



Cummins Inc.
Columbus, Indiana 47202-3005
Engine Data Sheet

Basic Engine Model:
QSL9-G3 NR3

Curve Number:
FR-91996

G-DRIVE
QSL
1

Engine Critical Parts List:
CPL: 1404

Date:
16Apr07

Displacement : **8.8 litre (543 in³)**

Bore : **114 mm (4.49 in.)** Stroke : **145 mm (5.69 in.)**

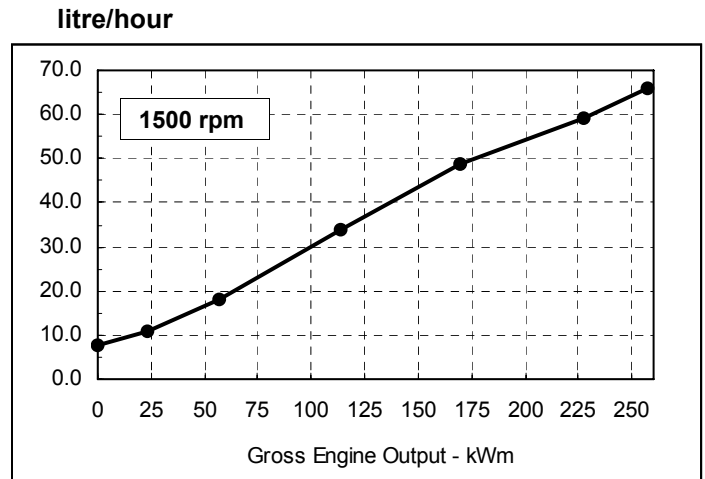
No. of Cylinders : **6**

Aspiration : **Turbocharged and Charge Air Cooled**

Engine Speed rpm	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	257	345	227	305	193	259
1800	297	399	262	352	178	238

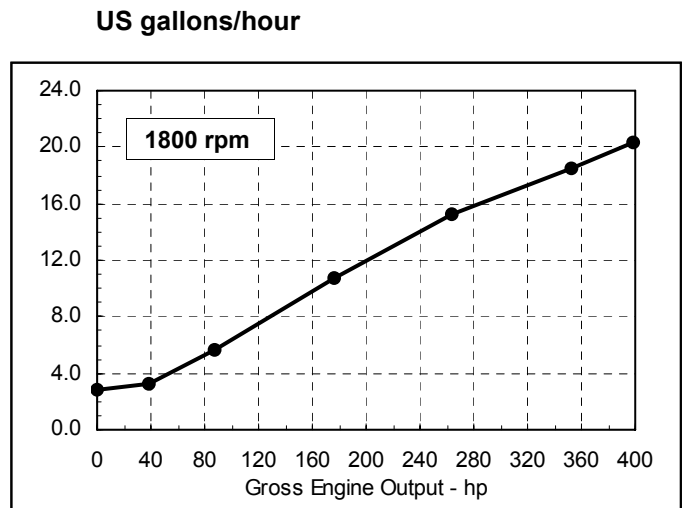
Engine Performance Data @ 1500 rpm

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm·h	lb/ hp·h	litre/ hour	US gal/ hour
STANDBY POWER						
100	257	345	0.217	0.357	66	17.3
PRIME POWER						
100	227	305	0.221	0.364	59	15.6
75	170	228	0.246	0.405	49	13.0
50	114	152	0.253	0.416	34	8.9
25	57	76	0.264	0.435	18	4.7
CONTINUOUS POWER						
100	193	259	0.234	0.386	53	14.1



Engine Performance Data @ 1800 rpm

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm·h	lb/ hp·h	litre/ hour	US Gal/ hour
STANDBY POWER						
100	297	399	0.221	0.364	77	20.4
PRIME POWER						
100	262	352	0.226	0.373	70	18.5
75	197	264	0.248	0.409	58	15.2
50	131	176	0.266	0.437	41	10.8
25	66	88	0.274	0.451	21	5.6
CONTINUOUS POWER						
100	178	238	0.256	0.420	53	14.1



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 10 in H₂O air intake restriction and 2 in Hg exhaust back pressure.

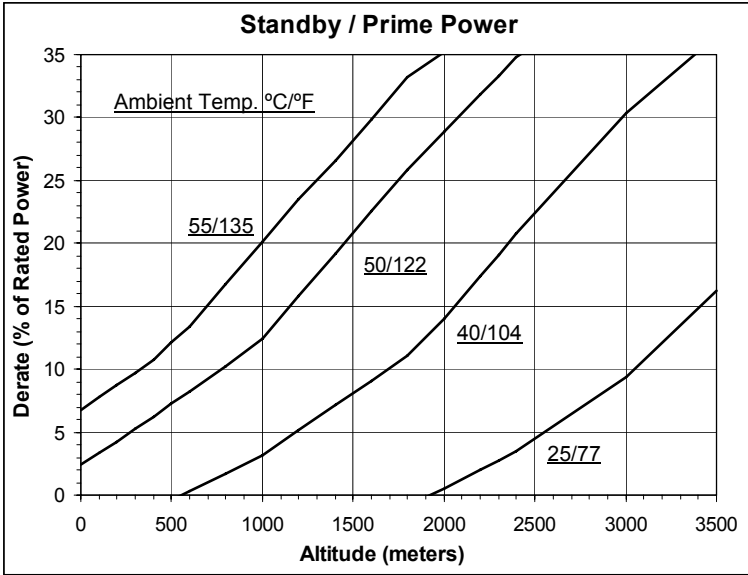
The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/US gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: --Limited Production--

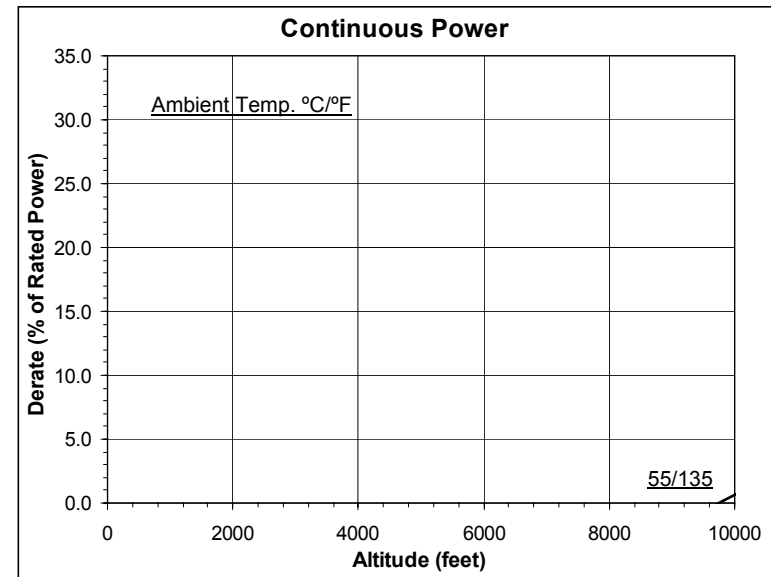
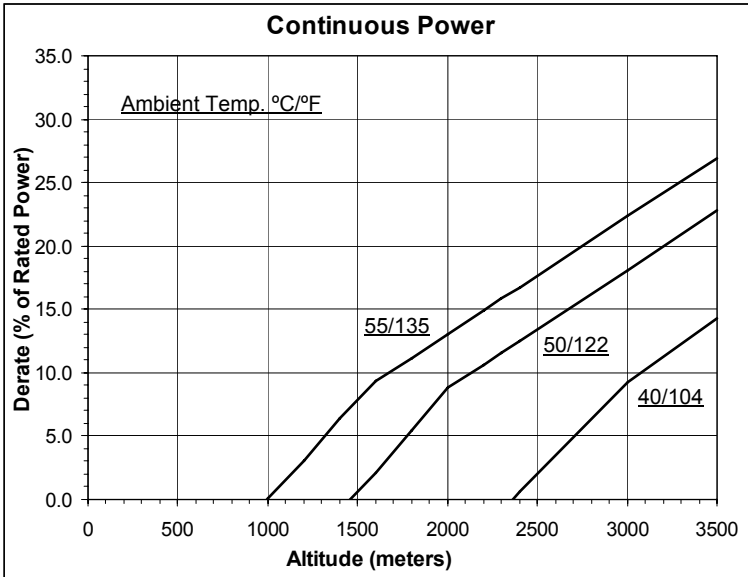
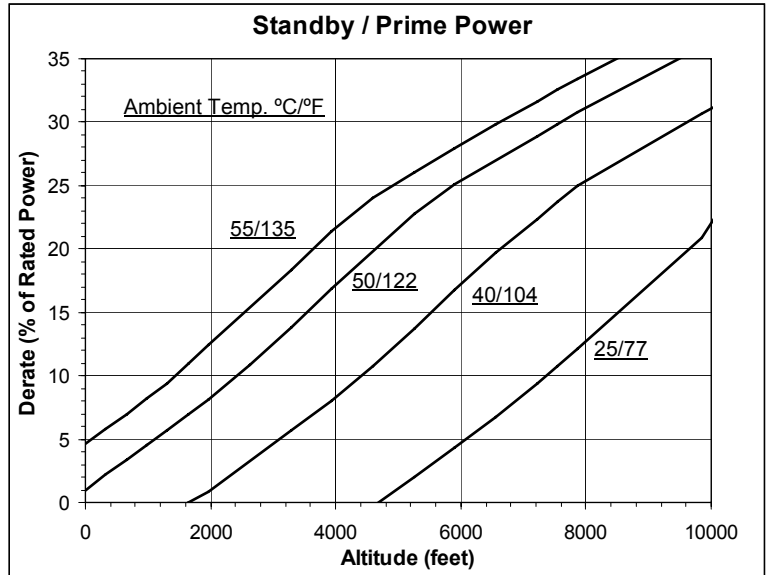
Data Tolerance: ± 5%

Chief Engineer:

1500 rpm Derate Curves



1800 rpm Derate Curves



Operation At Elevated Temperature And Altitude:

For **Standby/Prime Operation** above these conditions, derate by an additional 4.1% per 300 m (1000 ft), and 15% per 10 °C (18 °F).
 For **Continuous Operation** above these conditions, derate by an additional 4.8% per 300 m (1000 ft), and 15% per 10 °C (18 °F).

Operation At Elevated Temperature And Altitude:

For **Standby/Prime Operation** above these conditions, derate by an additional 7.5% per 300 m (1000 ft), and 9% per 10 °C (18 °F).
 For **Continuous Operation** above these conditions, derate by an additional 7.2% per 300 m (1000 ft), and 9% per 10 °C (18 °F).

Cummins Inc.

Engine Data Sheet

ENGINE MODEL : **QSL9-G3 NR3** CONFIGURATION NUMBER : D563007GX03

DATA SHEET : DS1404
 DATE : 16Apr07

PERFORMANCE CURVE : FR-91996

INSTALLATION DIAGRAM

• Fan to Flywheel: 4953752

CPL NUMBER

• Engine Critical Parts List: 1404

GENERAL ENGINE DATA

Type	4-Cycle; In-line; 6-Cylinder Diesel
Aspiration	Turbocharged and Charge Air Cooled
Bore x Stroke	4.49 x 5.69 (114 x 145)
Displacement	543 (8.8)
Compression Ratio	17.8 : 1
Dry Weight (Approximate), Fan to Flywheel Engine	— lb (kg) 1575 (714)
Wet Weight (Approximate), Fan to Flywheel Engine	— lb (kg) 1627 (738)
Moment of Inertia of Rotating Components	
• with FW 9878 Flywheel	— lb _m • ft ² (kg • m ²) 42.50 (1.79)
• with FW 9525 Flywheel	— lb _m • ft ² (kg • m ²) 58.66 (2.47)
Center of Gravity from Rear Face of Block	— in (mm) 16.89 (429)
Center of Gravity Above Crankshaft Centerline	— in (mm) 8.35 (212)
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) 1000 (1356)
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EXHAUST SYSTEM

Maximum Back Pressure	— in Hg (kPa) 3 (10.2)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction	
• with Dirty Filter Element	— in H ₂ O (kPa) 25 (6.2)
• with Clean Filter Element	— in H ₂ O (kPa) 15 (3.7)

COOLING SYSTEM

Jacket Water Circuit Requirements

Coolant Capacity — Engine Only	— US gal (litre) 2.9 (11)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft (m) 60 (18.3)
Standard Thermostat (Modulating) Range	— °F (°C) 180-199 (82-93)
Minimum Pressure Cap	— psi (kPa) 15 (103)
Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C) 230/219 (110/104)
Maximum Coolant Friction Head External to Engine — 1800 rpm	— psi (kPa) 5 (35)
— 1500 rpm	— psi (kPa) 4 (28)

Air to Air Core Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold	— °F (°C) 45 (25)
Maximum Air Pressure Drop from Turbo Air outlet to Intake Manifold — 1800 rpm	— in Hg (kPa) 4 (13.6)
— 1500 rpm	— in Hg (kPa) 2.5 (8.5)
Maximum Intake Manifold Temperature @ 77°F (25 °C) ambient	— °F (°C) 122 (50)
Maximum Intake Manifold Temperature for engine protection (Warning Threshold)	— °F (°C) 200 (93)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— psi (kPa) 15 (103)
@ Governed Speed	— psi (kPa) 40-60 (276-414)
Maximum Oil Temperature	— °F (°C) 250 (121)
Oil Capacity with OP 9451 Oil Pan : High - Low	— US gal (litre) 6.3-5.3 (24-20)
Total System Capacity (Including Combo Filter)	— US gal (litre) 7 (26.5)

FUEL SYSTEM

Type Injection System.....	Bosch HPCR	
Maximum Restriction at Lift Pump	6	(20.3)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	10	(33.9)
Maximum Fuel Flow to Injector Pump	22	(83)
Maximum Return Fuel Flow	19	(72)
Maximum Fuel Inlet Temperature	160	(70)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)	12	24
Battery Charging System, Negative Ground	100	70
Maximum Allowable Resistance of Cranking Circuit	0.001	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)	1500	(750)

COLD START CAPABILITY

Minimum Ambient Temperature for NFPA 110 Cold Start (90 degrees F Coolant Temperature)	40	(4)
Minimum Ambient Temperature for Unaided Cold Start	10	(-12)

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); 1800 rpm	— dBA	118.8
Exhaust Noise at 1 m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45 °; 1800 rpm.....	— dBA	119.5

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

	STANDBY		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
	1800	1500	1800	1500
	700 - 900	700 - 900	700 - 900	700 - 900
Governed Engine Speed	399 (298)	345 (257)	352 (262)	305 (227)
Engine Idle Speed	700 - 900	700 - 900	700 - 900	700 - 900
Gross Engine Power Output.....	325 (2241)	338 (2330)	287 (1979)	297 (2048)
Brake Mean Effective Pressure.....	1707 (8.7)	1422 (7.2)	1707 (8.7)	1422 (7.2)
Piston Speed	47 (35)	35 (26)	47 (35)	35 (26)
Friction Horsepower	64 (4.0)	52 (3.3)	64 (4.0)	52 (3.3)
Engine Water Flow at Stated Friction Head External to Engine:				
• 2.5 psi Friction Head.....	60 (3.8)	47 (3.0)	60 (3.8)	47 (3.0)
• Maximum Friction Head				
Intake Air Flow	785 (370)	660 (315)	770 (365)	655 (310)
Exhaust Gas Temperature	1105 (595)	1080 (585)	1035 (560)	995 (535)
Exhaust Gas Flow	2165 (1020)	1800 (850)	2040 (965)	1685 (795)
Air to Fuel Ratio.....	23 : 1	23 : 1	25 : 1	25 : 1
Radiated Heat to Ambient	1160 (25)	1090 (20)	1145 (25)	960 (20)
Heat Rejection to Jacket Coolant.....	6940 (125)	6030 (110)	6310 (115)	5535 (100)
Heat Rejection to Exhaust	16015 (285)	13150 (235)	14510 (255)	11735 (210)
Heat Rejected to Fuel	65 (1.1)	65 (1.1)	65 (1.1)	65 (1.1)
Heat Rejected to Aftercooler.....	3600 (65)	3005 (55)	3430 (65)	2925 (55)
Charge Air Flow.....	56 (26)	47 (22)	55 (25)	46 (22)
Turbocharger Compressor Outlet Pressure	65 (220)	64 (217)	63 (213)	61 (207)
Turbocharger Compressor Outlet Temperature.....	374 (190)	368 (187)	364 (184)	357 (181)

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

ENGINE MODEL : QSL9-G3 NR3
DATA SHEET : DS-1404
DATE : 16Apr07
CURVE NO. : FR-91996