



## CUMMINS ENGINE COMPANY LTD. ENGINE PERFORMANCE CURVE

**CONFIGURATION**  
D193091DX02

**ENGINE MODEL:** KTA19-G3A

**CURVE NUMBER:** FR-4212

**CPL No.:** 4153

**DATE:** 2013/6/25

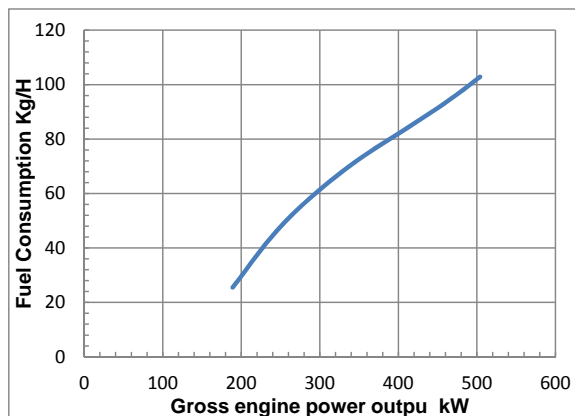
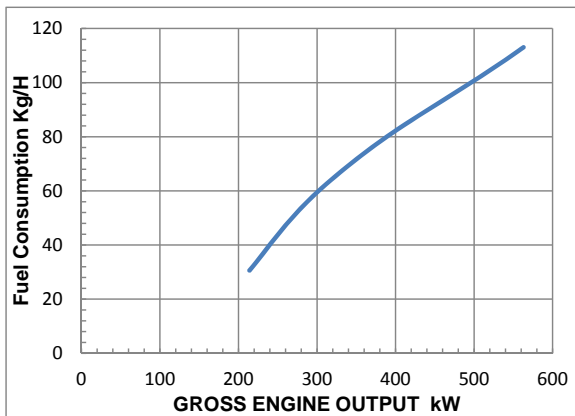
Displacement: 19L (1150)	Aspiration: Turbocharged , Aftercooled	<b>RATING</b>
BoreXStroke: 159X159mm (6.25X6.25 in.)	Fuel System: Cummins PT	563 kW(755 BHP)@1800r/min
Compress Ratio: 13.9:1	No. of Cylinder: 6	504 kW(675 BHP)@1500r/min

All data is based on the engine operating with fuel system, water pump, and 20 in. H<sub>2</sub>O(4.98kPa) inlet air restriction with 5.8 in.(147mm) inner diameter, and with 2 in. Hg(7kPa) exhaust restriction with 8 in.(203mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolant as 50% ethylene glycol/50% water. All data is subject to change without notice.

### GROSS ENGINE POWER OUTPUT

SPEED rpm	STANDBY POWER		PRIME POWER		CONTINUOUS POWER	
	BHP	kW	BHP	kW	BHP	kW
1800	755	563	680	507	575	429
1500	675	504	600	448	475	354

### FUEL CONSUMPTION



	OUTPUT POWER		CONSUMPTION		BFSC		
	%	BHP	kW	Lb/h	Kg/h	g/kW.h	Lb/BHP.h
<b>1800RPM</b>							
STANDBY							
100	755	563	249	113	201	0.330	
PRIME							
100	680	507	225	102	201	0.331	
75	510	380	172	78	206	0.338	
50	383	285	122	55	194	0.318	
25	287	214	67	31	143	0.235	
CONTINUOUS							
100	575	429	190	86	201	0.331	
<b>1500RPM</b>							
STANDBY							
100	675	504	227	103	204	0.336	
PRIME							
100	600	448	201	91	203	0.334	
75	450	336	154	70	207	0.341	
50	338	252	107	48	192	0.316	
25	254	189	56	26	135	0.221	
CONTINUOUS							
100	475	354	157	71	202	0.331	

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with SAE J1995 conditions of 29.61 in. Hg(100kPa) barometric pressure [300ft.(91m) altitude] 77deg F (25 deg C) inlet temperature, and 0.30 in. Hg(1kPa) water vapor pressure with No.2 diesel fuel.

TECHNICAL DATA DEPT.

CERTIFIED WITHIN 5%

CHIEF ENGINEER

**Cummins Confidential**



## POWER RATING APPLICATION GUIDE LINES 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**

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 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 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:

1800RPM up to 5,000 ft.(1500m) and 104°F (40°C) without power deration. 1500RPM up to 7,500 ft.(2280m) and 104°F (40°C) without power deration.

For sustained operation above these conditions, derate by 4% per 1,000ft. (300m), and 1% per 10°F (2% per 11°C).



# CUMMINS ENGINE COMPANY LTD. ENGINE DATA SHEET

**ENGINE MODEL: KTA19-G3A**

**STAND\_BY:** 755 BHP @1800r/min  
563 kW  
**PRIME:** 680 BHP @1800r/min  
507 kW

**REFERENCE INFORMATION:**  
**CONFIGURATION..... D193091DX02**  
**CPL NUMBER ..... 4153**  
**PERFORMANCE CURVE NUMBER..... FR-4212**

**GENERAENGINE DATA**

Type.....	4 Cycle , In-line , 6 Cylinder
Aspiration.....	Turbocharged , Aftercooled
Bore— <i>in.</i> ( <i>mm</i> )×stroke— <i>in.</i> ( <i>mm</i> ).....	6.25×6.25 (159×159)
Displacement— <i>in</i> <sup>3</sup> ( <i>L</i> ).....	1150 (19)
Compression Ratio.....	13.9:1
Dry Weight	
Fan Hub to Flywheel Engine — <i>lb</i> ( <i>kg</i> ).....	3725 (1690)
Radiator Cooled Engine — <i>lb</i> ( <i>kg</i> ).....	5900 (2676)
Wet Weight	
Fan Hub to Flywheel Engine — <i>lb</i> ( <i>kg</i> ).....	3880 (1760)
Radiator Cooled Engine — <i>lb</i> ( <i>kg</i> ).....	6300 (2858)
Moment of Inertia of Rotating Components (Excluding Flywheel) — <i>lb<sub>m</sub>.ft<sup>2</sup></i> ( <i>kg•m<sup>2</sup></i> ).....	43 (1.82)
·With FW 4001 Flywheel — <i>kg•m<sup>2</sup></i> ( <i>lb<sub>m</sub>.ft<sup>2</sup></i> ).....	7.16 (170.0)
·With FW 4006 Flywheel — <i>kg•m<sup>2</sup></i> ( <i>lb<sub>m</sub>.ft<sup>2</sup></i> ).....	8.39 (199.0)
C.G. Distance From Front Face of Block— <i>in</i> ( <i>mm</i> ).....	23.6 (598)
C.G. Distance Above Crank Centerline— <i>in</i> ( <i>mm</i> ).....	9 (229)
Maximum Allowable Bending Moment at Rear Face of Block — <i>N•m</i> ( <i>lb.ft</i> ).....	2000 (907)
Firing Order.....	1-5-3-6-2-4

**ENGINE MOUNTING**

Moment of Inertia About Roll Axis — <i>lb.ft<sup>2</sup></i> ( <i>kg•m<sup>2</sup></i> ).....	1876 (79)
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**EXHAUST SYSTEM**

Maximum Allowable Back Pressure (1500/1800 rpm) — <i>in.Hg</i> ( <i>kPa</i> ).....	2.3/3 (7.8/10.2)
Maximum Allowable Back Pressure — <i>in.Hg</i> ( <i>kPa</i> ).....	3 (10)
Exhaust Pipe Size Normally Acceptable — <i>in</i> ( <i>mm</i> ).....	5 (127)

**AIR INDUCTION SYSTEM**

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner	
Clean Element — <i>in.H<sub>2</sub>O</i> ( <i>kPa</i> ).....	15 (3.73)
Clean Element — <i>in.H<sub>2</sub>O</i> ( <i>kPa</i> ).....	15 (3.73)
Intake Air Alarm Temperature (1500/1800 rpm)— <i>°C</i> ( <i>°F</i> ).....	82 (180)

**COOLING SYSTEM**

Coolant Capacity	
After-cooler Only — <i>U.S.Gal</i> ( <i>L</i> ).....	6 (23)
With heat exchanger HX 6076 ( With out explanation tank) — <i>U.S.Gal</i> ( <i>L</i> ).....	53 (199)
With explanation tank & LTA— <i>U.S.Gal</i> ( <i>L</i> ).....	30 (112)
<i>Main Engine Circuit</i>	
Maximum Coolant Friction Heat External to Engine @1800 rpm — <i>PSI</i> ( <i>kPa</i> ).....	10 (68.9)
@1500 rpm — <i>PSI</i> ( <i>kPa</i> ).....	10 (68.9)
Maximum Allowable Air Friction Across radator — <i>in.H<sub>2</sub>O</i> ( <i>kPa</i> ).....	0.5 (0.1)
Minimum Raw Water Flow @ 90°F(32°C) to Heat Exchanger With HX 6076 — <i>GPM</i> ( <i>L/mi</i> 108)	(408.8)



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Maximum Raw Water Inlet Pressure @ Heat Exchanger HX 6076 —PSI(kPa).....	50	(344.7)
Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(°C).....	220/212	(104/100)
Standard Thermostat (modulating) Range— °F(°C).....	180-200	(82-93)
Maximum Allowable Coolant Temperature —°F(°C).....	205	(96.1)
Minimum Coolant Makeup Capacity —U.S.Gal(L).....	1.6	(6.1)
Maximum Raw water Inlet Friction —PSI(kPa).....	10	(254.0)
Minimum Allowable Fill Rate —U.S.GPM(L/min).....	5	(18.9)
Maximum Allowable Initial Fill Time —min.....	5	
Minimum Allowable Coolant Expansion Space —% of System Capacity.....	5	
Maximum Allowable Inlet Coolant Temperature at Limited situation (Stand_by/Prime) —	160/150	(71/66)

**LUBRICATION SYSTEM**

Oil Pressure

@ Idle —PSI(kPa).....	20	(138)
@ Rated Speed —PSI(kPa).....	50-70	(345-483)
Oil Flow at Rated Speed —U.S.GPM(L/min).....	40	(151.4)
Maximum Allowable Oil Temperature —°F(°C).....	250	(121.0)
By-Pass Filter Capacity		
Spin-on Cartridge Type —U.S.Gal(L).....	0.7	(2.6)
Replaceable Element Type —U.S.Gal(L) .....	2.9	(11.0)
Oil Pan Capacity (Option OP4019)		
High —U.S.Gal(L).....	10.0	(37.9)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L).....	22.3	(84.4)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L).....	13.2	(50.0)
Angularly of Standard Oil Pan ( Option OP		
Front Down.....	30°	

**FUEL SYSTEM**

Fuel Injection System..... Cummins PT

Maximum Fuel Consumption at Maximum Rated Output and Speed —lb/h(kg/h).....		
Maximum allowable Restriction to PT Fuel Pump		
With Clean Fuel Filter —in.Hg(kPa).....	4	(13.55)
With Dirty Fuel Filter —in.Hg(kPa).....	9	(30.48)
Maximum Fuel Supply at Rated Power and Speed —lb/h(kg/h).....		
Maximum Allowable Injector Return Line Restriction		
With Check Valves —in.Hg(kPa).....	7	(22)
Less Check Valves —in.Hg(kPa).....	3	(8)
Minimum Allowable Fuel Tank Vent Capability —ft <sup>3</sup> /h (L/h) .....	15	(425)
(With 2.5 in. Hg (63 mm Hg) or Less Back Pressure)		
Starter (Heavy, Anode)—Volt.....		24
Battery Recharge System,Negative ground—A.....		35
Maximum Allowable Resistance of Starting Circuit—Ω.....		0.002
Minimum Recommended Battery Capacity		
·Cold Soak at 50°F(10°C) or Above—0°F CCA.....		600
·Cold Soak at 32~50°F(0~10°C) or Above—0°F CCA.....		640
·Cold Soak at 0~32°F(-18~0°C) or Above—0°F CCA.....		900



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**PERFORMANCE DATA**

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler, not included are alternator, compressor, fan, optional equipment and driven components. Data represents gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions for 29.61 in Hg(100 kPa) barometric pressure[300ft. (90 m) altitude], 77°F (25 °C) inlet air temperature, and 0.30 in. Hg (1kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2. All data is subject to change without notice

	STAND_BY		PRIME	
	60 Hz	50 Hz	60 Hz	50 Hz
Engine Speed r/min.....	1800	1500	1800	1500
Idle Speed r/min.....	675-775	675-775	675-775	675-775
Gross Power Output BHP(kW).....	755(563)	675(504)	680(507)	600(448)
Brake Mean Effective Pressure PSI(kPa).....	287(1978)	308(2125)	258(1781)	274(1889)
Piston Speed ft/min(m/s).....	1870(9.5)	1555(7.9)	1870(9.5)	1555(7.9)
Friction Horsepower BHP(kW).....	83(62)	54(40)	83(62)	54(40)
Intake Air FlowCFM( L/s).....	1517(716)	1226(579)	1455(687)	1126(531)
Exhaust Gas Flow CFM( L/s).....	3945(1862)	3398(1604)	3673(1734)	3039(1434)
Exhaust Gas Temperature °F(°C).....	939(504)	1034(557)	898(481)	1000(538)
Heat Rejection to Ambient BTU/min(kW).....	4522(80)	4108(72)	4050(0)	3645(64)
Heat Rejection to Coolant BTU/min(kW).....	22830(401)	20530(361)	20824(366)	18125(319)
Engine Water Flow L/s(U.S.GPM) @ 3psi.....	196(12.4)	162(10.2)	196(12.4)	162(10.2)

<b>Change Log</b>		
Date	Author	Change Description
2013/6/25	Jiang Li	Release