G16CM34 Gas Petroleum Engine

6100 bkW (8180 bhp)
750 rpm

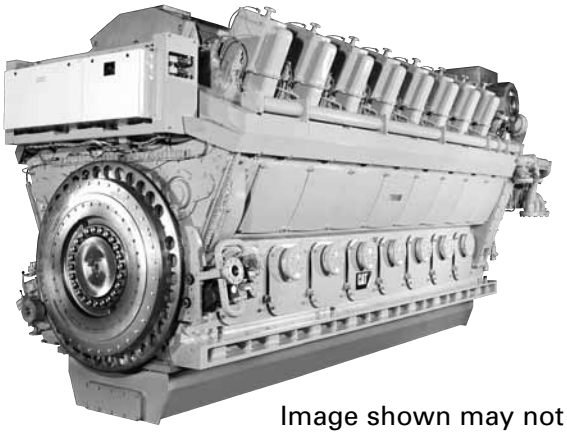


Image shown may not reflect actual engine

CAT® ENGINE SPECIFICATIONS

V-16, 4-Stroke-Cycle

Emissions	U.S. EPA SI NSPS 2007
Displacement	610 L (37,209 in^3)
Rated Speed Turndown	450 rpm
Bore	340 mm (13.38 in)
Stroke	420 mm (16.54 in)
Effective Compression Ratio	11.4:1
Aspiration	Turbocharged-2 Stage Aftercooled
Governor and Protection	Electronic (ADEM™ A3)
Engine Weight, net dry (approx)	82 000 kg (181,000 lb)
Power Density	13.44 kg/bkW (22.1 lb/bhp)
Power per Displacement	10 bkW/L (0.22 bhp/in^3)
Capacity for Liquids*	
Lube Oil System	3157 L (834 U.S. gal)
HT Cooling Water System	2343 L (619 U.S. gal)
LT Cooling Water System	651 L (172 U.S. gal)
Oil Change Interval	7500 hours
Mean Piston Speed	10.7 m/s (34.6 ft/s)
Mean Effective Pressure	16 bar (232 psi)
Swept Volume of Cylinder	38.1 L (2325 in^3)
Rotation per ISO 1204	Counterclockwise
Flywheel Teeth	408

*Volumes provided are the engine manufacturer's scope of supply and do not include volume needed for interconnecting lines, coolers etc.

FEATURES

Technical Description

The G16CM34 is a natural gas, spark ignited, V-style, turbocharged and aftercooled engine that provides: low emissions, high efficiency, high reliability, high flexibility, constant torque and variable speed.

The engine achieves high efficiency and low emissions by utilizing solenoid operated gas admission valves, enriched pre-chamber design, and Cat® ADEM A3 control technology.

Cylinder Block

- One-piece design for strength and rigidity
- Underslung crankshaft reduces weight and provides easy access to bearings for service
- Cooling water-free cylinder block offers reduced repair times and increased strength
- Crankcase pressure relief devices
- Designed for block or skid mounting

Cylinder Head

- Individual cylinder heads with two inlet and two exhaust valves per cylinder
- Watercooled exhaust seats to increase life
- Nitrided valves with automatic rotators

Fuel System

- Lean burn combustion system with independent fuel control for main chamber and prechamber
- Inlet pressure range is 50 to 87 psig
- Solenoid operated gas admission valve (SOGAV) on each cylinder to control fuel injection

Exhaust Gas System

- Two front-mounted (non-flywheel end) turbochargers designed for constant pressure supercharging
- Variable geometry turbochargers will provide optimal air-fuel ratio control through a wide operating range by controlling its own manifold pressure
- Exhaust gas pipe manifold with one expansion joint per cylinder; connection allows easy maintenance and quick cylinder head removal

Flywheels & Flywheel Housings

A flywheel with starting ring gear is shipped mounted, cover/guard not included.

Drive Coupling

A torsionally elastic high damping steel spring coupling is provided. The TVA study with up to eight compressor load cases is included.

FEATURES (continued)

Starting System
Equipped with turbine-type air starters (TDI) uses compressed air or natural gas for engine starting; 1034 kPa (150 psi) minimum air pressure. Rear mounted.

Cooling/Lube Oil System
The engine includes an auxiliary skid that combines the cooling system and lubrication system functions. The standard cooling system separates the High Temperature (HT — includes JW) circuit from the Low Temperature (LT — includes 2nd stage of aftercooler) circuit. Thermostatic valves are included for each circuit.

Two-stage charge air cooler splits heat load between the HT and LT circuit, reducing the heat load to the LT system, minimizing cooler costs.

The lube oil system includes a duplex filter, plate and frame oil cooler, an engine-mounted gear-driven lubrication pump, and an electric motor-driven pre/post-lubricating pump. A pneumatically actuated thermostatic valve (controlled by the engine control panel) controls the lube oil temperature.

All components mounted on a single base-plate with drip pan for pollution control. Interconnecting pipe between engine and cooling water/lube oil skid are by customer. Motor controls are by customer.

Engine Controls and Instrumentation
The engine utilizes the ADEM A3 engine management system for speed regulation, individual cylinder detonation control, closed loop air/fuel ratio control, engine monitoring and protection.

Electronically controlled pneumatic actuated valves control the main and pilot fuel gas pressure.

System also includes an operator interface for displaying operating parameters and system messages. This system includes a local control panel with PLC for additional engine management and protection. Protection provided by this system includes:

- Engine control panel with PLC and operator control interface
- Floor-standing enclosure with window kit for touch screen
- Supplied local control panel includes space to incorporate compressor PLC, which can be displayed on same screen

Crankcase Ventilation Systems
- Design includes multi-stage oil remover with metal elements and paper filter
- Capacity — 340 m^3/h (200 scfm)

Painting
The engine is painted Cat yellow, other colors can be provided. Caterpillar Motoren's standard paint system will be used.

Testing
Each engine is factory tested before shipment from Kiel, Germany. Test reports will be provided as part of the standard documentation.

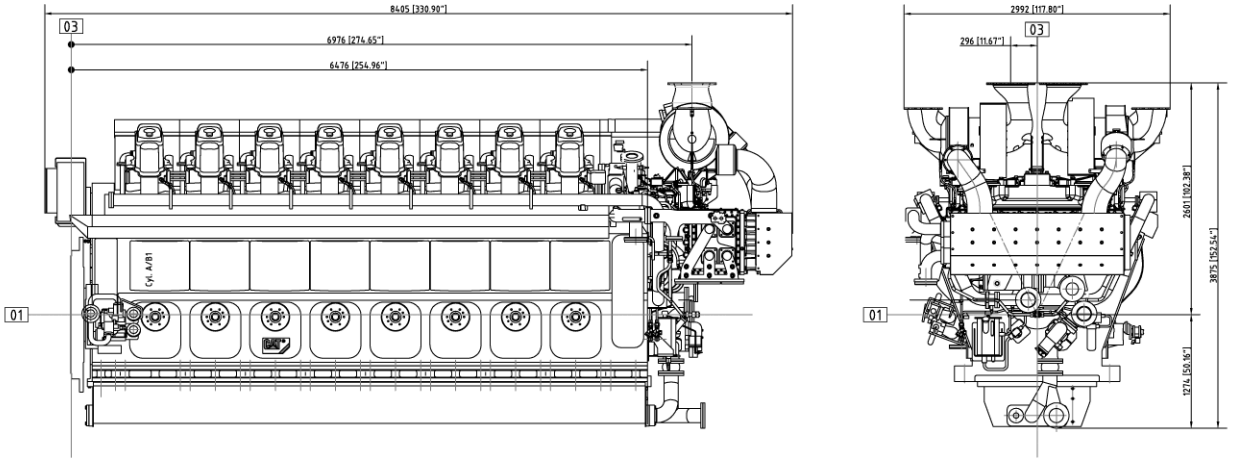
TECHNICAL DATA

G16CM34 Gas Petroleum Engine — 750 rpm

Fuel System		0.7 g NOx Setting G16CM34	0.5 g NOx Setting G16CM34
Engine Power			
@ 100% Load	bkW (bhp)	6100 (8180)	6100 (8180)
@ 75% Load	bkW (bhp)	4575 (6135)	4575 (6135)
Engine Speed	rpm	**750**	**750**
Aftercooler Temperature	°C (°F)	44 (111)	44 (111)
Compression Ratio		11.4:1	11.4:1
Emissions (NTE)*			
NOx	g/bkW-hr (g/bhp-hr)	0.94 (0.70)	0.67 (0.50)
CO	g/bkW-hr (g/bhp-hr)	2.68 (2.00)	3.35 (2.50)
Total Hydrocarbons	g/bkW-hr (g/bhp-hr)	8.05 (6.00)	8.72 (6.50)
Fuel Consumption			
@ 100% Load	MJ/bkW-hr (Btu/bhp-hr)	8.15 (5759)	8.26 (5839)
@ 75% Load	MJ/bkW-hr (Btu/bhp-hr)	8.74 (6173)	8.82 (6234)
Heat Balance			
Heat Rejection to Jacket Water			
@ 100% Load	bkW (Btu/min)	865.3 (49,210)	865.3 (49,210)
@ 75% Load	bkW (Btu/mn)	649.0 (36,910)	649.0 (36,910)
Heat Rejection to Atmosphere			
@ 100% Load	bkW (Btu/min)	288.2 (16,390)	288.2 (16,390)
@ 75% Load	bkW (Btu/min)	216.3 (12,300)	216.3 (12,300)
Heat Rejection to Aftercooler			
Stage 1			
@ 100% Load	bkW (Btu/min)	1237.4 (70,370)	1237.4 (70,370)
@ 75% Load	bkW (Btu/min)	928.1 (52,780)	928.1 (52,780)
Stage 2			
@ 100% Load	bkW (Btu/min)	577.3 (32,830)	577.3 (32,830)
@ 75% Load	bkW (Btu/min)	433.1 (24,630)	433.1 (24,630)
Heat Rejection to Lube Oil Cooler	bkW (Btu/min)	992 (56,414)	992 (56,414)
Exhaust System			
Exhaust Gas Flow Rate			
@ 100% Load	m^3/min (cfm)	544.7 (19,237)	557.4 (19,685)
@ 75% Load	m^3/min (cfm)	409.5 (14,460)	418.5 (14,778)
Exhaust Stack Temperature			
@ 100% Load	°C (°F)	350 (662)	345 (653)
@ 75% Load	°C (°F)	390 (734)	380 (716)
Intake System			
Air Inlet Flow Rate			
@ 100% Load	m^3/min (scfm)	519.7 (18,352)	532.0 (18,787)
@ 75% Load	m^3/min (scfm)	389.3 (13,748)	398.1 (14,059)
Gas Pressure	kPag (psig)	414 (60)	414 (60)

*at 100% load

DIMENSIONS



DIMENSIONS		
Length	mm (in)	8405 (331)
Width	mm (in)	2992 (118)
Height	mm (in)	3875 (153)
Shipping Weight	kg (lb)	82,000 (181,000)

Note: General configuration not to be used for installation.

Dimensions are in mm (inches).

RATING DEFINITIONS AND CONDITIONS

Engine performance is obtained in accordance with SAE J1995, ISO3046/1, BS5514/1, and DIN6271/1 standards.

Transient response data is acquired from an engine/generator combination at normal operating temperature and in accordance with ISO3046/1 standard ambient conditions. Also in accordance with SAE J1995, BS5514/1, and DIN6271/1 standard reference conditions.

Conditions: Power for gas engines is based on fuel having an LHV of 33.74 kJ/L (905 Btu/cu ft) at 101 kPa (29.91 in Hg) and 15°C (59°F). Fuel rate is based on a cubic meter at 100 kPa (29.61 in Hg) and 15.6°C (60.1°F). Air flow is based on a cubic foot at 100 kPa (29.61 in Hg) and 25°C (77°F). Exhaust flow is based on a cubic foot at 100 kPa (29.61 in Hg) and stack temperature.