

# **CUMMINS ENGINE CO.LTD**

Model: STARPAC 4 CYLINDER B SERIES 1500 rpm

Data sheet:001 Jan 98 Rev03

GENERAL ENGINE DATA Type: 4 cycle,in-line,3.9 litres Engine Model Aspiration		<b>CPL 1522 4B3.9G</b> Nat Asp	CPL 1521/6 4BT3.9G1 Turbo	CPL 1520/5 4BT3.9G2 Turbo	CPL 2246 4BTA3.9G1 Turbo and Aftercooled
Bore/Stroke Compression Ratio Firing Order Rotation (viewed from front) Weight Dry	mm kg	17.3:1 1-3-4-2 390	All Models 16.5:1 1-3-4-2 All Models : Clo	16.5:1 1-3-4-2 ckwise Rotation 402	16.5:1 1-3-4-2 457
Weight Wet C of G from FFOB Installation Diagram	kg mm	418 206.5 3276870	430 210.5 3276871	430 210.5 3276871	500 210.5 3673746
ENGINE MOUNTING  Maximum Bending Moment @ Rea Face of Block No 4 CYLINDER B SERIES ENGINES	m(lb.ft)	IOT BE SOLID	All Models:1 MOUNTED TO E		
	nmH <sub>2</sub> 0	508	635	635	635
	nmH₂0 g/CFM	254	254 All Mo	254 dels:3	254
	mmHg		All Mod	dels:75	
°C	ndby me	104 100	104 100	104 100	104 100
	pa(psi) °C	69(10) 82-95	69(10) 82-95	69(10) 82-95	69(10) 82-95
STANDARD COOLING WITH 20" Maximum Air Restriction On Disch	FAN	0 <u>2</u> 00	0 <u>1</u> 00	5 <u>2</u> 55	02 00
	nmH <sub>2</sub> 0 °C Litres	10 52 21.2	10 52 21.2	10 52 21.2	10 52 22.9
Duct Restriction M <sup>3</sup> /sec		2.0	2.0	2.0	2.0
Oil Pan Capacity (OP 9003)	pa(psi) Litres	345(50)	345(50)	345(50)	345(50)
Hig	h(Low)	9.5(7.6)	9.5(7.6)	9.5(7.6)	9.5(7.6)

**FUEL SYSTEM** 

Type of Injection System

Maximum Restriction to Lift Pump mmHg

Standyne DB4 Direct Injection

All Models:102

Maximum Return Line Restriction mmHg

All Models: 102

All Models: 508

Total Return Line Flow litres/hr All Loads : 30 (Constant for all loads)

ENGINE MODEL		4B3.9G	4BT3.9G1	4BT3.9G2	4BTA3.9G1
ELECTRICAL SYSTEM					
Battery Charging System (Neg.	Ground)				
	Amps(12V)	63	63	63	63
	. (24V)	40	40	40	40
Cranking Motor	, ,	All Mo	odels:Heavy Duty	, Positive Engag	ement
Maximum Resistance of Cranki	ng		, ,	, 5 5	,
	hms(12V)	0.00075	0.00075	0.00075	0.00075
	(24V)	0.002	0.002	0.002	0.002
Minimum Recommended Batte	rv `´´				
Capacity @ -18°C and above		800	800	800	800
	(24V)	400	400	400	400
Note: CCA according to STD	SAE J537H				
3					
PERFORMANCE DATA					
Steady State Stability @ Any Co	onstant				
Load	+/- %	0.5	0.5	0.5	0.5

Engine Model	Rating	RPM	Gross Engine Output BHP	BMEP Bar	Piston Speed m/sec	Engine Water Flow I/sec	Intake Air Flow I/sec	Exhaust Gas Flow I/sec	Exhaust Gas Temp °C	Heat Rejection Exhaust Kwm	Heat Rejection Ambient Kwm
4B3.9	Standby	1500	55	8.35	6.0	1.6	41	132	657	24	6.4
	Prime	1500	50	7.59	6.0	1.6	40	120	596	22	5.8
4BT3.9G1	Standby	1500	74	11.24	6.0	1.6	54	149	502	44	8.0
	Prime	1500	67	10.21	6.0	1.6	52	137	466	41	7.3
4BT3.9G2	Standby	1500	87	13.24	6.0	1.6	59	172	554	56	10.0
	Prime	1500	79	12.00	6.0	1.6	57	158	521	52	9.0
4BTA3.9G1	Standby	1500	98	14.76	6.0	1.6	71	178	505	43	10.4
	Prime	1500	89	13.33	6.0	1.6	69	166	475	39	9.5

### **NOTE**

- 1, All data represents gross engine performance capabilities obtained and corrected in accordance with ISO 3046 conditions of 29.53 inHg (100 Kpa) barometric pressure, 361 ft (100 m) altitude, 77°F (25°C) air inlet temperature and 30% relative humidity with #2-D diesel fuel or a fuel corresponding to ASTM D975.
- 2, Data is based on the engine operating with fuel system, water pump, and lubricating oil pump. Not included are battery charging alternator, fan and optional equipment, and driven components.
- 3, Engine water flow at maximum 4 psi friction head.
- 4, Data certified within +/- 5%.

# NETT ENGINE OUTPUTS AND TYPICAL GENERATOR SET OUTPUTS, 50 Hz ONLY

Engine Model		4B3.9G	4BT3.9G1	4BT3.9G2	4BTA3.9G1
Nett Engine Output Kwm	Standby	38	53	62	70
-	Prime	34	48	56	64
Typical Gen Set Output	Kwe(KVa)				
	Standby	33(41)	47(59)	56(70)	62(78)
	Prime	30(37)	43(53)	50(63)	56(70)

#### **FUEL CONSUMPTION DATA**

Maximum Power Brake	e Specific Fuel				
Consumption	g/Kwm-Hr	220	215	221	200
Fuel Consumption	litres/hour				
	100% Standby	10.60	13.89	16.88	17.0
	100% Prime	9.65	12.76	15.37	15.0
	75% Prime	7.53	9.9	11.47	12.0
	50% Prime	5.41	7.42	7.76	8.0
	25% Prime	3.71	4.84	4.43	5.0
	0% Prime	2.73	2.73	2.73	2.73
Performance Curve		FR-9578	FR-9604	FR-9605	FR-90221

## **OPERATION AT ELEVATED TEMPERATURE AND ALTITUDE**

Normal Operation					
Maximum Altitude Before Derate	m	150	610	150	150
Maximum Temperature Before Derate	e °C	25	40	40	40
·					
For Sustained Operation Above These	e Condi	tions			
Derate Factor per 1000ft(300m) %		3	4	4	4
Derate factor per 10°F(5°C)	%	1	1	1	1
Derate Factor per 10% Relative Humi	dity				
Above 30%	%	1.5	N/A	N/A	N/A

### **NOTE**

- 5, Fuel consumption data taken from the relevant performance curve, and is based on a specific gravity of #2-D diesel of 0.85 Kg/litre.
- 6, Tabulation quotes typical fuel consumption within 5%
- 7, Reference data obtained and corrected in accordance with ISO 3046 conditions of 100Kpa barometric pressure, 110m altitude, 25°C air inlet temperature and relative humidity of 30%.
- 8, Net engine outputs quoted are based on maximum engine ratings less deductions for the standard STARPAC fan arrangement etc at standard operating conditions.
- 9, Typical Generator set outputs are based on an alternator efficiency range of 87-89% and 0.8 p.f.
- 10, All engines use dry type exhaust manifolds.

#### **CAUTION**

Engines supplied without regard for the attached ratings guidelines may not be covered by warranty.

#### ALL DATA SUBJECT TO CHANGE WITHOUT NOTICE

CUMMINS ENGINE COMPANY
EUROPEAN TECHNICAL OPERATIONS
YARM RD
DARLINGTON
DL1 4PW
ENGLAND

TEL (01325) 556600