



No: 4H.SPEC.006.0.B  SHEET NO. : A/1	<b>BROAD SPECIFICATIONS</b> <b>4R1040NA ENGINE</b> <b>Industrial Powerpack</b> <b>Application</b>	<b>SECT.</b>  <b>A</b>	 Enriching Lives
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**PROVISIONAL BROAD SPECIFICATIONS OF ENGINE SUITABLE FOR OFF-HIGHWAY APPLICATION**

S. NO.	PARAMETER	UNIT	VALUE
1.1	Engine Model	--	4R1040 NA
1.2	Emission compliance	--	Non-Emission
1.3	Engine cooling	--	Water cooled
1.4	Bore x Stroke	mm x mm	105 x 120
1.5	No. of cylinders	--	4
1.6	Total displacement	cc	4156
1.7	Valves per cylinder – intake/exhaust	--	1/1
1.8	Compression Ratio	--	18:1
1.9	Firing order (starting from flywheel end)	--	1-3-4-2
1.10	Combustion system	--	Direct Injection
1.11	Aspiration	--	Naturally Aspirated
1.12	Rated Power / Speed for the lead rating	hp / rpm	76 / 2200
1.13	<i>All intermediate &amp; lead rating engine performance Parameter mentioned in the following table.</i>		


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Engine Performance Parameter				High Idle Speed Range		BMEP
RPM	Gross Power (HP)	Gross Torque (NM)	Gross BSFC (gm/hp hr)	Min RPM	Max. RPM	
2200	76	242.6	161	2376	2420	7.5
2000	72	252.8	158	2160	2200	7.8
1800	67	261.4	154	1944	1980	8.1
1500	58	271.5	154	1620	1650	8.4

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S. NO.	PARAMETER	UNIT		VALUE	
1.14	Max. Crank-Case pressure	mm of H <sub>2</sub> O (kPa)		15 (0.147)	
1.15	Lubricating oil pressure	At low idle speed	bar	1.5 Min.	
		At rated speed and full load		3.5 Min.	
1.16	Lubricating oil change period for K Oil Premium (* First oil change at 50 hrs.)	hours		500	
1.17	Maximum oil temperature in sump	°C		75 above ambient	
1.18	Lubricating oil consumption (As per KOEL std. test cycle and test procedure)	% of fuel consumption		0.3 Max.	
1.19	Fuel Injection Pump	--		Mechanical Inline Pump	

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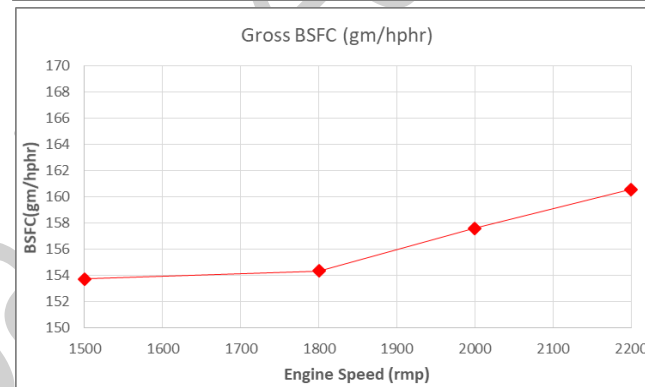
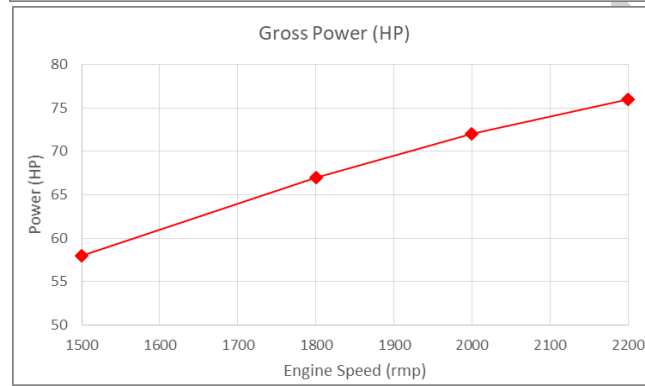
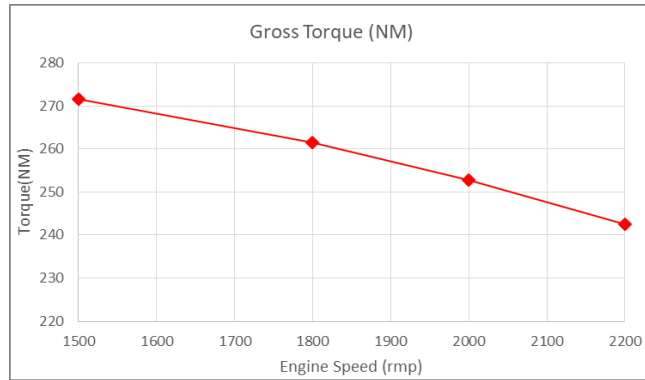
1.20	Main fuel filter	--	1.1 ltr dual fuel filter w/o overflow valve (MICO no -F2 002 H20 114)
1.21	Maximum allowable back pressure of exhaust system at rated power (at exhaust manifold outlet)	mm of Hg	50
1.22	Maximum exhaust temperature	deg C	650
1.23	Maximum air inlet restriction - Clean air cleaner - Used air cleaner	mm H <sub>2</sub> O	200 500
1.24	Maximum inlet airflow	kg/hr	290
1.25	Maximum exhaust gas flow	kg/hr	305

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## ENGINE PERFORMANCE CURVES

**Note:** Production Tolerance:  $\pm 5\%$  for Gross Torque, Gross Power and  $+5\%$  for Gross BSFC



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**Heat Balance Sheet:-**

**Note:** Heat balance is calculated at NTP conditions

HEAT BALANCE SHEET				
	76 HP@ 2200RPM	72 HP@ 2000RPM	67 HP@ 1800RPM	58 HP@ 1500RPM
Heat released by fuel (kW)	148.5	136.5	124.1	111.6
Brake Power (kW)	55.9	53.0	49.3	42.7
Heat lost to cooling water (kW)	40.1	36.8	33.5	30.1
Heat lost to exhaust (kW)	44.6	40.9	37.2	33.5
Unaccounted / Radiation losses (kW)	8.0	5.7	4.1	5.3

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