



CHONGQING CUMMINS ENGINE COMPANY LTD. ENGINE PERFORMANCE CURVE

CONFIGURATION
D233031DX02

ENGINE MODEL: KTA38-G5

CURVE NUMBER: FR-6141

CPL No.: 1543

DATE: 2013/9/17

Displacement: 38L

(2300)

Aspiration: Turbocharged, Aftercooled

RATING

BoreXStroke: 199X159mm

(6.25X6.25 in.)

Fuel System: Cummins PT

Compress Ratio: 13.9:1

No. of Cylinder: V-12

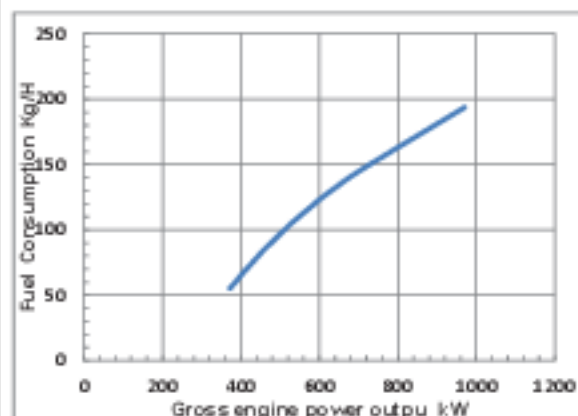
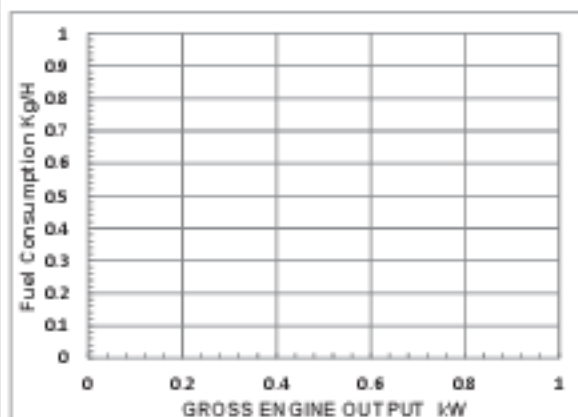
970 kW(1300 BHP)@1500/min

All data is based on the engine operating with fuel system, water pump, and 20 in. H₂O(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						
1500	1300	970	1180	881	880	657

FUEL CONSUMPTION



OUTPUT POWER			CONSUMPTION		BFSC	
%	BHP	kW	Lb/h	Kg/h	g/kWh	Lb/BHP.h
1800RPM						
STANDBY						
100	1300	970	427	194	200	0.329
PRIME						
100	1180	881	382	178	202	0.332
75	885	661	302	137	207	0.341
50	664	496	212	96	194	0.319
25	498	372	122	55	149	0.245
1500RPM						

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 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

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:

1800R PM up to 5,000 ft (1,500m) 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).



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ENGINE MODEL: **KTA38-G5**

STAND_BY: 970 kW
1300 BHP @1500r/min
PRIME: 881 kW
1180 BHP @1500r/min

REFERENCE INFORMATION:
CONFIGURATION.....D233031DX02
CPL NUMBER1543
PERFORMANCE CURVE NUMBER.....FR-6141

GENERAL ENGINE DATA

Type.....	4 Cycle, 60° Vee, 12 Cylind
Aspiration.....	Turbocharged, Aftercooled
Bore—in.(mm)×stroke—in.(mm).....	8.25×8.25 (159×159)
Displacement—in ³ (L).....	2300 (38)
Compression Ratio.....	13.9:1
Dry Weight	
Fan Hub to Flywheel Engine —lb(kg).....	8200 (3719)
Radiator Cooled Engine —lb(kg).....	9625 (4366)
Wet Weight	
Fan Hub to Flywheel Engine —lb(kg).....	8700 (3946)
Radiator Cooled Engine —lb(kg).....	11030 (5003)
Moment of Inertia of Rotating Components (Excluding Flywheel) —lb.ft ² (kg.m ²).....	94 (3.98)
With FW 6001 Flywheel —kg.m ² (lb.ft ²).....	10.46 (248.0)
With FW 6011 Flywheel —kg.m ² (lb.ft ²).....	20.78 (463.0)
C.G. Distance From Front Face of Block—in.(mm).....	31.5 (801)
C.G. Distance Above Crank Centerline—in.(mm).....	11 (279)
Maximum Allowable Bending Moment at Rear Face of Block —N.m(lb.ft).....	2000 (907)
Firing Order.....	1R-6L-6R-2L-3R-4L-6R-1L- 2R-6L-4R-3L

ENGINE MOUNTING

Moment of Inertia About Roll Axis —lb.ft²(kg.m²).....

EXHAUST SYSTEM

Maximum Allowable Back Pressure (1500/1800 rpm) —in.Hg(kPa).....	2.33 (7.8/10.2)
Maximum Allowable Back Pressure —in.Hg(kPa).....	3 (10)
Exhaust Pipe Size Normally Acceptable —in.(mm).....	6 (152)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner

Clean Element —in.H ₂ O(kPa).....	16 (3.73)
Clean Element —in.H ₂ O(kPa).....	16 (3.73)
Intake Air Alarm Temperature (1500/1800 rpm)—°C(°F).....	82 (180)

COOLING SYSTEM

Coolant Capacity

After-cooler Only —U.S.Gal(L).....	8 (23)
With heat exchanger HX 8078 (With out explanation tank) —U.S.Gal(L).....	63 (199)
With explanation tank & LTA—U.S.Gal(L).....	30 (112)

Main Engine Circuit

Maximum Coolant Friction Heat External to Engine @1800 rpm —PSI(kPa).....	10 (68.9)
@1500 rpm —PSI(kPa).....	10 (68.9)
Maximum Allowable Air Friction Across radiator —in.H ₂ O(kPa).....	0.6 (0.1)
Minimum Raw Water Flow @90°F(32°C) to Heat Exchanger With HX 8078 —GPM(L/min).....	108 (408.8)

CHONGQING CUMMINS ENGINE COMPANY LTD.

CHONGQING, CHINA

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<http://www.ccec.easia.cummins.com/~Publish/design/>



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Maximum Raw Water Inlet Pressure @ Heat Exchanger HX 8078 —PSI(kPa).....	60	(344.7)
Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(°C).....	220/212	(104/100)
Standard Thermostat(modulating) Range —°F(°C).....	180-200	(82-69)
Maximum Allowable Coolant Temperature —°F(°C).....	205	(96.1)
Minimum Coolant Makeup Capacity —U.S.Gal(L).....	8.3	(23.8)
Maximum Raw water Inlet Friction —PSI(kPa).....	10	(254.0)
Maximum Raw water Pump Suction —ft.(m).....	15	(4.6)
Maximum Raw water Pump head —ft.(m).....	67	(20.5)
Minimum Allowable Fill Rate —U.S.GPM(L/min).....	5	(18.9)
Maximum Allowable Initial Fill Time —min.....	6	
Minimum Allowable Coolant Expansion Space —% of System Capacity.....	6	
Maximum Allowable Inlet Coolant Temperature at Limited situation (Stand_by/Prime) —° 160/150		(71/68)

LUBRICATION SYSTEM

Oil Pressure

@ Idle —PSI(kPa).....	20	(138)
@ Rated Speed —PSI(kPa).....	45-65	(310-448)
Oil Flow at Rated Speed —U.S.GPM(L/min).....	124	(469.4)
Maximum Allowable Oil Temperature —°F(°C).....	250	(121.0)

By-Pass Filter Capacity

Spin-on Cartridge Type —U.S.Gal(L).....	2 X 0.7	(2 X 2.6)
Replaceable Element Type —U.S.Gal(L).....	2 X 2.9	(2 X 11.0)

Oil Pan Capacity (Option OP802-4)

High —U.S.Gal(L).....	40.0	(151.4)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L).....	46.0	(170.3)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L).....	35.7	(135.1)

Angularity of Standard Oil Pan (Option OP8

Front Down.....	30°	
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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	(13.56)
With Dirty Fuel Filter —in.Hg(kPa).....	10	(33.86)

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 —ft³/h (L/h)..... 16 (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.....	1200	
—Cold Soak at 32~50°F(0~10°C) or Above—0°F CCA.....	1280	
—Cold Soak at 0~32°F(-18~0°C) or Above—0°F CCA.....	1800	

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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 to 29.81 in Hg(100 kPa) barometric pressure(300ft. (90 m) altitude), 77°F (25 °C) inlet air temperature, and 0.30 in. Hg (1k Pa) 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.....		1500		1500
Idle Speed r/min.....		725-775		725-775
Gross Power Output BHP(kW).....		1300(970)		1180(881)
Brake Mean Effective Pressure PSI(kPa).....		297(20.46)		289(19.67)
Piston Speed ft/min(m/s).....		1655(7.9)		1655(7.9)
Friction Horsepower BHP(kW).....		115(86)		115(86)
Intake Air Flow CFM(L/s).....		2570(1213)		2415(1140)
Exhaust Gas Flow CFM(L/s).....		7005(3308)		6485(3051)
Exhaust Gas Temperature °F(°C).....		955(513)		930(499)
Heat Rejection to Ambient BTU/min(kW).....		7820(138)		7135(125)
Heat Rejection to Coolant BTU/min(kW).....		33800(594)		30880(539)
Engine Water Flow L/s(U.S.GPM) @ 4psi.....		310(19.8)		310(19.8)

Change Log

Date	Author	Change Description
2013/6/25	Jiang Li	Release
2013/9/17	Jiang Li	Added continuous power rating