

LAMPIRAN

Tabel L.1 Jadwal Penelitian

No.	Urutan Penelitian	Bulan ke-					
		I	II	III	IV	V	VI
1.	Tinjauan Pustaka						
2.	Seminar Proposal tugas akhir						
3.	Persiapan alat dan bahan turbin angin Savonius dua sudu dengan variasi diameter <i>dimple</i>						
4.	Pembuatan alat penelitian turbin angin Savonius dua sudu dengan <i>dimple</i> variasi diameter <i>dimple</i>						
5.	Pengambilan data						
6.	Pengolahan data dan analisa data						
7.	Seminar hasil						
8.	Ujian						

Tabel L. 2 Sifat- sifat Zat

894 FLUID MECHANICS							
TABLE A-9							
Properties of air at 1 atm pressure							
Temp. $T, ^\circ\text{C}$	Density $\rho, \text{kg/m}^3$	Specific Heat c_p $\text{J/kg} \cdot \text{K}$	Thermal Conductivity $k, \text{W/m} \cdot \text{K}$	Thermal Diffusivity $\alpha, \text{m}^2/\text{s}$	Dynamic Viscosity $\mu, \text{kg/m} \cdot \text{s}$	Kinematic Viscosity $\nu, \text{m}^2/\text{s}$	Prandtl Number Pr
-150	2.866	983	0.01171	4.158×10^{-6}	8.636×10^{-6}	3.013×10^{-6}	0.7246
-100	2.038	966	0.01582	8.036×10^{-6}	1.189×10^{-5}	5.837×10^{-6}	0.7263
-50	1.582	999	0.01979	1.252×10^{-5}	1.474×10^{-5}	9.319×10^{-6}	0.7440
-40	1.514	1002	0.02057	1.356×10^{-5}	1.527×10^{-5}	1.008×10^{-5}	0.7436
-30	1.451	1004	0.02134	1.465×10^{-5}	1.579×10^{-5}	1.087×10^{-5}	0.7425
-20	1.394	1005	0.02211	1.578×10^{-5}	1.630×10^{-5}	1.169×10^{-5}	0.7408
-10	1.341	1006	0.02288	1.696×10^{-5}	1.680×10^{-5}	1.252×10^{-5}	0.7387
0	1.292	1006	0.02364	1.818×10^{-5}	1.729×10^{-5}	1.338×10^{-5}	0.7362
5	1.269	1006	0.02401	1.880×10^{-5}	1.754×10^{-5}	1.382×10^{-5}	0.7350
10	1.246	1006	0.02439	1.944×10^{-5}	1.778×10^{-5}	1.426×10^{-5}	0.7336
15	1.225	1007	0.02476	2.009×10^{-5}	1.802×10^{-5}	1.470×10^{-5}	0.7323
20	1.204	1007	0.02514	2.074×10^{-5}	1.825×10^{-5}	1.516×10^{-5}	0.7309
25	1.184	1007	0.02551	2.141×10^{-5}	1.849×10^{-5}	1.562×10^{-5}	0.7296
30	1.164	1007	0.02588	2.208×10^{-5}	1.872×10^{-5}	1.608×10^{-5}	0.7282
35	1.145	1007	0.02625	2.277×10^{-5}	1.895×10^{-5}	1.655×10^{-5}	0.7268
40	1.127	1007	0.02662	2.346×10^{-5}	1.918×10^{-5}	1.702×10^{-5}	0.7255
45	1.109	1007	0.02699	2.416×10^{-5}	1.941×10^{-5}	1.750×10^{-5}	0.7241
50	1.092	1007	0.02735	2.487×10^{-5}	1.963×10^{-5}	1.798×10^{-5}	0.7228
60	1.059	1007	0.02808	2.632×10^{-5}	2.008×10^{-5}	1.896×10^{-5}	0.7202
70	1.028	1007	0.02881	2.780×10^{-5}	2.052×10^{-5}	1.995×10^{-5}	0.7177
80	0.9994	1008	0.02953	2.931×10^{-5}	2.096×10^{-5}	2.097×10^{-5}	0.7154
90	0.9718	1008	0.03024	3.086×10^{-5}	2.139×10^{-5}	2.201×10^{-5}	0.7132
100	0.9458	1009	0.03095	3.243×10^{-5}	2.181×10^{-5}	2.306×10^{-5}	0.7111
120	0.8977	1011	0.03235	3.565×10^{-5}	2.264×10^{-5}	2.522×10^{-5}	0.7073
140	0.8542	1013	0.03374	3.898×10^{-5}	2.345×10^{-5}	2.745×10^{-5}	0.7041
160	0.8148	1016	0.03511	4.241×10^{-5}	2.420×10^{-5}	2.975×10^{-5}	0.7014
180	0.7788	1019	0.03646	4.593×10^{-5}	2.504×10^{-5}	3.212×10^{-5}	0.6992
200	0.7459	1023	0.03779	4.954×10^{-5}	2.577×10^{-5}	3.455×10^{-5}	0.6974
250	0.6746	1033	0.04104	5.890×10^{-5}	2.760×10^{-5}	4.091×10^{-5}	0.6946
300	0.6158	1044	0.04418	6.871×10^{-5}	2.934×10^{-5}	4.765×10^{-5}	0.6935
350	0.5664	1056	0.04721	7.892×10^{-5}	3.101×10^{-5}	5.475×10^{-5}	0.6937
400	0.5243	1069	0.05015	8.951×10^{-5}	3.261×10^{-5}	6.219×10^{-5}	0.6948
450	0.4880	1081	0.05298	1.004×10^{-4}	3.415×10^{-5}	6.997×10^{-5}	0.6965
500	0.4565	1093	0.05572	1.117×10^{-4}	3.563×10^{-5}	7.806×10^{-5}	0.6986
600	0.4042	1115	0.06093	1.352×10^{-4}	3.846×10^{-5}	9.515×10^{-5}	0.7037
700	0.3627	1135	0.06581	1.598×10^{-4}	4.111×10^{-5}	1.133×10^{-4}	0.7092
800	0.3289	1153	0.07037	1.855×10^{-4}	4.362×10^{-5}	1.326×10^{-4}	0.7149
900	0.3008	1169	0.07465	2.122×10^{-4}	4.600×10^{-5}	1.529×10^{-4}	0.7206
1000	0.2772	1184	0.07868	2.398×10^{-4}	4.826×10^{-5}	1.741×10^{-4}	0.7260
1500	0.1990	1234	0.09599	3.908×10^{-4}	5.817×10^{-5}	2.922×10^{-4}	0.7478
2000	0.1553	1264	0.11113	5.664×10^{-4}	6.630×10^{-5}	4.270×10^{-4}	0.7539

Note: For ideal gases, the properties c_p , k , μ , and Pr are independent of pressure. The properties ρ , ν , and α at a pressure P (in atm) other than 1 atm are determined by multiplying the values of ρ at the given temperature by P and by dividing ν and α by P .

Source: Data generated from the EES software developed by S. A. Klein and F. L. Alvarado. Original sources: Keenan, Chao, Keyes, Gas Tables, Wiley, 198; and Thermophysical Properties of Matter, Vol. 3: Thermal Conductivity, Y. S. Touloukian, P. E. Liley, S. C. Saxena, Vol. 11: Viscosity, Y. S. Touloukian, S. C. Saxena, and P. Hestermanns, IFI/Plenum, NY, 1970, ISBN 0-306067020-8.

Tabel L.3 Pengukuran temperatur dan kecepatan angin dengan menggunakan anemometer data logger

NO	Kecepatan angin (m/s)	Temperatur (°C)	Waktu	Tanggal
1	10,48	24	1:32:04 PM	14-Aug-25
2	10,47	24	1:32:05 PM	14-Aug-25
3	9,58	24	1:32:06 PM	14-Aug-25
4	9,60	24	1:32:08 PM	14-Aug-25
5	10,35	24	1:32:08 PM	14-Aug-25
6	10,26	24	1:32:10 PM	14-Aug-25
7	10,19	24	1:32:11 PM	14-Aug-25
8	9,83	24	1:32:12 PM	14-Aug-25
9	10,13	24	1:32:13 PM	14-Aug-25
10	10,13	24	1:32:14 PM	14-Aug-25
11	10,10	24	1:32:15 PM	14-Aug-25
12	9,68	24	1:32:16 PM	14-Aug-25
13	9,95	24	1:32:17 PM	14-Aug-25
14	9,91	24	1:32:18 PM	14-Aug-25
15	10,74	24	1:32:19 PM	14-Aug-25
16	10,51	24	1:32:20 PM	14-Aug-25
17	10,47	24	1:32:21 PM	14-Aug-25
18	10,06	24	1:32:22 PM	14-Aug-25
19	9,96	24	1:32:23 PM	14-Aug-25
20	9,79	24	1:32:24 PM	14-Aug-25
21	9,56	24	1:32:25 PM	14-Aug-25
21	9,55	24	1:32:26 PM	14-Aug-25
22	9,98	24	1:32:27 PM	14-Aug-25
23	9,84	24	1:32:28 PM	14-Aug-25
24	9,90	24	1:32:29 PM	14-Aug-25
25	10,41	24	1:32:30 PM	14-Aug-25
26	10,05	24	1:32:31 PM	14-Aug-25
27	10,08	24	1:32:32 PM	14-Aug-25
28	9,76	24	1:32:33 PM	14-Aug-25
29	9,87	24	1:32:34 PM	14-Aug-25
30	10,04	24	1:32:04 PM	14-Aug-25
	10,48	24		

Tabel L.4 Data pengukuran beban dan putaran turbin angin Savonius dengan tiga sudu variasi diameter tanpa *dimple*

	Tanpa <i>Dimple</i>									
	Tanpa beban		0,5 kg		1 kg		1,5 kg		2 kg	
No	Putaran	Tanggal/waktu	Putaran	Tanggal/waktu	Putaran	Tanggal/waktu	Putaran	Tanggal/waktu	Putaran	Tanggal/waktu
1	457,10	2025-08-14 12:43:40.102	416,20	2025-08-14 12:46:38.755	370,50	2025-08-14 12:48:43.966	326,10	2025-08-14 12:50:57.602	287,40	2025-08-14 12:53:05.994
2	457,20	2025-08-14 12:43:40.609	416,20	2025-08-14 12:46:39.258	370,50	2025-08-14 12:48:44.469	323,60	2025-08-14 12:50:58.091	288,10	2025-08-14 12:53:06.497
3	457,20	2025-08-14 12:43:41.094	416,20	2025-08-14 12:46:39.778	368,70	2025-08-14 12:48:44.973	323,60	2025-08-14 12:50:58.596	288,10	2025-08-14 12:53:07.000
4	456,50	2025-08-14 12:43:41.600	414,10	2025-08-14 12:46:40.248	368,70	2025-08-14 12:48:45.460	323,60	2025-08-14 12:50:59.101	288,10	2025-08-14 12:53:07.488
5	456,50	2025-08-14 12:43:42.106	414,10	2025-08-14 12:46:40.753	368,00	2025-08-14 12:48:45.963	321,70	2025-08-14 12:50:59.605	287,90	2025-08-14 12:53:07.993
6	455,80	2025-08-14 12:43:42.609	413,30	2025-08-14 12:46:41.257	368,00	2025-08-14 12:48:46.468	321,70	2025-08-14 12:51:00.108	287,90	2025-08-14 12:53:08.497
7	455,80	2025-08-14 12:43:43.112	413,30	2025-08-14 12:46:41.762	368,00	2025-08-14 12:48:46.971	321,50	2025-08-14 12:51:00.596	288,70	2025-08-14 12:53:09.000
8	455,30	2025-08-14 12:43:43.600	411,90	2025-08-14 12:46:42.249	368,00	2025-08-14 12:48:47.476	321,50	2025-08-14 12:51:01.101	288,70	2025-08-14 12:53:09.487
9	455,30	2025-08-14 12:43:44.104	411,90	2025-08-14 12:46:42.753	370,10	2025-08-14 12:48:47.963	322,60	2025-08-14 12:51:01.603	288,70	2025-08-14 12:53:09.992
10	456,40	2025-08-14 12:43:44.608	411,70	2025-08-14 12:46:43.256	370,10	2025-08-14 12:48:48.467	322,60	2025-08-14 12:51:02.108	290,70	2025-08-14 12:53:10.496
11	456,40	2025-08-14 12:43:45.112	411,70	2025-08-14 12:46:43.761	375,00	2025-08-14 12:48:48.971	326,00	2025-08-14 12:51:02.595	290,70	2025-08-14 12:53:10.999
12	457,90	2025-08-14 12:43:45.598	411,70	2025-08-14 12:46:44.248	375,00	2025-08-14 12:48:49.475	326,00	2025-08-14 12:51:03.099	292,40	2025-08-14 12:53:11.485
13	457,90	2025-08-14 12:43:46.103	413,20	2025-08-14 12:46:44.752	375,00	2025-08-14 12:48:49.961	329,70	2025-08-14 12:51:03.603	292,40	2025-08-14 12:53:11.991
14	456,40	2025-08-14 12:43:46.607	413,20	2025-08-14 12:46:45.255	377,70	2025-08-14 12:48:50.466	329,70	2025-08-14 12:51:04.106	292,40	2025-08-14 12:53:12.495
15	456,40	2025-08-14 12:43:47.111	414,30	2025-08-14 12:46:45.760	377,70	2025-08-14 12:48:50.970	329,70	2025-08-14 12:51:04.594	292,20	2025-08-14 12:53:12.998
16	454,30	2025-08-14 12:43:47.599	414,30	2025-08-14 12:46:46.263	377,30	2025-08-14 12:48:51.474	332,30	2025-08-14 12:51:05.098	292,20	2025-08-14 12:53:13.486
17	454,30	2025-08-14 12:43:48.102	416,00	2025-08-14 12:46:46.751	377,30	2025-08-14 12:48:51.961	332,30	2025-08-14 12:51:05.601	292,20	2025-08-14 12:53:13.985
18	451,80	2025-08-14 12:43:48.606	416,00	2025-08-14 12:46:47.254	376,50	2025-08-14 12:48:52.465	333,30	2025-08-14 12:51:06.105	289,80	2025-08-14 12:53:14.490
19	451,80	2025-08-14 12:43:49.109	419,20	2025-08-14 12:46:47.759	376,50	2025-08-14 12:48:52.969	333,30	2025-08-14 12:51:06.592	289,80	2025-08-14 12:53:15.013
20	449,00	2025-08-14 12:43:49.614	419,20	2025-08-14 12:46:48.261	375,90	2025-08-14 12:48:53.472	333,60	2025-08-14 12:51:07.097	287,70	2025-08-14 12:53:15.501
21	449,00	2025-08-14 12:43:50.102	419,20	2025-08-14 12:46:48.750	375,90	2025-08-14 12:48:53.976	333,60	2025-08-14 12:51:07.601	287,70	2025-08-14 12:53:15.989
22	447,80	2025-08-14 12:43:50.605	421,40	2025-08-14 12:46:49.254	375,90	2025-08-14 12:48:54.463	332,10	2025-08-14 12:51:08.105	287,70	2025-08-14 12:53:16.491
23	447,80	2025-08-14 12:43:51.104	421,40	2025-08-14 12:46:49.757	376,50	2025-08-14 12:48:54.968	332,10	2025-08-14 12:51:08.608	287,90	2025-08-14 12:53:16.996
24	447,80	2025-08-14 12:43:51.611	419,60	2025-08-14 12:46:50.261	376,50	2025-08-14 12:48:55.469	326,30	2025-08-14 12:51:09.095	287,90	2025-08-14 12:53:17.500
25	447,80	2025-08-14 12:43:52.099	419,60	2025-08-14 12:46:50.749	376,60	2025-08-14 12:48:55.976	326,30	2025-08-14 12:51:09.599	288,10	2025-08-14 12:53:17.987
26	449,20	2025-08-14 12:43:52.604	418,00	2025-08-14 12:46:51.252	376,60	2025-08-14 12:48:56.463	326,30	2025-08-14 12:51:10.102	288,10	2025-08-14 12:53:18.491
27	449,20	2025-08-14 12:43:53.106	418,00	2025-08-14 12:46:51.756	376,50	2025-08-14 12:48:56.966	321,90	2025-08-14 12:51:10.607	288,10	2025-08-14 12:53:18.995
28	450,50	2025-08-14 12:43:53.611	418,90	2025-08-14 12:46:52.259	376,50	2025-08-14 12:48:57.470	321,90	2025-08-14 12:51:11.093	287,90	2025-08-14 12:53:19.498
29	450,50	2025-08-14 12:43:54.106	418,90	2025-08-14 12:46:52.748	374,20	2025-08-14 12:48:57.974	321,40	2025-08-14 12:51:11.597	287,90	2025-08-14 12:53:19.986
30	450,90	2025-08-14 12:43:54.602	419,10	2025-08-14 12:46:53.252	374,20	2025-08-14 12:48:58.462	321,40	2025-08-14 12:51:12.101	286,80	2025-08-14 12:53:20.490
	453,33		416,06		373,80		326,59		289,14	

Tanpa Dimple										
No	2.5 kg		3 kg		3.5 kg		4 kg		4.5 kg	
	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	165,60	2025-08-13 12:34:39.171	117,40	2025-08-13 12:35:44.406	70,10	2025-08-13 12:59:24.859	51,05	2025-08-13 13:04:21.973	0	2025-08-13 13:07:00.622
2	165,30	2025-08-13 12:34:39.674	112,60	2025-08-13 12:35:44.904	72,10	2025-08-13 12:59:25.361	51,05	2025-08-13 13:04:22.460	0	2025-08-13 13:07:01.126
3	165,30	2025-08-13 12:34:40.160	112,60	2025-08-13 12:35:45.412	72,10	2025-08-13 12:59:25.867	52,05	2025-08-13 13:04:22.964	0	2025-08-13 13:07:01.613
4	165,30	2025-08-13 12:34:40.665	112,60	2025-08-13 12:35:45.900	72,80	2025-08-13 12:59:26.370	52,05	2025-08-13 13:04:23.468	0	2025-08-13 13:07:02.118
5	169,30	2025-08-13 12:34:41.170	110,70	2025-08-13 12:35:46.404	72,80	2025-08-13 12:59:26.858	53,04	2025-08-13 13:04:23.972	0	2025-08-13 13:07:02.621
6	169,30	2025-08-13 12:34:41.672	110,70	2025-08-13 12:35:46.908	72,80	2025-08-13 12:59:27.363	53,04	2025-08-13 13:04:24.476	0	2025-08-13 13:07:03.125
7	173,70	2025-08-13 12:34:42.192	112,50	2025-08-13 12:35:47.412	76,00	2025-08-13 12:59:27.866	53,04	2025-08-13 13:04:24.961	0	2025-08-13 13:07:03.613
8	173,70	2025-08-13 12:34:42.665	112,50	2025-08-13 12:35:47.899	76,00	2025-08-13 12:59:28.370	51,55	2025-08-13 13:04:25.467	0	2025-08-13 13:07:04.117
9	173,70	2025-08-13 12:34:43.168	112,50	2025-08-13 12:35:48.403	76,00	2025-08-13 12:59:28.873	51,55	2025-08-13 13:04:25.971	0	2025-08-13 13:07:04.620
10	178,80	2025-08-13 12:34:43.672	118,80	2025-08-13 12:35:48.908	79,70	2025-08-13 12:59:29.361	48,78	2025-08-13 13:04:26.475	0	2025-08-13 13:07:05.124
11	178,80	2025-08-13 12:34:44.175	118,80	2025-08-13 12:35:49.406	79,70	2025-08-13 12:59:29.865	48,78	2025-08-13 13:04:26.962	0	2025-08-13 13:07:05.628
12	180,00	2025-08-13 12:34:44.664	126,90	2025-08-13 12:35:49.898	79,70	2025-08-13 12:59:30.367	48,78	2025-08-13 13:04:27.467	0	2025-08-13 13:07:06.115
13	180,00	2025-08-13 12:34:45.168	126,90	2025-08-13 12:35:50.401	83,30	2025-08-13 12:59:30.872	45,90	2025-08-13 13:04:27.970	0	2025-08-13 13:07:06.619
14	180,00	2025-08-13 12:34:45.688	133,60	2025-08-13 12:35:50.906	83,30	2025-08-13 12:59:31.360	45,90	2025-08-13 13:04:28.474	0	2025-08-13 13:07:07.122
15	177,40	2025-08-13 12:34:46.175	133,60	2025-08-13 12:35:51.410	86,70	2025-08-13 12:59:31.864	45,90	2025-08-13 13:04:28.961	0	2025-08-13 13:07:07.627
16	177,40	2025-08-13 12:34:46.663	137,40	2025-08-13 12:35:51.913	86,70	2025-08-13 12:59:32.368	40,85	2025-08-13 13:04:29.480	0	2025-08-13 13:07:08.113
17	175,10	2025-08-13 12:34:47.166	137,40	2025-08-13 12:35:52.401	86,70	2025-08-13 12:59:32.872	40,85	2025-08-13 13:04:29.969	0	2025-08-13 13:07:08.618
18	175,10	2025-08-13 12:34:47.670	139,20	2025-08-13 12:35:52.904	86,40	2025-08-13 12:59:33.359	40,85	2025-08-13 13:04:30.473	0	2025-08-13 13:07:09.121
19	175,10	2025-08-13 12:34:48.174	139,20	2025-08-13 12:35:53.408	86,40	2025-08-13 12:59:33.863	38,53	2025-08-13 13:04:30.977	0	2025-08-13 13:07:09.625
20	168,90	2025-08-13 12:34:48.662	141,20	2025-08-13 12:35:53.910	86,40	2025-08-13 12:59:34.367	38,53	2025-08-13 13:04:31.465	0	2025-08-13 13:07:10.113
21	168,90	2025-08-13 12:34:49.164	141,20	2025-08-13 12:35:54.402	85,00	2025-08-13 12:59:34.869	38,53	2025-08-13 13:04:31.968	0	2025-08-13 13:07:10.616
22	160,70	2025-08-13 12:34:49.669	141,20	2025-08-13 12:35:54.899	85,00	2025-08-13 12:59:35.374	42,32	2025-08-13 13:04:32.472	0	2025-08-13 13:07:11.120
23	160,70	2025-08-13 12:34:50.172	138,60	2025-08-13 12:35:55.407	85,00	2025-08-13 12:59:35.861	42,32	2025-08-13 13:04:32.975	0	2025-08-13 13:07:11.625
24	156,00	2025-08-13 12:34:50.676	138,60	2025-08-13 12:35:55.911	83,70	2025-08-13 12:59:36.364	47,37	2025-08-13 13:04:33.463	0	2025-08-13 13:07:12.128
25	156,00	2025-08-13 12:34:51.165	131,40	2025-08-13 12:35:56.398	83,70	2025-08-13 12:59:36.868	47,37	2025-08-13 13:04:33.966	0	2025-08-13 13:07:12.615
26	154,20	2025-08-13 12:34:51.668	131,40	2025-08-13 12:35:56.902	81,80	2025-08-13 12:59:37.373	47,37	2025-08-13 13:04:34.470	0	2025-08-13 13:07:13.119
27	154,20	2025-08-13 12:34:52.172	122,70	2025-08-13 12:35:57.406	81,80	2025-08-13 12:59:37.859	52,94	2025-08-13 13:04:34.974	0	2025-08-13 13:07:13.622
28	154,50	2025-08-13 12:34:52.674	122,70	2025-08-13 12:35:57.910	81,80	2025-08-13 12:59:38.364	52,94	2025-08-13 13:04:35.462	0	2025-08-13 13:07:14.127
29	154,50	2025-08-13 12:34:53.162	122,70	2025-08-13 12:35:58.395	80,70	2025-08-13 12:59:38.900	57,90	2025-08-13 13:04:35.966	0	2025-08-13 13:07:14.614
30	154,50	2025-08-13 12:34:53.663	114,50	2025-08-13 12:35:58.901	80,70	2025-08-13 12:59:39.371	57,90	2025-08-13 13:04:36.470	0	2025-08-13 13:07:15.118
	168,07		125,74		80,50		47,97		0	

Tabel L.5 data pengukuran beban dan putaran turbin angin Savonius dengan tiga sudu variasi diameter 5 mm

Diameter 5												
Tanpa beban			0.5 kg		1 kg		1.5 kg		2 kg		2.5 kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	424,80	2025-08-13 13:09:09.995	379,60	2025-08-13 13:12:45.513	342,20	2025-08-13 13:14:39.569	290,00	2025-08-13 13:16:53.243	256,50	2025-08-13 13:19:08.654	214,00	2025-08-13 13:28:14.468
2	424,80	2025-08-13 13:09:10.498	379,60	2025-08-13 13:12:46.017	342,20	2025-08-13 13:14:40.073	290,00	2025-08-13 13:16:53.731	260,00	2025-08-13 13:19:09.157	215,20	2025-08-13 13:28:14.971
3	422,80	2025-08-13 13:09:10.986	377,60	2025-08-13 13:12:46.521	344,00	2025-08-13 13:14:40.579	291,30	2025-08-13 13:16:54.218	260,00	2025-08-13 13:19:09.660	215,20	2025-08-13 13:28:15.475
4	422,80	2025-08-13 13:09:11.490	377,60	2025-08-13 13:12:47.025	344,00	2025-08-13 13:14:41.066	291,30	2025-08-13 13:16:54.722	262,90	2025-08-13 13:19:10.164	217,10	2025-08-13 13:28:15.964
5	422,40	2025-08-13 13:09:11.994	375,00	2025-08-13 13:12:47.528	344,40	2025-08-13 13:14:41.570	292,10	2025-08-13 13:16:55.226	262,90	2025-08-13 13:19:10.668	217,10	2025-08-13 13:28:16.467
6	422,40	2025-08-13 13:09:12.499	375,00	2025-08-13 13:12:48.015	344,40	2025-08-13 13:14:42.075	292,10	2025-08-13 13:16:55.730	265,40	2025-08-13 13:19:11.157	216,00	2025-08-13 13:28:16.971
7	422,40	2025-08-13 13:09:12.986	375,20	2025-08-13 13:12:48.520	344,80	2025-08-13 13:14:42.578	292,90	2025-08-13 13:16:56.234	265,40	2025-08-13 13:19:11.660	216,00	2025-08-13 13:28:17.474
8	420,10	2025-08-13 13:09:13.489	375,20	2025-08-13 13:12:49.024	344,80	2025-08-13 13:14:43.082	292,90	2025-08-13 13:16:56.722	266,00	2025-08-13 13:19:12.164	213,10	2025-08-13 13:28:17.962
9	420,10	2025-08-13 13:09:13.993	377,20	2025-08-13 13:12:49.527	344,30	2025-08-13 13:14:43.569	293,50	2025-08-13 13:16:57.226	266,00	2025-08-13 13:19:12.650	213,10	2025-08-13 13:28:18.466
10	417,80	2025-08-13 13:09:14.497	377,20	2025-08-13 13:12:50.014	344,30	2025-08-13 13:14:44.088	293,50	2025-08-13 13:16:57.729	266,00	2025-08-13 13:19:13.155	213,10	2025-08-13 13:28:18.969
11	417,80	2025-08-13 13:09:15.000	377,20	2025-08-13 13:12:50.518	342,80	2025-08-13 13:14:44.577	294,60	2025-08-13 13:16:58.232	264,80	2025-08-13 13:19:13.659	212,00	2025-08-13 13:28:19.473
12	420,00	2025-08-13 13:09:15.488	379,20	2025-08-13 13:12:51.020	342,80	2025-08-13 13:14:45.081	294,60	2025-08-13 13:16:58.721	264,80	2025-08-13 13:19:14.163	212,00	2025-08-13 13:28:19.961
13	420,00	2025-08-13 13:09:15.992	379,20	2025-08-13 13:12:51.526	342,80	2025-08-13 13:14:45.567	296,10	2025-08-13 13:16:59.224	262,70	2025-08-13 13:19:14.666	213,10	2025-08-13 13:28:20.465
14	423,60	2025-08-13 13:09:16.495	381,20	2025-08-13 13:12:52.013	341,60	2025-08-13 13:14:46.072	296,10	2025-08-13 13:16:59.729	262,70	2025-08-13 13:19:15.154	213,10	2025-08-13 13:28:20.969
15	423,60	2025-08-13 13:09:16.999	381,20	2025-08-13 13:12:52.518	341,60	2025-08-13 13:14:46.576	296,10	2025-08-13 13:17:00.233	260,20	2025-08-13 13:19:15.658	214,80	2025-08-13 13:28:21.471
16	424,70	2025-08-13 13:09:17.487	382,90	2025-08-13 13:12:53.020	341,00	2025-08-13 13:14:47.076	297,70	2025-08-13 13:17:00.719	260,20	2025-08-13 13:19:16.162	214,80	2025-08-13 13:28:21.976
17	424,70	2025-08-13 13:09:17.991	382,90	2025-08-13 13:12:53.525	341,00	2025-08-13 13:14:47.566	297,70	2025-08-13 13:17:01.223	257,90	2025-08-13 13:19:16.665	216,50	2025-08-13 13:28:22.463
18	424,40	2025-08-13 13:09:18.495	382,90	2025-08-13 13:12:54.028	342,30	2025-08-13 13:14:48.071	298,10	2025-08-13 13:17:01.726	257,90	2025-08-13 13:19:17.150	216,50	2025-08-13 13:28:22.967
19	424,40	2025-08-13 13:09:18.998	384,40	2025-08-13 13:12:54.515	342,30	2025-08-13 13:14:48.570	298,10	2025-08-13 13:17:02.247	257,90	2025-08-13 13:19:17.657	218,30	2025-08-13 13:28:23.471
20	424,40	2025-08-13 13:09:19.485	384,40	2025-08-13 13:12:55.020	343,90	2025-08-13 13:14:49.078	297,30	2025-08-13 13:17:02.734	254,60	2025-08-13 13:19:18.160	218,30	2025-08-13 13:28:23.974
21	425,30	2025-08-13 13:09:19.989	386,80	2025-08-13 13:12:55.522	343,90	2025-08-13 13:14:49.582	297,30	2025-08-13 13:17:03.222	254,60	2025-08-13 13:19:18.664	218,90	2025-08-13 13:28:24.462
22	425,30	2025-08-13 13:09:20.493	386,80	2025-08-13 13:12:56.026	345,60	2025-08-13 13:14:50.069	297,30	2025-08-13 13:17:03.726	251,20	2025-08-13 13:19:19.152	218,90	2025-08-13 13:28:24.965
23	425,20	2025-08-13 13:09:20.996	385,70	2025-08-13 13:12:56.514	345,60	2025-08-13 13:14:50.573	297,70	2025-08-13 13:17:04.230	251,20	2025-08-13 13:19:19.655	216,90	2025-08-13 13:28:25.470
24	425,20	2025-08-13 13:09:21.483	385,70	2025-08-13 13:12:57.018	345,60	2025-08-13 13:14:51.077	297,70	2025-08-13 13:17:04.733	249,10	2025-08-13 13:19:20.177	216,90	2025-08-13 13:28:25.973
25	425,70	2025-08-13 13:09:21.988	385,70	2025-08-13 13:12:57.522	348,90	2025-08-13 13:14:51.581	300,40	2025-08-13 13:17:05.220	249,10	2025-08-13 13:19:20.663	213,60	2025-08-13 13:28:26.460
26	425,70	2025-08-13 13:09:22.493	382,50	2025-08-13 13:12:58.026	348,90	2025-08-13 13:14:52.068	300,40	2025-08-13 13:17:05.725	249,10	2025-08-13 13:19:21.167	213,60	2025-08-13 13:28:26.965
27	427,80	2025-08-13 13:09:22.996	382,50	2025-08-13 13:12:58.514	350,90	2025-08-13 13:14:52.588	302,00	2025-08-13 13:17:06.228	248,80	2025-08-13 13:19:21.654	210,60	2025-08-13 13:28:27.469
28	427,80	2025-08-13 13:09:23.495	379,70	2025-08-13 13:12:59.017	350,90	2025-08-13 13:14:53.076	302,00	2025-08-13 13:17:06.732	248,80	2025-08-13 13:19:22.158	210,60	2025-08-13 13:28:27.972
29	429,70	2025-08-13 13:09:24.003	379,70	2025-08-13 13:12:59.521	350,80	2025-08-13 13:14:53.578	302,00	2025-08-13 13:17:07.218	249,10	2025-08-13 13:19:22.661	211,00	2025-08-13 13:28:28.475
30	429,70	2025-08-13 13:09:24.493	374,90	2025-08-13 13:13:00.023	350,80	2025-08-13 13:14:54.066	299,70	2025-08-13 13:17:07.723	249,10	2025-08-13 13:19:23.165	211,00	2025-08-13 13:28:28.964
	423,85		380,49		344,78		296,08		257,83		214,71	

Diameter 5										
3 kg			3.5 kg		4 kg		4.5 kg		5 kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	169,70	2025-08-13 13:32:51.900	119,20	2025-08-13 13:36:08.233	80,90	2025-08-13 13:38:32.108	47,90	2025-08-13 13:41:34.642	0	2025-08-13 13:46:54.972
2	169,70	2025-08-13 13:32:52.388	119,20	2025-08-13 13:36:08.737	80,90	2025-08-13 13:38:32.611	47,90	2025-08-13 13:41:35.147	0	2025-08-13 13:46:55.460
3	167,10	2025-08-13 13:32:52.889	119,20	2025-08-13 13:36:09.241	79,20	2025-08-13 13:38:33.115	48,20	2025-08-13 13:41:35.650	0	2025-08-13 13:46:55.964
4	167,10	2025-08-13 13:32:53.395	122,90	2025-08-13 13:36:09.746	79,20	2025-08-13 13:38:33.618	48,20	2025-08-13 13:41:36.137	0	2025-08-13 13:46:56.467
5	166,20	2025-08-13 13:32:53.897	122,90	2025-08-13 13:36:10.249	79,20	2025-08-13 13:38:34.106	50,20	2025-08-13 13:41:36.642	0	2025-08-13 13:46:56.971
6	166,20	2025-08-13 13:32:54.386	122,90	2025-08-13 13:36:10.737	79,80	2025-08-13 13:38:34.610	50,20	2025-08-13 13:41:37.145	0	2025-08-13 13:46:57.458
7	166,20	2025-08-13 13:32:54.904	127,80	2025-08-13 13:36:11.242	79,80	2025-08-13 13:38:35.113	50,20	2025-08-13 13:41:37.648	0	2025-08-13 13:46:57.963
8	166,30	2025-08-13 13:32:55.394	127,80	2025-08-13 13:36:11.744	79,80	2025-08-13 13:38:35.619	52,90	2025-08-13 13:41:38.137	0	2025-08-13 13:46:58.466
9	166,30	2025-08-13 13:32:55.897	132,20	2025-08-13 13:36:12.248	79,30	2025-08-13 13:38:36.123	52,90	2025-08-13 13:41:38.641	0	2025-08-13 13:46:58.971
10	167,90	2025-08-13 13:32:56.401	132,20	2025-08-13 13:36:12.734	79,30	2025-08-13 13:38:36.609	52,90	2025-08-13 13:41:39.144	0	2025-08-13 13:46:59.458
11	167,90	2025-08-13 13:32:56.889	132,20	2025-08-13 13:36:13.240	79,50	2025-08-13 13:38:37.114	56,00	2025-08-13 13:41:39.648	0	2025-08-13 13:46:59.961
12	167,90	2025-08-13 13:32:57.393	133,30	2025-08-13 13:36:13.740	79,50	2025-08-13 13:38:37.617	56,00	2025-08-13 13:41:40.152	0	2025-08-13 13:47:00.465
13	170,30	2025-08-13 13:32:57.896	133,30	2025-08-13 13:36:14.246	79,50	2025-08-13 13:38:38.122	56,00	2025-08-13 13:41:40.640	0	2025-08-13 13:47:00.968
14	170,30	2025-08-13 13:32:58.400	130,70	2025-08-13 13:36:14.747	80,90	2025-08-13 13:38:38.616	59,10	2025-08-13 13:41:41.142	0	2025-08-13 13:47:01.473
15	171,40	2025-08-13 13:32:58.888	130,70	2025-08-13 13:36:15.233	80,90	2025-08-13 13:38:39.113	59,10	2025-08-13 13:41:41.647	0	2025-08-13 13:47:01.960
16	171,40	2025-08-13 13:32:59.392	130,70	2025-08-13 13:36:15.738	82,80	2025-08-13 13:38:39.616	59,10	2025-08-13 13:41:42.151	0	2025-08-13 13:47:02.464
17	173,70	2025-08-13 13:32:59.894	127,10	2025-08-13 13:36:16.244	82,80	2025-08-13 13:38:40.119	58,00	2025-08-13 13:41:42.638	0	2025-08-13 13:47:02.968
18	173,70	2025-08-13 13:33:00.397	127,10	2025-08-13 13:36:16.748	82,80	2025-08-13 13:38:40.607	58,00	2025-08-13 13:41:43.141	0	2025-08-13 13:47:03.470
19	173,40	2025-08-13 13:33:00.883	127,10	2025-08-13 13:36:17.232	84,10	2025-08-13 13:38:41.112	53,40	2025-08-13 13:41:43.645	0	2025-08-13 13:47:03.959
20	173,40	2025-08-13 13:33:01.384	125,20	2025-08-13 13:36:17.735	84,10	2025-08-13 13:38:41.614	53,40	2025-08-13 13:41:44.150	0	2025-08-13 13:47:04.462
21	173,40	2025-08-13 13:33:01.896	125,20	2025-08-13 13:36:18.239	84,50	2025-08-13 13:38:42.118	48,10	2025-08-13 13:41:44.637	0	2025-08-13 13:47:04.967
22	170,30	2025-08-13 13:33:02.395	125,50	2025-08-13 13:36:18.747	84,50	2025-08-13 13:38:42.605	48,10	2025-08-13 13:41:45.141	0	2025-08-13 13:47:05.472
23	170,30	2025-08-13 13:33:02.880	125,50	2025-08-13 13:36:19.236	84,50	2025-08-13 13:38:43.110	40,80	2025-08-13 13:41:45.645	0	2025-08-13 13:47:05.958
24	169,50	2025-08-13 13:33:03.386	125,50	2025-08-13 13:36:19.739	83,80	2025-08-13 13:38:43.614	40,80	2025-08-13 13:41:46.147	0	2025-08-13 13:47:06.461
25	169,50	2025-08-13 13:33:03.890	124,90	2025-08-13 13:36:20.243	83,80	2025-08-13 13:38:44.117	40,80	2025-08-13 13:41:46.651	0	2025-08-13 13:47:06.966
26	170,90	2025-08-13 13:33:04.392	124,90	2025-08-13 13:36:20.747	84,00	2025-08-13 13:38:44.621	32,60	2025-08-13 13:41:47.139	0	2025-08-13 13:47:07.469
27	170,90	2025-08-13 13:33:04.895	120,10	2025-08-13 13:36:21.235	84,00	2025-08-13 13:38:45.108	32,60	2025-08-13 13:41:47.643	0	2025-08-13 13:47:07.973
28	170,90	2025-08-13 13:33:05.383	120,10	2025-08-13 13:36:21.738	84,00	2025-08-13 13:38:45.611	32,60	2025-08-13 13:41:48.146	0	2025-08-13 13:47:08.460
29	173,50	2025-08-13 13:33:05.892	114,80	2025-08-13 13:36:22.242	87,70	2025-08-13 13:38:46.116	24,65	2025-08-13 13:41:48.651	0	2025-08-13 13:47:08.964
30	173,50	2025-08-13 13:33:06.396	114,80	2025-08-13 13:36:22.746	87,70	2025-08-13 13:38:46.620	24,65	2025-08-13 13:41:49.137	0	2025-08-13 13:47:09.468
	169,96		125,50		82,09		47,84		0	

Tabel L.6 data pengukuran beban dan putaran turbin angin Savonius dengan tiga sudu variasi diameter 7 mm

Diameter 7mm														
Tanpa beban			0.5 kg		1 kg		1.5 kg		2 kg		2.5 kg		3 kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	463,50	2025-08-13 14:18:10.445	426,60	2025-08-13 14:24:27.498	385,40	2025-08-13 14:26:50.230	339,60	2025-08-13 14:29:51.596	310,70	2025-08-13 14:31:22.011	271,70	2025-08-13 14:33:39.195	234,00	2025-08-13 14:36:30.393
2	463,50	2025-08-13 14:18:10.947	429,90	2025-08-13 14:24:27.999	385,40	2025-08-13 14:26:50.732	339,60	2025-08-13 14:29:52.098	311,20	2025-08-13 14:31:22.516	272,60	2025-08-13 14:33:39.681	234,80	2025-08-13 14:36:30.895
3	461,90	2025-08-13 14:18:11.435	429,90	2025-08-13 14:24:28.505	387,00	2025-08-13 14:26:51.237	342,00	2025-08-13 14:29:52.604	311,20	2025-08-13 14:31:23.018	272,60	2025-08-13 14:33:40.186	234,80	2025-08-13 14:36:31.397
4	461,90	2025-08-13 14:18:11.940	429,90	2025-08-13 14:24:28.992	387,00	2025-08-13 14:26:51.724	342,00	2025-08-13 14:29:53.108	311,20	2025-08-13 14:31:23.522	274,30	2025-08-13 14:33:40.689	234,80	2025-08-13 14:36:31.905
5	461,90	2025-08-13 14:18:12.444	429,10	2025-08-13 14:24:29.495	389,20	2025-08-13 14:26:52.227	343,90	2025-08-13 14:29:53.595	310,80	2025-08-13 14:31:24.010	274,30	2025-08-13 14:33:41.193	233,40	2025-08-13 14:36:32.391
6	461,90	2025-08-13 14:18:12.933	429,10	2025-08-13 14:24:30.001	389,20	2025-08-13 14:26:52.733	343,90	2025-08-13 14:29:54.099	310,80	2025-08-13 14:31:24.514	274,50	2025-08-13 14:33:41.682	233,40	2025-08-13 14:36:32.894
7	462,80	2025-08-13 14:18:13.451	428,70	2025-08-13 14:24:30.504	389,70	2025-08-13 14:26:53.235	343,90	2025-08-13 14:29:54.603	310,40	2025-08-13 14:31:25.018	274,50	2025-08-13 14:33:42.184	231,10	2025-08-13 14:36:33.395
8	462,80	2025-08-13 14:18:13.941	428,70	2025-08-13 14:24:30.992	389,70	2025-08-13 14:26:53.724	344,40	2025-08-13 14:29:55.107	310,40	2025-08-13 14:31:25.521	274,50	2025-08-13 14:33:42.688	231,10	2025-08-13 14:36:33.901
9	462,30	2025-08-13 14:18:14.444	430,60	2025-08-13 14:24:31.496	388,70	2025-08-13 14:26:54.228	344,40	2025-08-13 14:29:55.593	310,30	2025-08-13 14:31:26.010	274,00	2025-08-13 14:33:43.191	229,00	2025-08-13 14:36:34.389
10	462,30	2025-08-13 14:18:14.934	430,60	2025-08-13 14:24:31.999	388,70	2025-08-13 14:26:54.732	342,90	2025-08-13 14:29:56.098	310,30	2025-08-13 14:31:26.513	274,00	2025-08-13 14:33:43.680	229,00	2025-08-13 14:36:34.896
11	462,50	2025-08-13 14:18:15.437	430,60	2025-08-13 14:24:32.503	388,40	2025-08-13 14:26:55.236	342,90	2025-08-13 14:29:56.601	310,10	2025-08-13 14:31:27.017	273,40	2025-08-13 14:33:44.185	225,40	2025-08-13 14:36:35.400
12	462,50	2025-08-13 14:18:15.941	430,50	2025-08-13 14:24:33.007	388,40	2025-08-13 14:26:55.722	339,90	2025-08-13 14:29:57.106	310,10	2025-08-13 14:31:27.521	273,40	2025-08-13 14:33:44.688	225,40	2025-08-13 14:36:35.904
13	462,50	2025-08-13 14:18:16.444	430,50	2025-08-13 14:24:33.494	388,40	2025-08-13 14:26:56.227	339,90	2025-08-13 14:29:57.609	310,70	2025-08-13 14:31:28.008	273,30	2025-08-13 14:33:45.191	224,20	2025-08-13 14:36:36.391
14	465,20	2025-08-13 14:18:16.948	429,20	2025-08-13 14:24:33.998	388,40	2025-08-13 14:26:56.730	339,90	2025-08-13 14:29:58.097	310,70	2025-08-13 14:31:28.512	273,30	2025-08-13 14:33:45.695	224,20	2025-08-13 14:36:36.894
15	465,20	2025-08-13 14:18:17.435	429,20	2025-08-13 14:24:34.502	388,10	2025-08-13 14:26:57.235	335,80	2025-08-13 14:29:58.601	309,90	2025-08-13 14:31:29.015	273,30	2025-08-13 14:33:46.183	224,20	2025-08-13 14:36:37.400
16	466,40	2025-08-13 14:18:17.936	425,10	2025-08-13 14:24:35.005	388,10	2025-08-13 14:26:57.738	335,80	2025-08-13 14:29:59.104	309,90	2025-08-13 14:31:29.519	273,10	2025-08-13 14:33:46.687	226,80	2025-08-13 14:36:37.898
17	466,40	2025-08-13 14:18:18.438	425,10	2025-08-13 14:24:35.494	388,10	2025-08-13 14:26:58.226	334,40	2025-08-13 14:29:59.608	308,50	2025-08-13 14:31:30.023	273,10	2025-08-13 14:33:47.190	226,80	2025-08-13 14:36:38.406
18	464,80	2025-08-13 14:18:18.942	420,00	2025-08-13 14:24:35.997	388,40	2025-08-13 14:26:58.729	334,40	2025-08-13 14:30:00.092	308,50	2025-08-13 14:31:30.511	271,30	2025-08-13 14:33:47.694	229,90	2025-08-13 14:36:38.894
19	464,80	2025-08-13 14:18:19.429	420,00	2025-08-13 14:24:36.501	388,40	2025-08-13 14:26:59.233	334,40	2025-08-13 14:30:00.597	308,40	2025-08-13 14:31:31.014	271,30	2025-08-13 14:33:48.182	229,90	2025-08-13 14:36:39.396
20	463,60	2025-08-13 14:18:19.938	417,70	2025-08-13 14:24:37.004	388,10	2025-08-13 14:26:59.735	337,90	2025-08-13 14:30:01.103	308,40	2025-08-13 14:31:31.518	271,30	2025-08-13 14:33:48.684	232,90	2025-08-13 14:36:39.901
21	463,60	2025-08-13 14:18:20.442	417,70	2025-08-13 14:24:37.488	388,10	2025-08-13 14:27:00.224	337,90	2025-08-13 14:30:01.603	307,10	2025-08-13 14:31:32.022	269,60	2025-08-13 14:33:49.189	232,90	2025-08-13 14:36:40.404
22	464,10	2025-08-13 14:18:20.946	419,20	2025-08-13 14:24:37.991	385,90	2025-08-13 14:27:00.728	341,50	2025-08-13 14:30:02.110	307,10	2025-08-13 14:31:32.509	269,60	2025-08-13 14:33:49.692	233,50	2025-08-13 14:36:40.892
23	464,10	2025-08-13 14:18:21.433	419,20	2025-08-13 14:24:38.494	385,90	2025-08-13 14:27:01.232	341,50	2025-08-13 14:30:02.597	307,10	2025-08-13 14:31:33.013	267,00	2025-08-13 14:33:50.181	233,50	2025-08-13 14:36:41.391
24	463,90	2025-08-13 14:18:21.937	419,20	2025-08-13 14:24:38.998	383,70	2025-08-13 14:27:01.735	342,80	2025-08-13 14:30:03.101	305,10	2025-08-13 14:31:33.516	267,00	2025-08-13 14:33:50.684	234,20	2025-08-13 14:36:41.900
25	463,90	2025-08-13 14:18:22.437	423,80	2025-08-13 14:24:39.502	383,70	2025-08-13 14:27:02.223	342,80	2025-08-13 14:30:03.605	305,10	2025-08-13 14:31:34.020	263,10	2025-08-13 14:33:51.188	234,20	2025-08-13 14:36:42.403
26	463,10	2025-08-13 14:18:22.942	423,80	2025-08-13 14:24:39.990	383,70	2025-08-13 14:27:02.726	342,80	2025-08-13 14:30:04.093	303,80	2025-08-13 14:31:34.508	263,10	2025-08-13 14:33:51.691	235,30	2025-08-13 14:36:42.890
27	463,10	2025-08-13 14:18:23.427	425,00	2025-08-13 14:24:40.493	383,70	2025-08-13 14:27:03.231	343,80	2025-08-13 14:30:04.596	303,80	2025-08-13 14:31:35.011	263,10	2025-08-13 14:33:52.196	235,30	2025-08-13 14:36:43.392
28	463,70	2025-08-13 14:18:23.935	425,00	2025-08-13 14:24:40.996	384,60	2025-08-13 14:27:03.733	343,80	2025-08-13 14:30:05.117	302,90	2025-08-13 14:31:35.516	262,90	2025-08-13 14:33:52.680	233,00	2025-08-13 14:36:43.898
29	463,70	2025-08-13 14:18:24.434	422,90	2025-08-13 14:24:41.501	384,60	2025-08-13 14:27:04.238	345,20	2025-08-13 14:30:05.604	302,90	2025-08-13 14:31:36.020	262,90	2025-08-13 14:33:53.187	233,00	2025-08-13 14:36:44.402
30	463,70	2025-08-13 14:18:24.939	422,90	2025-08-13 14:24:41.988	384,60	2025-08-13 14:27:04.723	345,20	2025-08-13 14:30:06.107	301,50	2025-08-13 14:31:36.522	266,20	2025-08-13 14:33:53.691	233,00	2025-08-13 14:36:44.890
	463,52		425,66		387,04		340,97		308,30		270,61		231,10	

Diameter 7mm												
3.5 kg			4 kg		4,5 kg		5 kg		5,5 kg		6 kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	201,80	2025-08-13 14:39:33.484	156,30	2025-08-13 14:41:17.623	113,40	2025-08-13 14:43:01.600	75,80	2025-08-13 14:45:17.315	28,49	2025-08-14 11:08:03.441	0	2025-08-14 11:10:27.054
2	201,80	2025-08-13 14:39:33.987	152,50	2025-08-13 14:41:18.127	113,40	2025-08-13 14:43:02.103	75,30	2025-08-13 14:45:17.803	28,49	2025-08-14 11:08:03.949	0	2025-08-14 11:10:27.557
3	201,80	2025-08-13 14:39:34.490	152,50	2025-08-13 14:41:18.614	114,50	2025-08-13 14:43:02.590	75,30	2025-08-13 14:45:18.307	28,49	2025-08-14 11:08:04.453	0	2025-08-14 11:10:28.062
4	199,50	2025-08-13 14:39:34.993	152,50	2025-08-13 14:41:19.117	114,50	2025-08-13 14:43:03.094	74,30	2025-08-13 14:45:18.811	28,49	2025-08-14 11:08:04.956	0	2025-08-14 11:10:28.565
5	199,50	2025-08-13 14:39:35.482	150,40	2025-08-13 14:41:19.622	116,70	2025-08-13 14:43:03.598	74,30	2025-08-13 14:45:19.314	23,07	2025-08-14 11:08:05.445	0	2025-08-14 11:10:29.051
6	199,50	2025-08-13 14:39:35.986	150,40	2025-08-13 14:41:20.126	116,70	2025-08-13 14:43:04.103	75,10	2025-08-13 14:45:19.802	23,07	2025-08-14 11:08:05.947	0	2025-08-14 11:10:29.556
7	199,50	2025-08-13 14:39:36.489	149,20	2025-08-13 14:41:20.629	118,80	2025-08-13 14:43:04.590	75,10	2025-08-13 14:45:20.306	26,38	2025-08-14 11:08:06.452	0	2025-08-14 11:10:30.060
8	199,50	2025-08-13 14:39:36.993	149,20	2025-08-13 14:41:21.119	118,80	2025-08-13 14:43:05.094	78,60	2025-08-13 14:45:20.810	26,38	2025-08-14 11:08:06.954	0	2025-08-14 11:10:30.565
9	198,00	2025-08-13 14:39:37.481	149,20	2025-08-13 14:41:21.622	118,80	2025-08-13 14:43:05.597	78,60	2025-08-13 14:45:21.311	26,38	2025-08-14 11:08:07.443	0	2025-08-14 11:10:31.068
10	198,00	2025-08-13 14:39:37.984	149,20	2025-08-13 14:41:22.125	120,00	2025-08-13 14:43:06.102	78,60	2025-08-13 14:45:21.798	33,93	2025-08-14 11:08:07.943	0	2025-08-14 11:10:31.555
11	198,00	2025-08-13 14:39:38.488	149,20	2025-08-13 14:41:22.629	120,00	2025-08-13 14:43:06.588	81,60	2025-08-13 14:45:22.305	33,93	2025-08-14 11:08:08.449	0	2025-08-14 11:10:32.060
12	194,10	2025-08-13 14:39:38.992	150,90	2025-08-13 14:41:23.115	118,60	2025-08-13 14:43:07.092	81,60	2025-08-13 14:45:22.808	33,93	2025-08-14 11:08:08.951	0	2025-08-14 11:10:32.564
13	194,10	2025-08-13 14:39:39.495	150,90	2025-08-13 14:41:23.618	118,60	2025-08-13 14:43:07.596	81,60	2025-08-13 14:45:23.312	40,65	2025-08-14 11:08:09.437	0	2025-08-14 11:10:33.067
14	191,60	2025-08-13 14:39:39.983	153,30	2025-08-13 14:41:24.124	118,60	2025-08-13 14:43:08.100	84,20	2025-08-13 14:45:23.815	40,65	2025-08-14 11:08:09.944	0	2025-08-14 11:10:33.555
15	191,60	2025-08-13 14:39:40.486	153,30	2025-08-13 14:41:24.629	116,80	2025-08-13 14:43:08.604	84,20	2025-08-13 14:45:24.303	45,39	2025-08-14 11:08:10.450	0	2025-08-14 11:10:34.059
16	191,20	2025-08-13 14:39:40.991	154,90	2025-08-13 14:41:25.112	116,80	2025-08-13 14:43:09.091	84,20	2025-08-13 14:45:24.807	45,39	2025-08-14 11:08:10.954	0	2025-08-14 11:10:34.562
17	191,20	2025-08-13 14:39:41.494	154,90	2025-08-13 14:41:25.618	115,80	2025-08-13 14:43:09.595	86,20	2025-08-13 14:45:25.311	45,39	2025-08-14 11:08:11.441	0	2025-08-14 11:10:35.067
18	191,10	2025-08-13 14:39:41.982	155,10	2025-08-13 14:41:26.122	115,80	2025-08-13 14:43:10.099	86,20	2025-08-13 14:45:25.814	48,02	2025-08-14 11:08:11.962	0	2025-08-14 11:10:35.553
19	191,10	2025-08-13 14:39:42.485	155,10	2025-08-13 14:41:26.626	115,80	2025-08-13 14:43:10.603	83,40	2025-08-13 14:45:26.302	48,02	2025-08-14 11:08:12.449	0	2025-08-14 11:10:36.057
20	191,90	2025-08-13 14:39:42.989	157,30	2025-08-13 14:41:27.130	115,10	2025-08-13 14:43:11.091	83,40	2025-08-13 14:45:26.806	48,33	2025-08-14 11:08:12.953	0	2025-08-14 11:10:36.562
21	191,90	2025-08-13 14:39:43.493	157,30	2025-08-13 14:41:27.617	115,10	2025-08-13 14:43:11.594	76,10	2025-08-13 14:45:27.310	48,33	2025-08-14 11:08:13.457	0	2025-08-14 11:10:37.065
22	191,90	2025-08-13 14:39:43.981	161,10	2025-08-13 14:41:28.121	118,40	2025-08-13 14:43:12.098	76,10	2025-08-13 14:45:27.814	48,33	2025-08-14 11:08:13.945	0	2025-08-14 11:10:37.568
23	195,20	2025-08-13 14:39:44.485	161,10	2025-08-13 14:41:28.625	118,40	2025-08-13 14:43:12.602	67,40	2025-08-13 14:45:28.302	45,07	2025-08-14 11:08:14.448	0	2025-08-14 11:10:38.056
24	195,20	2025-08-13 14:39:44.988	161,10	2025-08-13 14:41:29.129	118,40	2025-08-13 14:43:13.090	67,40	2025-08-13 14:45:28.804	45,07	2025-08-14 11:08:14.955	0	2025-08-14 11:10:38.560
25	195,20	2025-08-13 14:39:45.487	164,40	2025-08-13 14:41:29.617	123,60	2025-08-13 14:43:13.590	67,40	2025-08-13 14:45:29.309	44,31	2025-08-14 11:08:15.455	0	2025-08-14 11:10:39.080
26	196,90	2025-08-13 14:39:45.977	164,40	2025-08-13 14:41:30.116	123,60	2025-08-13 14:43:14.095	60,39	2025-08-13 14:45:29.812	44,31	2025-08-14 11:08:15.941	0	2025-08-14 11:10:39.567
27	196,90	2025-08-13 14:39:46.478	168,20	2025-08-13 14:41:30.623	125,40	2025-08-13 14:43:14.599	60,39	2025-08-13 14:45:30.316	44,31	2025-08-14 11:08:16.446	0	2025-08-14 11:10:40.055
28	196,50	2025-08-13 14:39:46.986	168,20	2025-08-13 14:41:31.127	125,40	2025-08-13 14:43:15.088	56,70	2025-08-13 14:45:30.804	45,96	2025-08-14 11:08:16.951	0	2025-08-14 11:10:40.559
29	196,50	2025-08-13 14:39:47.491	171,00	2025-08-13 14:41:31.613	124,80	2025-08-13 14:43:15.590	56,70	2025-08-13 14:45:31.308	45,96	2025-08-14 11:08:17.455	0	2025-08-14 11:10:41.062
30	196,50	2025-08-13 14:39:47.995	171,00	2025-08-13 14:41:32.117	124,80	2025-08-13 14:43:16.096	56,70	2025-08-13 14:45:31.810	46,43	2025-08-14 11:08:17.942	0	2025-08-14 11:10:41.566
	195,92		156,47		118,51		74,76		38,70		0	

Tabel L.7 data pengukuran beban dan putaran turbin angin Savonius dengan tiga sudu variasi diameter 9 mm

Diameter 9														
Tanpa beban			0.5 kg		1 kg		1.5 kg		2 kg		2.5 kg		3 kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	496,60	2025-08-14 11:19:08.391	464,10	2025-08-14 11:22:20.734	418,40	2025-08-14 11:25:46.769	385,10	2025-08-14 11:28:22.555	342,10	2025-08-14 11:30:04.911	310,80	2025-08-14 11:33:31.422	267,00	2025-08-14 11:36:09.189
2	496,60	2025-08-14 11:19:08.896	465,10	2025-08-14 11:22:21.242	418,80	2025-08-14 11:25:47.273	385,10	2025-08-14 11:28:23.059	342,10	2025-08-14 11:30:05.414	310,80	2025-08-14 11:33:31.940	265,80	2025-08-14 11:36:09.692
3	499,00	2025-08-14 11:19:09.400	465,10	2025-08-14 11:22:21.745	418,80	2025-08-14 11:25:47.777	382,60	2025-08-14 11:28:23.564	341,80	2025-08-14 11:30:05.933	310,80	2025-08-14 11:33:32.429	265,80	2025-08-14 11:36:10.196
4	499,00	2025-08-14 11:19:09.886	466,30	2025-08-14 11:22:22.233	420,30	2025-08-14 11:25:48.263	382,60	2025-08-14 11:28:24.068	341,80	2025-08-14 11:30:06.421	311,90	2025-08-14 11:33:32.918	264,70	2025-08-14 11:36:10.699
5	498,40	2025-08-14 11:19:10.390	466,30	2025-08-14 11:22:22.735	420,30	2025-08-14 11:25:48.785	382,60	2025-08-14 11:28:24.555	340,70	2025-08-14 11:30:06.910	311,90	2025-08-14 11:33:33.422	264,70	2025-08-14 11:36:11.186
6	498,40	2025-08-14 11:19:10.895	468,00	2025-08-14 11:22:23.241	420,30	2025-08-14 11:25:49.272	382,60	2025-08-14 11:28:25.058	340,70	2025-08-14 11:30:07.414	312,70	2025-08-14 11:33:33.924	264,50	2025-08-14 11:36:11.691
7	497,20	2025-08-14 11:19:11.399	468,00	2025-08-14 11:22:23.745	421,70	2025-08-14 11:25:49.776	382,60	2025-08-14 11:28:25.562	340,70	2025-08-14 11:30:07.917	312,70	2025-08-14 11:33:34.429	264,50	2025-08-14 11:36:12.195
8	497,20	2025-08-14 11:19:11.885	470,30	2025-08-14 11:22:24.232	421,70	2025-08-14 11:25:50.263	383,20	2025-08-14 11:28:26.066	340,60	2025-08-14 11:30:08.421	314,20	2025-08-14 11:33:34.917	265,80	2025-08-14 11:36:12.699
9	497,20	2025-08-14 11:19:12.389	470,30	2025-08-14 11:22:24.736	421,20	2025-08-14 11:25:50.766	383,20	2025-08-14 11:28:26.554	340,60	2025-08-14 11:30:08.908	314,20	2025-08-14 11:33:35.420	265,80	2025-08-14 11:36:13.186
10	496,20	2025-08-14 11:19:12.893	472,50	2025-08-14 11:22:25.239	421,20	2025-08-14 11:25:51.270	382,20	2025-08-14 11:28:27.056	342,60	2025-08-14 11:30:09.412	314,20	2025-08-14 11:33:35.924	267,00	2025-08-14 11:36:13.690
11	496,20	2025-08-14 11:19:13.398	472,50	2025-08-14 11:22:25.744	420,90	2025-08-14 11:25:51.773	382,20	2025-08-14 11:28:27.561	342,60	2025-08-14 11:30:09.917	313,80	2025-08-14 11:33:36.428	267,00	2025-08-14 11:36:14.195
12	496,30	2025-08-14 11:19:13.885	473,30	2025-08-14 11:22:26.248	420,90	2025-08-14 11:25:52.262	382,20	2025-08-14 11:28:28.064	344,50	2025-08-14 11:30:10.420	313,80	2025-08-14 11:33:36.916	266,80	2025-08-14 11:36:14.699
13	496,30	2025-08-14 11:19:14.388	473,30	2025-08-14 11:22:26.735	421,90	2025-08-14 11:25:52.765	383,60	2025-08-14 11:28:28.552	344,50	2025-08-14 11:30:10.907	309,30	2025-08-14 11:33:37.420	266,80	2025-08-14 11:36:15.186
14	497,80	2025-08-14 11:19:14.892	470,10	2025-08-14 11:22:27.239	421,90	2025-08-14 11:25:53.269	383,60	2025-08-14 11:28:29.054	346,10	2025-08-14 11:30:11.412	309,30	2025-08-14 11:33:37.923	265,10	2025-08-14 11:36:15.690
15	497,80	2025-08-14 11:19:15.396	470,10	2025-08-14 11:22:27.743	424,20	2025-08-14 11:25:53.773	386,60	2025-08-14 11:28:29.560	346,10	2025-08-14 11:30:11.915	309,30	2025-08-14 11:33:38.427	265,10	2025-08-14 11:36:16.193
16	497,80	2025-08-14 11:19:15.901	465,90	2025-08-14 11:22:28.246	424,20	2025-08-14 11:25:54.276	386,60	2025-08-14 11:28:30.064	347,90	2025-08-14 11:30:12.418	304,60	2025-08-14 11:33:38.931	263,20	2025-08-14 11:36:16.697
17	498,50	2025-08-14 11:19:16.388	465,90	2025-08-14 11:22:28.734	424,20	2025-08-14 11:25:54.764	386,60	2025-08-14 11:28:30.567	347,90	2025-08-14 11:30:12.922	304,60	2025-08-14 11:33:39.418	263,20	2025-08-14 11:36:17.200
18	498,50	2025-08-14 11:19:16.891	464,00	2025-08-14 11:22:29.238	424,90	2025-08-14 11:25:55.268	388,10	2025-08-14 11:28:31.054	348,70	2025-08-14 11:30:13.410	301,70	2025-08-14 11:33:39.921	264,40	2025-08-14 11:36:17.688
19	498,40	2025-08-14 11:19:17.395	464,00	2025-08-14 11:22:29.742	424,90	2025-08-14 11:25:55.771	388,10	2025-08-14 11:28:31.559	348,70	2025-08-14 11:30:13.913	301,70	2025-08-14 11:33:40.426	264,40	2025-08-14 11:36:18.192
20	498,40	2025-08-14 11:19:17.899	462,80	2025-08-14 11:22:30.260	423,60	2025-08-14 11:25:56.275	387,80	2025-08-14 11:28:32.062	347,20	2025-08-14 11:30:14.417	301,70	2025-08-14 11:33:40.929	265,40	2025-08-14 11:36:18.696
21	499,80	2025-08-14 11:19:18.386	462,80	2025-08-14 11:22:30.733	423,60	2025-08-14 11:25:56.763	387,80	2025-08-14 11:28:32.565	347,20	2025-08-14 11:30:14.922	300,30	2025-08-14 11:33:41.417	265,40	2025-08-14 11:36:19.199
22	499,80	2025-08-14 11:19:18.890	461,70	2025-08-14 11:22:31.237	422,40	2025-08-14 11:25:57.267	385,30	2025-08-14 11:28:33.054	347,20	2025-08-14 11:30:15.409	300,30	2025-08-14 11:33:41.921	264,90	2025-08-14 11:36:19.687
23	499,80	2025-08-14 11:19:19.394	461,70	2025-08-14 11:22:31.740	422,40	2025-08-14 11:25:57.771	385,30	2025-08-14 11:28:33.558	343,20	2025-08-14 11:30:15.913	300,60	2025-08-14 11:33:42.424	264,90	2025-08-14 11:36:20.191
24	502,00	2025-08-14 11:19:19.898	461,70	2025-08-14 11:22:32.244	419,60	2025-08-14 11:25:58.275	385,30	2025-08-14 11:28:34.061	343,20	2025-08-14 11:30:16.417	300,60	2025-08-14 11:33:42.928	264,90	2025-08-14 11:36:20.694
25	502,00	2025-08-14 11:19:20.385	461,50	2025-08-14 11:22:32.748	419,60	2025-08-14 11:25:58.761	382,90	2025-08-14 11:28:34.565	340,30	2025-08-14 11:30:16.921	300,60	2025-08-14 11:33:43.415	265,60	2025-08-14 11:36:21.198
26	503,10	2025-08-14 11:19:20.888	461,50	2025-08-14 11:22:33.236	419,60	2025-08-14 11:25:59.265	382,90	2025-08-14 11:28:35.053	340,30	2025-08-14 11:30:17.407	300,20	2025-08-14 11:33:43.920	265,60	2025-08-14 11:36:21.686
27	503,10	2025-08-14 11:19:21.392	461,50	2025-08-14 11:22:33.739	415,20	2025-08-14 11:25:59.769	382,60	2025-08-14 11:28:35.556	339,90	2025-08-14 11:30:17.912	300,20	2025-08-14 11:33:44.424	267,30	2025-08-14 11:36:22.189
28	502,60	2025-08-14 11:19:21.897	461,50	2025-08-14 11:22:34.243	415,20	2025-08-14 11:26:00.273	382,60	2025-08-14 11:28:36.061	339,90	2025-08-14 11:30:18.415	299,00	2025-08-14 11:33:44.927	267,30	2025-08-14 11:36:22.694
29	502,60	2025-08-14 11:19:22.384	460,30	2025-08-14 11:22:34.746	411,60	2025-08-14 11:26:00.760	382,60	2025-08-14 11:28:36.564	339,50	2025-08-14 11:30:18.935	299,00	2025-08-14 11:33:45.415	269,20	2025-08-14 11:36:23.197
30	502,60	2025-08-14 11:19:22.885	460,30	2025-08-14 11:22:35.234	411,60	2025-08-14 11:26:01.264	383,40	2025-08-14 11:28:37.067	339,50	2025-08-14 11:30:19.407	299,00	2025-08-14 11:33:45.918	269,20	2025-08-14 11:36:23.702
	498,97		465,75		420,50		384,26		343,27		306,46		265,71	

Diameter 9														
3,5 kg			4 kg			4,5 kg			5 kg			5,5 kg		
No	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	234,70	2025-08-14 11:38:28.132	195,40	2025-08-14 11:40:55.732	149,99	2025-08-14 11:45:24.216	108,42	2025-08-14 11:48:10.999	76,49	2025-08-14 11:50:15.462	36,02	2025-08-14 11:52:40.933	0	2025-08-14 11:54:14.065
2	234,70	2025-08-14 11:38:28.617	192,40	2025-08-14 11:40:56.233	149,99	2025-08-14 11:45:24.721	108,42	2025-08-14 11:48:11.486	76,49	2025-08-14 11:50:15.963	37,72	2025-08-14 11:52:41.437	0	2025-08-14 11:54:14.571
3	232,70	2025-08-14 11:38:29.123	192,40	2025-08-14 11:40:56.738	149,99	2025-08-14 11:45:25.222	108,42	2025-08-14 11:48:11.987	75,57	2025-08-14 11:50:16.468	37,72	2025-08-14 11:52:41.941	0	2025-08-14 11:54:15.070
4	232,70	2025-08-14 11:38:29.627	192,40	2025-08-14 11:40:57.243	152,28	2025-08-14 11:45:25.728	107,58	2025-08-14 11:48:12.491	75,57	2025-08-14 11:50:16.973	37,72	2025-08-14 11:52:42.445	0	2025-08-14 11:54:15.575
5	230,40	2025-08-14 11:38:30.131	190,30	2025-08-14 11:40:57.728	152,28	2025-08-14 11:45:26.216	107,58	2025-08-14 11:48:12.998	74,33	2025-08-14 11:50:17.462	39,88	2025-08-14 11:52:42.934	0	2025-08-14 11:54:16.061
6	230,40	2025-08-14 11:38:30.618	190,30	2025-08-14 11:40:58.234	152,63	2025-08-14 11:45:26.719	107,58	2025-08-14 11:48:13.501	74,33	2025-08-14 11:50:17.965	39,88	2025-08-14 11:52:43.437	0	2025-08-14 11:54:16.565
7	229,70	2025-08-14 11:38:31.122	187,50	2025-08-14 11:40:58.738	152,63	2025-08-14 11:45:27.223	109,36	2025-08-14 11:48:13.989	74,33	2025-08-14 11:50:18.468	46,71	2025-08-14 11:52:43.941	0	2025-08-14 11:54:17.068
8	229,70	2025-08-14 11:38:31.626	187,50	2025-08-14 11:40:59.243	152,63	2025-08-14 11:45:27.727	109,36	2025-08-14 11:48:14.492	70,04	2025-08-14 11:50:18.972	46,71	2025-08-14 11:52:44.444	0	2025-08-14 11:54:17.574
9	229,70	2025-08-14 11:38:32.130	187,50	2025-08-14 11:40:59.729	147,40	2025-08-14 11:45:28.231	109,36	2025-08-14 11:48:14.996	70,04	2025-08-14 11:50:19.461	46,71	2025-08-14 11:52:44.932	0	2025-08-14 11:54:18.063
10	229,50	2025-08-14 11:38:32.634	185,00	2025-08-14 11:41:00.234	147,40	2025-08-14 11:45:28.718	118,72	2025-08-14 11:48:15.500	67,92	2025-08-14 11:50:19.964	43,78	2025-08-14 11:52:45.434	0	2025-08-14 11:54:18.568
11	229,50	2025-08-14 11:38:33.121	185,00	2025-08-14 11:41:00.738	147,40	2025-08-14 11:45:29.221	118,72	2025-08-14 11:48:15.988	67,92	2025-08-14 11:50:20.467	43,78	2025-08-14 11:52:45.939	0	2025-08-14 11:54:19.072
12	230,50	2025-08-14 11:38:33.625	185,00	2025-08-14 11:41:01.240	141,29	2025-08-14 11:45:29.725	127,16	2025-08-14 11:48:16.491	68,29	2025-08-14 11:50:20.971	43,78	2025-08-14 11:52:46.444	0	2025-08-14 11:54:19.578
13	230,50	2025-08-14 11:38:34.128	184,40	2025-08-14 11:41:01.744	141,29	2025-08-14 11:45:30.230	127,16	2025-08-14 11:48:16.995	68,29	2025-08-14 11:50:21.458	43,78	2025-08-14 11:52:46.931	0	2025-08-14 11:54:20.075
14	232,30	2025-08-14 11:38:34.632	184,40	2025-08-14 11:41:02.232	141,29	2025-08-14 11:45:30.717	128,85	2025-08-14 11:48:17.499	68,29	2025-08-14 11:50:21.964	38,77	2025-08-14 11:52:47.435	0	2025-08-14 11:54:20.564
15	232,30	2025-08-14 11:38:35.121	184,40	2025-08-14 11:41:02.737	139,07	2025-08-14 11:45:31.222	128,85	2025-08-14 11:48:17.986	66,87	2025-08-14 11:50:22.467	38,77	2025-08-14 11:52:47.939	0	2025-08-14 11:54:21.071
16	232,30	2025-08-14 11:38:35.624	186,80	2025-08-14 11:41:03.239	139,07	2025-08-14 11:45:31.724	128,85	2025-08-14 11:48:18.486	66,87	2025-08-14 11:50:22.971	40,03	2025-08-14 11:52:48.442	0	2025-08-14 11:54:21.575
17	234,80	2025-08-14 11:38:36.127	186,80	2025-08-14 11:41:03.738	139,07	2025-08-14 11:45:32.228	127,29	2025-08-14 11:48:18.993	65,24	2025-08-14 11:50:23.475	40,03	2025-08-14 11:52:48.945	0	2025-08-14 11:54:22.079
18	234,80	2025-08-14 11:38:36.629	186,80	2025-08-14 11:41:04.232	144,16	2025-08-14 11:45:32.715	127,29	2025-08-14 11:48:19.499	65,24	2025-08-14 11:50:23.961	40,03	2025-08-14 11:52:49.434	0	2025-08-14 11:54:22.567
19	236,60	2025-08-14 11:38:37.118	192,40	2025-08-14 11:41:04.734	144,16	2025-08-14 11:45:33.219	127,29	2025-08-14 11:48:19.986	67,29	2025-08-14 11:50:24.466	40,03	2025-08-14 11:52:49.937	0	2025-08-14 11:54:23.070
20	236,60	2025-08-14 11:38:37.623	192,40	2025-08-14 11:41:05.239	152,16	2025-08-14 11:45:33.724	111,62	2025-08-14 11:48:20.489	67,29	2025-08-14 11:50:24.969	39,98	2025-08-14 11:52:50.441	0	2025-08-14 11:54:23.573
21	237,20	2025-08-14 11:38:38.127	196,10	2025-08-14 11:41:05.742	152,16	2025-08-14 11:45:34.227	111,62	2025-08-14 11:48:20.994	67,29	2025-08-14 11:50:25.474	39,98	2025-08-14 11:52:50.942	0	2025-08-14 11:54:24.077
22	237,20	2025-08-14 11:38:38.630	196,10	2025-08-14 11:41:06.230	160,20	2025-08-14 11:45:34.715	111,62	2025-08-14 11:48:21.496	67,29	2025-08-14 11:50:25.960	39,98	2025-08-14 11:52:51.427	0	2025-08-14 11:54:24.565
23	237,20	2025-08-14 11:38:39.117	196,10	2025-08-14 11:41:06.734	160,20	2025-08-14 11:45:35.218	111,62	2025-08-14 11:48:22.000	75,22	2025-08-14 11:50:26.465	39,98	2025-08-14 11:52:51.936	0	2025-08-14 11:54:25.068
24	238,30	2025-08-14 11:38:39.622	194,90	2025-08-14 11:41:07.237	168,60	2025-08-14 11:45:35.723	99,81	2025-08-14 11:48:22.488	75,22	2025-08-14 11:50:26.968	33,42	2025-08-14 11:52:52.440	0	2025-08-14 11:54:25.572
25	238,30	2025-08-14 11:38:40.124	194,90	2025-08-14 11:41:07.742	168,60	2025-08-14 11:45:36.226	99,81	2025-08-14 11:48:22.992	74,38	2025-08-14 11:50:27.472	33,42	2025-08-14 11:52:52.943	0	2025-08-14 11:54:26.077
26	240,10	2025-08-14 11:38:40.629	194,90	2025-08-14 11:41:08.244	173,00	2025-08-14 11:45:36.726	99,81	2025-08-14 11:48:23.496	74,38	2025-08-14 11:50:27.960	33,42	2025-08-14 11:52:53.431	0	2025-08-14 11:54:26.580
27	240,10	2025-08-14 11:38:41.133	192,10	2025-08-14 11:41:08.732	173,00	2025-08-14 11:45:37.218	101,42	2025-08-14 11:48:23.998	74,38	2025-08-14 11:50:28.464	33,13	2025-08-14 11:52:53.932	0	2025-08-14 11:54:27.067
28	238,60	2025-08-14 11:38:41.620	192,10	2025-08-14 11:41:09.236	174,90	2025-08-14 11:45:37.720	101,42	2025-08-14 11:48:24.487	65,73	2025-08-14 11:50:28.967	33,13	2025-08-14 11:52:54.438	0	2025-08-14 11:54:27.572
29	238,60	2025-08-14 11:38:42.124	192,10	2025-08-14 11:41:09.740	174,90	2025-08-14 11:45:38.227	101,42	2025-08-14 11:48:24.990	65,73	2025-08-14 11:50:29.471	33,13	2025-08-14 11:52:54.940	0	2025-08-14 11:54:28.076
30	238,60	2025-08-14 11:38:42.645	187,20	2025-08-14 11:41:10.244	174,90	2025-08-14 11:45:38.729	105,13	2025-08-14 11:48:25.494	69,08	2025-08-14 11:50:29.958	40,32	2025-08-14 11:52:55.427	0	2025-08-14 11:54:28.579
	234,29		190,19		153,89		113,05		70,51		39,39		0	

Tabel L.8 data pengukuran beban dan putaran turbin angin Savonius dengan tiga sudu variasi diameter 11 mm

Diameter 11														
Tanpa beban			0.5 kg		1 kg		1.5 kg		2 kg		2.5 kg		3 kg	
No	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	478,60	2025-08-14 12:00:06.026	435,40	2025-08-14 12:03:23.612	396,90	2025-08-14 12:06:05.237	350,90	2025-08-14 12:07:48.179	317,10	2025-08-14 12:09:30.098	274,30	2025-08-14 12:11:29.051	237,20	2025-08-14 12:21:21.543
2	478,60	2025-08-14 12:00:06.533	438,30	2025-08-14 12:03:24.118	396,70	2025-08-14 12:06:05.740	351,90	2025-08-14 12:07:48.683	316,40	2025-08-14 12:09:30.603	274,30	2025-08-14 12:11:29.555	235,90	2025-08-14 12:21:22.063
3	478,60	2025-08-14 12:00:07.037	438,30	2025-08-14 12:03:24.623	396,70	2025-08-14 12:06:06.228	351,90	2025-08-14 12:07:49.187	316,40	2025-08-14 12:09:31.108	274,30	2025-08-14 12:11:30.059	235,90	2025-08-14 12:21:22.534
4	478,10	2025-08-14 12:00:07.522	439,30	2025-08-14 12:03:25.125	396,70	2025-08-14 12:06:06.731	351,10	2025-08-14 12:07:49.691	314,70	2025-08-14 12:09:31.595	271,80	2025-08-14 12:11:30.547	234,00	2025-08-14 12:21:23.038
5	478,10	2025-08-14 12:00:08.028	439,30	2025-08-14 12:03:25.610	397,30	2025-08-14 12:06:07.236	351,10	2025-08-14 12:07:50.194	314,70	2025-08-14 12:09:32.099	271,80	2025-08-14 12:11:31.051	234,00	2025-08-14 12:21:23.543
6	477,90	2025-08-14 12:00:08.533	439,20	2025-08-14 12:03:26.116	397,30	2025-08-14 12:06:07.740	351,10	2025-08-14 12:07:50.682	314,70	2025-08-14 12:09:32.604	268,20	2025-08-14 12:11:31.554	234,00	2025-08-14 12:21:24.046
7	477,90	2025-08-14 12:00:09.036	439,20	2025-08-14 12:03:26.619	399,10	2025-08-14 12:06:08.227	351,10	2025-08-14 12:07:51.186	313,90	2025-08-14 12:09:33.107	268,20	2025-08-14 12:11:32.057	232,50	2025-08-14 12:21:24.534
8	478,90	2025-08-14 12:00:09.526	438,00	2025-08-14 12:03:27.127	399,10	2025-08-14 12:06:08.731	351,10	2025-08-14 12:07:51.705	313,90	2025-08-14 12:09:33.594	265,10	2025-08-14 12:11:32.561	232,50	2025-08-14 12:21:25.036
9	478,90	2025-08-14 12:00:10.027	438,00	2025-08-14 12:03:27.615	400,60	2025-08-14 12:06:09.233	352,80	2025-08-14 12:07:52.193	316,10	2025-08-14 12:09:34.098	265,10	2025-08-14 12:11:33.049	231,50	2025-08-14 12:21:25.541
10	478,90	2025-08-14 12:00:10.528	437,40	2025-08-14 12:03:28.119	400,60	2025-08-14 12:06:09.735	352,80	2025-08-14 12:07:52.682	316,10	2025-08-14 12:09:34.603	265,40	2025-08-14 12:11:33.553	231,50	2025-08-14 12:21:26.059
11	478,60	2025-08-14 12:00:11.036	437,40	2025-08-14 12:03:28.622	400,60	2025-08-14 12:06:10.236	354,40	2025-08-14 12:07:53.183	320,00	2025-08-14 12:09:35.106	265,40	2025-08-14 12:11:34.056	231,50	2025-08-14 12:21:26.532
12	478,60	2025-08-14 12:00:11.540	437,40	2025-08-14 12:03:29.126	399,80	2025-08-14 12:06:10.730	354,40	2025-08-14 12:07:53.688	320,00	2025-08-14 12:09:35.593	268,40	2025-08-14 12:11:34.559	230,70	2025-08-14 12:21:27.037
13	477,40	2025-08-14 12:00:12.027	437,40	2025-08-14 12:03:29.613	399,80	2025-08-14 12:06:11.233	355,80	2025-08-14 12:07:54.192	320,00	2025-08-14 12:09:36.097	268,40	2025-08-14 12:11:35.049	230,70	2025-08-14 12:21:27.540
14	477,40	2025-08-14 12:00:12.532	436,90	2025-08-14 12:03:30.116	397,20	2025-08-14 12:06:11.737	355,80	2025-08-14 12:07:54.679	321,80	2025-08-14 12:09:36.601	268,40	2025-08-14 12:11:35.552	231,10	2025-08-14 12:21:28.044
15	476,30	2025-08-14 12:00:13.034	436,90	2025-08-14 12:03:30.621	397,20	2025-08-14 12:06:12.222	356,30	2025-08-14 12:07:55.183	321,80	2025-08-14 12:09:37.105	272,60	2025-08-14 12:11:36.055	231,10	2025-08-14 12:21:28.548
16	476,30	2025-08-14 12:00:13.539	436,30	2025-08-14 12:03:31.125	394,90	2025-08-14 12:06:12.726	356,30	2025-08-14 12:07:55.687	321,00	2025-08-14 12:09:37.609	272,60	2025-08-14 12:11:36.560	231,10	2025-08-14 12:21:29.036
17	473,30	2025-08-14 12:00:14.027	436,30	2025-08-14 12:03:31.628	394,90	2025-08-14 12:06:13.233	355,40	2025-08-14 12:07:56.191	321,00	2025-08-14 12:09:38.096	276,00	2025-08-14 12:11:37.046	231,40	2025-08-14 12:21:29.539
18	473,30	2025-08-14 12:00:14.527	436,30	2025-08-14 12:03:32.116	394,90	2025-08-14 12:06:13.736	355,40	2025-08-14 12:07:56.691	319,70	2025-08-14 12:09:38.600	276,00	2025-08-14 12:11:37.551	231,40	2025-08-14 12:21:30.044
19	473,30	2025-08-14 12:00:15.034	435,40	2025-08-14 12:03:32.620	394,70	2025-08-14 12:06:14.255	355,40	2025-08-14 12:07:57.182	319,70	2025-08-14 12:09:39.104	277,20	2025-08-14 12:11:38.055	231,10	2025-08-14 12:21:30.547
20	471,80	2025-08-14 12:00:15.538	435,40	2025-08-14 12:03:33.124	394,70	2025-08-14 12:06:14.728	355,40	2025-08-14 12:07:57.686	317,90	2025-08-14 12:09:39.607	277,20	2025-08-14 12:11:38.558	231,10	2025-08-14 12:21:31.035
21	471,80	2025-08-14 12:00:16.023	434,90	2025-08-14 12:03:33.627	397,00	2025-08-14 12:06:15.231	356,10	2025-08-14 12:07:58.186	317,90	2025-08-14 12:09:40.090	279,50	2025-08-14 12:11:39.062	233,80	2025-08-14 12:21:31.537
22	474,00	2025-08-14 12:00:16.529	434,90	2025-08-14 12:03:34.114	397,00	2025-08-14 12:06:15.733	356,10	2025-08-14 12:07:58.695	317,90	2025-08-14 12:09:40.614	279,50	2025-08-14 12:11:39.550	233,80	2025-08-14 12:21:32.042
23	474,00	2025-08-14 12:00:17.032	433,70	2025-08-14 12:03:34.618	399,00	2025-08-14 12:06:16.238	356,80	2025-08-14 12:07:59.182	317,10	2025-08-14 12:09:41.102	283,00	2025-08-14 12:11:40.050	233,80	2025-08-14 12:21:32.546
24	474,00	2025-08-14 12:00:17.538	433,70	2025-08-14 12:03:35.122	399,00	2025-08-14 12:06:16.726	356,80	2025-08-14 12:07:59.685	317,10	2025-08-14 12:09:41.606	283,00	2025-08-14 12:11:40.554	239,20	2025-08-14 12:21:33.034
25	474,70	2025-08-14 12:00:18.024	433,40	2025-08-14 12:03:35.625	399,00	2025-08-14 12:06:17.230	356,80	2025-08-14 12:08:00.188	319,70	2025-08-14 12:09:42.093	282,70	2025-08-14 12:11:41.056	239,20	2025-08-14 12:21:33.537
26	474,70	2025-08-14 12:00:18.528	433,40	2025-08-14 12:03:36.114	398,60	2025-08-14 12:06:17.745	356,80	2025-08-14 12:08:00.692	319,70	2025-08-14 12:09:42.596	282,70	2025-08-14 12:11:41.544	243,60	2025-08-14 12:21:34.042
27	474,80	2025-08-14 12:00:19.032	434,70	2025-08-14 12:03:36.618	398,60	2025-08-14 12:06:18.237	354,40	2025-08-14 12:08:01.180	322,00	2025-08-14 12:09:43.099	282,70	2025-08-14 12:11:42.050	243,60	2025-08-14 12:21:34.544
28	474,80	2025-08-14 12:00:19.536	434,70	2025-08-14 12:03:37.138	396,90	2025-08-14 12:06:18.725	354,40	2025-08-14 12:08:01.684	322,00	2025-08-14 12:09:43.604	280,30	2025-08-14 12:11:42.554	245,00	2025-08-14 12:21:35.048
29	475,60	2025-08-14 12:00:20.039	435,70	2025-08-14 12:03:37.625	396,90	2025-08-14 12:06:19.225	349,90	2025-08-14 12:08:02.187	322,00	2025-08-14 12:09:44.109	280,30	2025-08-14 12:11:43.058	245,00	2025-08-14 12:21:35.536
30	475,60	2025-08-14 12:00:20.528	435,70	2025-08-14 12:03:38.127	395,80	2025-08-14 12:06:19.732	349,90	2025-08-14 12:08:02.690	322,70	2025-08-14 12:09:44.595	281,00	2025-08-14 12:11:43.543	244,00	2025-08-14 12:21:36.039
	476,16		436,43		397,58		353,95		318,50		274,51		235,04	

Diameter 11												
No	3,5 kg		4 kg		4,5 kg		5 kg		5,5 kg		6 kg	
	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	204,60	2025-08-14 12:23:25.466	165,40	2025-08-14 12:31:22.413	115,52	2025-08-14 12:33:07.756	78,89	2025-08-14 12:35:32.430	43,14	2025-08-14 12:37:41.374	0	2025-08-14 12:39:05.476
2	202,90	2025-08-14 12:23:25.969	165,40	2025-08-14 12:31:22.901	115,52	2025-08-14 12:33:08.259	76,08	2025-08-14 12:35:32.919	43,14	2025-08-14 12:37:41.861	0	2025-08-14 12:39:05.979
3	202,90	2025-08-14 12:23:26.474	156,95	2025-08-14 12:31:23.404	115,52	2025-08-14 12:33:08.763	76,08	2025-08-14 12:35:33.407	43,14	2025-08-14 12:37:42.364	0	2025-08-14 12:39:06.483
4	202,90	2025-08-14 12:23:26.978	156,95	2025-08-14 12:31:23.908	118,62	2025-08-14 12:33:09.267	76,57	2025-08-14 12:35:33.911	43,14	2025-08-14 12:37:42.868	0	2025-08-14 12:39:06.988
5	202,00	2025-08-14 12:23:27.481	156,95	2025-08-14 12:31:24.412	118,62	2025-08-14 12:33:09.756	76,57	2025-08-14 12:35:34.414	43,14	2025-08-14 12:37:43.373	0	2025-08-14 12:39:07.474
6	202,00	2025-08-14 12:23:27.969	151,48	2025-08-14 12:31:24.898	118,62	2025-08-14 12:33:10.260	80,02	2025-08-14 12:35:34.918	41,64	2025-08-14 12:37:43.860	0	2025-08-14 12:39:07.979
7	202,00	2025-08-14 12:23:28.472	151,48	2025-08-14 12:31:25.403	118,91	2025-08-14 12:33:10.762	80,02	2025-08-14 12:35:35.406	41,64	2025-08-14 12:37:44.365	0	2025-08-14 12:39:08.516
8	202,90	2025-08-14 12:23:28.977	151,48	2025-08-14 12:31:25.907	118,91	2025-08-14 12:33:11.267	83,52	2025-08-14 12:35:35.910	41,64	2025-08-14 12:37:44.868	0	2025-08-14 12:39:08.986
9	202,90	2025-08-14 12:23:29.478	151,60	2025-08-14 12:31:26.410	118,91	2025-08-14 12:33:11.754	83,52	2025-08-14 12:35:36.414	41,64	2025-08-14 12:37:45.372	0	2025-08-14 12:39:09.474
10	202,90	2025-08-14 12:23:29.969	151,60	2025-08-14 12:31:26.929	115,43	2025-08-14 12:33:12.258	83,52	2025-08-14 12:35:36.929	41,64	2025-08-14 12:37:45.859	0	2025-08-14 12:39:09.978
11	200,20	2025-08-14 12:23:30.471	157,02	2025-08-14 12:31:27.402	115,43	2025-08-14 12:33:12.762	83,52	2025-08-14 12:35:37.404	39,17	2025-08-14 12:37:46.363	0	2025-08-14 12:39:10.482
12	200,20	2025-08-14 12:23:30.975	157,02	2025-08-14 12:31:27.906	115,43	2025-08-14 12:33:13.270	84,91	2025-08-14 12:35:37.909	39,17	2025-08-14 12:37:46.881	0	2025-08-14 12:39:11.000
13	200,20	2025-08-14 12:23:31.479	162,55	2025-08-14 12:31:28.409	118,26	2025-08-14 12:33:13.752	84,91	2025-08-14 12:35:38.413	39,17	2025-08-14 12:37:47.371	0	2025-08-14 12:39:11.473
14	197,10	2025-08-14 12:23:31.982	162,55	2025-08-14 12:31:28.929	118,26	2025-08-14 12:33:14.257	84,91	2025-08-14 12:35:38.917	39,17	2025-08-14 12:37:47.858	0	2025-08-14 12:39:11.977
15	197,10	2025-08-14 12:23:32.471	162,55	2025-08-14 12:31:29.401	118,26	2025-08-14 12:33:14.760	80,73	2025-08-14 12:35:39.420	40,64	2025-08-14 12:37:48.362	0	2025-08-14 12:39:12.481
16	197,10	2025-08-14 12:23:32.975	159,04	2025-08-14 12:31:29.905	122,67	2025-08-14 12:33:15.264	80,73	2025-08-14 12:35:39.908	40,64	2025-08-14 12:37:48.864	0	2025-08-14 12:39:12.984
17	196,20	2025-08-14 12:23:33.478	159,04	2025-08-14 12:31:30.408	122,67	2025-08-14 12:33:15.769	75,65	2025-08-14 12:35:40.412	40,64	2025-08-14 12:37:49.369	0	2025-08-14 12:39:13.489
18	196,20	2025-08-14 12:23:33.982	159,04	2025-08-14 12:31:30.913	122,07	2025-08-14 12:33:16.255	75,65	2025-08-14 12:35:40.915	40,64	2025-08-14 12:37:49.873	0	2025-08-14 12:39:13.976
19	196,20	2025-08-14 12:23:34.470	153,80	2025-08-14 12:31:31.399	122,07	2025-08-14 12:33:16.759	75,65	2025-08-14 12:35:41.419	42,25	2025-08-14 12:37:50.360	0	2025-08-14 12:39:14.479
20	195,00	2025-08-14 12:23:34.972	153,80	2025-08-14 12:31:31.904	122,07	2025-08-14 12:33:17.263	74,57	2025-08-14 12:35:41.907	42,25	2025-08-14 12:37:50.864	0	2025-08-14 12:39:14.983
21	195,00	2025-08-14 12:23:35.477	155,85	2025-08-14 12:31:32.407	123,31	2025-08-14 12:33:17.783	74,57	2025-08-14 12:35:42.411	42,25	2025-08-14 12:37:51.368	0	2025-08-14 12:39:15.487
22	195,00	2025-08-14 12:23:35.980	155,85	2025-08-14 12:31:32.911	123,31	2025-08-14 12:33:18.255	74,53	2025-08-14 12:35:42.914	45,61	2025-08-14 12:37:51.871	0	2025-08-14 12:39:15.974
23	195,40	2025-08-14 12:23:36.469	155,85	2025-08-14 12:31:33.415	123,31	2025-08-14 12:33:18.759	74,53	2025-08-14 12:35:43.418	45,61	2025-08-14 12:37:52.359	0	2025-08-14 12:39:16.478
24	195,40	2025-08-14 12:23:36.972	162,96	2025-08-14 12:31:33.902	123,61	2025-08-14 12:33:19.262	78,61	2025-08-14 12:35:43.906	45,61	2025-08-14 12:37:52.861	0	2025-08-14 12:39:16.982
25	197,80	2025-08-14 12:23:37.476	162,96	2025-08-14 12:31:34.406	123,61	2025-08-14 12:33:19.766	78,61	2025-08-14 12:35:44.409	45,61	2025-08-14 12:37:53.366	0	2025-08-14 12:39:17.487
26	197,80	2025-08-14 12:23:37.979	171,80	2025-08-14 12:31:34.908	123,61	2025-08-14 12:33:20.253	78,61	2025-08-14 12:35:44.914	48,16	2025-08-14 12:37:53.871	0	2025-08-14 12:39:17.972
27	197,80	2025-08-14 12:23:38.467	171,80	2025-08-14 12:31:35.413	122,88	2025-08-14 12:33:20.758	78,61	2025-08-14 12:35:45.417	48,16	2025-08-14 12:37:54.358	0	2025-08-14 12:39:18.477
28	198,60	2025-08-14 12:23:38.971	178,00	2025-08-14 12:31:35.901	122,88	2025-08-14 12:33:21.260	84,05	2025-08-14 12:35:45.921	48,16	2025-08-14 12:37:54.862	0	2025-08-14 12:39:18.981
29	198,60	2025-08-14 12:23:39.475	178,00	2025-08-14 12:31:36.405	122,88	2025-08-14 12:33:21.765	84,05	2025-08-14 12:35:46.408	48,44	2025-08-14 12:37:55.365	0	2025-08-14 12:39:19.484
30	198,60	2025-08-14 12:23:39.978	181,60	2025-08-14 12:31:36.909	120,33	2025-08-14 12:33:22.269	85,41	2025-08-14 12:35:46.913	48,44	2025-08-14 12:37:55.870	0	2025-08-14 12:39:19.988
	199,12		160,68		120,05		79,59		43,12		0	

Tabel L.9 data pengukuran beban dan putaran turbin angin Savonius dengan tiga sudu variasi diameter 13

Diameter 13												
Tanpa beban			0.5 kg		1 kg		1.5 kg		2 kg		2.5 kg	
No.	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	457,10	2025-08-14 12:43:40.102	416,20	2025-08-14 12:46:38.755	370,50	2025-08-14 12:48:43.966	326,10	2025-08-14 12:50:57.602	287,40	2025-08-14 12:53:05.994	252,60	2025-08-14 12:56:41.257
2	457,20	2025-08-14 12:43:40.609	416,20	2025-08-14 12:46:39.258	370,50	2025-08-14 12:48:44.469	323,60	2025-08-14 12:50:58.091	288,10	2025-08-14 12:53:06.497	252,60	2025-08-14 12:56:41.762
3	457,20	2025-08-14 12:43:41.094	416,20	2025-08-14 12:46:39.778	368,70	2025-08-14 12:48:44.973	323,60	2025-08-14 12:50:58.596	288,10	2025-08-14 12:53:07.000	255,00	2025-08-14 12:56:42.264
4	456,50	2025-08-14 12:43:41.600	414,10	2025-08-14 12:46:40.248	368,70	2025-08-14 12:48:45.460	323,60	2025-08-14 12:50:59.101	288,10	2025-08-14 12:53:07.488	255,00	2025-08-14 12:56:42.769
5	456,50	2025-08-14 12:43:42.106	414,10	2025-08-14 12:46:40.753	368,00	2025-08-14 12:48:45.963	321,70	2025-08-14 12:50:59.605	287,90	2025-08-14 12:53:07.993	256,90	2025-08-14 12:56:43.257
6	455,80	2025-08-14 12:43:42.609	413,30	2025-08-14 12:46:41.257	368,00	2025-08-14 12:48:46.468	321,70	2025-08-14 12:51:00.108	287,90	2025-08-14 12:53:08.497	256,90	2025-08-14 12:56:43.760
7	455,80	2025-08-14 12:43:43.112	413,30	2025-08-14 12:46:41.762	368,00	2025-08-14 12:48:46.971	321,50	2025-08-14 12:51:00.596	288,70	2025-08-14 12:53:09.000	260,10	2025-08-14 12:56:44.265
8	455,30	2025-08-14 12:43:43.600	411,90	2025-08-14 12:46:42.249	368,00	2025-08-14 12:48:47.476	321,50	2025-08-14 12:51:01.101	288,70	2025-08-14 12:53:09.487	260,10	2025-08-14 12:56:44.766
9	455,30	2025-08-14 12:43:44.104	411,90	2025-08-14 12:46:42.753	370,10	2025-08-14 12:48:47.963	322,60	2025-08-14 12:51:01.603	288,70	2025-08-14 12:53:09.992	261,60	2025-08-14 12:56:45.255
10	456,40	2025-08-14 12:43:44.608	411,70	2025-08-14 12:46:43.256	370,10	2025-08-14 12:48:48.467	322,60	2025-08-14 12:51:02.108	290,70	2025-08-14 12:53:10.496	261,60	2025-08-14 12:56:45.760
11	456,40	2025-08-14 12:43:45.112	411,70	2025-08-14 12:46:43.761	375,00	2025-08-14 12:48:48.971	326,00	2025-08-14 12:51:02.595	290,70	2025-08-14 12:53:10.999	261,40	2025-08-14 12:56:46.264
12	457,90	2025-08-14 12:43:45.598	411,70	2025-08-14 12:46:44.248	375,00	2025-08-14 12:48:49.475	326,00	2025-08-14 12:51:03.099	292,40	2025-08-14 12:53:11.485	261,40	2025-08-14 12:56:46.767
13	457,90	2025-08-14 12:43:46.103	413,20	2025-08-14 12:46:44.752	375,00	2025-08-14 12:48:49.961	329,70	2025-08-14 12:51:03.603	292,40	2025-08-14 12:53:11.991	261,40	2025-08-14 12:56:47.254
14	456,40	2025-08-14 12:43:46.607	413,20	2025-08-14 12:46:45.255	377,70	2025-08-14 12:48:50.466	329,70	2025-08-14 12:51:04.106	292,40	2025-08-14 12:53:12.495	258,20	2025-08-14 12:56:47.759
15	456,40	2025-08-14 12:43:47.111	414,30	2025-08-14 12:46:45.760	377,70	2025-08-14 12:48:50.970	329,70	2025-08-14 12:51:04.594	292,20	2025-08-14 12:53:12.998	258,20	2025-08-14 12:56:48.262
16	454,30	2025-08-14 12:43:47.599	414,30	2025-08-14 12:46:46.263	377,30	2025-08-14 12:48:51.474	332,30	2025-08-14 12:51:05.098	292,20	2025-08-14 12:53:13.486	253,40	2025-08-14 12:56:48.766
17	454,30	2025-08-14 12:43:48.102	416,00	2025-08-14 12:46:46.751	377,30	2025-08-14 12:48:51.961	332,30	2025-08-14 12:51:05.601	292,20	2025-08-14 12:53:13.985	253,40	2025-08-14 12:56:49.269
18	451,80	2025-08-14 12:43:48.606	416,00	2025-08-14 12:46:47.254	376,50	2025-08-14 12:48:52.465	333,30	2025-08-14 12:51:06.105	289,80	2025-08-14 12:53:14.490	249,00	2025-08-14 12:56:49.757
19	451,80	2025-08-14 12:43:49.109	419,20	2025-08-14 12:46:47.759	376,50	2025-08-14 12:48:52.969	333,30	2025-08-14 12:51:06.592	289,80	2025-08-14 12:53:15.013	249,00	2025-08-14 12:56:50.260
20	449,00	2025-08-14 12:43:49.614	419,20	2025-08-14 12:46:48.261	375,90	2025-08-14 12:48:53.472	333,60	2025-08-14 12:51:07.097	287,70	2025-08-14 12:53:15.501	243,00	2025-08-14 12:56:50.764
21	449,00	2025-08-14 12:43:50.102	419,20	2025-08-14 12:46:48.750	375,90	2025-08-14 12:48:53.976	333,60	2025-08-14 12:51:07.601	287,70	2025-08-14 12:53:15.989	243,00	2025-08-14 12:56:51.268
22	447,80	2025-08-14 12:43:50.605	421,40	2025-08-14 12:46:49.254	375,90	2025-08-14 12:48:54.463	332,10	2025-08-14 12:51:08.105	287,70	2025-08-14 12:53:16.491	243,00	2025-08-14 12:56:51.756
23	447,80	2025-08-14 12:43:51.104	421,40	2025-08-14 12:46:49.757	376,50	2025-08-14 12:48:54.968	332,10	2025-08-14 12:51:08.608	287,90	2025-08-14 12:53:16.996	236,60	2025-08-14 12:56:52.259
24	447,80	2025-08-14 12:43:51.611	419,60	2025-08-14 12:46:50.261	376,50	2025-08-14 12:48:55.469	326,30	2025-08-14 12:51:09.095	287,90	2025-08-14 12:53:17.500	236,60	2025-08-14 12:56:52.763
25	447,80	2025-08-14 12:43:52.099	419,60	2025-08-14 12:46:50.749	376,60	2025-08-14 12:48:55.976	326,30	2025-08-14 12:51:09.599	288,10	2025-08-14 12:53:17.987	236,60	2025-08-14 12:56:53.267
26	449,20	2025-08-14 12:43:52.604	418,00	2025-08-14 12:46:51.252	376,60	2025-08-14 12:48:56.463	326,30	2025-08-14 12:51:10.102	288,10	2025-08-14 12:53:18.491	229,40	2025-08-14 12:56:53.755
27	449,20	2025-08-14 12:43:53.106	418,00	2025-08-14 12:46:51.756	376,50	2025-08-14 12:48:56.966	321,90	2025-08-14 12:51:10.607	288,10	2025-08-14 12:53:18.995	229,40	2025-08-14 12:56:54.258
28	450,50	2025-08-14 12:43:53.611	418,90	2025-08-14 12:46:52.259	376,50	2025-08-14 12:48:57.470	321,90	2025-08-14 12:51:11.093	287,90	2025-08-14 12:53:19.498	222,70	2025-08-14 12:56:54.762
29	450,50	2025-08-14 12:43:54.106	418,90	2025-08-14 12:46:52.748	374,20	2025-08-14 12:48:57.974	321,40	2025-08-14 12:51:11.597	287,90	2025-08-14 12:53:19.986	222,70	2025-08-14 12:56:55.266
30	450,90	2025-08-14 12:43:54.602	419,10	2025-08-14 12:46:53.252	374,20	2025-08-14 12:48:58.462	321,40	2025-08-14 12:51:12.101	286,80	2025-08-14 12:53:20.490	222,70	2025-08-14 12:56:55.753
	453,33		416,06		373,80		326,59		289,14		248,12	

Diameter 13												
No	3 kg		3,5 kg		4 kg		4,5 kg		5 kg		5,5 kg	
	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu	Putaran	Tanggal/Waktu
1	201,30	2025-08-14 12:58:29.616	163,60	2025-08-14 13:01:33.266	119,39	2025-08-14 13:04:29.188	72,06	2025-08-14 13:06:18.645	43,50	2025-08-14 13:07:30.963	0	2025-08-14 13:08:43.224
2	201,30	2025-08-14 12:58:30.117	163,60	2025-08-14 13:01:33.758	125,21	2025-08-14 13:04:29.696	72,06	2025-08-14 13:06:19.148	43,50	2025-08-14 13:07:31.469	0	2025-08-14 13:08:43.729
3	201,30	2025-08-14 12:58:30.619	159,78	2025-08-14 13:01:34.262	125,21	2025-08-14 13:04:30.198	72,12	2025-08-14 13:06:19.651	43,50	2025-08-14 13:07:31.972	0	2025-08-14 13:08:44.213
4	200,60	2025-08-14 12:58:31.109	159,78	2025-08-14 13:01:34.764	125,21	2025-08-14 13:04:30.686	72,12	2025-08-14 13:06:20.157	46,49	2025-08-14 13:07:32.458	0	2025-08-14 13:08:44.717
5	200,60	2025-08-14 12:58:31.611	157,17	2025-08-14 13:01:35.269	128,25	2025-08-14 13:04:31.192	72,12	2025-08-14 13:06:20.660	46,49	2025-08-14 13:07:32.964	0	2025-08-14 13:08:45.219
6	200,60	2025-08-14 12:58:32.117	157,17	2025-08-14 13:01:35.757	128,25	2025-08-14 13:04:31.694	75,65	2025-08-14 13:06:21.146	46,49	2025-08-14 13:07:33.467	0	2025-08-14 13:08:45.723
7	201,20	2025-08-14 12:58:32.620	157,17	2025-08-14 13:01:36.261	128,25	2025-08-14 13:04:32.200	75,65	2025-08-14 13:06:21.651	46,49	2025-08-14 13:07:33.969	0	2025-08-14 13:08:46.214
8	201,20	2025-08-14 12:58:33.110	156,80	2025-08-14 13:01:36.765	123,94	2025-08-14 13:04:32.703	75,65	2025-08-14 13:06:22.155	39,99	2025-08-14 13:07:34.460	0	2025-08-14 13:08:46.719
9	201,20	2025-08-14 12:58:33.613	156,80	2025-08-14 13:01:37.269	123,94	2025-08-14 13:04:33.191	83,03	2025-08-14 13:06:22.643	39,99	2025-08-14 13:07:34.963	0	2025-08-14 13:08:47.221
10	202,30	2025-08-14 12:58:34.117	157,64	2025-08-14 13:01:37.772	123,94	2025-08-14 13:04:33.691	83,03	2025-08-14 13:06:23.147	39,99	2025-08-14 13:07:35.467	0	2025-08-14 13:08:47.724
11	202,30	2025-08-14 12:58:34.638	157,64	2025-08-14 13:01:38.260	119,41	2025-08-14 13:04:34.198	83,03	2025-08-14 13:06:23.650	38,75	2025-08-14 13:07:35.970	0	2025-08-14 13:08:48.213
12	202,30	2025-08-14 12:58:35.106	157,64	2025-08-14 13:01:38.764	119,41	2025-08-14 13:04:34.700	83,03	2025-08-14 13:06:24.154	38,75	2025-08-14 13:07:36.458	0	2025-08-14 13:08:48.717
13	202,30	2025-08-14 12:58:35.613	161,50	2025-08-14 13:01:39.268	119,41	2025-08-14 13:04:35.189	86,46	2025-08-14 13:06:24.641	38,75	2025-08-14 13:07:36.962	0	2025-08-14 13:08:49.220
14	202,30	2025-08-14 12:58:36.116	161,50	2025-08-14 13:01:39.771	118,23	2025-08-14 13:04:35.693	86,46	2025-08-14 13:06:25.144	42,24	2025-08-14 13:07:37.466	0	2025-08-14 13:08:49.725
15	202,40	2025-08-14 12:58:36.618	167,20	2025-08-14 13:01:40.259	118,23	2025-08-14 13:04:36.195	78,86	2025-08-14 13:06:25.649	42,24	2025-08-14 13:07:37.968	0	2025-08-14 13:08:50.228
16	202,40	2025-08-14 12:58:37.108	167,20	2025-08-14 13:01:40.763	118,23	2025-08-14 13:04:36.698	78,86	2025-08-14 13:06:26.152	42,24	2025-08-14 13:07:38.458	0	2025-08-14 13:08:50.715
17	202,40	2025-08-14 12:58:37.611	169,90	2025-08-14 13:01:41.266	119,87	2025-08-14 13:04:37.188	78,86	2025-08-14 13:06:26.656	42,84	2025-08-14 13:07:38.957	0	2025-08-14 13:08:51.217
18	202,90	2025-08-14 12:58:38.115	169,90	2025-08-14 13:01:41.770	119,87	2025-08-14 13:04:37.693	69,23	2025-08-14 13:06:27.144	42,84	2025-08-14 13:07:39.459	0	2025-08-14 13:08:51.724
19	202,90	2025-08-14 12:58:38.619	167,50	2025-08-14 13:01:42.257	119,87	2025-08-14 13:04:38.211	69,23	2025-08-14 13:06:27.649	42,84	2025-08-14 13:07:39.966	0	2025-08-14 13:08:52.223
20	202,90	2025-08-14 12:58:39.123	167,50	2025-08-14 13:01:42.762	124,85	2025-08-14 13:04:38.700	71,67	2025-08-14 13:06:28.152	42,84	2025-08-14 13:07:40.468	0	2025-08-14 13:08:52.713
21	202,40	2025-08-14 12:58:39.610	167,50	2025-08-14 13:01:43.265	124,85	2025-08-14 13:04:39.204	71,67	2025-08-14 13:06:28.656	41,13	2025-08-14 13:07:40.955	0	2025-08-14 13:08:53.219
22	202,40	2025-08-14 12:58:40.113	163,60	2025-08-14 13:01:43.769	124,85	2025-08-14 13:04:39.691	79,33	2025-08-14 13:06:29.157	41,13	2025-08-14 13:07:41.464	0	2025-08-14 13:08:53.722
23	202,40	2025-08-14 12:58:40.618	163,60	2025-08-14 13:01:44.273	126,14	2025-08-14 13:04:40.195	79,33	2025-08-14 13:06:29.647	41,13	2025-08-14 13:07:41.966	0	2025-08-14 13:08:54.226
24	201,00	2025-08-14 12:58:41.122	159,06	2025-08-14 13:01:44.761	126,14	2025-08-14 13:04:40.698	79,33	2025-08-14 13:06:30.147	37,95	2025-08-14 13:07:42.467	0	2025-08-14 13:08:54.714
25	201,00	2025-08-14 12:58:41.609	159,06	2025-08-14 13:01:45.263	126,14	2025-08-14 13:04:41.202	79,33	2025-08-14 13:06:30.654	37,95	2025-08-14 13:07:42.954	0	2025-08-14 13:08:55.218
26	201,00	2025-08-14 12:58:42.113	159,06	2025-08-14 13:01:45.768	126,56	2025-08-14 13:04:41.689	86,11	2025-08-14 13:06:31.142	37,95	2025-08-14 13:07:43.457	0	2025-08-14 13:08:55.720
27	202,30	2025-08-14 12:58:42.616	156,14	2025-08-14 13:01:46.271	126,56	2025-08-14 13:04:42.194	86,11	2025-08-14 13:06:31.646	39,65	2025-08-14 13:07:43.961	0	2025-08-14 13:08:56.224
28	202,30	2025-08-14 12:58:43.117	156,14	2025-08-14 13:01:46.759	126,56	2025-08-14 13:04:42.697	86,11	2025-08-14 13:06:32.149	39,65	2025-08-14 13:07:44.464	0	2025-08-14 13:08:56.712
29	206,20	2025-08-14 12:58:43.608	160,80	2025-08-14 13:01:47.262	127,53	2025-08-14 13:04:43.201	86,11	2025-08-14 13:06:32.653	39,65	2025-08-14 13:07:44.958	0	2025-08-14 13:08:57.217
30	206,20	2025-08-14 12:58:44.111	160,80	2025-08-14 13:01:47.766	127,53	2025-08-14 13:04:43.689	86,48	2025-08-14 13:06:33.138	39,65	2025-08-14 13:07:45.461	0	2025-08-14 13:08:57.716
	202,13		161,425		123,73		78,64		41,55		0	



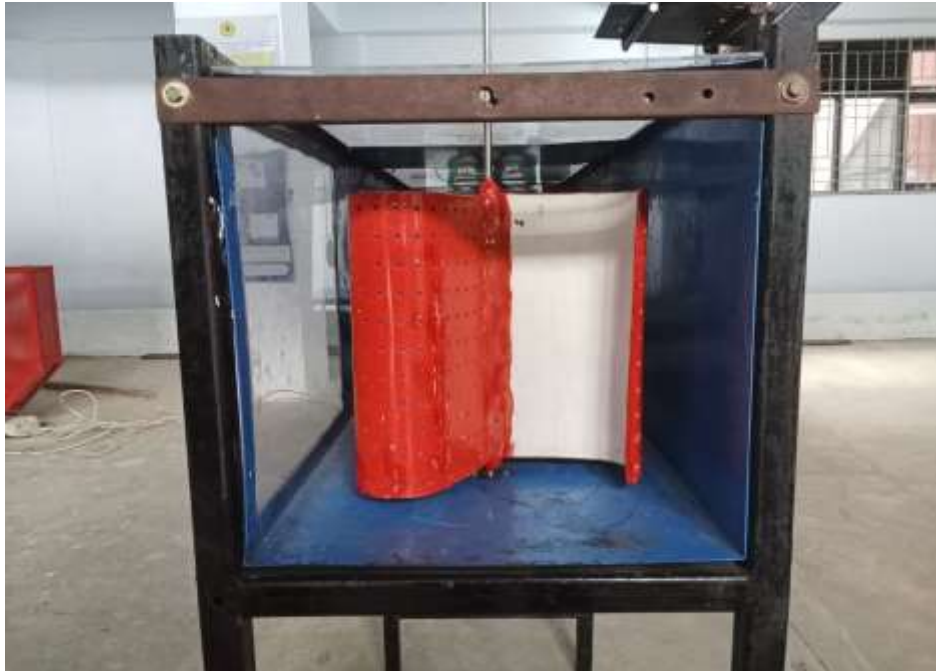
Gambar L.1 Proses pemasangan rotor pada *wind tunnel*



Gambar L. 2 Proses pengukuran putaran dengan *tachometer*



Gambar L.3 Turbin angin Savonius tiga sudu tampak depan



Gambar L.4 Turbin angin Savonius tiga sudu tampak belakang



Gambar L.5 *Wind tunnel* turbin angin Savonius tiga sudu tampak samping



Gambar L.6 *Wind tunnel* turbin angin tampak samping atas



Gambar L. 7 *Blower* tampak belakang



Gambar L.8 Model dan variasi diameter *dimple*

c) Diameter 7 mm

d) Diameter 9 mm



e) Diameter 11 mm

f) Diameter 13 mm

Gambar L.9 Model dan variasi diameter *dimple*

Matriks Reverensi

No	Author/ Tahun	Publisher	Judul	Tujuan	Metode	Hasil
1	Lubis, (2022)	Teknologi Rekayasa Teknik Mesin (JTRAIN) Program Studi Teknik Mesin dan Teknik Elektro, Universitas Tanjungpura, Pontianak Vol. 3, No. 1, 2022: 98-103 halaman	Analisis Energi Turbin Angin Savonius 3 Sudu Pada Jermal Ikan Dusun Besar Kecamatan Pulau Maya	(1)Penelitian ini bertujuan untuk menganalisis pemanfaatan turbin angin Savonius 3 sudu sebagai pembangkit listrik alternatif di Jermal Ikan Dusun Besar, Kecamatan Pulau Maya, Kabupaten Kayong Utara, Kalimantan Barat.	(1)Kecepatan angin diukur selama 11 hari untuk mendapatkan data rata-rata. Turbin Savonius tiga sudu dengan dimensi 80 cm tinggi dan 40 cm diameter dirancang menggunakan Solidworks. (2)Pengujian dilakukan dengan mengukur tegangan, arus, dan daya pada kecepatan angin 1,5–5,5 m/s, serta mencatat putaran poros dan keluaran generator.	(1)Hasil ini membuktikan bahwa turbin angin Savonius 3 sudu efektif digunakan untuk memenuhi kebutuhan listrik skala kecil di daerah pesisir seperti jermal ikan, meskipun pada kecepatan angin yang relatif rendah. (2)maka hasil daya angin (Pa) dengan besar 2,364 watt dan daya generator (poutg) sebesar 0,578 watt sehingga perhitungan efisiensi sebesar 39% dengan kecepatan angin 2,88 m/s dari alat yang telah dibuat. (3)Penelitian merekomendasikan pengembangan desain dan pemilihan generator yang lebih optimal untuk meningkatkan output daya.
2	Meta dkk., (2023)	Universitas Bung Hatta	Perancangan Turbin Angin Sumbu	(1)Penelitian ini bertujuan merancang turbin angin sumbu	(1)Penelitian ini menggunakan metode perancangan dan	(1)Hasil penelitian menunjukkan bahwa turbin berhasil dirancang dengan daya keluaran sekitar 200

		No. 2022: 64–68 halaman	Vertikal Lima Sudu untuk Aplikasi Penerangan Jalan Raya Daya 200 Watt	vertikal lima sudu untuk menghasilkan listrik penerangan jalan raya dengan memanfaatkan angin dari lalu lintas kendaraan.sekaligus mengurangi efek silau dari lampu kendaraan yang melintas dari arah berlawanan.	pengujian turbin angin sumbu vertikal lima sudu yang ditempatkan di median jalan raya	Watt pada kecepatan angin yang tidak stabil, serta konstruksi turbin yang sederhana dan efektif untuk aplikasi penerangan jalan raya serta mengurangi silau lampu kendaraan dari arah berlawanan.
3	Sudirman & Santoso, (2020)	Jurnal Teknik Universitas Sultan Ageng Tirtayasa. Volume 8, Nomor 1, Februari 2017: 1-8 halaman	Pengaruh pengarah angin dan kecepatan angin pada turbin savonius tiga sudu terhadap energi listrik yang dihasilkan.	(1)Tujuan penelitian ini adalah untuk mengetahui pengaruh pengarah angin dan variasi kecepatan angin terhadap energi listrik yang dihasilkan oleh turbin savonius tiga sudu.	(1)Metode yang digunakan berupa eksperimen dengan menguji turbin pada berbagai kecepatan angin, baik dengan maupun tanpa pengarah angin. (2)Pada kecepatan angin 5 m/s, prototipe turbin angin savonius tiga sudu menghasilkan tegangan listrik 2 Volt. Sedangkan saat menggunakan pengarah angin, tegangan listrik 2 Volt didapatkan	(1)Hasilnya menunjukkan bahwa pengarah angin memungkinkan turbin menghasilkan tegangan listrik yang sama pada kecepatan angin lebih rendah, sehingga meningkatkan efisiensi turbin.Pada variasi sudut 15, 20, 25, 30 derajat didapatkan sudut 20 derajat menghasilkan tegangan listrik maksimum untuk masing-masing kecepatan udara 1,8 m/s sampai dengan 4 m/s.

					pada kecepatan angin 4,5 m/s, sehingga penambahan pengarah angin pada prototipe turbin angin savonius tiga sudu dapat meningkatkan energi listrik yang dihasilkan.	
4	Silla dkk., (2022)	UPT Perpustakaan Undana, Kupang Halaman 64– 68.	Analisis Kinerja Turbin Savonius sebagai Sumber Energi Alternatif	(1) Tujuan penelitian ini adalah memanfaatkan energi angin dengan turbin Savonius karena konstruksinya yang sederhana dan kemampuannya beroperasi pada kecepatan rendah.	(1) Metode yang digunakan yaitu pengukuran langsung putaran turbin, kecepatan angin, dan torsi	Hasilnya menunjukkan bahwa pada kecepatan angin 8.26 m/s, turbin menghasilkan putaran 654 rpm dan torsi 0.33 N.m, dengan Koefisien Daya (CP) 2.8%. (1) Kecepatan rata-rata angin yang terukur di desa Oenali adalah 8.26 m/s mampu memutar turbin Savonius dengan putaran rata-rata sebesar 654 rpm sehingga menghasilkan Torsi Turbin (Tt) sebesar 0.33 N.m. (2) Koefisien Daya (CP) sebesar 2.8 (%) dengan tip speed ratio sebesar 0.6 (λ). (3) Koefisien Torsi (CT) diperoleh sebesar 8.7 (%), dan Tip Speed Ratio yang diperoleh sebesar 0.1 (λ).

5	Nur Kholis dkk., (2024)	Jurnal Politeknik Negeri Ujung Pandang Volume: Vol. 7, 194-200 halaman	Performansi turbin air tipe savonius tiga sudu menggunakan pengaruh aliran	(1)Penelitian ini bertujuan menentukan koefisien daya dan <i>tip speed ratio</i> (TSR) turbin air Savonius tiga sudu dengan pengaruh aliran, serta pengaruh variasi bukaan saluran irigasi.	(1)Metode yang digunakan adalah eksperimen dengan menguji turbin pada berbagai kecepatan air.	(1)Hasilnya menunjukkan bahwa performa turbin dipengaruhi oleh kecepatan air dan bukaan saluran, dengan daya maksimum 0,939 W pada kecepatan air 0,41 m/s dengan dua bukaan saluran.
6	Saputra dkk., (2020)	Teknik Mesin dan Manufaktur, Universitas Hasyim Asy'ari Jombang 5-10 halaman dalam Vol. 1 No. 2 (2020)	Pengaruh diameter dan jumlah sudu turbin angin savonius tipe L terhadap unjuk kerja yang dihasilkan	(1)Tujuan penelitian ini adalah untuk mengetahui pengaruh diameter dan jumlah sudu pada turbin angin savonius tipe L terhadap performa turbin.	(1)Metode yang digunakan berupa simulasi dengan variasi diameter rotor dan jumlah sudu, kemudian dianalisis menggunakan ANOVA 2 arah dengan menggunakan aplikasi SPSS. (2)Variasi yang digunakan adalah diameter 20 cm dan 40 cm serta jumlah sudu 2 dan 4. Hasilnya turbin angin dengan variasi 40 cm dan 4 sudu mampu menghasilkan output terbaik yang dimana	(1)Hasilnya menunjukkan turbin dengan diameter 40 cm dan 4 sudu memiliki performa terbaik dengan daya dan efisiensi tertinggi.(2)yakni 1,744 watt dan untuk BHP menghasilkan 3,3520 watt dan efisiensinya mencapai 2,17 % untuk torsi tertinggi dicapai turbin variasi 40 cm 2 sudu dengan torsi 0,116.

					menghasilkan RPM 350,98 tegangan 11,64 volt arus 0,144 ampere dan daya 1,676 watt.	
7	Hidayat & Surbakti, (2021)	Program Studi Teknik Mesin, Universitas Jakarta Volume 1 Nomor 1, Oktober 2021 ;38–55 halaman	Turbin Angin Savonius 3 Sudu untuk Lampu Perangkap Hama untuk Masyarakat Kabupaten Cianjur, Jawa Barat	(1)Penelitian ini bertujuan menyediakan energi listrik alternatif dari turbin angin Savonius 3 sudu untuk menyalakan lampu perangkap hama di daerah sulit akses listrik, khususnya bagi petani di Kabupaten Cianjur.	(1)Penelitian dilakukan melalui tahapan desain dan pemilihan material, pembuatan turbin angin VAWT Savonius 3 sudu dari seng aluminium tebal 0,3 mm, serta pengujian alat selama 5 hari di Desa Segaramakmur, Bekasi. (2)Komponen utama menggunakan poros S-45C Chrome dengan diameter 17 mm dan panjang 1500 mm.piringan penyanggah blade.	(1)Hasil pengujian 5 hari menunjukkan daya maksimum harian sekitar 21–25 Watt dan daya rata-rata sekitar 10 Watt, dengan efisiensi turbin mencapai 10,3%. (2)Rancangan alat dinilai sederhana, mudah dibuat, dan efektif untuk menghasilkan listrik di daerah terpencil.
8	Hidayatulloh (dkk., t.t.)	Politeknik Penerbangan Surabaya	Studi Penambahan Dimple Pada Turbin Angin	(1)Menurunkan pressure drag pada returning blade turbin Savonius dengan menambahkan dimple pada	(2)Simulasi numerik 2D pada turbin Savonius diameter 200 mm dengan dimple kedalaman 1 mm dan jarak antar dimple 14°,	(1)Penambahan dimple justru menurunkan performa turbin hingga 19% dibanding turbin tanpa dimple. Koefisien drag pada turbin dengan dimple lebih tinggi, sehingga

		Vol. 6 No. 1, April 2022 : 55–66 halaman	Savonius Untuk Meningkatkan Performa Aerodinamika	permukaannya untuk meningkatkan performa aerodinamika turbin	pada kecepatan angin 5 m/s ($Re=6,31 \times 10^4$). (2) Analisis dilakukan dengan membandingkan koefisien daya, momen, drag, lift, serta kontur tekanan dan kecepatan antara turbin konvensional dan turbin dengan dimple.	menambah hambatan aerodinamis. (2) Hasil simulasi belum valid sepenuhnya karena masalah <i>meshing</i> dan pengaturan solver.
9	Sampelawang dkk., (2025)	Engineering Headway, Vol. 20, 2025-03-17 : 75-83 halaman	Performance Analysis of the Savonius-Type Rotor with Grooved Blades as a Hydrokinetic Turbin	(1) Meningkatkan efisiensi dan kinerja turbin hidrokinetik Savonius dengan menambahkan alur (grooves) pada sudu rotor. (2) Penelitian ini bertujuan memahami bagaimana konfigurasi alur memengaruhi perilaku aerodinamis dan efisiensi ekstraksi energi.	(1) Metode yang digunakan melibatkan desain variasi lebar alur pada sudu Savonius, termasuk model dengan lebar 12,5 mm. (2) Eksperimen dilakukan untuk mengukur efisiensi (η) dan koefisien drag (CD) pada berbagai debit aliran air, serta membandingkan performa antara rotor konvensional dan rotor beralur.	(1) Hasil penelitian menunjukkan bahwa rotor beralur mencapai efisiensi maksimum 35,66% , meningkat 4,69% dibandingkan rotor konvensional. (2) Koefisien drag tertinggi tercapai pada lebar alur 12,5 mm dengan nilai 3,08 , naik 0,37 dari model dasar. (3) Alur meningkatkan gesekan dan distribusi tekanan, sehingga memperbaiki torsi positif dan mengurangi fluktuasi torsi negatif. (4) Temuan ini menunjukkan potensi signifikan dalam optimasi turbin hidrokinetik

						untuk daerah berkecepatan aliran air rendah.
--	--	--	--	--	--	--

10	Sampelawang dkk., (2024)	Eastern-European Journal of Enterprise Technologies; Vol. 1, 2024-02-28 : 28-37 halaman	Enhancing Savonius Rotor Model With Additional Grooves On Hydrokinetic Turbine Performance	(1)Tujuan penelitian adalah meningkatkan efisiensi dan kinerja turbin hidrokinetik Savonius melalui modifikasi sudu dengan penambahan alur (grooves) pada sisi cekung, untuk memahami bagaimana konfigurasi alur memengaruhi perilaku aerodinamis dan efisiensi ekstraksi energi dari aliran air	(1)Metode yang digunakan melibatkan desain dan pengujian model rotor Savonius dengan tambahan alur pada sudu, termasuk variasi lebar alur, serta pengukuran efisiensi dan koefisien drag pada berbagai debit aliran air. (2)Uji kinerja dilakukan untuk membandingkan model konvensional tanpa alur dan model beralur, dengan fokus pada pengaruh lebar alur terhadap efisiensi dan koefisien drag.	(1)Hasil penelitian menunjukkan bahwa penambahan alur pada sudu Savonius secara signifikan meningkatkan efisiensi dan koefisien drag. (2)Model beralur dengan lebar 12,5 mm memberikan efisiensi maksimum 35,66% dan koefisien drag 3,08, yang berarti terjadi peningkatan efisiensi sebesar 4,69% dan koefisien drag sebesar 0,37 dibandingkan model tanpa alur. (3)Alur pada sudu meningkatkan gesekan dan distribusi tekanan, sehingga memperbaiki kinerja turbin secara keseluruhan dan efektif untuk ekstraksi energi pada aliran air berkecepatan rendah.
----	--------------------------	---	--	--	---	---



PROGRAM STUDI TEKNIK MESIN
FAKULTAS TEKNIK
UNIVERSITAS KRISTEN INDONESIA (UKI) TORAJA
Alamat : Jln. Poros Sa'dan, Telp (0423) 2920484, Kakondongan, Rantepao
Email : teknikmesin@ukitoraja.ac.id

SURAT KETERANGAN

Nomor : LM/2026/126

Yang bertanda tangan di bawah ini, menerangkan bahwa telah dilakukan Penelitian di Laboratorium Teknik Mesin Universitas Kristen Indonesia (UKI) Toraja pada tanggal 14 Agustus 2025 dalam rangka penyelesaian tugas akhir mahasiswa.

Nama : Noris Lebang

Nim : 221212089

Fakultas : Teknik

Perguruan Tinggi : Universitas Kristen Indonesia (UKI) Toraja

Judul Tugas Akhir : Analisis Performa Turbin Savonius Tipe I. Tiga Sudu Dengan Variasi Diameter Dimple).

Tabel 4.3 tabel hasil penghitungan

NO	Diameter dimple (mm)	Kecepatan angin, v (m/s)	Luas penampang, A (m ²)	Beban, m (kg)	Putaran, n (rpm)	Gaya, F (N)	Torsi, τ (Nm)	Kecepatan sudut, ω (rad/s)	Tip Speed ratio (G)	Daya angin, P _r (W)	Daya turbin, P _t (W)	Efisiensi turbin, η (%)
1	Tanpa Dimple	10,04	0,09	0	381,49	0	0	39,93	0,10	54,10	0	0
2			0,09	0,5	337,34	4,91	0,10	33,31	0,09	54,10	3,45	6,40
3			0,09	1	294,89	9,81	0,20	30,87	0,08	54,10	6,06	11,19
4			0,09	1,5	256,00	14,72	0,29	26,79	0,07	54,10	7,89	14,57
5			0,09	2	215,19	19,62	0,39	22,52	0,06	54,10	8,84	16,34
6			0,09	2,5	168,07	24,53	0,49	17,59	0,04	54,10	8,63	15,95
7			0,09	3	125,74	29,43	0,59	13,16	0,03	54,10	7,75	14,32
8			0,09	3,5	80,50	34,34	0,69	8,43	0,02	54,10	5,79	10,69
9			0,09	4	47,97	39,24	0,78	5,02	0,01	54,10	3,94	7,28
10			0,09	4,5	0	44,15	0,88	0	0	54,10	0	0
1	5	10,04	0,09	0	423,85	0	0	44,36	0,11	54,10	0	0
2			0,09	0,5	380,49	4,91	0,10	39,82	0,10	54,10	3,91	7,22
3			0,09	1	344,78	9,81	0,20	36,09	0,09	54,10	7,08	13,09
4			0,09	1,5	296,08	14,72	0,29	30,99	0,08	54,10	9,12	16,86
5			0,09	2	257,83	19,62	0,39	26,99	0,07	54,10	10,59	19,57
6			0,09	2,5	214,71	24,53	0,49	22,47	0,06	54,10	11,02	20,37
7			0,09	3	169,96	29,43	0,59	17,79	0,04	54,10	10,47	19,35
8			0,09	3,5	125,50	34,34	0,69	13,14	0,03	54,10	9,02	16,67
9			0,09	4	82,09	39,24	0,78	8,59	0,02	54,10	6,74	12,46
10			0,09	4,5	47,84	44,15	0,88	5,01	0,01	54,10	4,42	8,17
11			0,09	5	0	49,05	0,98	0	0	54,10	0	0

NO	Diameter dimple (mm)	Kecepatan angin, v (m/s)	Luas penampang, A (m ²)	Beban, m (kg)	Putaran n, (rpm)	Gaya, F (N)	Torsi, τ (Nm)	Kecepatan sudut, ω (rad/s)	Tip Speed ratio (λ)	Daya angin P _w , (W)	Daya turbina, P _t (W)	Efisiensi turbina, η (%)
1	7	10,04	0,09	0	463,52	0	0	46,52	0,12	54,10	0	0
2			0,09	0,5	425,66	4,91	0,10	44,55	0,11	54,10	4,37	8,08
3			0,09	1	387,04	9,81	0,20	40,51	0,10	54,10	7,55	14,09
4			0,09	1,5	340,97	14,72	0,29	35,69	0,09	54,10	10,50	19,41
5			0,09	2	306,30	19,62	0,39	32,27	0,08	54,10	12,66	23,40
6			0,09	2,5	270,61	24,53	0,49	28,12	0,07	54,10	13,89	25,68
7			0,09	3	231,10	29,43	0,59	24,19	0,06	54,10	14,24	26,31
8			0,09	3,5	195,92	34,34	0,69	20,51	0,05	54,10	14,68	26,03
9			0,09	4	156,47	39,24	0,78	16,38	0,04	54,10	12,85	23,76
10			0,09	4,5	118,51	44,15	0,88	12,49	0,03	54,10	10,95	20,24
11			0,09	5	74,78	49,05	0,98	7,83	0,02	54,10	7,68	14,19
12			0,09	5,5	35,20	53,96	1,08	4,05	0,01	54,10	4,37	8,08
13			0,09b	6	0	58,86	1,18	0	0	54,10	0	0
1	9	10,04	0,09	0	463,52	0	0	46,52	0,12	54,10	0	0
2			0,09	0,5	425,66	4,91	0,10	44,55	0,11	54,10	4,37	8,08
3			0,09	1	387,04	9,81	0,20	40,51	0,10	54,10	7,55	14,09
4			0,09	1,5	340,97	14,72	0,29	35,69	0,09	54,10	10,50	19,41
5			0,09	2	306,30	19,62	0,39	32,27	0,08	54,10	12,66	23,40
6			0,09	2,5	270,61	24,53	0,49	28,12	0,07	54,10	13,89	25,68
7			0,09	3	231,10	29,43	0,59	24,19	0,06	54,10	14,24	26,31
8			0,09	3,5	195,92	34,34	0,69	20,51	0,05	54,10	14,68	26,03
9			0,09	4	156,47	39,24	0,78	16,38	0,04	54,10	12,85	23,76
10			0,09	4,5	118,51	44,15	0,88	12,49	0,03	54,10	10,95	20,24
11			0,09	5	74,78	49,05	0,98	7,83	0,02	54,10	7,68	14,19
12			0,09	5,5	35,20	53,96	1,08	4,05	0,01	54,10	4,37	8,08
13			0,09b	6	0	58,86	1,18	0	0	54,10	0	0

NO	Diameter dimple (mm)	Kecepatan angin, v (m/s)	Luas penampang, A (m ²)	Beban, m (kg)	Putaran n, (rpm)	Gaya, F (N)	Torsi, τ (Nm)	Kecepatan sudut, ω (rad/s)	Tip Speed ratio (λ)	Daya angin P _w , (W)	Daya turbina, P _t (W)	Efisiensi turbina, η (%)
12	11	10,04	0,09	5,5	70,51	53,96	1,08	7,38	0,02	54,10	7,96	14,72
13			0,09	6	39,39	58,86	1,18	4,12	0,01	54,10	4,85	8,97
14			0,09	6,5	0	63,77	1,28	0	0	54,10	0	0
1			0,09	0	476,16	0	0	49,84	0,12	54,10	0	0
2			0,09	0,5	436,43	4,91	0,10	45,68	0,11	54,10	4,48	8,28
3			0,09	1	397,58	9,81	0,20	41,61	0,10	54,10	8,16	15,09
4			0,09	1,5	353,95	14,72	0,29	37,05	0,09	54,10	10,90	20,15
5			0,09	2	318,50	19,62	0,39	33,34	0,08	54,10	13,08	24,18
6			0,09	2,5	274,51	24,53	0,49	28,73	0,07	54,10	14,09	26,05
7			0,09	3	235,04	29,43	0,59	24,80	0,06	54,10	14,48	26,76
8			0,09	3,5	199,12	34,34	0,69	20,84	0,05	54,10	14,31	26,45
9			0,09	4	160,68	39,24	0,78	16,82	0,04	54,10	13,20	24,39
10			0,09	4,5	120,05	44,15	0,88	12,57	0,03	54,10	11,09	20,50
11			0,09	5	80	49,05	0,98	8,33	0,02	54,10	8,17	15,10
12	13	10,04	0,09	5,5	43	53,96	1,08	4,51	0,01	54,10	4,87	9,00
13			0,09	6	0	58,86	1,18	0	0	54,10	0	0
1			0,09	0	453,33	0	0	47,45	0,12	54,10	0	0
2			0,09	0,5	416,06	4,91	0,10	43,55	0,11	54,10	4,27	7,90
3			0,09	1	373,80	9,81	0,20	39,12	0,10	54,10	7,68	14,19
4			0,09	1,5	326,59	14,72	0,29	34,18	0,09	54,10	10,06	18,59
5			0,09	2	289,14	19,62	0,39	30,26	0,08	54,10	11,88	21,95
6			0,09	2,5	248,12	24,53	0,49	25,97	0,06	54,10	12,74	23,54
7			0,09	3	202,13	29,43	0,59	21,16	0,05	54,10	12,45	23,02
8			0,09	3,5	161,43	34,34	0,69	16,90	0,04	54,10	11,60	21,44

NO	Diameter dimple (mm)	Kecelakaan angin, v (m/s)	Luas penampang, A (m ²)	Beban, m (kg)	Putaran n , (rpm)	Gaya, F (N)	Torsi, τ (Nm)	Kecelakaan sudut, ω (rad/s)	Tip Speed rate (g)	Daya angin P_w (W)	Daya turbin, P_t (W)	Efisiensi turbin, η (%)
9												
10			0,09	4	121,73	39,24	0,78	12,95	0,03	54,10	10,16	18,78
11			0,09	4,5	79	44,15	0,88	8,23	0,02	54,10	2,27	13,43
12			0,09	5	42	49,03	0,98	4,35	0,01	54,10	4,27	7,89
			0,09	5,5	0	53,96	1,08	0	0	54,10	0	0

Kakondongan, 15 April 2026

Mengetahui :

Kepala Laboratorium Teknik Mesin




Ir. Formanto Palilang S.T., M.T.
 NIDN. 0924019203