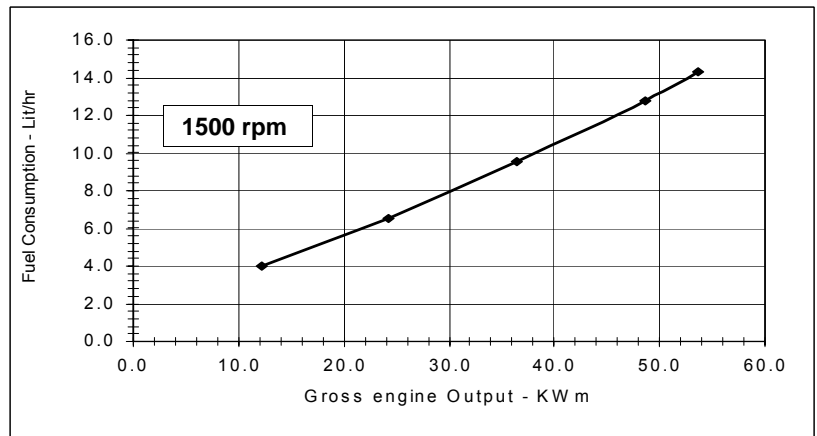
	Cummins India Limited Power Generation Business Unit Engine Data Sheet	Basic Engine Model: S3.8-G6	Curve Number:	G-DRIVE S3.8 1
		Engine Critical Parts List:	Date: 19JAN10	
Displacement : 3.8 litre (232 in³)		Bore : 97mm (3.82 in.) Stroke : 128 mm (5 in.)		
No. of Cylinders : 4		Aspiration : Turbocharged		

Engine Speed rpm	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	53.6	71.9	48.7	65.3	34.1	45.7

Engine Performance Data @ 1500 rpm

litre/hour

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm-h	lb/ hp-h	litre/ hour	US gal/ hour
STANDBY POWER						
100	53.6	71.9	0.227	0.374	14.3	3.8
PRIME POWER						
100	48.7	65.3	0.223	0.366	12.8	3.4
75	36.5	48.9	0.222	0.365	9.5	2.5
50	24.3	32.6	0.228	0.374	6.5	1.7
25	12.2	16.4	0.279	0.458	4.0	1.1
CONTINUOUS POWER						
100	34.1	45.7	0.227	0.373	9.1	2.4



CONVERSIONS: (litres = US Gal x 3.785) (US Gal = litres x 0.2642)

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. **STANDBY POWER RATING:** 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. **PRIME POWER RATING:** 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:** Limited Time 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. **CONTINUOUS POWER RATING:** 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.

Data Subject to Change Without Notice

Reference AEB 10.47 for determining Electrical Output.

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2. Derates shown are based on 15 in H₂O air intake restriction and 2 in Hg exhaust back pressure.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/US gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

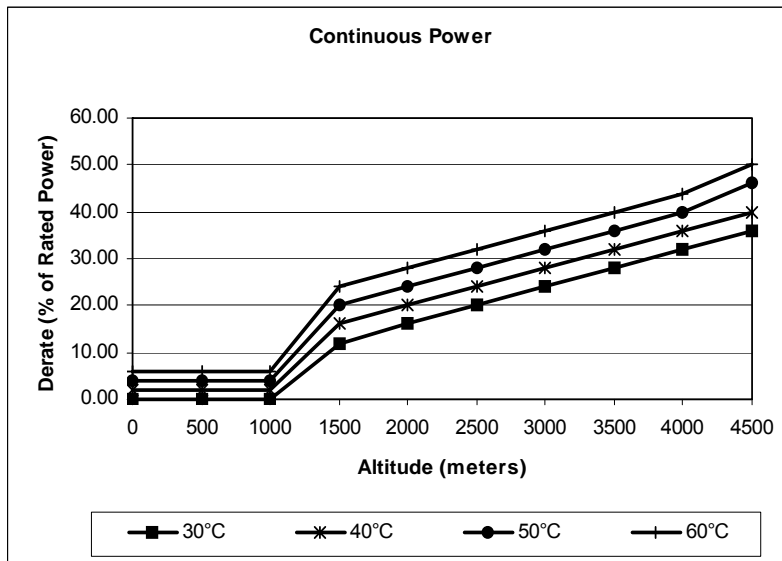
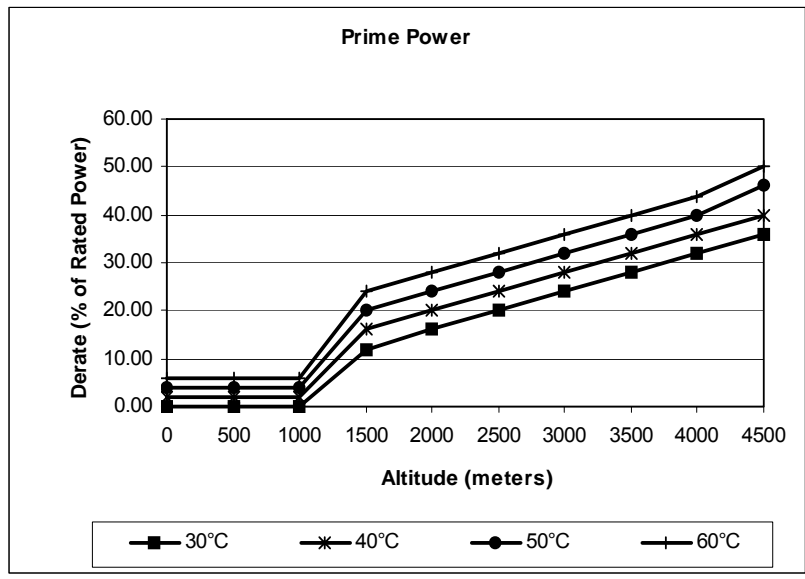
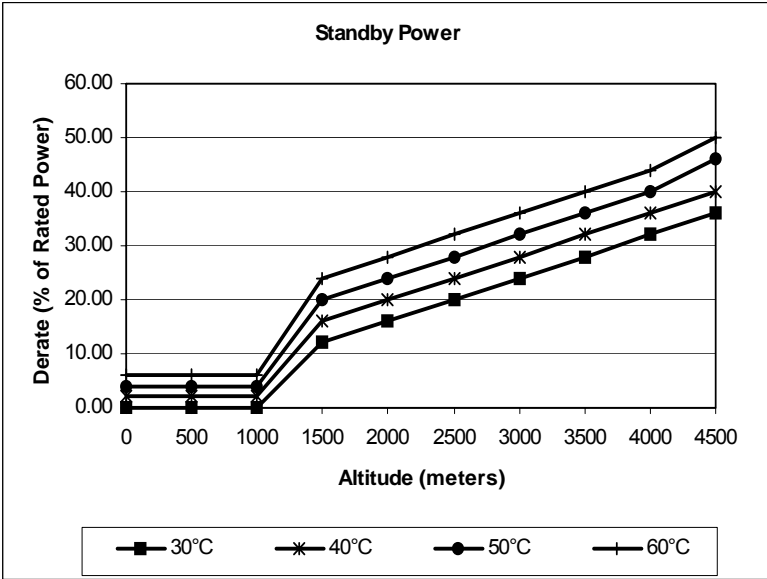
Data Status: Limited Production

Data Tolerance: ± 5%

Chief Engineer:



1500 RPM Power Derate Curves



Operation At Elevated Temperature And Altitude:

For **Standby Operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 2% per 10 °C (18 °F).

For **Prime Operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 2% per 10 °C (18 °F).

For **Continuous Operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 2% per 10 °C (18 °F).

Cummins Inc.

Engine Data Sheet

ENGINE MODEL : S3.8-G6

 DATA SHEET : DS-S3.8_B
 CONFIGURATION NUMBER : N/A DATE : 19JAN10
 PERFORMANCE CURVE : N/A
INSTALLATION DIAGRAMCPL NUMBER**GENERAL ENGINE DATA**

Type	Inline 4-Cylinder Diesel		
Aspiration	Turbocharged		
Bore x Stroke	3.82 x 5 (97 X 128)		
Displacement	232 (3.8)		
Compression Ratio	17.5 : 1		
Dry Weight (Approximate), Fan to Flywheel Engine	— lb (kg)	842	(382)
Wet Weight (Approximate), Fan to Flywheel Engine	— lb (kg)	882	(400)
Moment of Inertia of Rotating Components			
• with ___ Flywheel	— lb _m • ft ² (kg • m ²)	23.19	(0.977)
Center of Gravity from Rear Face of Block	— in (mm)	9.84	(250)
Center of Gravity Above Crankshaft Centerline	— in (mm)	5.55	(141)
Maximum Static Loading at Rear Main Bearing	— lb (kg)	N.A.	(N.A.)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— lb • ft (N • m)	N.A.	(N.A.)
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EXHAUST SYSTEM

Maximum Back Pressure	— in Hg (kPa)	2	(6.7)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction:			
• with Clean Filter Element (Normal Duty Air Cleaner)	— in H ₂ O (kPa)	8	(2)
• with Clean Filter Element (Heavy Duty Air Cleaner)	— in H ₂ O (kPa)	N/A	(N/A)
• with Dirty Filter Element (Normal Duty Air Cleaner)	— in H ₂ O (kPa)	25	(6.2)

COOLING SYSTEM**Jacket Water Circuit Requirements**

Coolant Capacity — Engine Only	— US gal (litre)	1.85	(7)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft (m)	20	(6)
Standard Thermostat (Modulating) Range	— °F (°C)	169 - 189	(76 - 87)
Minimum Pressure Cap	— psi (kPa)	7	(48)
Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C)	217 / 212	(103 / 100)
Maximum Coolant Friction Head External to Engine	— psi (kPa)	4	(28)

Charge Air Cooler Requirements

Maximum Temp. Rise Between Engine Air Intake and Aftercooler Air Outlet- 1500/1800 rpm — °F (°C)	N/A	(N/A)	
Maximum Air Pressure Drop from Turbo Air outlet to Intake Manifold - 1500/1800 rpm . — in Hg (kPa)	N/A	(N/A)	
Maximum Intake Manifold Temperature @ 77 °F (25 °C) ambient - 1500/1800 rpm	— °F (°C)	N/A	(N/A)
Maximum Compressor Outlet Temperature	— °F (°C)	N/A	(N/A)
Maximum Intake Manifold Temperature for engine protection (Shut Down Threshold)	— °F (°C)	N/A	(N/A)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed (minimum)	— psi (kPa)	14.5	(100)
@ Governed Speed	— psi (kPa)	58	(400)
Maximum Oil Temperature	— °F (°C)	266	(130)
Oil Capacity with ___ Oil Pan : Low - High	— US gal (litre)	2.4 - 1.85	(7 - 9)
Total System Capacity (With Combo Filters)	— US gal (litre)	3	(11)

FUEL SYSTEM

Type Injection System.....		Bosch Mechanical
Maximum Restriction at Lift Pump(clean/dirty filter).....	— in Hg (kPa)	N.A. (N.A.)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head).....	— in Hg (kPa)	N.A. (N.A.)
Maximum Fuel Flow to Injector Pump.....	— US gph (litre/hr)	N.A. (N.A.)
Maximum Return Fuel Flow.....	— US gph (litre/hr)	N.A. (N.A.)
Maximum Fuel Inlet Temperature.....	— °F (°C)	N.A. (N.A.)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement).....	— volt	12
Battery Charging System, Negative Ground.....	— ampere	40
Maximum Allowable Resistance of Cranking Circuit.....	— ohm	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F).....	— 0°F CCA	500

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with ___ watt Coolant Heater to Rated Speed.....	— °F (°C)	14	(-10)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed.....	— °F (°C)	32	(0)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature).....	— °F (°C)	N.A.	(N.A.)

PERFORMANCE DATA

- All data is based on:
- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
 - Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
 - ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure : 100 kPa (29.53 in Hg)	Air Temperature : 25 °C (77 °F)
Altitude : 110 m (361 ft)	Relative Humidity : 30%
Air Intake Restriction : 156 mm H ₂ O (6.14 in H ₂ O)	Exhaust Restriction : 3.2 kPa (0.94 in Hg)

Steady State Stability Band at any Constant Load.....	— %	+/- 0.5
Estimated Free Field Sound Pressure Level of a Typical Generator Set; Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); @1500 rpm.....	— dBA	105
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°.....	— dBA	N.A.

Governed Engine Speed.....	rpm
Engine High Idle Speed.....	rpm
Gross Engine Power Output.....	hp (kW)
Brake Mean Effective Pressure.....	psi (kPa)
Piston Speed.....	ft/min (m/s)
Friction Horsepower.....	hp (kW)
Engine Water Flow at Stated Friction Head External to Engine:	
• 1 psi Friction Head.....	US gpm (litre/min)
• Maximum Friction Head.....	US gpm (litre/min)

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
Governed Engine Speed.....	N/A	1500	N/A	1500
Engine High Idle Speed.....	N/A	1570	N/A	1570
Gross Engine Power Output.....	N/A	71.9 (53.6)	N/A	65.3 (48.7)
Brake Mean Effective Pressure.....	N/A	165 (1139)	N/A	149 (1030)
Piston Speed.....	N/A	1260 (6.4)	N/A	1260 (6.4)
Friction Horsepower.....	N/A	N.A. (N.A.)	N/A	N.A. (N.A.)
Engine Water Flow at Stated Friction Head External to Engine:				
• 1 psi Friction Head.....	N/A	24.22 (91.7)	N/A	24.22 (91.7)
• Maximum Friction Head.....	N/A	23.77 (90)	N/A	23.77 (90)
Intake Air Flow.....	N/A	126.42 (59.66)	N/A	122.01 (57.58)
Exhaust Gas Temperature.....	N/A	1014 (545.7)	N/A	939 (504)
Exhaust Gas Flow.....	N/A	148 (70)	N/A	142.3 (67)
Air to Fuel Ratio.....	N/A	23.1 : 1	N/A	25.1 : 1
Radiated Heat to Ambient.....	N/A	327 (6)	N/A	292 (5)
Heat Rejection to Jacket Coolant.....	N/A	1251 (22)	N/A	983 (17)
Heat Rejection to Exhaust.....	N/A	3565 (62.6)	N/A	3250 (57)
Heat Rejected to Fuel.....	N/A	N.A. (N.A.)	N/A	N.A. (N.A.)
Charge Air Cooler Heat Rejection.....	N/A	N/A (N/A)	N/A	N/A (N/A)
Turbocharger Compressor Outlet Pressure.....	N/A	13 (92)	N/A	11 (80)
Turbocharger Compressor Outlet Temperature.....	N/A	N.A. (N.A.)	N/A	N.A. (N.A.)

- N.A. - Not Available
 N/A - Not Applicable to this Engine
 TBD - To Be Determined

*This is the maximum heat rejection to fuel, which is at low load.

ENGINE MODEL : S3.8-G6
DATA SHEET : DS-S3.8_B
DATE : 19 JAN 10
CURVE NO. :