

Cummins Technical



ENGINE MODEL: 4BT3.9-C100
CURVE & DATASHEET: FR91468

15Feb2005



Engine Performance Curve

Basic Engine Model:
4BT3.9-C100

Curve Number:
FR91468

Pg. No.

Engine Family:
D38

CPL Code:
857-02

Date:
2005-02

01

Displacement: **3.9 L** Aspiration: **Turbocharged**

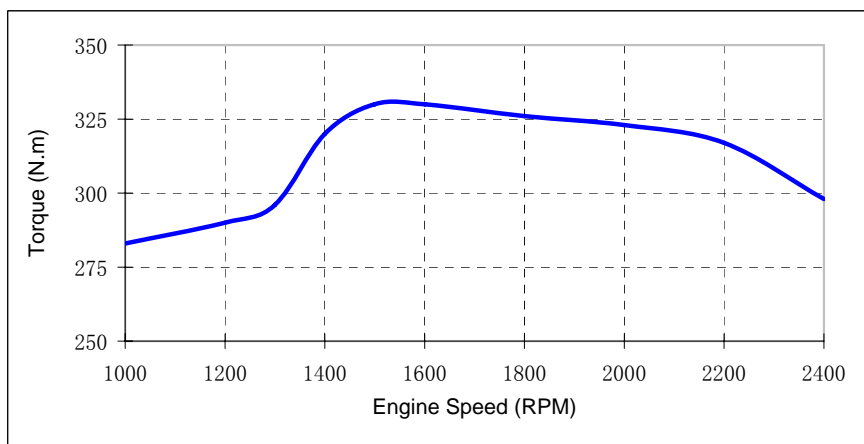
Bore: **102 mm** kW (BHP) @ RPM

Stroke: **120 mm** No. of Cylinders: **4** **75 (102)** **2400**

Emission Control: Fuel system: **Inline-WEIFU AD/RSV** **8% Governor Regulation**

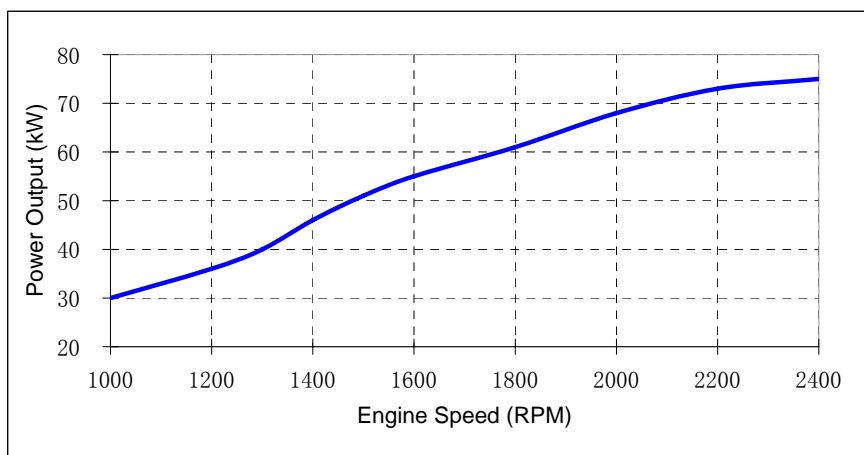
All data are based on the engine operating with fuel system, water pump, lubricating oil pump, and 250 mm H₂O (10 in. H₂O) inlet air restriction and with 50 mm Hg (2.0 in. Hg) exhaust restriction; not included are alternator, fan, optional equipment and driven components.

Performance curve



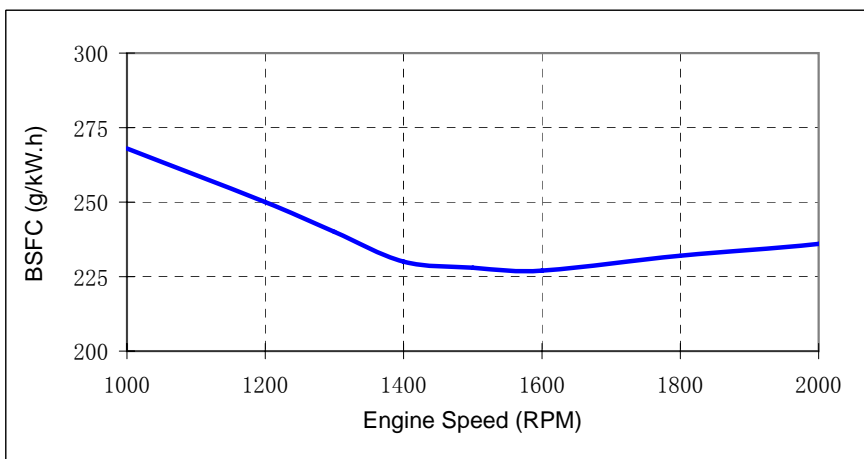
TORQUE

RPM	N.m
1000	283
1200	290
1300	296
1400	320
1500	330
1600	330
1800	326
2000	323
2200	317
2400	298



POWER OUTPUT

RPM	kW
1000	30
1200	36
1300	40
1400	46
1500	51
1600	55
1800	61
2000	68
2200	73
2400	75



FUEL CONSUMPTION

RPM	g/kW.h
1000	268
1200	250
1300	240
1400	230
1500	228
1600	227
1800	232
2000	236
2200	242
2400	250

All performance data based on the standard status and GB/T18297 conditions.



Base Engine Data Sheet

Pg. No.

02

ENGINE MODEL:	4BTA3.9-C100	CPL NUMBER:	857- 02	DATE:	Feb05
CONFIGURATION NUMBER:	D382043CX02	CURVE NUMBER:	FR91468		
AFTERCOOLED SYSTEM:	NO	RATED POWER:	102 bhp @ 2400rpm		
FUEL SYSTEM:	Inline - WEIFU AD/RSV		75 kW @ 2400rpm		

GENERAL ENGINE DATA

Engine Wet Weight (Pricing Configuration).....	-kg	338
Moment of Inertia of Rotating Components (No Flywheel).....	-kg·m ²	0.143
Center of Gravity from Front Face of Block.....	-mm	262
Center of Gravity above Crankshaft Centerline.....	-mm	160

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	11.1
— Pitch Axis.....	-kg·m ²	19.1
— Yaw Axis.....	-kg·m ²	14.7

EXHAUST SYSTEM

Maximum Back Pressure.....	-mmHg	76
Exhaust Pipe Size Normally Acceptable.....	-mm	75
Maximum Static Supported Weight at the Turbocharger Outlet Flange.....	-N·m	13.5
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		
— Clean Element.....	-mmH ₂ O	381
— Dirty Element.....	-mmH ₂ O	635
Minimum Dirt Holding Capacity with Heavy Duty Air Cleaner.....	-g/litre/sec.	53
Maximum Temperature Rise from Ambient to the Inlet of the Turbocharger.....	-°C	17
Maximum Pressure Drop from the Turbocharger Outlet to the Intake Manifold.....	-kPa	NO

LUBRICATION SYSTEM

Normal Operating Oil Pressure Range.....	-kPa	276 - 345
Maximum Lube Oil Flow for Engine Accessories.....	-litre/min.	4.0
Maximum Sump Oil Temperature.....	-°C	121
Minimum Engine Oil Pressure for Engine Protection Devices:		
— At Rated Speed and Load.....	-kPa	276
— At Torque Peak Speed and Load.....	-kPa	207
— At Low Idle.....	-kPa	69
Minimum Required Lube System Capacity - Sump plus Filters.....	-litre	9.0
By-pass Filtration Required.....	-Yes/No	No
Angularity of Standard Oil Pan: (Values stated are for intermittent operation only):		
— Front Down.....	-°	45
— Front Up.....	-°	45
— Side to Side.....	-°	45



Base Engine Data Sheet

Pg. No.

03

COOLING SYSTEM

Coolant Capacity - Engine Only.....	-litre	7.9
Maximum Engine Cooling Circuit External Resistance.....	-kPa	TBD
Minimum Pump Inlet Pressure with Open Thermostat and no Pressure Cap.....	-mmHg	TBD
Maximum Static Head of Coolant Above Engine Crankshaft Centerline.....	-m	TBD
Standard (modulating) Thermostat Range.....	-°C	82-93
Maximum Block Coolant Pressure with Closed Thermostat and no Pressure Cap.....	-kPa	50
Minimum Pressure Cap.....	-kPa	50
Maximum Engine Coolant Temperature at Engine Outlet.....	-°C	100
Maximum Engine Coolant Temperature for Engine Protection Devices.....	-°C	101.6
Minimum Engine Coolant Temperature.....	-°C	71
Minimum Fill Rate.....	-litre/min.	19
Maximum Initial Fill Time.....	-min.	5
Minimum Coolant Expansion Space.....	- %of System Capacity	6
Maximum Deaeration Time.....	-min.	25
Minimum Drawdown.....	— % of Total System Capacity	11%
(Drawdown Must Exceed the Volume Not Filled at Initial Fill & Must Not Include Expansion Space)		
Fan-on Engine Coolant Outlet Temperature.....	-°C	93
Shutter Opening Coolant Outlet Temperature.....	-°C	85
Shutter Opening Intake Manifold Air Temperature.....	-°C	no

CRANKING SYSTEM

Minimum Battery Capacity - Cold Soak at 0°F (-18°C) or Above		12V	24V
— Engine Only - Cold Cranking Amperes.....	-CCA	800	400
— Engine Only - Reserve Capacity.....	-min.	160	80
Maximum Starting Circuit Voltage Drop @ ----Amperes.....	-Volts	TBD	
Minimum Ambient Temperature for Unaided Cold Start.....	-°C (-°F)	-12	
Minimum Cranking Speed Required for Unaided Cold Start.....	-rpm	125	
Breakaway Torque at Minimum Unaided Start Temperature.....	-N.m(lb.-ft.)	TBD	
Cranking Torque at Minimum Unaided Start Temperature.....	-N.m(lb.-ft.)	TBD	
Cranking Torque at -10°F.....	-N.m(lb.-ft.)	TBD	

FUEL SYSTEM

Maximum Fuel Flow on the Supply Side of the Fuel Pump.....	-kg/hr	97
Maximum Fuel Inlet Restriction		
— with clean fuel filter.....	-mmHg	102
— with dirty fuel filter.....	-mmHg	203
Maximum Fuel Drain Restriction		
— with check valves.....	-mmHg	N/A
— less check valves.....	-mmHg	510
Maximum Fuel Inlet Temperature.....	-°C	71
Minimum Fuel Tank Air Venting Capability Required at 6 in. H ₂ O Back Pressure.....	-litre/hr	340



Low Idle Set Speed.....	-rpm	750
Maximum Governed Speed (10% of Rated Torque)	-rpm	2600
Maximum Overspeed Capability.....	-rpm	3750
Maximum altitude limit restriction		
—Continuous.....	-m	TBD
Closed Throttle Torque @ 700 rpm (for 900 rpm Low Idle Speed).....	-N.m	TBD
Throttle Angle		
—High Idle.....	Deg.	102 ±4
—Low Idle.....	Deg.	75± 4
—Delta.....	Deg.	27

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 ISO 8178:

—Weight-Specific NOx.....	g/kW.h	TBD
—Weight-Specific HC.....	g/kW.h	TBD
—Weight-Specific CO.....	g/kW.h	TBD
—Weight-Specific Particulates.....	g/kW.h	TBD

Fuel Rating Option used for these Data: **FR91468**

Engine Speed.....	-rpm
Gross Power Output.....	-kW
Torque.....	-N.m
Intake Manifold Pressure.....	-kPa
Motoring Friction Horsepower.....	-kW
Turbocharger Compressor Outlet Pressure.....	-kPa
Intake Air Flow.....	-litre/sec.
Exhaust Gas Flow.....	-litre/sec.
Compressor Outlet Temperature	-°C
Exhaust Temperature	-°C
Heat Rejection to Ambient (Dry Manifold).....	-kW
Heat Rejection to Coolant (Dry Manifold).....	-kW
Heat Rejection to Fuel.....	-kW
Engine Coolant Flow.....	-litre/sec.
External Cooling Circuit Resistance.....	-kPa△ P
Altitude Limitations:	
—Intermittent.....	-m
—Continuous.....	-m
Steady State Smoke.....	-Bosch

RATED POWER	MAXIMUM POWER POINT	PEAK TORQUE
2400		1500
75		51
298		330
90		45
16.6		7
90		45
120		68
283		182
N/A		N/A
550		560
10.9		8
50		36
1.0		0.6
3.3		2.0
15.2		15.2
TBD		TBD
TBD		TBD
TBD		TBD

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.