

CUMMINS ENGINE COMPANY, INC

Columbus, Indiana 47201

ENGINE PERFORMANCE CURVE

Basic Engine Model: KTA19-G2

Curve Number: FR-4125

Page No.

Engine Critical Parts List:

CPL: 0520

Date:

14Apr97

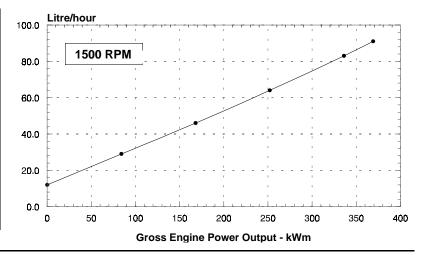
Displacement : **18.9** litre (**1150** in³) Bore : **159** mm (**6.25** in.) Stroke : **159** mm (**6.25** in.)

No. of Cylinders: 6 Aspiration: Turbocharged and Aftercooled

Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	ВНР	kWm	ВНР	kWm	ВНР
1500	369	495	336	450	328	440
1800	448	600	392	525	336	450

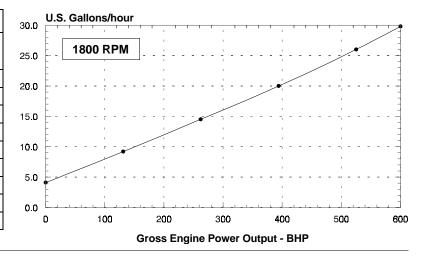
Engine Performance Data @ 1500 RPM

OUTI	OUTPUT POWER		FUEL CONSUMPTION			ON
%	kWm	ВНР	kg/ kWm∙h	lb/ BHP∙h	litre/ hour	U.S. Gal/ hour
STAN	STANDBY POWER					
100	369	495	0.210	0.344	91	24.0
PRIME	PRIME POWER					
100	336	450	0.209	0.344	83	21.8
75	252	338	0.215	0.353	64	16.8
50	168	225	0.232	0.382	46	12.1
25	84	112	0.292	0.482	29	7.6
CONTINUOUS POWER						
100	328	440	0.205	0.336	78	20.8



Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	ВНР	kg/ kWm∙h	lb/ BHP∙h	litre/ hour	U.S. Gal/ hour
STAN	STANDBY POWER					
100	448	600	0.214	0.353	113	29.8
PRIME	PRIME POWER					
100	392	525	0.213	0.352	98	26.0
75	294	394	0.220	0.360	76	20.0
50	195	262	0.240	0.393	55	14.5
25	98	131	0.304	0.499	35	9.2
CONTINUOUS POWER						
100	336	450	0.211	0.347	83	22.0



CONVERSIONS:

(Litres = U.S. Gal x 3.785)

(Engine kWm = BHP x 0.746)

 $(U.S. Gal = Litres \times 0.2642)$

(Engine BHP = Engine kWm x 1.34)

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/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.

CERTIFIED WITHIN 5% CHIEF ENGINEER

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

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 is 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.

CONTINUOUS POWER RATING is 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.

PRIME POWER RATING is 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

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.

Reference Standards:

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

Operation At Elevated Temperature And Altitude:

The engine may be operated at:

1800 RPM up to 5,000 ft (1525 m) and 104 $^{\rm o}$ F (40 $^{\rm o}$ C) without power deration.

1500 RPM up to 4,300 ft (1310 m) and 104 $^{\rm o}F$ (40 $^{\rm o}C)$ without power deration.

For sustained operation above these conditions, derate by 4% per 1,000 ft (300 m), and 1% per 10 $^{\rm o}$ F (2% per 11 $^{\rm o}$ C).

Cummins Engine Company, Inc.

Engine Data Sheet

DATA SHEET: DS-4084-F ENGINE MODEL: KTA19-G2 DATE: 14Apr97
PERFORMANCE CURVE: FR-4125 **CONFIGURATION NUMBER:** D193056DX02

INSTALLATION DIAGRAM
• Fan to Flywheel : CPL NUMBEREngine Critical Parts List : 3003983 : 0520

Heat Exchanger Cooled: N.A.	Engline Chilical Parts List	: 0520	
GENERAL ENGINE DATA			
Type		4 Cycle: In line:	6 Cylindar Diag
•••		4-Cycle; In-line; Turbocharged a	
Aspiration			
Bore x Stroke	` _ /	6.25 x 6.25 (159	(X 159)
Displacement		1150 (18.9)	
Compression Ratio		13.9 : 1	
Dry Weight			
Fan to Flywheel Engine	— lb (kg)	4000	(1814)
Heat Exchanger Cooled Engine	— lb (kg)	4421	(2005)
Wet Weight			
Fan to Flywheel Engine	— lb (kg)	4159	(1886)
Heat Exchanger Cooled Engine	— lb (kg)	4723	(2142)
Moment of Inertia of Rotating Components			
• with FW 4001 Flywheel	- lb • ft ² (kg • m ²)	170	(7.2)
• with FW 4006 Flywheel		199	(8.4)
Center of Gravity from Rear Face of Flywheel Housing (FH 4018)		28.4	(721)
Center of Gravity Above Crankshaft Centerline		9.0	, ,
Maximum Static Loading at Rear Main Bearing		2000	(229) (908)
Maximum Static Edding at Near Main Bearing	lb (kg)	2000	(300)
ENGINE MOUNTING			
Maximum Bending Moment at Rear Face of Block	— lb • ft (N • m)	1000	(1356)
EXHAUST SYSTEM			
Maximum Back Pressure	— in Hg (mm Hg)	3	(76)
AIR INDUCTION SYSTEM			
Maximum Intake Air Restriction			
	: 110/ 110	0.5	(005)
• with Dirty Filter Element		25	(635)
with Normal Duty Air Cleaner and Clean Filter Element		10	(254)
with Heavy Duty Air Cleaner and Clean Filter Element	— in H_2O (mm H_2O)	15	(381)
COOLING SYSTEM			
Coolant Capacity — Engine Only	— US gal (liter)	8.0	(30)
— with HX 4073 Heat Exchanger		17.5	(66)
Maying up Coolant Frintian Hood Futowal to Fraging 4000 mpg	nei (IrDe)	10	(00)
	— psi (kPa)	10	(69)
	— psi (kPa)	8	(55)
Maximum Static Head of Coolant Above Engine Crank Centerline		60	(18.3)
Standard Thermostat (Modulating) Range	—°F (°C)	180 - 200	(82 - 93)
Minimum Pressure Cap	— psi (kPa)	10	(69)
Maximum Top Tank Temperature for Standby / Prime Power	—°F (°C)	220 / 212	(104 / 100)
Minimum Raw Water Flow @ 90°F to HX 4073 Heat Exchanger		54	(204)
Maximum Raw Water Inlet Pressure at HX 4073 Heat Exchanger		50	(345)
UBRICATION SYSTEM			
Oil Pressure @ Idle Speed	nci (kPa)	20	(138)
·	. ,		` '
@ Governed Speed		50 - 70	(345 - 483)
Maximum Oil Temperature	` ,	250	(121)
Oil Capacity with OP 4019 Oil Pan: High - Low		10.0 - 8.5	(38 - 32)
Total System Capacity (Including Bypass Filter)		13.2	(50)
Angularity of OP 4019 Oil Pan — Front Down			30°
— Front Up			30°
Sido to Sido			300

— Side to Side....

30°

FUEL SYSTEM

I OLL OTOTLIN		
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— in Hg (mm Hg)	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— US gph (liter / hr)	104	(394)
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	600	
• Cold Soak @ 32 °F to 50 °F (0 °C to 10 °C)	640	
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)	900	
COLD START CAPABILITY		
Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds	50	(10)
Minimum Ambient Temperature for Unaided Cold Start	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) : 110 m (361 ft) Relative Humidity : 30%

+/- 0.25 Estimated Free Field Sound Pressure Level of a Typical Generator Set;

N.A. N.A.

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)

ingine Water Flow at Stated Friction Head External to Engine: • 3 psi Friction Head— US gpm (literation Head)	,
ingine Data with Dry Type Exhaust Manifold	
ntake Air Flow— cfm (liter	r / s)
xhaust Gas Temperature °F	(°C)
xhaust Gas Flow— cfm (lite	r / s)
.ir to Fuel Ratio— air :	fuel
Radiated Heat to Ambient BTU / min (k'	$N_{\rm m}$)
leat Rejection to Coolant	$N_{\rm m}$)
leat Rejection to Exhaust BTU / min (k'	N_{m})

STANDE	Y POWER	PRIME POWER		
60 hz	50 hz	60 hz	50 hz	
4000	4500	4000	4500	
1800	1500	1800	1500	
675 - 775	675 - 775	675 - 775	675 - 775	
600 (448)	495 (369)	525 (392)	450 (336)	
230 (1586)	227 (1565)	201 (1386)	207 (1427)	
1875 (9.5)	1562 (7.9)	1875 (9.5)	1562 (7.9)	
85 (63)	60 (45)	85 (63)	60 (45)	
196 (12.4)	162 (10.2)	196 (12.4)	162 (10.2)	
175 (11.0)	145 (9.1)	175 (11.0)	145 (9.1)	
1320 (623)	945 (446)	1230 (581)	915 (432)	
955 (513)	985 (529)	920 (493)	975 (524)	
3600 (1699)	2630 (1241)	3270 (1543)	2530 (1194)	
27.5 : 1	24.5 : 1	29.4 : 1	26.0 : 1	
3870 (68)	3120 (55)	3380 (59)	2830 (50)	
15600 (274)	12870 (226)	13650 (240)	11700 (206)	
19595 (344)	14970 (263)	16995 (299)	13580 (239)	
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N.A. - Data is Not Available N/A - Not Applicable to this Engine TBD - To Be Determined

ENGINE MODEL: KTA19-G2

DATA SHEET: DS-4084-F **DATE**: 14Apr97 **CURVE NO.:** FR-4125