



Cummins Inc.

Columbus, Indiana 47201

Engine Data Sheet

Basic Engine Model:
QSL9-G5

Engine Critical Parts List:
CPL: 8693

Curve Number:
FR-91545

Date:
15Aug05

G-DRIVE
QSL
1

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

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

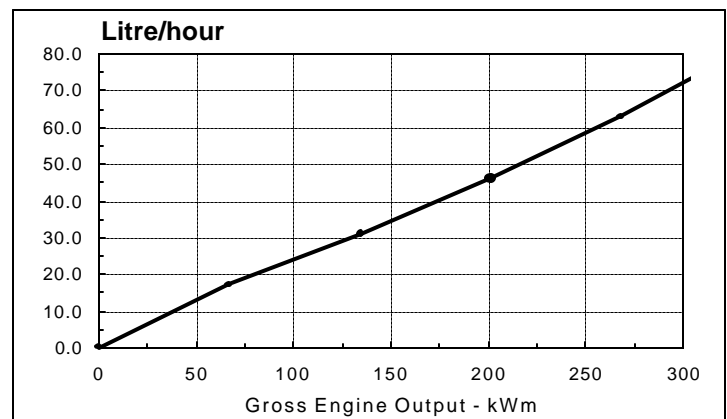
No. of Cylinders : **6**

Aspiration : **Turbocharged and Charge Air Cooled**

Engine Speed	Standby Power		Prime Power		Continuous Power	
	RPM	kWm	BHP	kWm	BHP	kWm
1500	310	415	268	359	228	305
1800	355	476	307	412	261	350

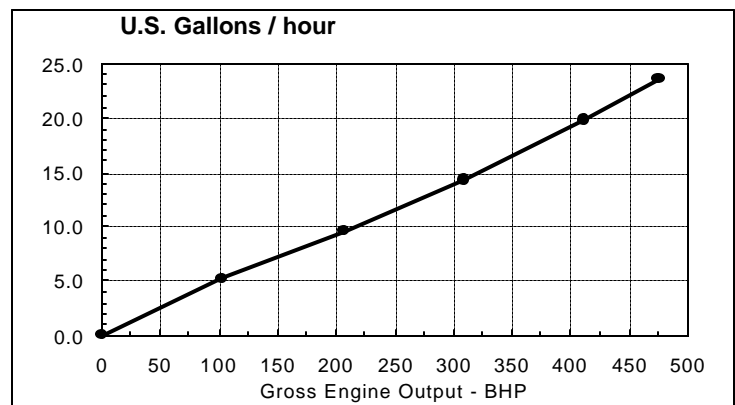
Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm-h	lb/ BHP-h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	310	415	0.206	0.338	75	19.8
PRIME POWER						
100	268	359	0.199	0.328	63	16.6
75	201	269	0.194	0.319	46	12.1
50	134	180	0.196	0.323	31	8.2
25	67	90	0.213	0.351	17	4.4
CONTINUOUS POWER						
100	228	305	0.196	0.323	53	13.9



Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm-h	lb/ BHP-h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	355	476	0.214	0.352	89	23.6
PRIME POWER						
100	307	412	0.208	0.342	75	19.9
75	231	309	0.201	0.331	55	14.4
50	154	206	0.202	0.332	36	9.6
25	77	103	0.221	0.363	20	5.3
CONTINUOUS POWER						
100	261	350	0.204	0.335	63	16.5



CONVERSIONS:(litres = U.S. Gal x 3.785) (U.S.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 15 in H₂O air intake restriction and 2 in Hg exhaust back pressure.

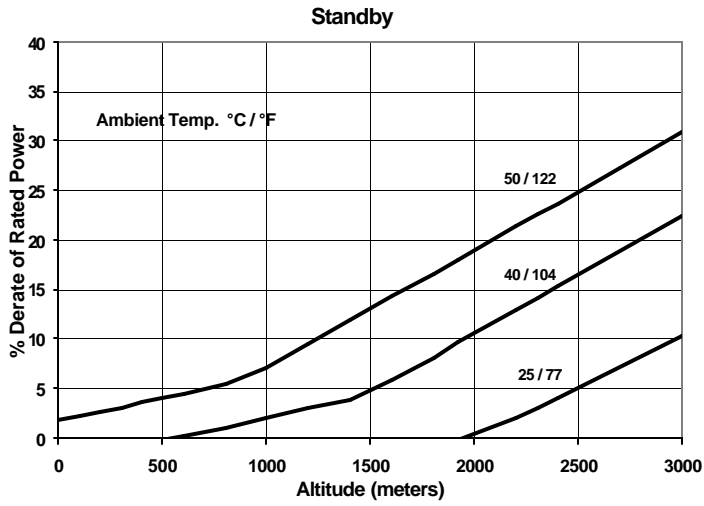
The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: --Limited Production--

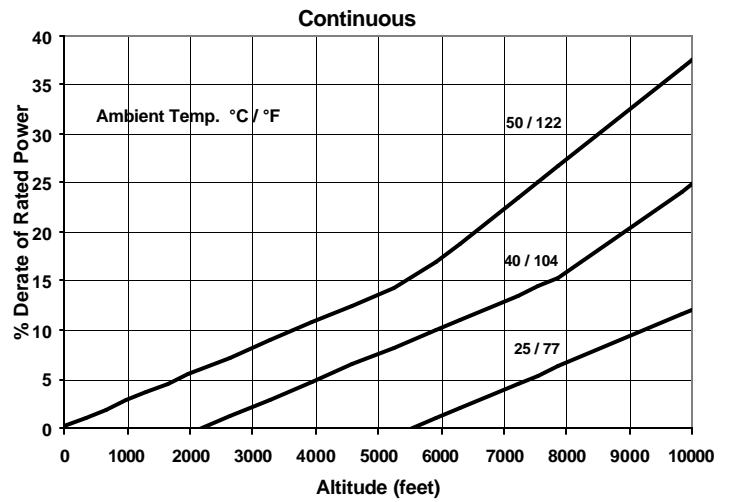
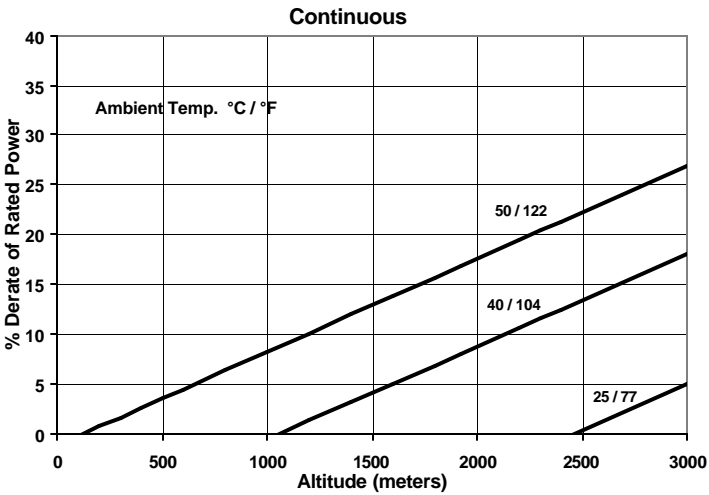
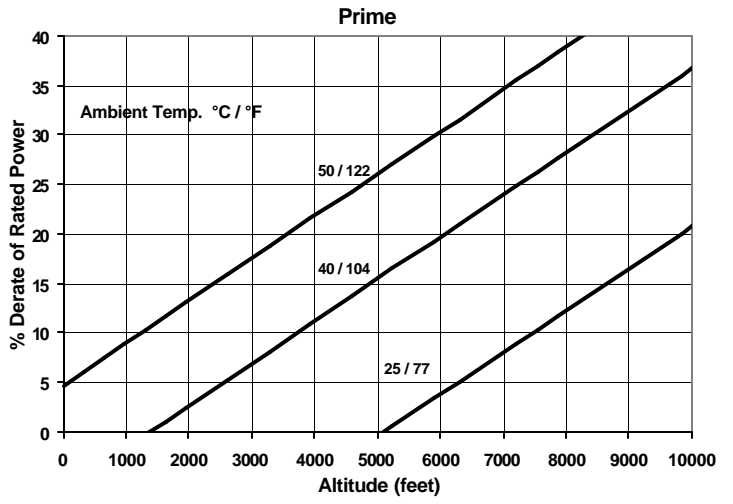
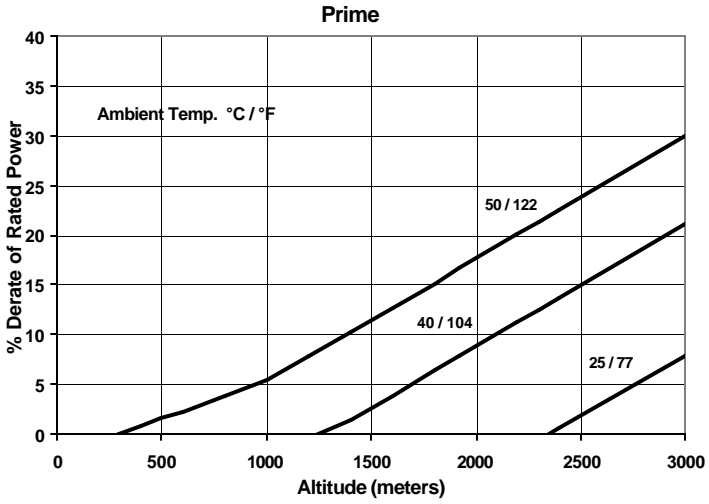
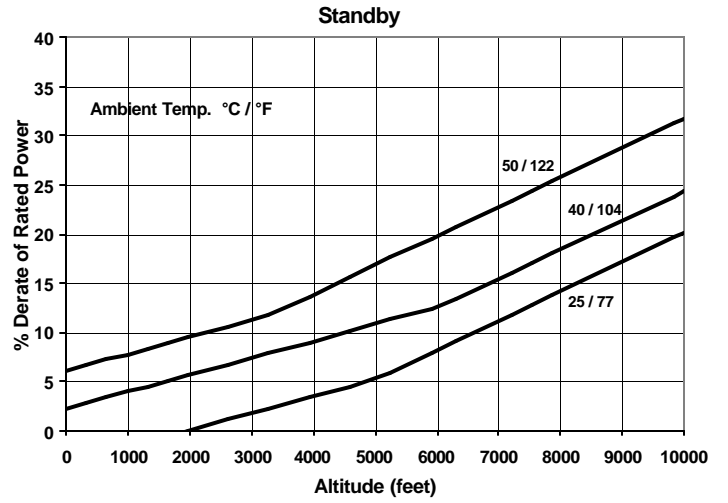
Data Tolerance: ± 5%

Chief Engineer:

1500 RPM Derate Curves



1800 RPM Derate Curves



Operation At Elevated Temperature And Altitude:

For **Standby operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 4% per 10° C (18° F).
 For **Prime operation** above these conditions, derate by an additional 5% per 300 m (1000 ft), and 8% per 10° C (18° F).

Operation At Elevated Temperature And Altitude:

For **Standby operation** above these conditions, derate by an additional 3.0% per 300 m (1000 ft), and 5% per 10° C (18° F).
 For **Prime operation** above these conditions, derate by an additional 5.0% per 300 m (1000 ft), and 10% per 10° C (18° F).

Cummins Inc.

Engine Data Sheet

ENGINE MODEL : **QSL9-G5**

CONFIGURATION NUMBER : D563007GX03

DATA SHEET : DS91545

DATE : 15Aug05

PERFORMANCE CURVE : FR-91545

INSTALLATION DIAGRAM

• Fan to Flywheel : xxxxxxxx

CPL NUMBER

• Engine Critical Parts List : 8693

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	16.8 : 1	
Dry Weight		
Fan to Flywheel Engine	1575	(714)
Wet Weight		
Fan to Flywheel Engine	1627	(738)
Moment of Inertia of Rotating Components		
• with FW 9520 Flywheel	TBD	(TBD)
• with FW 9525 Flywheel	TBD	(TBD)
Center of Gravity from Rear Face of Block	16.89	(429)
Center of Gravity Above Crankshaft Centerline	8.35	(212)
Maximum Static Loading at Rear Main Bearing	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 (mm Hg)	3	(76)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction

• with Dirty Filter Element	25	(635)
• with Clean Filter Element	15	(381)

COOLING SYSTEM**Jacket Water Circuit Requirements**

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

Air-to-Air Core Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold	45	(25)
Maximum Air Pressure Crop from Turbo Air outlet to Intake Manifold — 1800 rpm	4	(102)
— 1500 rpm	2.5	(63.5)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	15	(103)
@ Governed Speed	40 - 60	(276 - 414)
Maximum Oil Temperature	250	(121)
Oil Capacity with OP 9451 Oil Pan : High - Low	6	(22.7)
Total System Capacity (Including Combo Filter)	7	(26.5)
Angularity of OP 9451 Oil Pan — Front Down	45°	
— Front Up	45°	
— Side to Side	45°	

FUEL SYSTEM

Type Injection System	Bosch HPCR	
Maximum Restriction at Lift Pump	6	(152)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head).....	10	(254)
Maximum Fuel Flow to Injection Pump.....	43	(165)
Maximum Fuel Return Flow	8	(30)
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 @ 50-F (10-C) and Above.....	TBD	(TBD)
Cold Soak @ 32 to 50-F (0 to10-C)	TBD	(TBD)
Cold Soak @ 0 to 32-F (-18 to 0-C)	1500	(750)

COLD START CAPABILITY

Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds.....	TBD.	(TBD)
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
Exhaust Noise at 1m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45°	--- dBA	TBD

Governed Engine Speed	— rpm
Engine Idle Speed	— rpm
Gross Engine Power Output.....	— BHP (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	476 (355)	415 (310)	412 (307)	359 (268)
Engine Idle Speed	387 (2668)	404 (2785)	335 (2309)	350 (2413)
Gross Engine Power Output.....	1707 (8.7)	1422 (7.2)	1707 (8.7)	1422 (7.2)
Brake Mean Effective Pressure	47 (35)	35 (26)	47 (35)	35 (26)
Piston Speed	64 (242)	52 (195)	64 (242)	52 (195)
Friction Horsepower	60 (227)	47 (178)	60 (227)	47 (178)
Engine Water Flow at Stated Friction Head External to Engine:				
• 2.5 psi Friction Head.....	870 (410)	715 (340)	820 (390)	660 (310)
• Maximum Friction Head.....	1070 (580)	1040 (560)	945 (500)	930 (500)
Intake Air Flow	1355 (640)	1100 (520)	1270 (600)	1030 (490)
Exhaust Gas Temperature	22.1 : 1	21.7:1	24.8 : 1	23.8:1
Exhaust Gas Flow	2070 (40)	1720 (35)	1745 (35)	1455 (30)
Air to Fuel Ratio.....	7705 (140)	6610 (120)	6425 (115)	5550 (100)
Radiated Heat to Ambient	17175 (305)	13385 (240)	14120 (250)	11125 (200)
Heat Rejection to Jacket Coolant.....	N/A	N/A	N/A	N/A
Heat Rejection to Exhaust	4535 (80)	3580 (65)	3765 (70)	2865 (55)
Heat Rejection to Fuel.....	60 (27)	51 (23)	57 (26)	46 (21)
Heat Rejected to Aftercooler.....	75 (2006)	77 (1950)	71 (1815)	63 (1600)
Charge Air Flow.....	437 (225)	426 (219)	401 (205)	381 (194)
Turbocharger Compressor Outlet Pressure				
Turbocharger Compressor Outlet Temperature.....				

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