Emergency Standby Ratings for Application in Corporate Generator Sets Only

<table>
<thead>
<tr>
<th>Engine Speed</th>
<th>Standby Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPM</td>
<td>kWm</td>
</tr>
<tr>
<td>1500</td>
<td>1089</td>
</tr>
</tbody>
</table>

Engine Performance Data @ 1500 RPM:

<table>
<thead>
<tr>
<th>OUTPUT POWER</th>
<th>FUEL CONSUMPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>% kWm</td>
<td>BHP</td>
</tr>
<tr>
<td>STANDBY POWER</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>1089</td>
</tr>
<tr>
<td>75</td>
<td>817</td>
</tr>
<tr>
<td>50</td>
<td>545</td>
</tr>
<tr>
<td>25</td>
<td>272</td>
</tr>
</tbody>
</table>

Power Derate Curve @ 1500 RPM:

Operation At Elevated Temperature and Altitude:
For sustained operation above these conditions, derate by an additional 4% per 300 m (1000 ft), and 10% per 10° C (5.5% per 10 deg F).

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 70% average load factor and 200 hours of operation per year. This includes less than 5 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.

Data Status: Pre-Production
Data Tolerance:

Chief Engineer:
GENERAL ENGINE DATA

Type: 4-Cycle; 60° Vee; 12-Cylinder Diesel
Aspiration: Turbocharged and Aftercooled

Bore x Stroke: 159 x 159 (6.25 x 6.25) mm x mm (in x in)
Displacement: 2300 (37.8) litre (in³)
Compression Ratio: 13.9 : 1

Dry Weight
- Fan to Flywheel Engine: 4300 (9482) kg (lb)
- Fan to Flywheel Engine: 4536 (10002) kg (lb)

Wet Weight
- Fan to Flywheel Engine: 4300 (9482) kg (lb)
- Fan to Flywheel Engine: 4536 (10002) kg (lb)

Moment of Inertia of Rotating Components
- with FW 6001 Flywheel: 10.4 (248) kg • m² (lb • ft²)
- with FW 6011 Flywheel: 20.8 (493) kg • m² (lb • ft²)
Center of Gravity from Front Face of Block: 980 (38.6) mm (in)
Center of Gravity Above Crankshaft Centerline: 279 (11) mm (in)
Maximum Static Loading at Rear Main Bearing: 908 (2000) kg (lb)

ENGINE MOUNTING
Maximum Bending Moment at Rear Face of Block: 6100 (4500) N • m (lb • ft)

EXHAUST SYSTEM
Maximum Back Pressure at 1500 RPM (Standby Power): 76 (3) mm Hg (in Hg)

AIR INDUCTION SYSTEM
Maximum Intake Air Restriction
- with Dirty Filter Element: 6.2 (25) kPa (in H₂O)
- with Clean Filter Element: 3.7 (15) kPa (in H₂O)

COOLING SYSTEM
Coolant Capacity
- Engine only: 124 (32.7) litre (US gal)
- with HX 6076 Heat Exchanger: 199 (52.7) litre (US gal)
Minimum Pressure Cap (for Cooling Systems with less than 2m [6 ft.] Static Head): 69 (10) kPa (psi)
Maximum Static Head of Coolant Above Engine Crank Centerline: 18.3 (60) ft
Thermostat (Modulating) Range: 82-93 (180-200) °C (°F)
Maximum Coolant Friction Head External to Engine — 1500 rpm: 48 (7) kPa (psi)
Maximum Top Tank Temperature for Standby: 104 (220) °C (°F)
Maximum Raw Water Flow @ 90 F to HX6076 Heat Exchanger: 409 (108) liter/min (US gpm)
Maximum Raw Water Inlet Pressure at HX 6076 Heat Exchanger: 345 (50) kPa (psi)

LUBRICATION SYSTEM
Oil Pressure @ Idle Speed: 138 (20) kPa (psi)
@ Governed Speed: 310-448 (45-65) kPa (psi)
Maximum Oil Temperature: 121 (250) °C (°F)
Oil Capacity with OP6023 Oil Pan: Low - High: 114-87 (30-23) litre (US gal)
Total System Capacity (with Combo Filter): 135 (35.7) litre (US gal)
**FUEL SYSTEM**

Type Injection System ................................................................. Direct Injection Cummins PT

Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter.......................... — mm Hg (in Hg) 102 (4.0)
— with Dirty Fuel Filter ................................................................ — mm Hg (in Hg) 203 (8.0)

Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — mm Hg (in Hg) 165 (6.5)

Maximum Fuel Inlet Temperature ........................................................... — °C (°F) 70 (160)

Maximum Fuel Flow to Injection Pump ................................................................ — litre/hr (US gph) 428 (113)

**ELECTRICAL SYSTEM**

Cranking Motor (Heavy Duty, Positive Engagement). ...................................................... — volt 24

Battery Charging System, Negative Ground ................................................................ — ampere 35

Maximum Allowable Resistance of Cranking Circuit ............................................. — ohm .002

Minimum Recommended Battery Capacity
- Cold Soak @ 10 °C (50 °F) and Above ................................................................. — 0°F CCA 1200
- Cold Soak @ 0 °C to 10 °C (32 °F to 50 °F) ....................................................... — 0°F CCA 1280
- Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F) ........................................................ — 0°F CCA 1800

**COLD START CAPABILITY**

Minimum Ambient Temperature for Unaided Cold Start to Idle Speed .................. — °C (°F) 7 (45)

Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature).............. — °C (°F) 10 (50)

**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

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

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**STANDBY POWER**

<table>
<thead>
<tr>
<th>Data</th>
<th>50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governed Engine Speed</td>
<td>725-775</td>
</tr>
<tr>
<td>Engine Idle Speed</td>
<td>1500</td>
</tr>
<tr>
<td>Gross Engine Power Output</td>
<td>1089 (1460)</td>
</tr>
<tr>
<td>Brake Mean Effective Pressure</td>
<td>2296 (333)</td>
</tr>
<tr>
<td>Piston Speed</td>
<td>7.9 (1562)</td>
</tr>
<tr>
<td>Friction Horsepower</td>
<td>86 (115)</td>
</tr>
<tr>
<td>Engine Jacket Water Flow at Stated Friction Head External to Engine:</td>
<td></td>
</tr>
<tr>
<td>• 4 psi Friction Head</td>
<td>19.6 (310)</td>
</tr>
<tr>
<td>• Maximum Friction Head</td>
<td>17.7 (280)</td>
</tr>
</tbody>
</table>

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**Engine Data**

Intake Air Flow ................................................................ — litre/s (cfm) 1309 (2775)

Exhaust Gas Temperature ................................................................ — °C (°F) 529 (985)

Exhaust Gas Flow ................................................................ — litre/s (cfm) 3540 (7500)

Air to Fuel Ratio ................................................................ — air : fuel 24.8:1

Radiated Heat to Ambient ................................................................ — kWm (BTU / min) 154 (8764)

Heat Rejection to Engine Jacket Radiator ................................................................ — kWm (BTU / min) 672 (38243)

Heat Rejection to Exhaust ................................................................ — kWm (BTU / min) 652 (37082)

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

Cummins Inc. Columbus, Indiana 47202-3005

ENGINE MODEL : KTA38-G9
DATA SHEET : DS-6454
DATE : 12May04
CURVE NO. : FR-6454