



# Engine Performance Data

Industrial  
**QSM11**  
 FR20019

**350 BHP (261 kW) @ 2000 RPM**  
**1,350 lb-ft (1,830 N-m) @ 1400 RPM**

Configuration  
**D353020CX03**

CPL Code  
**8544**

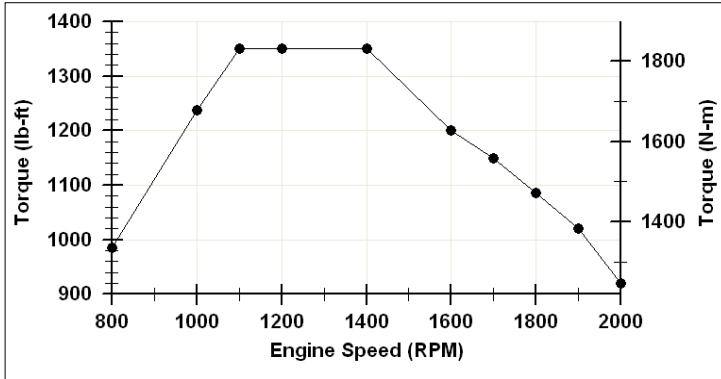
Revision  
**20-Apr-2006**

Compression Ratio: **16.3:1**  
 Fuel System: **Celect Electronic**  
 Emission Certification: **U.S. EPA Tier 3, CARB Tier 3, EU Stage IIIA**

Displacement: **660 in3 (10.8 L)**  
 Aspiration: **Turbocharged and Charge Air Cooled**

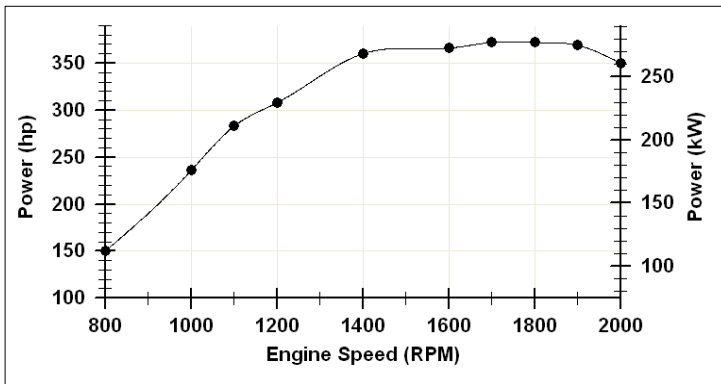
All data is based on the engine operating with fuel system, water pump, and 15 in H<sub>2</sub>O (3.733 kPa) inlet air restriction with 6 in (152 mm) inner diameter, and with 2 in Hg (7 kPa) exhaust restriction with 5 in (127 mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolants as 50% ethylene glycol/50% water. All data is subject to change without notice.

### Rating Type: Intermittent



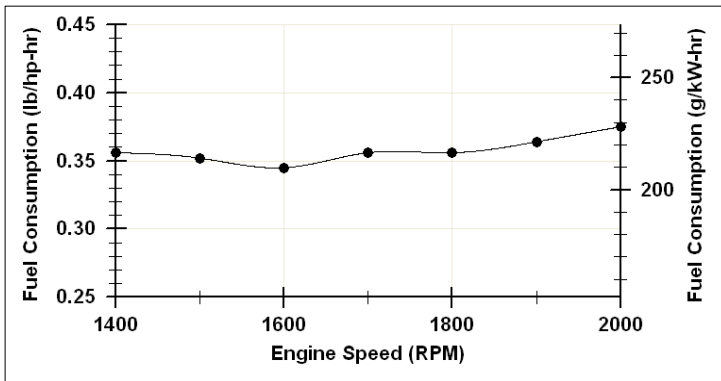
### Torque Output

RPM	lb-ft	N-m
800	985	1,335
1,000	1,238	1,679
1,100	1,350	1,830
1,200	1,350	1,830
1,400	1,350	1,830
1,600	1,200	1,627
1,700	1,150	1,559
1,800	1,086	1,472
1,900	1,021	1,384
2,000	919	1,246



### Power Output

RPM	hp	kW
800	150	112
1,000	236	176
1,100	283	211
1,200	308	230
1,400	360	268
1,600	366	273
1,700	372	277
1,800	372	277
1,900	369	275
2,000	350	261



### Fuel Consumption

RPM	lb/hp-hr	g/kW-hr
1,400	0.356	217
1,500	0.352	214
1,600	0.345	210
1,700	0.356	217
1,800	0.356	217
1,900	0.364	221
2,000	0.375	228

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with SAE J1995 conditions of 29.61 in Hg (100 kPa) barometric pressure [300ft (91m) altitude] 77 deg F (25 deg C) inlet air temperature, and 0.30 in Hg (1kPa) water vapor pressure with No. 2 diesel fuel. The engine may be operated up to 12,000 ft (3,658 m) altitude before electronic derate is applied.

### STATUS FOR CURVES AND DATA: Final

TOLERANCE: Within +/- 5 %

**Intake Air System**

Maximum allowable air temperature rise over ambient at Intake Manifold (Naturally Aspirated Engines) or Turbo Compressor inlet (Turbo-charged Engines): (This parameter impacts emissions, LAT and/or altitude capability)	30 delta deg F	16.7 delta deg C
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**Charge Air Cooling System**

Maximum intake manifold temperature at 25 deg C (77 F) ambient	140 deg F	60 deg C
Maximum allowable pressure drop across charge air cooler and OEM CAC piping (IMPD):	3.1 in-Hg	10 kPa
Maximum Intake Manifold Temperature Differential (Ambient to IMT) (IMTD):	63 delta deg F	35 delta deg C
Intake manifold temperature for Fan-ON	140 deg F	60 deg C
Maximum coolant temperature for engine protection controls	218 deg F	103 deg C
Maximum coolant operating temperature at engine outlet (max. top tank temp):	215 deg F	102 deg C

**Exhaust System**

Maximum exhaust back pressure:	3 in-Hg	10.1 kPa
Recommended exhaust piping size (inner diameter):	5 in	127 mm

**Lubrication System**

Nominal operating oil pressure		
@ minimum low idle	15 psi	103 kPa
@ maximum rated speed	35 psi	241 kPa
Minimum engine oil pressure for engine protection devices		
@ minimum low idle	10 psi	69 kPa

**Fuel System**

Fuel cooling requirements (with diesel fuel)		
Maximum heat rejection to return fuel at max. coolant and inlet fuel temperature:	250 BTU/min	4.4 kW
@ fuel return flow rate of:	558 lb/hr	253 kg/hr
@ fuel return temperature prior to cooler:	200 deg F	93 deg C
Maximum supply fuel flow:	572 lb/hr	259 kg/hr
Maximum return fuel flow:	558 lb/hr	253 kg/hr
Engine fuel compatibility (consult Service Bulletin #3379001 for appropriate use of other fuels)	DF1, DF2	
Maximum fuel inlet pressure:	10 psi	69 kPa

**Performance Data**

Maximum low idle speed:	1,200 RPM
Minimum low idle speed:	600 RPM
Minimum engine speed for full load sustained operation:	1,600 RPM

	Rated Power		Maximum Power		Torque Peak	
Engine Speed	2,000 RPM		1,800 RPM		1,400 RPM	
Output Power	350 hp	261 kW	372 hp	277 kW	360 hp	268 kW
Torque	919 lb-ft	1,246 N-m	1,086 lb-ft	1,472 N-m	1,350 lb-ft	1,830 N-m
Friction Horsepower	56 hp	42 kW	45 hp	33 kW	28 hp	21 kW
Intake Manifold Pressure	51 in-Hg	171 kPa	52 in-Hg	175 kPa	52 in-Hg	177 kPa
Turbo Comp. Outlet Pressure	54 in-Hg	182 kPa	55 in-Hg	184 kPa	54 in-Hg	182 kPa
Turbo Comp. Outlet Temperature	329 deg F	165 deg C	330 deg F	166 deg C	347 deg F	175 deg C
Inlet Air Flow	900 ft <sup>3</sup> /min	425 L/s	837 ft <sup>3</sup> /min	395 L/s	682 ft <sup>3</sup> /min	322 L/s
Charge Air Flow	66 lb/min	30 kg/min	61 lb/min	28 kg/min	50 lb/min	22 kg/min
Exhaust Gas Flow	2,317 ft <sup>3</sup> /min	1,094 L/s	2,251 ft <sup>3</sup> /min	1,062 L/s	1,968 ft <sup>3</sup> /min	929 L/s
Exhaust Gas Temperature	955 deg F	513 deg C	992 deg F	533 deg C	1,112 deg F	600 deg C
Maximum Fuel Flow to Pump	433 lb/hr	196 kg/hr	364 lb/hr	165 kg/hr	256 lb/hr	116 kg/hr
Heat Rejection to Coolant	5,898 BTU/min	103.71 kW	6,060 BTU/min	106.56 kW	5,906 BTU/min	103.85 kW
Heat Rejection to Fuel	233 BTU/min	4.1 kW	235 BTU/min	4.13 kW	234 BTU/min	4.11 kW
Heat Rejection to Ambient	1,424 BTU/min	25.04 kW	1,515 BTU/min	26.64 kW	1,401 BTU/min	24.64 kW
Heat Rejection to Exhaust	15,581 BTU/min	273.98 kW	14,824 BTU/min	260.67 kW	13,545 BTU/min	238.18 kW
**Steady State Smoke	0.87 Bosch		0.67 Bosch		0.33 Bosch	

\*\*When operating Naturally Aspirated engines above SAE J1995 conditions, it should be noted that smoke levels will increase due to combustion inefficiencies associated with a reduction in the air to fuel mixture.

**Cranking System (Cold Starting Capability)**

## Unaided Cold Start:

Minimum cranking speed:	110 RPM	
Minimum ambient temperature for unaided cold start	10 deg F	-12.2 deg C
Cranking torque at minimum unaided cold start temperature:	215 lb-ft	292 N-m

## Aided Cold Start:

Minimum ambient temperature with Grid Heater only	-10 deg F	-23 deg C
Minimum ambient temperature with Ether only:	-10 deg F	-23 deg C
Minimum ambient temperature with coolant and lube heater only:	0 deg F	-18 deg C

Cold starting aids available

Ether, Intake Manifold Heater, Block Heater, Oil Pan Heater

**Noise Emissions**

Top	98.2 dBa
Right Side	101 dBa
Left Side	100.9 dBa
Front	101.5 dBa
Exhaust noise emissions	121.5 dBa

Estimated Free Field Sound Pressure Level at 3.28ft (1m) and Full-Load Governed Speed  
(Excludes Noise from Intake, Exhaust, Cooling System and Driven Components)

**End of Report**