CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE PERFORMANCE CURVE

CONFIGURATION	ENGINE MODEL:	DATA SHEET:	CPL No.:
D233042GX03	QSK38-G5A	FR 549	3573
			DATE: 2019/8/19

Displacement:	37.7L	(2301 in^3)	Aspiration:	Turbocharged & LTA
BoreXStroke:	159X159mm	(6.25X6.25 in.)	Fuel System:	Cummins MCRS
Compress Ratio:	15:1		Emission:	CS III

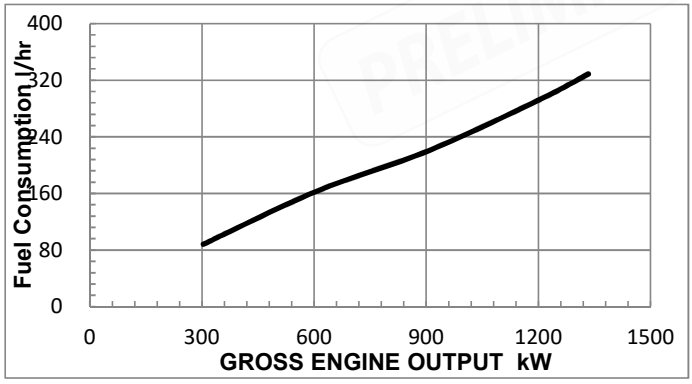
RATING
STANDBY: 1334 kW(1788 HP)@1500 RPM
PRIME: 1212 kW(1624 HP)@1500 RPM

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler; 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	STANDBY POWER		PRIME POWER		CONTINUOUS POWER	
rpm	BHP	kW	BHP	kW	BHP	kW
1500	1788	1334	1624	1212	1250	933
-	-	-	-	-	-	-

FUEL CONSUMPTION



OUTPUT POWER			FUEL CONSUMPTION			
%	BHP	kW	kg/ kWm-h	lb/ bhp-h	l/hr	Gal/ hr
			1500RPM			
STNADBY						
100	1788	1334	211	0.354	329	87
PRIME						
100	1624	1212	208	0.349	295	78
75	1218	909	208	0.349	221	59
50	812	606	230	0.386	163	43
25	406	303	250	0.419	88	23
CONTINUOUS						
100	1250	933	208	0.349	227	60

Curves shown above represent gross engine performance capabilites 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 or a fuel corresponding to ASTM D2.

DATA STATUS: Development

TECHNICAL DATA DEPT. CERTIFIED WITHIN 5% CHIEF ENGINEER

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been foumulated 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 appliacations.

STANDBY POWER RATING is appliable 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 shouled 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 capablility is available for aperiod 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, theat 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 Temperatrue And Altitude:

The engine may be operated at:

1500RPM 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(S): QSK38-G5A

STAND_BY: 1334 kW(1788 HP)@1500 RPM

PRIME: 1212 kW(1624 HP)@1500 RPM

REFERENCE INFORMATION:

CONFIGURATION	**D233042GX03**
CPL NUMBER	**3573**
DATA SHEET	**FR 549**
DATE	**2019/8/19**

GENERAL ENGINE DATA

Type	Four cycle; Vee; 12 Cylinder	
Aspiration	Turbocharged & LTA	
Bore—in.(mm)×stroke—in.(mm)	6.25×6.25	(159×159)
Displacement—in^3(L)	2301	(37.7)
Compression Ratio	15:1	
Moment of Inertia of Rotating Components		
·With FW 6074 Flywheel —in-lbf-sec^2($kg•m^2$)	93	(10.4)
·With FW 6077 lywheel —in-lbf-sec^2($kg•m^2$)	184	(20.8)
C.G. Distance From Rear Face of block —in(mm)	31.5	(801)
C.G. Distance Above Crank Centerline—in(mm)	6.8	(173)
Maximum Static Loading at Rear Main Bearing —lb(kg)	2000	(907)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block—lb.ft(N•m)	4500	(6101)

EXHAUST SYSTEM

Maximum Allowable Back Pressure —in.Hg(kPa)	2	(7)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner		
Dirty Element —in.H_2O(kPa)	25	(6.2)
Clean Element —in.H_2O(kPa)	15	(3.7)

COOLING SYSTEM

Jacket Water Circuit Requirements

Coolant Capacity		
Engine Only —quarts(L)	112	(106)
After-cooler Only —quarts(L)	24	(22.7)
Minimum Allowable Pressure Cap @ sea level— PSI(kPa)	11	(76)
Maximum Static Head of Coolant Above Engine Crank Centerline —ft.(m)	60	(18.3)
Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(℃)	220/212	(104/100)
Standard Thermostat (modulating) Range— °F(℃)	180-202	(82-94)
Maximum Coolant Friction Heat External to Engine @1500/1800 rpm —PSI(kPa)	10/10	(68.9/68.9)

Aftercooler Circuit Requirements

Maximum Coolant Friction Heat External to Engine @1500/1800 rpm —PSI(kPa)	10/10	(68.9/68.9)
Maximum coolant temperature into the aftercooler @ 25℃ (77°F) ambient —°F(℃)	120	(49)
Maximum coolant temperature into the aftercooler @ Limiting Ambient conditions for Standby/Prime power —°F(℃)	160/150	(71/66)
Thermostat (Modulating) Range — °F(℃)	115-135	(46-57)

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LUBRICATION SYSTEM

Oil Pressure		
@Minimum low idle —PSI(kPa)	20	(138)
@ Rated Speed —PSI(kPa)	50-70	(344.7-482.6)
Maximum Allowable Oil Temperature —°F(℃)	248	(120)
Oil Capacity with OP 6125 Oil Pan: Low-High —U.S.Gal(L)	37-44	(140.1-166.6)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L)	45	(170.3)

FUEL SYSTEM

Fuel Injection System	Cummins MCRS	
Maximum fuel supply restriction at fuel pump inlet		
with clean fuel filter element(s) at maximum fuel flow —in.Hg(kPa)	5	(16.9)
with dirty fuel filter element(s) at maximum fuel flow —in.Hg(kPa)	10	(34)
Maximum fuel inlet temperature —°F(℃)	160	(71)
Maximum supply fuel flow — U.S.Gal/h(L/h)	159	(602)
Maximum return fuel flow — U.S.Gal/h(L/h)	94	(356)

ELECTRICAL SYSTEM

System Voltage —Volt		24
Minimum Recommended Battary Capacity		
·Cold Soak at 50°F(10℃) and Above — CCA		
·Cold Soak at 32~50°F(0~10℃) — CCA		1800
·Cold Soak at 0~32°F(-18~0℃) — CCA		
Maximum Allowable Resistance of Starting Circuit—Ω		0.002

COLD START CAPABILITY

Minimum Cranking Speed for Unaided Cold Start — RPM		150
Minimum Ambient Temperature for Unaided Cold Start — °F(℃)	45	(7)

PERFORMANCE DATA

All data is based on: • 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.

- Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
- ISO 3046, Part 1, Standard Reference Conditions of:

Barometric pressure： 29.53 in Hg(100 kPa) Inlet air temperature： 77°F (25°C)

Stability at Any Invariablenes 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) —dBa	99.4
Exhaust Noise at Rated 1 m Horizontally From Centerline of Exhaust Pipe Outlet Upwards at 45° —dBA	96.3

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	Standby Power		Prime Power	
		50 Hz		50 Hz
Engine Speed r/min		1500		1500
Engine Idle Speed r/min		700-900		700-900
Gross Engine PowerOutput BHP(kW)		1,782(1,334)		1,641(1,212)
Brake Mean Effective Pressure PSI(kPa)		407 (2,807)		327(2,255)
Piston Speed ft/min(m/s)		1,870 (9.5)		1,870 (9.5)
Friction Horsepower BHP(kW)		115 (86)		115 (86)
Engine Jacket Coolant Flow at Stated Friction Head external to Engine:				
• 5 psi-2.5 psi FrictionHead U.S.GPM(L/min)		274 (1,037)		274 (1,037)
• Maximum Friction Head U.S.GPM(L/min)		209 (791)		209 (791)
Engine Data				
Intake Air Flow CFM(L/s)		3,683(1,738)		3,519(1,660)
Exhaust Gas Temperature - DryStack °F(℃)		995(535)		977(535)
Exhaust Gas Flow CFM(L/s)		9,033(4,263)		8,638(4,077)
Air to Fuel ratio		23.34		23.8
Heat Rejection to Ambient BTU/min(kW)		7,422(130)		6,828(119)
Heat Rejection to Jacket Coolant BTU/min(kW)		2,7661(486)		26,040(457)
Heat Rejection to Exhaust BTU/min(kW)		54,623(960)		5,1061(898)
Heat Rejection to Fuel BTU/min(kW)		379 (6.7)		379 (6.7)
2 P 2 L				
Heat Rejection to Aftercooler Coolant BTU/min(kW)		19,820(348)		17,940(314)
Aftercooler Coolant Flow at Stated Friction Head External to Engine:				
• 2 psi-2.5 psi Friction Head U.S.GPM(L/min)		137 (519)		137 (519)
• Maximum Friction Head U.S.GPM(L/min)		116 (439)		116 (439)