



Cummins Inc.
Columbus, Indiana 47201
ENGINE PERFORMANCE CURVE

Basic Engine Model:
KTA50-G9

Curve Number:
FR-6244 (1P / 2L)
FR-6295 (2P / 2L)

Page No.

Engine Critical Parts List:
CPL: 2527 (1 Pump / 2 Loop)
CPL: 2533 (2 Pump / 2 Loop)

Date:
26Nov01

Displacement : **50.3 litre (3067 in³)**

Bore : **159 mm (6.25 in.)** Stroke : **159 mm (6.25 in.)**

No. of Cylinders : **16**

Aspiration : **Turbocharged and Low Temperature Aftercooled**

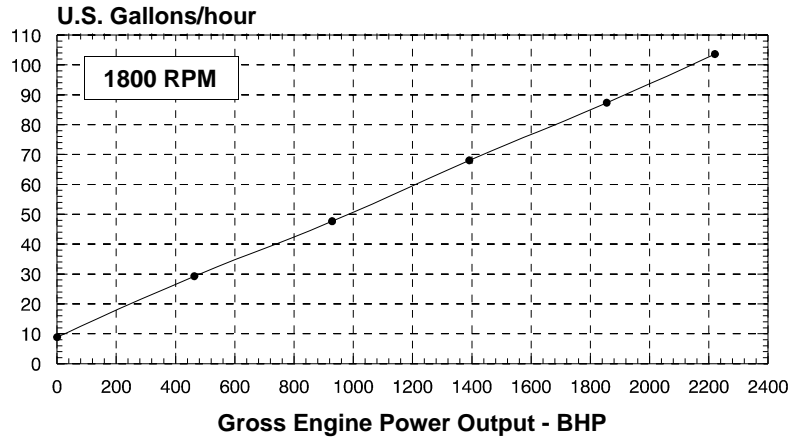
Engine Speed RPM	Standby Power		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
1800	1656	2220	1384	1855	1224	1640

Emissions Certification

This engine complies with certain emissions requirements established by US EPA/CARB. See Exhaust Emissions Data Sheet for conformance specifics.

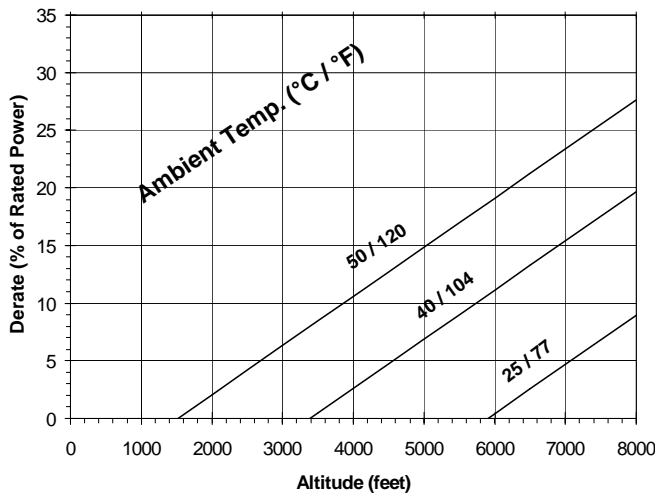
Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm-h	lb/ BHP-h	liter/ hour	U.S. Gal/ hour
STANDBY POWER						
100	1656	2220	0.201	0.331	392	103.6
PRIME POWER						
100	1384	1855	0.203	0.334	330	87.3
75	1038	1391	0.211	0.347	257	68.0
50	692	928	0.221	0.364	180	47.6
25	346	463	0.273	0.449	111	29.2
CONTINUOUS POWER						
100	1224	1640	0.208	0.342	299	79.0

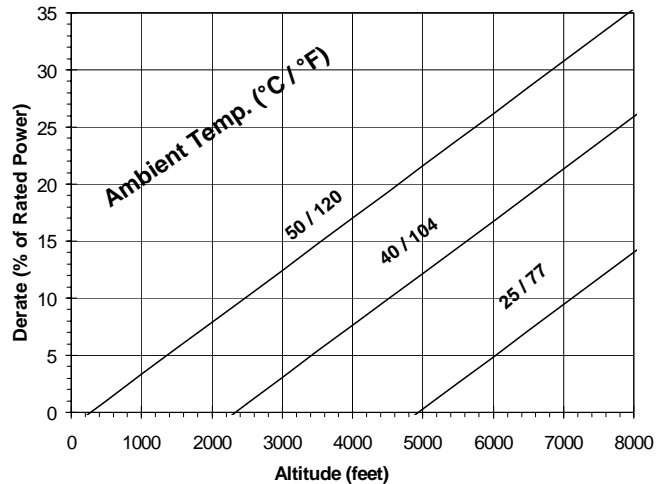


Power Derate Curves:

Standby / Prime Power



Continuous Power



Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 4.5% per 300 m (1000 ft), and 10% per 10° C (18° F).

CONVERSIONS:(Liters = U.S. Gal x 3.785) (U.S.Gal = Liters 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/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.

Data Status: Limited Production

Data Tolerance: ± 5%

Chief Engineer:

D.K. Trueblood

Cummins Engine Company, Inc.

Engine Data Sheet

ENGINE MODEL : KTA50-G9

CONFIGURATION NUMBER : D283022DX02

DATA SHEET : DS-6244

DATE : 26Nov01

PERFORMANCE CURVE : FR-6244 (1P / 2L)

FR-6295 (2P / 2L)

PERFORMANCE CURVE :

INSTALLATION DIAGRAM

- Fan to Flywheel (1P / 2L): 3170289
- Fan to Flywheel (2P / 2L): 3626419

CPL NUMBER

- Engine Critical Parts List : 2527 (1 Pump / 2 Loop)
- Engine Critical Parts List : 2533 (2 Pump / 2 Loop)

GENERAL ENGINE DATA

Type.....	4-Cycle; 60° Vee; 16-Cylinder Diesel	
Aspiration.....	Turbocharged & Low Temp. Aftercooled	
Bore x Stroke	6.25 x 6.25 (159 x 159)	
Displacement	3067 (50.3)	
Compression Ratio	13.9 : 1	
Dry Weight		
Fan to Flywheel Engine	11820	(5360)
Wet Weight		
Fan to Flywheel Engine	12485	(5662)
Moment of Inertia of Rotating Components		
• with FW 6009 Flywheel	301	(12.7)
• with FW 6017 Flywheel.....	515	(21.7)
Center of Gravity from Rear Face of Flywheel Housing (FH 6024).....	47.5	(1206)
Center of Gravity above Crankshaft Centerline	11.0	(279)
Maximum Static Loading at Rear Main Bearing	2000	(908)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block.....	4500	(6100)
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EXHAUST SYSTEM

Maximum Back Pressure @ Standby Power Rating	2	(51)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction		
• with Dirty Filter Element @ Standby Power Rating.....	25	(635)
• with Clean Filter Element @ Standby Power Rating.....	15	(381)

COOLING SYSTEM (Low Temperature Aftercooling Required; 1 Pump / 2 Loop or 2 Pump / 2 Loop)

Coolant Capacity — Engine Only.....	37	(140)
— Aftercoolers	9	(34)
Maximum Static Head of Coolant Above Engine Crank Centerline	60	(18.3)
Thermostat Modulating Range — High Flow (Jacket)	180 - 200	(82 - 93)
Maximum Top Tank Temperature for Standby Power / Prime Power	220 / 212	(104 / 100)
Target Coolant Inlet Temperature to Aftercoolers @ 77 °F (25 °C) Ambient—	130	(55)
Maximum Coolant Temperature to Aftercoolers; Standby Power / Prime Power	160 / 150	(71 / 66)

Additional 2 Pump / 2 Loop Requirements

Maximum Coolant Friction Head External to Engine— High Flow (Jacket).....	10	(67)
— Low Flow (Aftercooler).....	7	(48)
Thermostat Modulating Range — Low Flow (Aftercooler) (2P / 2L) w/ HX	N.A.	(N.A.)
Minimum Pressure Cap (for Cooling Systems with less than 2 m [6 ft.] Static Head)...	14	(96)

Additional 1 Pump / 2 Loop Requirements

Maximum Coolant Friction Head External to Engine— High Flow (Jacket)	15	(103)
— Low Flow (Aftercooler).....	5	(35)
Thermostat Modulating Range — Low Flow (Aftercooler).....	150 - 175	(66 - 79)
Minimum Pressure Cap (for Cooling Systems with less than 2 m [6 ft.] Static Head)...	14	(96)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed.....	20	(138)
@ Governed Speed.....	50 - 70	(345 - 483)
Maximum Oil Temperature	250	(121)
Oil Capacity with OP 6027 Oil Pan : High - Low.....	47 - 39	(178 - 148)
Total System Capacity (Including Bypass Filter)	54	(204)

FUEL SYSTEM

Type Injection System	Direct Injection Cummins PT	
Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter.....	4.0	(102)
— with Dirty Fuel Filter.....	8.0	(203)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head).....	6.5	(165)
Maximum Fuel Flow to Injection Pump	183	(693)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement).....	— volt	24
Battery Charging System, Negative Ground.....	— ampere	35
Maximum Allowable Resistance of Cranking Circuit.....	— ohm	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 50 °F (10 °C) and Above.....	— °F CCA	1280
• Cold Soak @ 32 °F to 50 °F (0 °C to 10 °C).....	— °F CCA	1800
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C).....	— °F CCA	1800

COLD START CAPABILITY

Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds.....	— °F (°C)	50	(10)
Minimum Ambient Temperature for Unaided Cold Start.....	— °F (°C)	45	(7)

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 94.6

Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°..... — dBA 130

Governed Engine Speed.....	— rpm	1800
Engine Idle Speed.....	— rpm	725 - 775
Gross Engine Power Output.....	— BHP (kW _m)	2220 (1656)
Brake Mean Effective Pressure.....	— psi (kPa)	318 (2221)
Piston Speed.....	— ft / min (m / s)	1875 (9.5)
Friction Horsepower.....	— HP (kW _m)	225 (168)

Engine Data with Dry Type Exhaust Manifold

Intake Air Flow.....	— cfm (liter / s)	4400 (2075)
Exhaust Gas Temperature.....	— °F (°C)	960 (515)
Exhaust Gas Flow.....	— cfm (liter / s)	10650 (5025)
Air to Fuel Ratio.....	— air : fuel	25.2 : 1
Radiated Heat to Ambient.....	— BTU / min (kW _m)	11220 (200)
Heat Rejection to Exhaust.....	— BTU / min (kW _m)	58925 (1040)

Additional Engine Aftercooler Data (2 Pump / 2 Loop)

Engine Jacket Coolant Flow at Stated Friction Head External to Engine:

• 4 psi Friction Head.....	— US gpm (liter / s)	430 (27.1)
• Maximum Friction Head.....	— US gpm (liter / s)	376 (23.7)
Heat Rejection to Coolant (Aftercooler).....	— BTU / min (kW _m)	19500 (345)
Heat Rejection to Coolant (Engine).....	— BTU / min (kW _m)	40600 (715)

Aftercooler Coolant Flow at Stated Friction Head External to Engine: .

• 2 psi Friction Head.....	— US gpm (liter / s)	112 (7.1)
• Maximum Friction Head.....	— US gpm (liter / s)	100 (6.3)

Additional Engine Aftercooler Data (1 Pump / 2 Loop)

Engine Jacket Coolant Flow at Stated Friction Head External to Engine:

• 4 psi Friction Head.....	— US gpm (liter / s)	430 (27.1)
• Maximum Friction Head.....	— US gpm (liter / s)	376 (23.7)
Heat to be Rejected by Low Temperature Radiator*.....	— BTU / min (kW _m)	35720 (630)
Heat to be Rejected by Jacket Coolant Radiator*.....	— BTU / min (kW _m)	26110 (460)

Aftercooler Coolant Flow at Stated Friction Head External to Engine: .


• 2 psi Friction Head.....	— US gpm (liter / s)	97 (6.1)
• Maximum Friction Head.....	— US gpm (liter / s)	94 (5.9)

STANDBY POWER		PRIME POWER UNLIMITED TIME	
60 hz	50 hz	60 hz	50 hz
1800		1800	
725 - 775		725 - 775	
2220 (1656)		1855 (1384)	
318 (2221)		266 (1835)	
1875 (9.5)		1875 (9.5)	
225 (168)		225 (168)	
4400 (2075)		4100 (1930)	
960 (515)		880 (470)	
10650 (5025)		9600 (4530)	
25.2 : 1		27.6 : 1	
11220 (200)		9610 (170)	
58925 (1040)	Not Applicable for 1500 RPM Operation	51690 (910)	Not Applicable for 1500 RPM Operation
430 (27.1)		430 (27.1)	
376 (23.7)		376 (23.7)	
19500 (345)		15200 (270)	
40600 (715)		35100 (620)	
112 (7.1)		112 (7.1)	
100 (6.3)		100 (6.3)	
430 (27.1)		430 (27.1)	
376 (23.7)		376 (23.7)	
35720 (630)		36620 (645)	
26110 (460)		15600 (275)	
97 (6.1)		97 (6.1)	
94 (5.9)		94 (5.9)	

* See AEB 90.39 1 Pump / 2 Loop KTA50-G8/9 system.

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

ENGINE MODEL : KTA50-G9
DATA SHEET : DS-6244
DATE : 26Nov01
CURVE NO. : FR-6244 (1P / 2L)
 FR-6295 (2P / 2L)

	Cummins Inc. Columbus, Indiana 47201 EXHAUST EMISSIONS DATA SHEET	Basic Engine Model: KTA50-G9	Curve Number: FR-6244	Page No.
		Engine Critical Parts List: CPL: 2527	Date: 22Apr03	
Displacement : 50.3 liter (3067 in³)		Bore : 159 mm (6.25 in.) Stroke : 159 mm (6.25 in.)		
No. of Cylinders : 16		Aspiration : Turbocharged and Low Temperature Aftercooled		
Emissions Control Device : Turbocharging, Low Temperature Aftercooling and Step Timing Control (STC)				

Engine Speed RPM	Standby Power		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
1500	-----	-----	-----	-----	-----	-----
1800	1656	2220	1384	1855	1224	1640

Exhaust Emissions Data @ 1500 RPM

Not Available at 1500 RPM

Exhaust Emissions Data @ 1800 RPM

Component	Standby Power			Prime Power			Continuous Power		
	g/BHP-h	mg/m ³	PPM	g/BHP-h	mg/m ³	PPM	g/BHP-h	mg/m ³	PPM
HC (Total Unburned Hydrocarbons)	0.17	42	57	0.18	48	60	0.20	50	64
NOx (Oxides of Nitrogen as NO ₂)	8.5	4150	1350	7.3	3500	1050	6.3	3000	890
CO (Carbon Monoxide)	1.3	490	260	1.0	310	160	0.8	280	130
PM (Particulate Matter)	0.11	60	-	0.13	62	-	0.14	61	-
SO ₂ (Sulfur Dioxide)	0.12	60	29	0.12	56	28	0.12	53	26

CONVERSIONS: (g/kWm·h = g/BHP·h x 1.34)

Note: mg/m³ and PPM numbers are measured dry and corrected to 5% O₂ content.

Test Methods and Conditions

Test Methods:

Steady-State emissions recorded per ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

Fuel Specification:

46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.

Reference Conditions:

25°C (77°F) Air Inlet Temperature, 40°C (104°F) Fuel Inlet Temperature, 100 kPa (29.53 in Hg) Barometric Pressure; 10.7 g/kg (75 grains H₂O/lb) of dry air Humidity (required for NOx correction); Intake Restriction set to maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subject to engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Data Subject to Change Without Notice.