

Cummins Technical Operations



ENGINE MODEL: 6BTAA5.9-C205

CURVE & DATASHEET: FR93241

REV 00 20JAN2010



Industrial Engine Performance Data

Basic Engine Model:
6BTAA5.9-C205

205 BHP (153kW) @ 2200 RPM
870 N-m @ 1400 RPM

FR93241

Configuration
D403042CX02

CPL Code
3536

Revision
2010-1-20

Compression Ratio: **17.3:1**

Bore: **102 mm**

Stroke: **120 mm**

Emission Certification: **MEP STAGE II**

Aspiration: **Turbocharged and Charge Air Cooled**

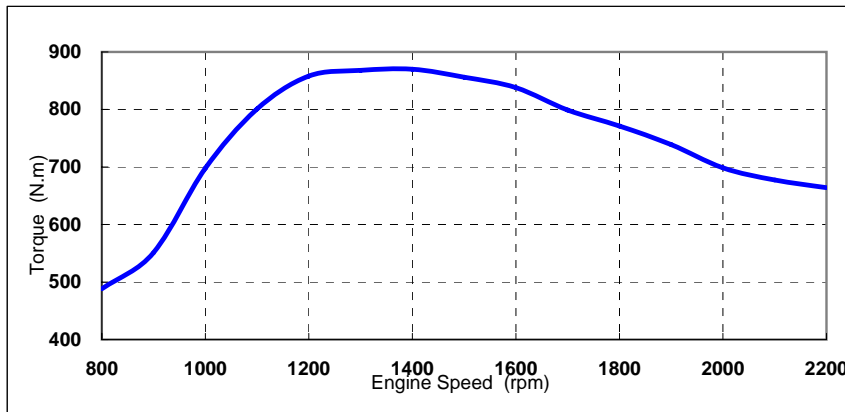
Displacement: **5.9 L**

No. of Cylinders: **6**

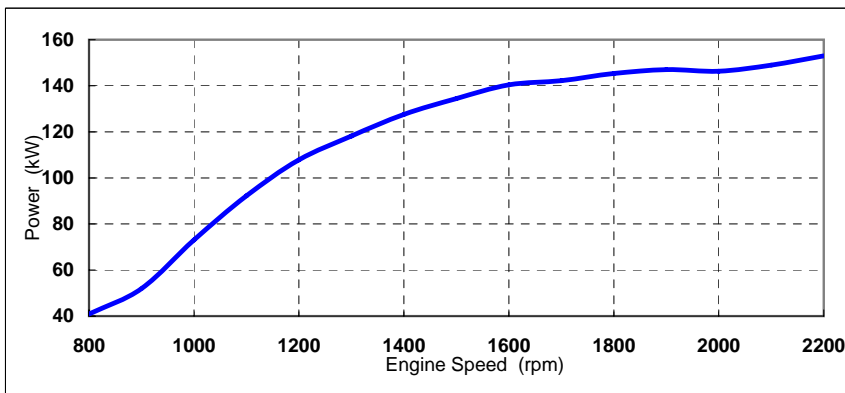
Fuel System: **WEIFU PW2000/RSV**

All data is based on the engine operating with fuel system, water pump, and 10 in H₂O (2.488 kPa) inlet air restriction with 5.98 in (152 mm) inner diameter, and with 2.01 in Hg (7 kPa) exhaust restriction with 4.02 in (102 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.

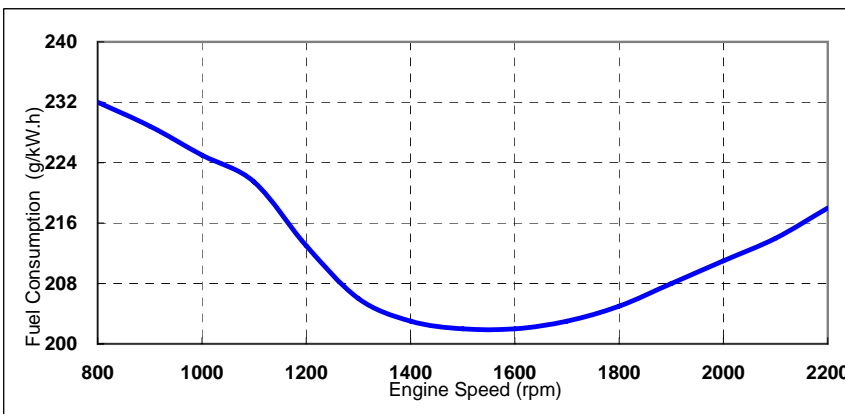
Performance curve



Torque Output	
rpm	N.m
2200	664
2000	699
1800	771
1600	838
1500	856
1400	870
1200	858
1000	698
900	551
800	488



Power Output	
rpm	kW
2200	153
2000	146
1800	145
1600	140
1500	134
1400	128
1200	108
1000	73
900	52
800	41



Fuel Consumption	
rpm	g/kW.h
2200	218
2000	211
1800	205
1600	202
1500	202
1400	203
1200	213
1000	225
900	229
800	232

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with GB/T18297 conditions of 100kPa (29.61 in. Hg) barometric pressure [80 m (263 ft.) altitude], 25°C (77°F) inlet air temperature, and 1 kPa (0.30 in. Hg) water vapor pressure with No.2 diesel fuel. The engine may be operated without changing the fuel setting up to 4000 m (13,123 ft.) altitude. For sustained operation at high altitudes, the fuel rate of the engine will be adjusted to limit performance by 4% per 305 m (1,000 ft.) above 2255 m (7,400 ft.) altitude and 2% per 11°C above 38°C (1% per 10°F above 100°F).

GENERAL ENGINE DATA

Approximate Engine Weight (wet).....	-kg	413
Mass Moment of Inertia of Rotating Components (No Flywheel).....	-kg·m ²	0.25
Center of Gravity from Front Face of Block.....	-mm	328
Center of Gravity above Crankshaft Centerline.....	-mm	155

ENGINE MOUNTING

Maximum (Static) Bending Moment at Front Support Mounting Surface.....	-N.m	435
Maximum (Static) Bending Moment at Side Pad Mounting Surface.....	-N.m	TBD
Maximum (Static) Bending Moment at Rear Face of Block.....	-N.m	1356
Moment of Inertia of Complete Engine		
— Roll Axis.....	-kg·m ²	14.8
— Pitch Axis.....	-kg·m ²	36.9
— Yaw Axis.....	-kg·m ²	31.9
Crankshaft Thrust Bearing Load Limit		
—Maximum Intermittent.....	-N	3781
—Maximum Continuous.....	-N	1780

EXHAUST SYSTEM

Maximum Back Pressure.....	-kPa	10.1
Exhaust Pipe Size Normally Acceptable.....	-mm	76
Maximum Static Supported Weight at the Turbocharger Outlet Flange.....	-N.m	14
Exhaust Manifold Insulation Acceptable.....	-Yes/No	No
Turbocharger Insulation Acceptable.....	-Yes/No	No

AIR INTAKE SYSTEM

Maximum Intake Air Restriction with Heavy Duty Air Cleaner		
— Dirty Element.....	-kPa	6
— Clean Element.....	-kPa	4
Minimum Dirt Holding Capacity with Heavy Duty Air Cleaner.....	-g/cfm	25
Maximum intake manifold temperature at 25 deg C (77 F) ambient.....	-°C	60
Maximum Temperature Rise from Ambient to the Inlet of the Turbocharger.	-°C	17
Recommended intake piping size (inner diameter).....	-mm	101.6

Charge Air Cooling System

Maximum allowable pressure drop across charge air cooler and OEM CAC piping(IMPD):.....	-kPa	14
Maximum Intake Manifold Temperature Differential (Ambient to IMT) (IMTD -°C		35
Intake manifold air temperature derate/alarm temperature.....	-°C	91
Intake manifold temperature for Fan-ON.....	-°C	60

LUBRICATION SYSTEM

Normal Operating Oil Pressure Range		
— minimum low idle.....	-kPa	69
—maximum rated speed.....	-kPa	345
Maximum oil pressure spike on cold engine.....	-kPa	690
Maximum Lube Oil Flow for Engine Accessories.....	-litre/min.	4.0
Maximum Sump Oil Temperature.....	-°C	127
Minimum Required Lube System Capacity - Sump plus Filters.....	-litre	16.3
By-pass Filtration Required.....	-Yes/No	Yes
Angularity of Standard Oil Pan: (Values stated are for intermittent operation only):		
— Front Down.....	- °	45
— Front Up.....	- °	45
— Side to Side.....	- °	45

COOLING SYSTEM

Minimum operating block coolant temperature.....	-°C	71
Minimum fill rate.....	-litre/min.	19
Maximum initial fill time.....	-min.	5
Minimum water pump inlet pressure with non-deaerating or partially deaerating cooling system.....	-kPa	0
Maximum static head of coolant above crankshaft centerline.....	-m	18.3
Minimum pressure cap rating at sea level.....	-kPa	48
Maximum pressure cap rating at sea level.....	-kPa	103
Minimum coolant expansion space (% of system capacity).....	- %	6
Maximum deaeration time.....	-min.	25
Minimum drawdown (% total cooling system capacity).....	- %	11
Full ON Fan engine coolant outlet temperature.....	-°C	93.3
Shutter opening temperature - coolant.....	-°C	85
Shutter opening temperature - intake manifold air (CAC).....	-°C	66
Coolant capacity - engine only.....	-litre	9
Maximum coolant operating temperature at engine outlet (max. top tank temp):	-°C	100
Standard (modulating) Thermostat Range.....	-°C	82-93
Maximum coolant temperature for engine protection controls.....	-°C	102
Maximum recommended external coolant flow restriction in engine circuit:.....	-kPa	34

CRANKING SYSTEM

Minimum Battery Capacity - Cold Soak at 0°F (-18°C) or Above		12V	24V
— Engine Only - Cold Cranking Amperes.....	-CCA	950	475
— Engine Only - Reserve Capacity.....	-min.	260	130
Maximum Starting Circuit Voltage Drop.....	-Volts	TBD	
Minimum Ambient Temperature for Unaided Cold Start.....	-°C(°F)	-12	(10)
Minimum Cranking Speed Required for Unaided Cold Start.....	-rpm	125	
Maximum starting circuit resistance.....	-Ohm	TBD	

FUEL SYSTEM

Maximum Fuel Flow on the Supply Side of the Fuel Pump.....	-kg/hr	193
Maximum fuel supply restriction at fuel pump inlet		
— with clean fuel filter element(s) at maximum fuel flow.....	-kPa	14
— with dirty fuel filter element(s) at maximum fuel flow	-kPa	27
Maximum fuel drain restriction (total head)		
— after (or with) check valve.....	-kPa	TBD
— before (or without) check valve.....	-kPa	68
Maximum fuel inlet temperature.....	-°C	71
Minimum fuel tank venting rate.....	-litre/hr	340

EMISSIONS

Estimated Free Field Sound Pressure Level At 15 m (50 ft.) and Full-Load Governed Speed
(Excludes Noise from Intake, Exhaust, Cooling System and Driven Components)

—Right Side.....	-dBa	TBD
—Left Side.....	-dBa	TBD
—Front.....	-dBa	TBD
—Rear.....	-dBa	TBD

Gaseous Emissions per GB 20891-2007

—Weight-Specific NOx.....	-g/kW.h	6.0
—Weight-Specific HC.....	-g/kW.h	1.0
—Weight-Specific CO.....	-g/kW.h	3.5
—Weight-Specific Particulates.....	-g/kW.h	0.2

PERFORMANCE DATA

Minimum low idle speed:.....	-rpm	850
Maximum Governed Speed (10% of Rated Torque)	-rpm	2440
Maximum altitude limit restriction		
—Continuous.....	-m	2200
Maximum torque available at closed throttle low idle speed.....	-N.m	460
Nominal governor regulation:.....	-%	≤8
Throttle Angle		
—High Idle.....	Deg.	103±10°
—Low Idle.....	Deg.	70±10°
—Delta.....	Deg.	33±5°
Throttle Angle at Engine Shutdown		
—Engine Work.....	Deg.	15±5°
—Engine Shutdown.....	Deg.	316±5°

Fuel Rating Option used for these Data: **FR93241**

	Rated Power	Maximum Power	Torque Peak
Engine Speed.....	2200		1400
Output Power.....	153		128
Torque.....	664		870
Friction Horsepower.....	TBD		TBD
Intake Manifold Pressure.....	135		117
Turbo Comp. Outlet Pressure.....	148		120
Turbo Comp. Outlet Temperature.....	140		120
Inlet Air Flow	216		138
Exhaust Gas Flow	545		376
Exhaust Gas Temperature.....	480		540
Heat Rejection to Ambient.....	TBD		TBD
Heat Rejection to Coolant.....	TBD		TBD
Steady State Smoke.....	0.5		0.5

ALL DATA CERTIFIED WITHIN 5%

TBD = To Be Decided

N/A = Not Applicable

N.A. = Not Available

All data is subject to change without notice, sorry for inform.