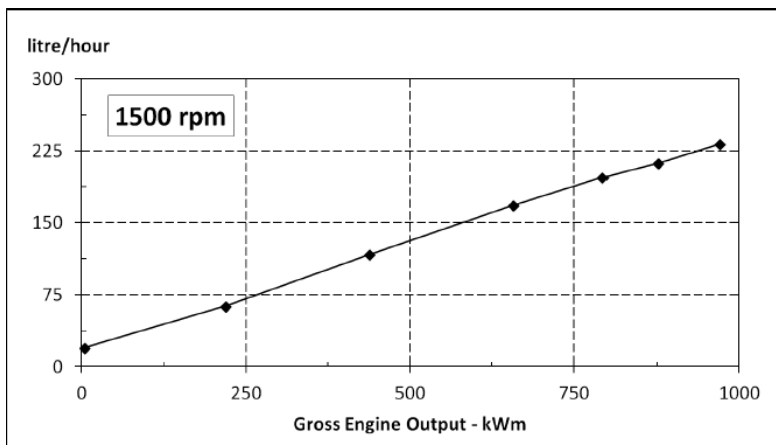


	Cummins Inc. Columbus, Indiana 47202-3005	Basic Engine Model: QSK38-G1	Curve Number: FR6786	<i>G-DRIVE</i> QSK 1
	ENGINE PERFORMANCE DATASHEET	Engine Critical Parts List: CPL : 3570	Date: 15 OCT 14	
Compression Ratio : 15:1		Displacement : 37.7 L (2301 in³)		
Fuel System : Cummins MCRC		Aspiration : Turbocharged and Aftercooled		
Emission Certification : U.S. EPA Tier 2				

Engine Speed	Standby Power		Prime Power		Continuous Power	
rpm	bhp	kWm	bhp	kWm	bhp	kWm
1500	1300	970	1174	876	1061	792

Engine Performance Data @ 1500 rpm

OUTPUT POWER			FUEL CONSUMPTION			
%	bhp	kWm	lb/ hp·h	kg/ kWm·h	US gal/ hour	litre/ hour
STANDBY POWER						
100	1300	970	0.335	0.204	61.3	232
PRIME POWER						
100	1174	876	0.339	0.206	56.0	212
75	881	657	0.357	0.217	44.3	168
50	587	438	0.373	0.227	30.8	117
25	294	219	0.404	0.245	16.7	63
CONTINUOUS POWER						
100	1061	792	0.348	0.212	52.1	197

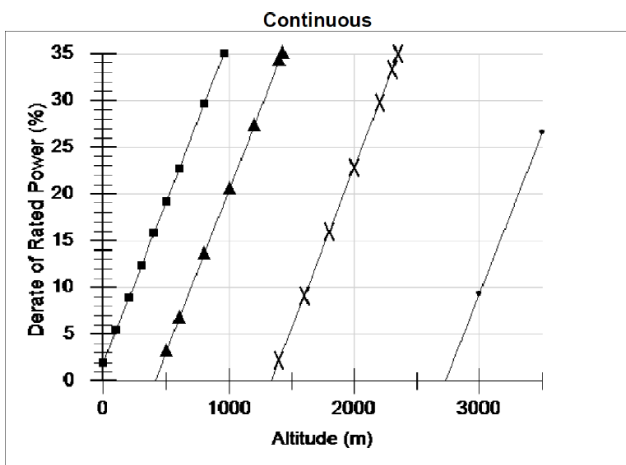
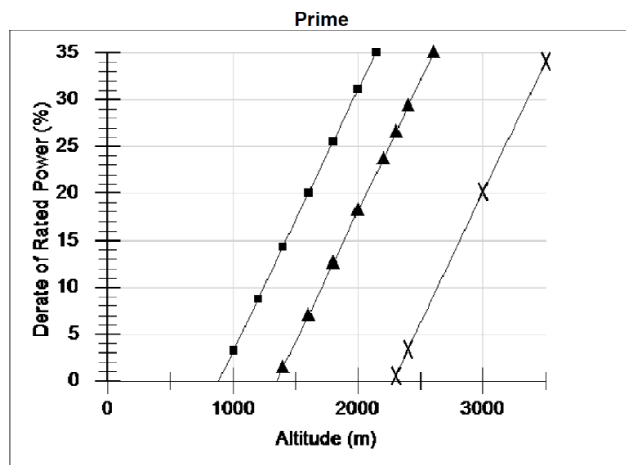
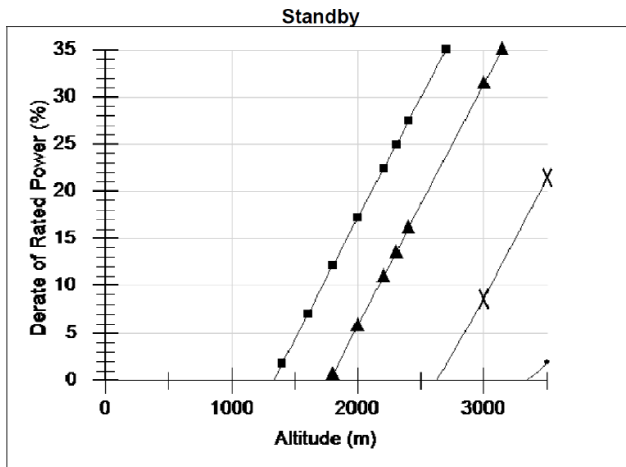


CONVERSIONS:(litres = US Gal x 3.785) (US Gal = litres x 0.2642)

Data Subject to Change Without Notice

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.	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 10/15 in H₂O air intake restriction and 1.5/2.0 in Hg exhaust back pressure @ 1500/1800 RPM. 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: Final Data Tolerance: ± 5%
	Chief Engineer: 

1500 rpm Derate Curves

**Operation at Elevated Temperature and Altitude:**

For **Standby** operation above these conditions, derate by an additional 8% per 1000 ft (300 m), and 23% per 18 delta deg F (10 delta deg C)

For **Prime** operation above these conditions, derate by an additional 8% per 1000 ft (300 m), and 26% per 18 delta deg F (10 delta deg C)

For **Continuous** operation above these conditions, derate by an additional 10% per 1000 ft (300 m), and 32% per 18 delta deg F (10 delta deg C)

- ◆— **77 deg F (25 deg C)**
- X— **104 deg F (40 deg C)**
- ▲— **122 deg F (50 deg C)**
- **131 deg F (55 deg C)**

Cummins Inc.

Engine Data Sheet

ENGINE MODEL : QSK38-G1

CONFIGURATION NUMBER : D233042GX03

DATA SHEET: FR6786

DATE: 15 OCT 14

INSTALLATION DIAGRAM

• Fan to Flywheel: 4954124

CPL NUMBER

• Engine Critical Parts List: 3570

GENERAL ENGINE DATA

Type	Four Cycle; Vee; 12 Cylinder	
Aspiration	Turbocharged and Low Temp Aftercooled	
Bore x Stroke	6.25 x 6.25	(159 x 159)
Displacement	2,301	(37.7)
Compression Ratio	15 : 1	
Dry Weight (Approximate)	8,433	(3,825)
Wet Weight (Approximate)	9,039	(4,100)
Moment of Inertia of Rotating Components		
• with FW 6074 Flywheel	246.8	(10.4)
• with FW 6077 Flywheel	493.6	(20.8)
Center of Gravity from Rear Face of Block	31.5	(801)
Center of Gravity Above Crankshaft Centerline	6.8	(173)
Maximum Static Loading at Rear Main Bearing	2,000	(907)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	4,500	(6,101)
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EXHAUST SYSTEM

Maximum Back Pressure at Standby Power	2	(7)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction		
• with Dirty Filter Element	25	(6.2)
• with Normal Duty Air Cleaner and Clean Filter Element	15	(3.7)

COOLING SYSTEM**Jacket Water Circuit Requirement**

Coolant Capacity — Engine	28	(106)
Minimum Pressure Cap Rating at Sea Level	11	(76)
Maximum Static Head of Coolant Above Crankshaft Centerline	60	(18.3)
Maximum Coolant Temperature (Max Top Tank Temp) for Standby/Prime Power	220 / 212	(104 / 100)
Thermostat (Modulating) Range	180 - 202	(82 - 94)
Maximum coolant friction head external to engine - 1500 RPM	10	(68.9)

Aftercooler Circuit Requirements

Coolant Capacity — Aftercooler	6	(22.7)
Maximum Coolant Friction Head External to Engine - 1500 RPM	10	(68.9)
Maximum Coolant Temperature into Aftercooler @ 77 °F (25 °C) Ambient	120	(49)
Maximum Coolant Temperature into Aftercooler @		
Limiting Ambient Conditions for Standby/Prime power	160 / 150	(71 / 66)
Thermostat (Modulating) Range	115 - 135	(46 - 57)

LUBRICATION SYSTEM

Oil Pressure @ Minimum Idle Speed	20	(138)
@ Governed Speed	50 - 70	(344.7 - 482.6)
Maximum Oil Temperature	248	(120)
Oil Capacity with OP 6125 Oil Pan : Low - High	37 - 44	(140.1 - 166.6)
Total System Capacity (with Combo Filter)	45	(170.3)

FUEL SYSTEM

Type Injection System.....	Cummins MCRS	4
Maximum Fuel Supply Restriction at Fuel Pump Inlet (clean/dirty filter)	5 / 10	(16.9 / 34)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	10	(34)
Maximum Fuel Inlet Temperature	160	(71)
Maximum Supply Fuel Flow - 1500 RPM.....	159	(602)
Maximum Return Fuel Flow - 1500 RPM.....	94	(356)

ELECTRICAL SYSTEM

System Voltage.....	— volt	24
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and above	— CCA	1,800
• Cold Soak @ 0 °C to 10 °C (32 °F to 50°F)	— CCA	1,800
• Cold Soak @ -18 °C to 0 °C (0 °F to 32°F)	— CCA	1,800
Maximum Starting Circuit Resistance	— ohm	0.002

COLD START CAPABILITY

Unaided Cold Start		
Minimum Cranking Speed	— RPM	150
Minimum Ambient Temperature for Unaided Cold Start.....	— °F (°C)	10 (-12.2)

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		99.4
Exhaust Noise at 1 m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45° @ 1500 RPM.....	— dBA		96.3

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
Governed Engine Speed	RPM	N/A	1,500	N/A
Engine Idle Speed.....	RPM	N/A	700 - 900	N/A
Gross Engine Power Output	hp (kW)	N/A	1,300 (970)	N/A
Brake Mean Effective Pressure	psi (kPa)	N/A	298 (2,057)	N/A
Piston Speed	ft/min (m/s)	N/A	1,562 (7.9)	N/A
Friction Horsepower	hp (kW)	N/A	115 (86)	N/A
Engine Water Flow at Stated Friction Head External to Engine:				
• 4 psi Friction Head.....	gpm (L/s)	N/A	274 (17)	N/A
• Maximum Friction Head	gpm (L/s)	N/A	209 (13)	N/A
Engine Data				
Intake Air Flow	cfm (L/s)	N/A	2,897 (1,368)	N/A
Exhaust Gas Temperature - Dry Stack	°F (°C)	N/A	860 (460)	N/A
Exhaust Gas Flow	cfm (L/s)	N/A	6,818 (3,218)	N/A
Air to Fuel Ratio	air : fuel	N/A	28.5:1	N/A
Radiated Heat to Ambient	BTU/min (kW)	N/A	5,314 (94)	N/A
Heat Rejection to Jacket Coolant	BTU/min (kW)	N/A	21,335 (375)	N/A
Heat Rejection to Exhaust	BTU/min (kW)	N/A	38,174 (671)	N/A
Heat Rejected to *Fuel	BTU/min (kW)	N/A	379 (7)	N/A
2P / 2L				
Heat Rejection to Aftercooler Coolant	BTU/min (kW)	N/A	12,486 (220)	N/A
Aftercooler Water Flow at Stated Friction Head External to Engine:				
• 2 psi Friction Head.....	gpm (L/s)	N/A	137 (9)	N/A
• Maximum Friction Head	gpm (L/s)	N/A	116 (7)	N/A

* This is the maximum heat rejection to fuel.

ENGINE MODEL : QSK38-G1

DATA SHEET : FR6786

DATE : 15 OCT 14

N.A. - Not Available

N/A - Not Applicable to this Engine

TBD - To Be Determined