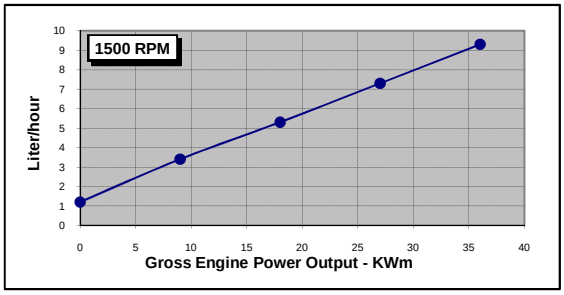
	Cummins Inc. Engine Data sheet	Basic Engine Model: 4BT3.9-G2	Date: November 2008	Page No. 1

Displacement: 3,9liter	Bore: 102mm	Stroke: 120mm
No. of Cylinders: 4	Aspiration: Turbocharged	
Emissions: EURO II & III		

Engine Speed	Standby Power Rating		Prime Power Rating		Continuous Power Rating	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500	40	54	36	48	*	*
1800	45	60	40	54	*	*

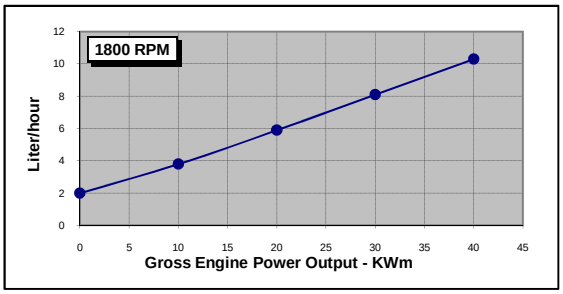
Engine Performance Data @1500 RPM

Output Power			Fuel Consumption	
%	kWm	BHP	kg/ kWm-h	litre/ hour
Standby Power				
100	40	54	0,212	10,3
Prime Power				
100	36	48	0,214	9,3
75	27	26	0,223	7,3
50	18	24	0,244	5,3
25	9	12	0,312	3,4
Continuous Power				
100	*	*	*	*



Engine Performance Data @1800 RPM

Output Power			Fuel Consumption	
%	kWm	BHP	kg/ kWm-h	litre/ hour
Standby Power				
100	45	60	0,219	11,6
Prime Power				
100	40	54	0,219	10,3
75	30,0	40	0,229	8,1
50	20	27	0,251	5,9
25	10	13	0,323	3,8
Continuous Power				
100	*	*	*	*



CONVERSIONS: **(kWm = BHP x 0.746)** **(BHP = Engine kWm x 1.34)**

Data shown above represent gross engine performance capabilities obtained and concerned in accordance with ISO-3046 conditions of 100 Kpa baromatic pressure [110m altitude], 25C air temperature,and relative humidity
of 30%with no.2 diesel or a fuel corresponding to ASTM D2.
The fuel consumption data is based on No.2 diesel fuel weight at 0.85kg/litre.
Power output curves are based on the engine operating with fuel system ,water pump and lubricating oil pump;not include are charging alternator,fan,optional equipment and driven components.

TECHNICAL DATA DEPT. **CERTIFIED WITHIN 5%** **CHIEF ENGINEER**

POWER RATING APPLICATION GUIDELINES
FOR
GENERATOR DRIVE ENGINES

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

STANDBY POWER RATING is applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating.

This rating should be applied where reliable utility power is available. A standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

CONTINUOUS POWER RATING is applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

PRIME POWER RATING is applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

UNLIMITED TIME RUNNING PRIME POWER

Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours.

The total operating time at 100% Prime Power shall not exceed 500 hours per year.

A 10% overload capability is available for a period of 1 hour within a 12 hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

LIMITED TIME RUNNING PRIME POWER

Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

Reference Standards:

BS-5514 and DIN-6271 standards are based on ISO-3046.

Operation At Elevated Temperature And Altitude:

The engine may be operated at:

1800 RPM up to 6,560 ft. (2000 m) and 104 ^{o}F (40 ^{o}C) without power deration.

1500 RPM up to 4,900 ft. (1500 m) and 104 ^{o}F (40 ^{o}C) without power deration.

For sustained operation above these conditions, derate by 4% per 1,000 ft (300 m), and 3% per 10 ^{o}C.

Cummins Inc.

Engine Data Sheet

ENGINE MODEL: **4BT3.9-G2**

DATA SHEET : DS-4BT3
DATE : November 2008

● Fan to Flywheel

GENERAL ENGINE DATA

Type ……..(Cyles #, Disposition, Cylinders)	In-Line 4 Cycle, Water Cooled
Aspiration……..	Turbocharged
Bore x Stroke……..(mm x mm)	102x120
Displacement……..(liter)	3,9
Compression Ratio……..	16,5:1
Dry Weight	
Fan to Flywheel Engine……..(Kg)	320
Wet Weight	
Fan to Flywheel Engine……..(Kg)	336
Moment of Inertia of Rotating Components……..($kg.m^2$)	0,143
Center of Gravity from Front Face of Block……..(mm)	373
Center of Gravity above Crankshaft Centerline……..(mm)	163

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block …… (N.m)	1356

EXHAUST SYSTEM

Maximum Back Pressure…….. (mm Hg)	76

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction	
• With Dirty Filter Element…… (mmH_2O)	635
• With Normal Duty Air Cleaner and Clean Filter Element ……..(mmH_2O)	254
• With Heavy Duty air Cleaner and Clean Filter Element…….. (mmH_2O)	381

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed ……..(kPa)	207
@ Governed Speed ……..(kPa)	345
Maximum Oil Temperature……..(℃)	121
Oil Capacity With Oil Pan : High-Low…….. (Litre)	9,5-8,5
Total System Capacity (Including Filters)…….. (Litre)	11
Angularity of Oil Pan	
• Front Down……..	40°
• Front Up ……..	40°
• Side to Side……..	40°

FUEL SYSTEM

Type Injection System ……..	BYC A Stanadyne
Maximum Inlet Restriction at Injection Pump…….(mmHg)	102
Maximum Allowable Head on Injector Return Line …….. (mmHg)	254
Fuel Flow to Lift Pump @ 43psi (3kg/cm^2)……..(Litre/hr)	30

COOLING SYSTEM

Coolant Capacity – Engine Only ……..(Litre)	7,2
Maximum coolant Friction Head External to Engine – 1500 rpm……..(kPa)	28
Maximum coolant Friction Head External to Engine – 1800 rpm…….. (kPa)	35
Maximum Static Head of Coolant Above Engine Crank Centerline ……..(m)	14
Standard Thermostat (Modulating) Range…….. (℃)	82-95
Minimum Pressure Cap…….. (kPa)	69
Maximum Top Tank Temperature for Standby / prime Power ……..(℃)	104/100

ELECTRICAL SYSTEM

Cranking Motor Voltage (Positive Engagement)…….. (Volt)	24
Battery Charging System, Negative Ground ……..(Amp)	40
Maximum Allowable Resistance of Cranking Circuit ……..(Ohm)	0,002
Minimum Recommended Battery Capacity	
• Cold Soak @ -12°c……..(0°F CCA)	400

PERFORMANCE DATA

	STANDBY POWER		PRIME POWER	
	60Hz	50Hz	60Hz	50Hz
Governed Engine Speed ……..(RPM)	1800	1500	1800	1500
Engine Idle Speed ……..(RPM)	950-1150	950-1150	950-1150	950-1150
Gross Engine power output ……..(kWm)	45	40	40	36
Brake Mean Effective Pressure ……..(kPa)	823	820	741	738
Piston Speed ……..(m/s)	7,2	6	7,2	6
Friction Horsepower…….. (kWm)	11,9	8,2	11,9	8,2
Engine water Flow at Stated Friction Head External to Engine:				
• 1 psi Friction Head ……..(litre/s)	2,8	2,2	2,8	2,2
• Maximum Friction Head ……..(litre/s)	2,2	1,6	2,2	1,6
Engine Data With Type Exhaust Manifold:				
Intake Air Flow…….. (litre/s)	48,9	44,9	46,6	43,6
Exhaust Gas Temperature ……..(℃)	490	487	466	463
Exhaust Gas Flow…….. (litre/s)	111	108	104	101
Heat Rejection to Coolant ……(kWm)	33	29	28,9	25,9

ENGINE MODEL: 4BT3.9-G2
DATA SHEET: DS-4BT3
Date: November 2008