



DEPARTEMEN ENERGI DAN SUMBER DAYA MINERAL REPUBLIK INDONESIA  
**BADAN PENELITIAN DAN PENGEMBANGAN SUMBER ENERGI DAN SUMBER  
DAYA MINERAL**  
**PUSAT PENELITIAN DAN PENGEMBANGAN TEKNOLOGI MINYAK DAN GAS  
BUMI**  
**“LEMIGAS”**  
JALAN CILEDUK RAYA KEBAYORAN LAMA JAKARTA SELATAN 12230 - INDONESIA

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**LAPORAN HASIL PENGUJIAN**

PENGUJIAN : OCTANE NUMBER  
METODE PENGUJIAN : ASTM D 2699

No.	JENIS BAHAN BAKAR	OCTANE NUMBER	METODE PENGUJIAN
1.	Premium	87,2	ASTM D 2699
2.	Premium + Power Clean 0,33%	87,7	ASTM D 2699
3.	Premium + Prima Ace 0,25%	87,5	ASTM D 2699
4.	Premium + Power 21 0,1%	87,7	ASTM D 2699
5.	Premium + Griffon 0,066 gr/liter	88,1	ASTM D 2699
6.	Premium + Elf Octane Booster 0,25%	88,0	ASTM D 2699

Jakarta, 14 April 2008  
Penganalisa



PRAYOGI

Lampiran 2

**DATA HASIL PENGUJIAN PREMIUM DAN PREMIUM + ADITIF  
PADA IGNITION TIMING 8° BTDC**

Premium	TEST NO.	Throttle Valve Open	Rotational Shaft Speed	Fuel Consumption	Specific Fuel Consumption	Brake Horse Power	Thermal Efficiency	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
1	10	1700	2,406	0,963	2,497	11,148	137	0,14	11,2	273	
2	20	1700	4,578	0,506	9,052	21,236	92	0,05	10,8	361	
3	30	1700	6,006	0,458	13,109	23,443	69	0,06	12,3	1488	
4	40	1700	6,584	0,439	14,982	24,441	84	0,30	13,5	1771	
1	20	1300	3,866	0,405	9,548	26,524	91	0,04	11,8	1527	
2	20	1500	4,475	0,428	10,466	25,115	87	0,05	11,4	1200	
3	20	1700	4,572	0,473	9,676	22,730	80	0,06	10,9	562	
4	20	1900	4,836	0,447	10,814	24,017	83	0,04	10,9	912	
5	20	2100	5,049	0,437	11,567	24,605	85	0,04	10,7	932	

Premium + PA 0,25%	TEST NO.	Throttle Valve Open	Rotational Shaft Speed	Fuel Consumption	Specific Fuel Consumption	Brake Horse Power	Thermal Efficiency	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
1	10	1700	2,406	0,964	2,497	11,146	118	0,13	11,4	312	
2	20	1700	4,354	0,498	8,740	21,558	86	0,05	10,6	336	
3	30	1700	5,736	0,427	13,422	25,130	72	0,06	12,6	1644	
4	40	1700	6,449	0,422	15,294	25,470	84	0,26	13,6	1903	
1	20	1300	3,778	0,406	9,309	26,466	84	0,03	12,0	1683	
2	20	1500	4,340	0,426	10,190	25,214	82	0,03	11,6	1278	
3	20	1700	4,433	0,430	10,300	24,952	75	0,04	10,9	736	
4	20	1900	4,844	0,434	11,163	24,752	81	0,04	11,1	1193	
5	20	2100	5,058	0,423	11,953	25,382	83	0,04	11,0	1058	

Premium + PC 0,33%	TEST NO.	Throttle Valve Open	Rotational Shaft Speed	Fuel Consumption	Specific Fuel Consumption	Brake Horse Power	Thermal Efficiency	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
1	10	1700	2,397	0,853	2,809	12,586	105	0,13	11,5	356	
2	20	1700	4,469	0,530	8,428	20,255	78	0,04	10,5	302	
3	30	1700	5,749	0,419	13,734	25,657	70	0,05	12,5	2000	
4	40	1700	6,322	0,413	15,294	25,981	85	0,26	13,4	2000	
1	20	1300	3,765	0,394	9,548	27,236	72	0,03	11,9	1420	
2	20	1500	4,266	0,408	10,466	26,346	71	0,03	11,6	1268	
3	20	1700	4,395	0,427	10,300	25,174	68	0,04	10,9	595	
4	20	1900	4,697	0,421	11,163	25,524	70	0,04	10,9	980	
5	20	2100	4,850	0,419	11,567	25,613	76	0,04	10,7	907	

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**DATA HASIL PENGUJIAN PREMIUM DAN PREMIUM + ADITIF  
PADA IGNITION TIMING 8° BTDC**

Premium + P21 0,10%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consum ption	Specific Fuel Consump tion	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
1	10	1700	2,394	0,959	2,497	11,203	104	0,11	11,50	289	
2	20	1700	4,175	0,446	9,364	24,086	80	0,05	10,80	434	
3	30	1700	5,767	0,402	14,358	26,738	79	0,07	12,40	2000	
4	40	1700	6,129	0,401	15,294	26,802	91	0,27	13,50	2000	
1	20	1300	3,728	0,390	9,548	27,504	88	0,03	11,90	1683	
2	20	1500	4,202	0,412	10,190	26,047	83	0,04	11,40	1249	
3	20	1700	4,320	0,419	10,300	25,610	76	0,04	10,90	723	
4	20	1900	4,503	0,403	11,163	26,623	78	0,04	10,90	1015	
5	20	2100	4,964	0,415	11,953	25,860	79	0,05	10,70	1054	

Premium + EOB 0,25%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consum ption	Specific Fuel Consump tion	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
1	10	1700	2,492	0,799	3,121	13,450	108	0,11	11,4	356	
2	20	1700	4,657	0,481	9,676	22,314	80	0,04	11,1	429	
3	30	1700	5,854	0,417	14,046	25,771	73	0,07	12,6	2000	
4	40	1700	6,127	0,393	15,607	27,359	86	0,29	13,5	2000	
1	20	1300	3,898	0,408	9,548	26,308	80	0,03	11,8	1566	
2	20	1500	4,097	0,392	10,466	27,432	77	0,03	11,4	1396	
3	20	1700	4,377	0,412	10,612	26,038	71	0,04	10,8	741	
4	20	1900	4,535	0,394	11,512	27,263	74	0,04	11,0	1093	
5	20	2100	4,777	0,413	11,567	26,006	80	0,04	10,8	1034	

Premium + GHP 0,066 gr/liter	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consum ption	Specific Fuel Consump tion	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/HP.hr	HP	%	ppm vol	% vol	% vol	ppm vol
1	10	1700	2,166	0,694	3,121	15,474	128	0,11	11,6	326	
2	20	1700	4,028	0,430	9,364	24,968	89	0,04	11,0	380	
3	30	1700	5,256	0,366	14,358	29,337	68	0,07	12,6	2000	
4	40	1700	5,710	0,366	15,607	29,353	84	0,32	13,4	2000	
1	20	1300	3,531	0,370	9,548	29,041	78	0,03	11,9	1454	
2	20	1500	3,849	0,368	10,466	29,203	73	0,03	11,5	1322	
3	20	1700	4,050	0,382	10,612	28,143	70	0,04	10,9	649	
4	20	1900	4,312	0,375	11,512	28,674	73	0,04	11,0	971	
5	20	2100	4,431	0,371	11,953	28,971	78	0,04	10,8	897	

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**DATA HASIL PENGUJIAN PREMIUM + ADITIF  
PADA IGNITION TIMING 6° BTDC**

Premium + PA 0,25%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consump tion	Specific Fuel Consump	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,358	0,944	2,497	11,374	112	0,12	11,2	336
	2	20	1700	4,550	0,486	9,364	22,103	84	0,04	10,6	439
	3	30	1700	5,771	0,430	13,422	24,978	65	0,07	12,3	1786
	4	40	1700	6,259	0,427	14,670	25,174	90	0,26	13,2	2000
	1	20	1300	3,940	0,423	9,309	25,378	76	0,03	11,7	1464
	2	20	1500	4,308	0,423	10,190	25,403	72	0,03	11,2	1234
	3	20	1700	4,420	0,443	9,988	24,268	67	0,04	10,6	614
	4	20	1900	4,772	0,427	11,163	25,125	70	0,04	10,7	806
	5	20	2100	4,941	0,427	11,567	25,143	80	0,04	10,6	883

Premium + PC 0,33%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consump tion	Specific Fuel Consump	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,320	0,929	2,497	11,560	114	0,14	11,3	234
	2	20	1700	0,000	0,000	0,000	0,000	79	0,05	10,6	302
	3	30	1700	0,000	0,000	0,000	0,000	55	0,05	12,1	1268
	4	40	1700	0,000	0,000	0,000	0,000	89	0,30	13,3	1635
	1	20	1300	3,966	0,426	9,309	25,211	80	0,03	11,7	1406
	2	20	1500	4,347	0,427	10,190	25,178	77	0,03	11,1	1127
	3	20	1700	4,645	0,480	9,676	22,372	72	0,04	10,6	610
	4	20	1900	4,817	0,445	10,814	24,114	73	0,04	10,7	951
	5	20	2100	5,420	0,485	11,182	22,157	79	0,04	10,6	878

Premium + P21 0,10%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consump tion	Specific Fuel Consump	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,329	0,933	2,497	11,514	115	0,11	11,40	331
	2	20	1700	4,319	0,477	9,052	22,511	86	0,04	10,70	444
	3	30	1700	5,516	0,421	13,109	25,523	62	0,06	12,30	1668
	4	40	1700	5,958	0,390	15,294	27,569	91	0,27	13,20	1839
	1	20	1300	3,967	0,416	9,548	25,846	81	0,03	11,70	1634
	2	20	1500	4,314	0,448	9,639	23,995	74	0,04	11,40	1195
	3	20	1700	4,791	0,465	10,300	23,090	72	0,05	10,90	829
	4	20	1900	5,014	0,464	10,814	23,165	74	0,05	10,80	1010
	5	20	2100	5,283	0,457	11,567	23,514	81	0,05	10,70	1024

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**DATA HASIL PENGUJIAN PREMIUM + ADITIF  
PADA IGNITION TIMING 6<sup>0</sup> BTDC**

Premium + EOB 0,25%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consump tion	Specific Fuel Consump	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,317	0,928	2,497	11,575	120	0,11	11,3	248
	2	20	1700	4,229	0,484	8,740	22,194	90	0,05	10,6	453
	3	30	1700	5,919	0,431	13,734	24,920	68	0,05	12,2	2000
	4	40	1700	6,173	0,396	15,607	27,154	84	0,22	13,2	2000
	1	20	1300	3,832	0,412	9,309	26,089	80	0,03	11,6	1478
	2	20	1500	3,918	0,395	9,915	27,177	79	0,03	10,9	912
	3	20	1700	4,248	0,439	9,676	24,462	73	0,04	10,7	678
	4	20	1900	4,464	0,413	10,814	26,017	76	0,04	10,8	946
	5	20	2100	4,564	0,408	11,182	26,313	80	0,04	10,6	1000

Premium + GHP 0,066 gr/liter	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consump tion	Specific Fuel Consump	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/HP.hr	HP	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,083	0,741	2,809	14,486	123	0,12	11,2	273
	2	20	1700	3,988	0,456	8,740	23,536	88	0,04	10,8	406
	3	30	1700	5,350	0,390	13,734	27,570	68	0,06	12,3	2000
	4	40	1700	5,623	0,368	15,294	29,212	82	0,24	13,3	2000
	1	20	1300	3,594	0,376	9,548	28,534	78	0,03	11,8	1429
	2	20	1500	4,044	0,408	9,915	26,332	73	0,03	11,1	1278
	3	20	1700	4,367	0,437	9,988	24,567	70	0,04	10,8	600
	4	20	1900	4,547	0,420	10,814	25,545	73	0,04	10,8	951
	5	20	2100	4,726	0,423	11,182	25,412	80	0,04	10,6	868

Lampiran 6

**DATA HASIL PENGUJIAN PREMIUM + ADITIF  
PADA IGNITION TIMING 10<sup>0</sup> BTDC**

Premium + PA 0,25%	TEST NO.	Throttle Valve Open	Rotational Shaft Speed	Fuel Consumption	Specific Fuel Consumption	Brake Horse Power	Thermal Efficiency	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,468	0,878	2,809	12,226	128	0,13	12,0	541
	2	20	1700	4,626	0,478	9,676	22,464	101	0,06	11,4	600
	3	30	1700	5,865	0,427	13,734	25,149	65	0,06	12,5	1912
	4	40	1700	6,241	0,417	14,982	25,781	94	0,32	13,6	2000
	1	20	1300	3,860	0,404	9,548	26,564	80	0,03	12,1	2000
	2	20	1500	4,054	0,398	10,190	26,996	74	0,03	11,1	1315
	3	20	1700	4,461	0,420	10,612	25,550	73	0,04	11,0	844
	4	20	1900	4,890	0,412	11,861	26,051	78	0,04	11,2	1312
	5	20	2100	5,089	0,400	12,724	26,853	80	0,04	11,1	1420

Premium + PC 0,33%	TEST NO.	Throttle Valve Open	Rotational Shaft Speed	Fuel Consumption	Specific Fuel Consumption	Brake Horse Power	Thermal Efficiency	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,369	0,843	2,809	12,734	135	0,13	11,5	361
	2	20	1700	4,475	0,494	9,052	21,723	110	0,05	11,1	463
	3	30	1700	5,676	0,404	14,046	26,575	95	0,07	12,7	2000
	4	40	1700	6,166	0,395	15,607	27,182	110	0,27	13,5	2000
	1	20	1300	3,807	0,389	9,786	27,608	103	0,04	11,8	1825
	2	20	1500	4,269	0,397	10,741	27,020	88	0,04	11,4	1327
	3	20	1700	4,652	0,438	10,612	24,499	80	0,05	10,8	824
	4	20	1900	4,856	0,422	11,512	25,463	83	0,05	10,8	1102
	5	20	2100	5,027	0,435	11,567	24,715	87	0,05	10,7	1127

Premium + P210,10%	TEST NO.	Throttle Valve Open	Rotational Shaft Speed	Fuel Consumption	Specific Fuel Consumption	Brake Horse Power	Thermal Efficiency	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,414	0,859	2,809	12,497	119	0,12	11,50	483
	2	20	1700	4,586	0,474	9,676	22,661	99	0,05	11,10	722
	3	30	1700	5,788	0,403	14,358	26,643	88	0,08	12,70	2000
	4	40	1700	6,213	0,415	14,982	25,898	105	0,27	13,50	2000
	1	20	1300	3,937	0,393	10,025	27,348	98	0,04	12,00	1693
	2	20	1500	4,071	0,411	9,915	26,160	87	0,04	10,90	1237
	3	20	1700	4,235	0,399	10,612	26,912	83	0,04	10,90	819
	4	20	1900	4,840	0,420	11,512	25,546	87	0,05	11,00	1000
	5	20	2100	5,189	0,449	11,567	23,942	92	0,05	10,90	1039

Lampiran 7

**DATA HASIL PENGUJIAN PREMIUM + ADITIF  
PADA IGNITION TIMING 10<sup>0</sup> BTDC**

Premium + EOB 0,25%	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consum ption	Specific Fuel Consump tion	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/kWh	kWh	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,287	0,733	3,121	14,655	129	0,11	11,7	370
	2	20	1700	4,510	0,452	9,988	23,785	103	0,04	11,0	522
	3	30	1700	5,749	0,419	13,734	25,657	71	0,06	12,5	1688
	4	40	1700	6,303	0,404	15,607	26,595	99	0,31	13,6	2000
	1	20	1300	3,772	0,385	9,786	27,864	90	0,03	11,9	1766
	2	20	1500	4,183	0,380	11,016	28,284	90	0,03	11,6	1388
	3	20	1700	4,472	0,409	10,925	26,236	83	0,04	11,0	932
	4	20	1900	4,741	0,400	11,861	26,872	85	0,04	11,1	1346
	5	20	2100	4,956	0,402	12,338	26,739	91	0,05	11,1	1385

Premium + GHP 0,066 gr/liter	TEST NO.	Throttl e Valve Open	Rotational Shaft Speed	Fuel Consum ption	Specific Fuel Consump tion	Brake Horse Power	Thermal Efficienc y	Exhaust Gas Analyser			
		%	N	FC	SFC	BHP	$h_{th}$	HC	CO	CO <sub>2</sub>	NO <sub>x</sub>
		%	rpm	L/hr	L/HP.hr	HP	%	ppm vol	% vol	% vol	ppm vol
	1	10	1700	2,341	0,750	3,121	14,322	128	0,13	11,6	388
	2	20	1700	4,586	0,474	9,676	22,661	103	0,05	11,0	541
	3	30	1700	5,842	0,407	14,358	26,395	80	0,07	12,5	2000
	4	40	1700	6,122	0,392	15,607	27,377	97	0,26	13,2	2000
	1	20	1300	3,759	0,384	9,786	27,958	88	0,03	11,9	1761
	2	20	1500	4,076	0,379	10,741	28,301	84	0,03	11,4	1332
	3	20	1700	4,348	0,410	10,612	26,215	83	0,04	11,0	922
	4	20	1900	4,768	0,402	11,861	26,716	87	0,04	11,1	1190
	5	20	2100	4,974	0,416	11,953	25,810	91	0,05	11,0	1234