

## Pengujian Torsi

No	Torsi (N.m)									
	Putaran (rpm)	Px	Putaran (rpm)	Pr	Putaran (rpm)	PE 5	Putaran (rpm)	PE 10	Putaran (rpm)	PE 15
1	4000	14.00	4000		4000	9.78	4000		4000	
2	4250	14.42	4250		4250	13.07	4250	12.81	4250	5.63
3	4500	15.55	4500		4500	14.92	4500	13.28	4500	12.11
4	4750	14.52	4750		4750	14.01	4750	12.91	4750	12.67
5	5000	13.86	5000		5000	13.82	5000	12.93	5000	12.55
6	5250	13.71	5250	9.87	5250	13.78	5250	12.87	5250	12.66
7	5500	14.09	5500	11.13	5500	14.00	5500	13.10	5500	12.90
8	5750	14.51	5750	11.67	5750	14.50	5750	13.48	5750	13.26
9	6000	14.97	6000	11.99	6000	14.87	6000	13.83	6000	13.71
10	6250	15.28	6250	12.2 4	6250	15.22	6250	14.19	6250	13.97
11	6500	15.41	6500	12.5 1	6500	15.31	6500	14.29	6500	14.13
12	6750	15.48	6750	12.7 1	6750	15.32	6750	14.37	6750	14.18
13	7000	15.53	7000	12.8 2	7000	15.58	7000	14.63	7000	14.35
14	7250	15.86	7250	13.0 7	7250	15.75	7250	14.85	7250	14.71
15	7500	16.16	7500	13.2 6	7500	16.09	7500	15.19	7500	14.90
16	7750	16.38	7750	13.5 3	7635	16.24	7647	15.36	7704	15.21
17	7825	16.57	7983	13.8 4	7750	16.18	7687	15.17	7722	15.14
18	8000	16.25	8000	13.6 9	7965	16.36	7750	15.27	7750	15.00
19	8223	16.35	8114	13.9 4	8000	16.22	7839	15.40	8000	14.93
20	8250	16.34	8222	13.4 7	8156	16.32	8000	15.18	8207	14.81
21	8277	16.30	8250	13.6 9	8250	16.20	8250	15.13	8250	15.00
22	8500	16.07	8500	13.6 2	8500	16.11	8500	15.03	8500	14.84
23	8750	15.91	8750	13.4 9	8750	15.86	8750	14.91	8750	14.62
24	9000	15.59	9000	13.3 0	9000	15.46	8858	14.92	9000	14.33

25	9174	15.48	9250	13.0 0	9047	15.60	9000	14.59	9037	14.17
26	9250	15.24	9500	12.7 8	9250	15.09	9235	14.20	9125	14.29
27	9500	14.84	9750	12.5 1	9333	15.15	9249	14.31	9250	13.85
28	9542	15.00	9908	11.97	9500	14.66	9250	14.17	9500	13.50
29	9625	14.65	10000	12.2 3	9605	14.49	9500	13.66	9750	13.22
30	9750	14.40	10250	11.86	9750	14.18	9750	13.28	9780	13.46
31	10000	13.99	10500	11.55	10000	13.79	10000	12.93	10000	12.77
32	10250	13.66	10750	11.26	10250	13.43	10250	13.58	10250	12.47
33	10500	13.26	11000	11.04	10500	13.08	10500	12.17	10500	12.11
No	Torsi (N.m)									
	Putaran (rpm)	Px	Putaran (rpm)	Pr	Putaran (rpm)	PE 5	Putaran (rpm)	PE 10	Putaran (rpm)	PE 15
34	10750	12.87	11250	10.8 9	10750	12.49	10750	11.88	10750	11.72
35	11000	12.49	11500	10.6 8	11000	12.31	11000	11.51	11000	11.43
36	11250	11.94	11529	11.02	11250	11.62	11250	10.97	11250	10.91
37	11500	11.44	11641	10.8 2	11500	11.23	11500	10.54	11500	10.44

Ket :Px = Pertamaxmurni

PE 10 = Premium etanol 10%

Pr = Premium murni

PE 15 = Premium etanol 15%

PE 5 = Premium etanol 5%

## Pengujian Daya

No	Daya (kW)									
	Putaran (rpm)	Px	Putaran (rpm)	Pr	Putaran (rpm)	PE 5	Putaran (rpm)	PE 10	Putaran (rpm)	PE 15
1	4000	6.29	4000		4000	4.18	4000		4000	
2	4250	6.51	4250		4250	5.84	4250	5.69	4250	2.50
3	4500	7.36	4500		4500	7.01	4500	6.26	4500	5.67
4	4750	7.23	4750		4750	6.98	4750	6.44	4750	6.29
5	5000	7.28	5000		5000	7.26	5000	6.79	5000	6.56
6	5250	7.53	5250	5.44	5250	7.58	5250	7.08	5250	6.98
7	5500	8.10	5500	6.39	5500	8.08	5500	7.53	5500	7.41
8	5750	8.72	5750	7.03	5750	8.72	5750	8.13	5750	7.98
9	6000	9.45	6000	7.53	6000	9.37	6000	8.70	6000	8.63
10	6250	10.04	6250	8.03	6250	9.99	6250	9.32	6250	9.17
11	6500	10.51	6500	8.53	6500	10.46	6500	9.74	6500	9.64
12	6750	10.96	6750	9.02	6750	10.86	6750	10.19	6750	10.04
13	7000	11.41	7000	9.42	7000	11.46	7000	10.79	7000	10.54
14	7250	12.06	7250	9.94	7250	11.98	7250	11.28	7250	11.21
15	7500	12.73	7500	10.44	7500	12.68	7500	11.96	7500	11.73
16	7750	13.35	7750	11.01	7635	12.98	7647	12.30	7704	12.30
17	7825	13.57	7983	11.56	7750	13.17	7687	12.23	7722	12.23
18	8000	13.67	8000	11.51	7965	13.65	7750	12.43	7750	12.23
19	8223	14.09	8114	11.86	8000	13.62	7839	12.68	8000	12.55

20	8250	14.19	8222	11.63	8156	13.94	8000	12.78	8207	12.75
21	8277	14.17	8250	11.86	8250	14.04	8250	13.10	8250	13.00
22	8500	14.37	8500	12.18	8500	14.37	8500	13.45	8500	13.25
23	8750	14.64	8750	12.40	8750	14.59	8750	13.75	8750	13.47
24	9000	14.74	9000	12.60	9000	14.67	8858	13.87	9000	13.60
25	9174	14.91	9250	12.68	9047	14.84	9000	13.80	9037	13.42
26	9250	14.84	9500	12.78	9250	14.69	9235	13.80	9125	13.72
27	9500	14.86	9750	12.83	9333	14.84	9249	13.87	9250	13.50
28	9542	15.06	9908	12.45	9500	14.67	9250	13.82	9500	13.50
29	9625	14.84	10000	12.88	9605	14.62	9500	13.65	9750	13.57
30	9750	14.81	10250	12.83	9750	14.57	9750	13.62	9780	13.87
31	10000	14.74	10500	12.75	10000	14.57	10000	13.62	10000	13.45
32	10250	14.74	10750	12.75	10250	14.52	10250	13.57	10250	13.47
33	10500	14.64	11000	12.80	10500	14.47	10500	13.47	10500	13.42
No	Daya (kW)									
	Putaran (rpm)	Px	Putaran (rpm)	Pr	Putaran (rpm)	PE 5	Putaran (rpm)	PE 10	Putaran (rpm)	PE 15
34	10750	14.59	11250	12.95	10750	14.29	10750	13.47	10750	13.27
35	11000	14.49	11500	12.95	11000	14.27	11000	13.35	11000	13.25
36	11250	14.14	11529	13.35	11250	13.80	11250	13.02	11250	12.95
37	11500	13.89	11641	13.27	11500	13.62	11500	12.80	11500	12.68

Ket :Px = Pertamaxmurni

PE 10 = Premium etanol 10%

Pr = Premium murni

PE 15 = Premium etanol 15%

PE 5 = Premium etanol 5%

## EMISI GAS BUANG

<b>Tabel Emisi Gas Buang Kadar HC</b>					
Putaran (rpm)	Premium	Pertamax	Premium Ethanol 5%	Premium Ethanol 10%	Premium Ethanol 15%
4000	364	297	118	286	477
6000	265	163	223	180	200
8000	211	145	52	102	149
9000	154	126	50	106	111

<b>Tabel Emisi Gas Buang Kadar Oksigen</b>					
Putaran (rpm)	Premium	Pertamax	Premium Ethanol 5%	Premium Ethanol 10%	Premium Ethanol 15%
4000	1.78	0.7	1.2	1.48	1.38
6000	1.11	0.7	2.32	1.35	1.84
8000	0.42	0.4	1.58	0.94	1.16
9000	0.47	1.04	2.12	1.2	1.04

<b>Tabel Emisi Gas Buang Kadar Karbon Monoksida</b>					
Putaran (rpm)	Premium	Pertamax	Premium Ethanol 5%	Premium Ethanol 10%	Premium Ethanol 15%
4000	4.676	3.586	1.92	1.104	2.003
6000	0.742	3.493	0.316	0.355	0.335
8000	2.532	2.562	0.15	0.329	0.674
9000	1.785	1.294	0.116	0.456	0.43

<b>Tabel Emisi Gas Buang Kadar Karbon Dioksida</b>					
Putaran (rpm)	Premium	Pertamax	Premium Ethanol 5%	Premium Ethanol 10%	Premium Ethanol 15%
4000	8.73	12.49	12.22	12.72	12.22
6000	13.33	8.53	12.76	12.76	12.87
8000	12.97	13.39	13.43	13.3	13.23
9000	13.81	14.13	12.91	13.23	13.37

Tabel Emisi Gas Buang $\lambda$					
Putaran (rpm)	Premium	Pertamax	Premium Ethanol 5%	Premium Ethanol 10%	Premium Ethanol 15%
4000	0.957	0.197	0.998	1.197	0.982
6000	1.038	0.94	1.1	1.05	1.022
8000	0.936	0.939	1.077	1.027	1.029
9000	0.963	1.035	1.105	1.068	1.032

## PENGUJIAN JALAN “TEST RUN”

Premium Murni								
N o	Bahan Bakar	Bahan Bakar awal (ml)	Bahan Bakar akhir (ml)	Kecepatan (km/jam)	Time (t)	Jarak (KM)	Penggunaan Bahan Bakar (ml)	Ket
1	Premium	1000	837	60	371,19	5.7	163	
2	Premium	1000	841	60	369,87	5.7	159	
3	Premium	1000	838	60	362,75	5.7	162	

Pertamax Murni								
N o	Bahan Bakar	Bahan Bakar awal (ml)	Bahan Bakar akhir (ml)	Kecepatan (km/jam)	Time (t)	Jarak (KM)	Penggunaan Bahan Bakar (ml)	Ket
1	Pertamax	1000	860	60	365,44	5.7	140	
2	Pertamax	1000	866	60	370,28	5.7	134	
3	Pertamax	1000	853	60	366,52	5.7	147	

Campuran Premium - Etanol 5%								
N o	Bahan Bakar	Bahan Bakar awal (ml)	Bahan Bakar akhir (ml)	Kecepatan (km/jam)	Time (t)	Jarak (KM)	Penggunaan Bahan Bakar (ml)	Ket
1	Pre - Eth 5%	1000	852	60	371,13	5.7	148	
2	Pre - Eth 5%	1000	849	60	369,58	5.7	151	
3	Pre - Eth 5%	1000	857	60	348,47	5.7	143	



Campuran Premium - Etanol 10%								
<b>N o</b>	<b>Bahan Bakar</b>	<b>Bahan Bakar awal (ml)</b>	<b>Bahan Bakar akhir (ml)</b>	<b>Kecepatan (km/jam)</b>	<b>Time (t)</b>	<b>Jarak (KM)</b>	<b>PenggunaanBahan Bakar (ml)</b>	<b>Ket</b>
<b>1</b>	Pre - Eth 10 %	1000	851	60	361,52	5.7	149	
<b>2</b>	Pre - Eth 10 %	1000	856	60	368,25	5.7	144	
<b>3</b>	Pre - Eth 10 %	1000	854	60	377,63	5.7	146	

Campuran Premium - Etanol 15%								
<b>N o</b>	<b>Bahan Bakar</b>	<b>Bahan Bakar awal (ml)</b>	<b>Bahan Bakar akhir (ml)</b>	<b>Kecepatan (km/jam)</b>	<b>Time (t)</b>	<b>Jarak (KM)</b>	<b>Penggunaan Bahan Bakar (ml)</b>	<b>Ket</b>
<b>1</b>	Pre - Eth 15 %	1000	853	60	369,69	5.7	147	
<b>2</b>	Pre - Eth 15 %	1000	850	60	361,39	5.7	150	
<b>3</b>	Pre - Eth 15 %	1000	859	60	362,43	5.7	141	

## KONSUMSI BAHAN BAKAR

Premium Murni							
No	Volume (ml)	rpm	<i>mf</i>	SFC	Torsi (N.m)	Daya (Kw)	Waktu KBB
1	20	5000					62,33
2	20	6000	0,957	0,127	11,99	7,53	56,23
3	20	7000	0,997	0,106	12,82	9,42	53,98
4	20	8000	1,056	0,092	13,69	11,51	50,96
5	20	9000	1,194	0,095	13,3	12,60	45,04
6	20	10000	1,338	0,104	12,23	12,88	40,19

Pertamax Murni							
No	Volume (ml)	rpm	<i>mf</i>	SFC	Torsi (N.m)	Daya (Kw)	Waktu KBB
1	20	5000	0,838	0,115	13,96	7,28	64,20
2	20	6000	0,906	0,096	15,02	9,45	59,40
3	20	7000	0,955	0,084	15,68	11,41	56,32
4	20	8000	1,031	0,075	16,31	13,67	52,16
5	20	9000	1,118	0,076	15,69	14,74	48,13
6	20	10000	1,239	0,084	14,00	14,74	43,43

Premium - Ethanol 5%							
No	Volume (ml)	rpm	<i>mf</i>	SFC	Torsi (N.m)	Daya (Kw)	Waktu KBB
1	20	5000	0,623	0,086	13,93	7,26	86,35
2	20	6000	0,681	0,073	14,96	9,37	78,98
3	20	7000	0,788	0,069	15,57	11,46	68,22
4	20	8000	0,956	0,070	16,61	13,65	56,27
5	20	9000	1,026	0,070	15,51	14,67	52,43
6	20	10000	1,149	0,079	13,90	14,57	46,82

Premium - Ethanol 10%							
No	Volume (ml)	rpm	<i>mf</i>	SFC	Torsi (N.m)	Daya (kw)	Waktu KBB
1	20	5000	0,605	0,089	12,94	6,79	88,87
2	20	6000	0,677	0,078	13,64	8,70	79,44
3	20	7000	0,731	0,068	14,57	10,79	73,54
4	20	8000	0,879	0,069	15,14	12,78	61,22
5	20	9000	0,966	0,070	14,46	13,87	55,70

<b>6</b>	20	1000 0	1,140	0,084	12,89	13,62	47,19
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Premium - Ethanol 15%							
<b>N o</b>	<b>Volume (ml)</b>	<b>rpm</b>	<b><i>mf</i></b>	<b>SFC</b>	<b>Torsi (N.m)</b>	<b>Daya (Kw)</b>	<b>Waktu KBB</b>
<b>1</b>	20	5000	0,596	0,091	12,50	6,56	90,23
<b>2</b>	20	6000	0,661	0,077	13,81	8,63	81,43
<b>3</b>	20	7000	0,761	0,072	14,64	10,54	70,68
<b>4</b>	20	8000	0,885	0,072	15,08	12,23	60,81
<b>5</b>	20	9000	1,016	0,075	14,43	13,60	52,97
<b>6</b>	20	1000 0	1,165	0,087	12,90	13,45	46,19

