.860	999.854
8	999.848	999.842	999.836	999.829	999.823	999.816	999.809	999.802	999.795	999.788
9	999.781	999.773	999.765	999.758	999.750	999.742	999.734	999.725	999.717	999.708
10	999.699	999.691	999.682	999.672	999.663	999.654	999.644	999.635	999.625	999.615
11	999.605	999.595	999.584	999.574	999.563	999.553	999.542	999.531	999.520	999.509
12	999.497	999.486	999.474	999.462	999.451	999.439	999.426	999.414	999.402	999.389
13	999.377	999.364	999.351	999.338	999.325	999.312	999.299	999.285	999.272	999.258
14	999.244	999.230	999.216	999.202	999.188	999.173	999.159	999.144	999.129	999.114
15	999.099	999.084	999.069	999.054	999.038	999.022	999.007	998.991	998.975	998.958
16	998.943	998.926	998.910	998.894	998.877	998.860	998.843	998.826	998.809	998.792
17	998.775	998.757	998.740	998.722	998.704	998.686	998.668	998.650	998.632	998.614
18	998.595	998.577	998.558	998.539	998.520	998.502	998.482	998.463	998.444	998.425
19	998.405	998.385	998.366	998.346	998.326	998.306	998.286	998.265	998.245	998.224
20	998.204	998.183	998.162	998.141	998.120	998.099	998.078	998.057	998.035	998.014
21	997.992	997.971	997.949	997.927	997.905	997.883	997.860	997.838	997.816	997.793
22	997.770	997.747	997.725	997.702	997.679	997.656	997.632	997.609	997.585	997.562
23	997.538	997.515	997.491	997.467	997.443	997.419	997.394	997.370	997.345	997.321
24	997.296	997.272	997.247	997.222	997.197	997.172	997.146	997.121	997.096	997.070
25	997.045	997.019	996.993	996.967	996.941	996.915	996.889	996.863	996.836	996.810
26	996.783	996.757	996.730	996.703	996.676	996.649	996.622	996.595	996.568	996.540
27	996.513	996.485	996.458	996.430	996.402	996.374	996.346	996.318	996.290	996.262
28	996.233	996.205	996.176	996.148	996.119	996.090	996.061	996.032	996.003	995.974
29	995.945	995.915	995.886	995.856	995.827	995.797	995.767	995.737	995.707	995.677
30	995.647	995.617	995.586	995.556	995.526	995.495	995.464	995.433	995.403	995.372
31	995.341	995.310	995.278	995.247	995.216	995.184	995.153	995.121	995.090	995.058
32	995.026	994.997	994.962	994.930	994.898	994.865	994.833	994.801	994.768	994.735
33	994.703	994.670	994.637	994.604	994.571	994.538	994.505	994.472	994.438	994.405
34	994.371	994.338	994.304	994.270	994.236	994.202	994.168	994.134	994.100	994.066
35	994.032	993.997	993.963	993.928	993.893	993.859	993.824	993.789	993.754	993.719
36	993.684	993.648	993.613	993.578	993.543	993.507	993.471	993.436	993.400	993.364
37	993.328	993.292	993.256	993.220	993.184	993.148	993.111	993.075	993.038	993.002
38	992.965	992.928	992.891	992.855	992.818	992.780	992.743	992.706	992.669	992.631
39	992.594	992.557	992.519	992.481	992.444	992.406	992.368	992.330	992.292	992.254
40	992.215	992.177	992.139	992.100	992.062	992.023	991.985	991.946	991.907	992.868
41	991.830	991.791	991.751	991.712	992.673	991.634	991.594	991.555	991.515	991.476
42	991.436	991.396	991.357	991.317	991.277	991.237	991.197	991.157	991.116	991.076
43	991.036	990.995	990.955	990.914	990.873	990.833	990.792	990.751	990.710	990.669
44	990.628	990.587	990.546	990.504	990.463	990.421	990.380	990.338	990.297	990.255
45	990.213	990.171	990.129	990.087	990.045	990.003	989.961	989.919	989.876	989.834
46	989.792	989.749	989.706	989.664	989.621	989.578	989.535	989.492	989.449	989.406
47	989.363	989.320	989.276	989.233	989.190	989.146	989.103	989.059	989.015	988.971
48	988.928	988.884	988.840	988.796	988.752	988.707	988.663	988.619	988.574	988.530
49	988.485	988.441	988.396	988.352	988.307	988.262	988.217	988.172	988.127	988.082

*From "Water: Density at Atmospheric Pressure and Temperatures from 0 to 100°C," *Tables of Standard Handbook Data*, Standartov, Moscow, 1978. To conserve space, only a few tables of density values are given. The reader is reminded that density values may be found as the reciprocal of the specific volume values tabulated in the "Thermodynamic Properties: Tables" subsection.

Lampiran 5. Dokumentasi

1. Pembuatan Alat



2. Pengukuran Head Aliran

3. Pengambilan Data