Cummins	**CUMMINS ENGINE COMPANY, INC** Columbus, Indiana 47201 **ENGINE PERFORMANCE CURVE**	Basic Engine Model: **QSK60-G4** Engine Critical Parts List: **CPL: 2888**	Curve Number: **FR-6345** Date: **22Aug01**	*G-DRIVE* **QSK** **1**

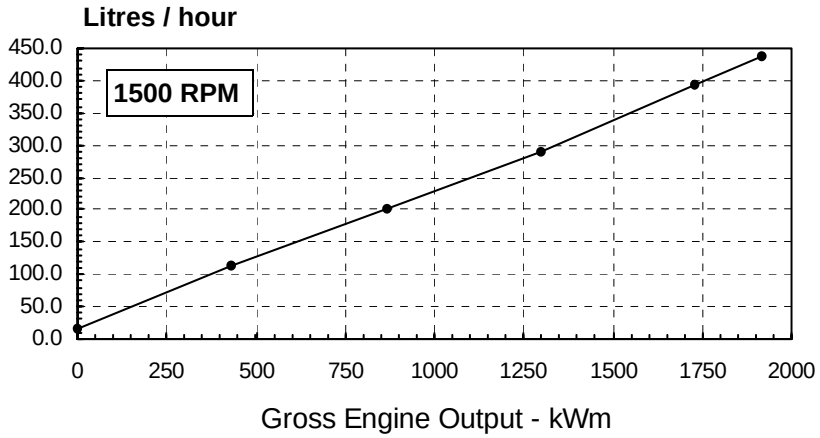
Displacement : **60.2** liter (**3673** in^3)	Bore : **159** mm (**6.25** in.) Stroke : **190** mm (**7.48** in.)
No. of Cylinders : **16**	Aspiration : **Turbocharged and Low Temperature Aftercooled (2 pump / 2 loop)**

•• PRELIMINARY ••

Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500	1915	2567	1730	2319	1415	1897

Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	liter/ hour	U.S. Gal/ hour
STANDBY POWER						
100	1915	2567	0.194	0.319	437	115.3
PRIME POWER						
100	1730	2319	0.193	0.318	394	103.9
75	1298	1739	0.191	0.314	291	76.9
50	865	1160	0.196	0.323	200	52.7
25	433	580	0.224	0.369	114	30.1
CONTINUOUS POWER						
100	1415	1897	0.192	0.316	320	84.4



CONVERSIONS: (litres = U.S. Gal x 3.785) (Engine kWm = BHP x 0.746) (U.S. Gal = litres x 0.2642) (Engine BHP = Engine kWm x 1.34)

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
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 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.

See reverse side for application rating guidelines.

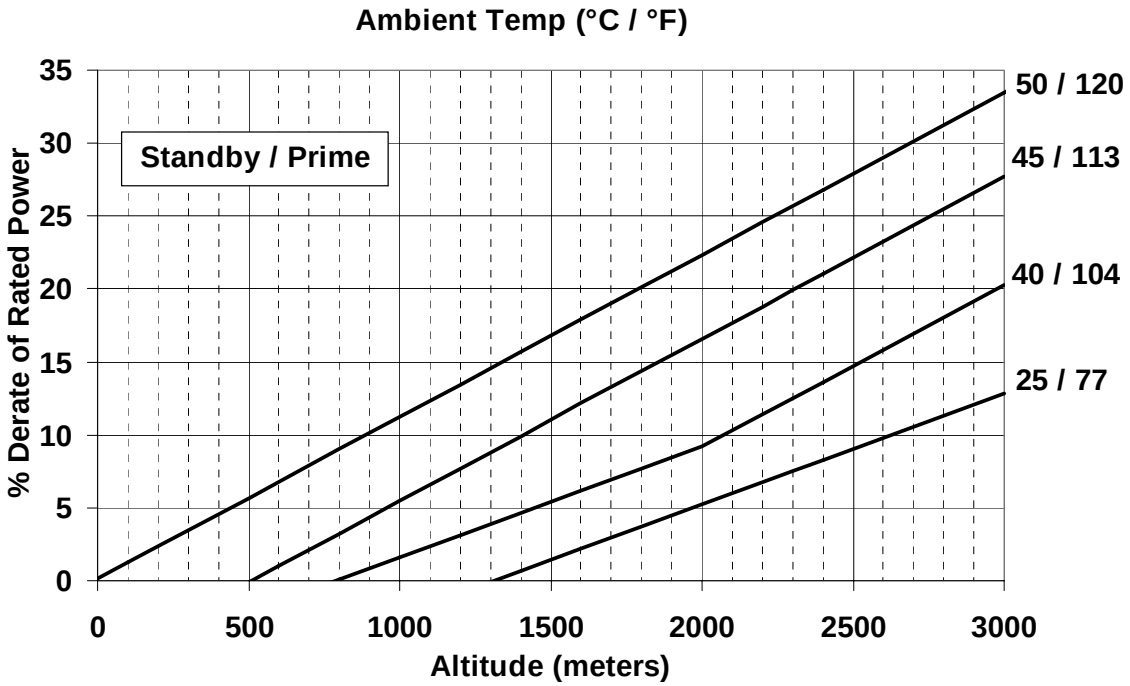
The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/liter (7.1 lbs/U.S. gal).

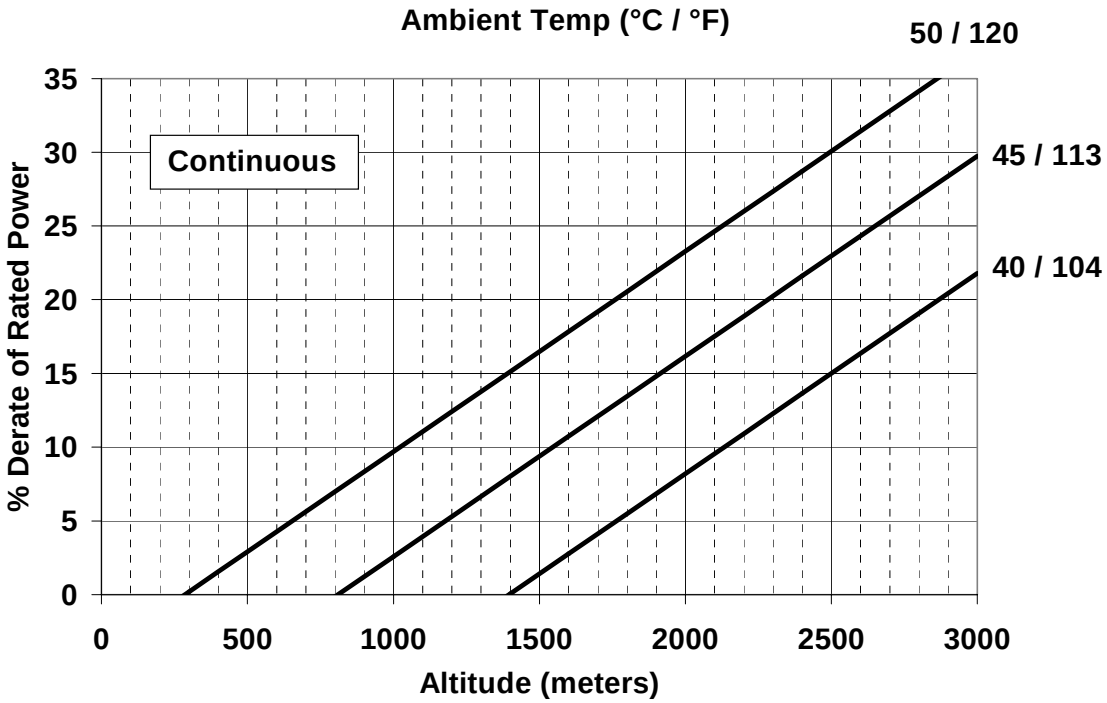
Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

D K. Trueblood

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

QSK60-G4 Derate Curves @ 1500 RPM
•• PRELIMINARY ••





Reference Standards:

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

Operation At Elevated Altitude and Temperature:

For sustained operation above these conditions, derate by an additional 4.1% per 300 m (1000 ft), and 13% per 10°C (18°F).

Note: Derates shown are based on 15 in H_20 air intake restriction and 2 in Hg exhaust back pressure.

•• PRELIMINARY ••

Cummins Engine Company, Inc.

Engine Data Sheet

ENGINE MODEL : **QSK60-G4** **CONFIGURATION NUMBER :** D593002GX03

DATA SHEET : DS-6345
DATE : 22Aug01
PERFORMANCE CURVE : FR-6345

INSTALLATION DIAGRAM
• Fan to Flywheel : 3170455

CPL NUMBER
• Engine Critical Parts List : 2888

GENERAL ENGINE DATA

Type	4-Cycle; 60° Vee; 16-Cylinder Diesel	
Aspiration	Turbocharged and Low Temperature Aftercooled (2 Pump / 2 Loop)	
Bore x Stroke — mm x mm (in x in)	159 x 190 (6.25 x 7.48)	
Displacement — liter (in^3)	60.2 (3673)	
Compression Ratio	14.5 : 1	
Dry Weight		
Fan to Flywheel Engine (with SAE 0 Flywheel and Flywheel Housing) — kg (lb)	7185	(15835)
Wet Weight		
Fan to Flywheel Engine — kg (lb)	7540	(16620)
Moment of Inertia of Rotating Components		
• with FW 6043 Flywheel (SAE 0) — kg • m^2 (lb_m • ft^2)	15.77	(375.5)
• with FW 6037 Flywheel (SAE 00) — kg • m^2 (lb_m • ft^2)	26.23	(622.4)
Center of Gravity from Front Face of Block — mm (in)	1001	(39.4)
Center of Gravity Above Crankshaft Centerline — mm (in)	219	(8.6)
Maximum Static Loading at Rear Main Bearing — kg (lb)	1134	2500

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block — N • m (lb • ft)	10350	(7634)

EXHAUST SYSTEM

Maximum Back Pressure at 1500 RPM (Standby Power) — mm Hg (in Hg)	51	(2)

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction		
• with Dirty Filter Element — kPa (in H_2O)	6.2	(25)
• with Clean Filter Element — kPa (in H_2O)	3.7	(15)

COOLING SYSTEM (Separate Circuit Aftercooling Required)

Coolant Capacity — Engine — liter (US gal)	157	(42)
— Aftercoolers — liter (US gal)	34	(9)
Maximum Coolant Friction Head External to Engine — 1500 rpm — kPa (psi)	69	(10)
Maximum Static Head of Coolant Above Engine Crank Centerline — m (ft)	18.3	(60)
Thermostat Modulating Range — High Flow °C (°F)	82 - 93	(180 - 200)
— Low Flow °C (°F)	46 - 57	(115 - 135)
Minimum Pressure Cap (For Cooling Systems with less than 2 m [6 ft.] Static Head) — kPa (psi)	69	(10)
Maximum Top Tank Temperature for Standby / Prime Power — °C (°F)	104 / 100	(220 / 212)
Aftercooler Circuit Requirements:		
Maximum Coolant Friction Head External to Engine — 1500 rpm — kPa (psi)	35	(5)
Maximum Inlet Water Temperature to Aftercooler @ 77 °F Ambient — °C (°F)	49	(120)
Maximum Inlet Water Temperature to Aftercooler — °C (°F)	65	(150)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed — kPa (psi)	138	(20)
@ Governed Speed — kPa (psi)	345-483	(50-70)
Maximum Oil Temperature — °C (°F)	121	(250)
Oil Capacity with OP6073 Oil Pan: Low - High — liter (US gal)	231-261	(61-69)
Total System Capacity (with Combo Filters) — liter (US gal)	280	(74)

FUEL SYSTEM

Type Injection System		Cummins HPI-PT	
Maximum Restriction at PT Fuel Injection Pump	— with Clean Fuel Filter — mm Hg (in Hg)	120	(4.0)
	— with Dirty Fuel Filter — mm Hg (in Hg)	203	(8.0)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — mm Hg (in Hg)		229	(9.0)
Maximum Fuel Inlet Temperature — °C (°F)		70	(160)
Maximum Fuel Flow to Injection Pump — liter / hr (US gph)		1893	(500)
Maximum Drain Flow — liter / hr (US gph)		1855	(490)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement) — volt	24	
Maximum Allowable Resistance of Cranking Circuit — ohm	.002	
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and Above — 0°F CCA	1280	
• Cold Soak @ 0 °C to 10 °C (32 °F to 50 °F) — 0°F CCA	1800	
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F) — 0°F CCA	1800	

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with_____watt Coolant Heater to Rated Speed — °C (°F)	TBD	(TBD)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed — °C (°F)	TBD	(TBD)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature) — °C (°F)	10	(50)

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%

Steady State Stability Band at any Constant Load — %	+/- 0.25	
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	93.4 (est.)	
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45° — dBA	108 (est.)	

	STANDBY POWER 60 hz	STANDBY POWER 50 hz	PRIME POWER 60 hz	PRIME POWER 50 hz
Governed Engine Speed — rpm	Not Applicable for 1800 RPM Operation	1500	Not Applicable for 1800 RPM Operation	1500
Engine Idle Speed — rpm		700 - 900		700 - 900
Gross Engine Power Output — kW_m (BHP)		1915 (2567)		1730 (2319)
Brake Mean Effective Pressure — kPa (psi)		2544 (369)		2296 (333)
Piston Speed — m / s (ft / min)		9.5 (1869)		9.5 (1869)
Friction Horsepower — kW_m (HP)		146 (196)		146 (196)
Engine Jacket Water Flow at Stated Friction Head External to Engine:				
• 4 psi Friction Head — liter / s (US gpm)		26.5 (420)		26.5 (420)
• Maximum Friction Head — liter / s (US gpm)		24.0 (380)		24.0 (380)
Engine Data				
Intake Air Flow — liter / s (cfm)		2405 (5090)		2264 (4800)
Exhaust Gas Temperature — °C (°F)		450 (835)		430 (805)
Exhaust Gas Flow — liter / s (cfm)		5610 (11880)		5190 (10990)
Air to Fuel Ratio — air : fuel		26.3:1		27.5:1
Radiated Heat to Ambient — kW_m (BTU / min)		175 (9990)		160 (9000)
Heat Rejection to Engine Jacket Radiator — kW_m (BTU / min)		500 (28300)		450 (25460)
Heat Rejection to Exhaust — kW_m (BTU / min)		1325 (75280)		1180 (67010)
Heat Rejection to Fuel* — kW_m (BTU / min)		35 (2000)		35 (2000)
Engine Aftercooler Data				
Heat Rejection to Coolant — kW_m (BTU / min)		455 (25730)		400 (22620)
Aftercooler Water Flow at Stated Friction Head External to Engine:				
• 2 psi Friction Head — liter / s (US gpm)		7.1 (112)		7.1 (112)
• Maximum Friction Head — liter / s (US gpm)		6.9 (109)		6.9 (109)

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

•• PRELIMINARY••

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

ENGINE MODEL : **QSK60-G4**
DATA SHEET : DS-6345
DATE : 22Aug01
CURVE NO. : FR-6345