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# 2009. The engine for construction.

15-50 kW at 1500-3000 rpm



## These are the characteristics of the 2009:

3 and 4 cylinder naturally aspirated in-line engines.

4 cylinder also as turbocharged version.

Water cooled .

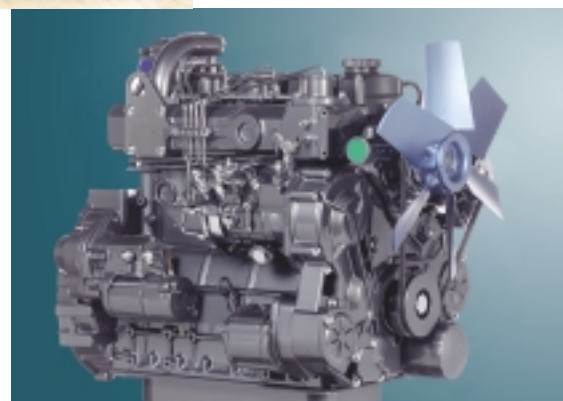
Compact engine design.

Innovative and efficient injection- and combustion system.

Customized component system with many different peripheral parts.

Cold starting ability even under extreme climatic conditions.

Full power PTO at flywheel end for axial or radial drives, two optional laid back PTOs from gear end cover.



## Your benefit:

- ▶ Compact engine, thus reducing equipment redesigning cost.
- ▶ Convincing power to weight ratio.
- ▶ Low exhaust emissions meeting EU-RL 97/68 Stage 2 and US-EPA Nonroad (Tier 2).
- ▶ High reliability combined with long maintenance intervals means less after sales cost for your customers.
- ▶ Impressed low level on complexity helps your after sales business.

## ► Engine description

Type of cooling:	Water-cooled, water circulation pump driven by a V belt, thermostat and integrated bypass system
Crankcase:	Ribbed, thin-wall grey cast iron with detachable sump
Crankcase breather:	Closed-circuit breather
Cylinder head:	Adaptable inlet manifold
Valve arrangement/ Timing:	Overhead valves in cylinder head, one inlet and one exhaust valve per cylinder, actuated via hydraulic tappets, push rods and rocker arms, driven by anti-backlash helical cut gears and camshaft
Piston	Three-ring piston, two compressions rings and one oil scraper ring
Piston cooling:	Splash oil-cooled with under crown oil jets on turbo version
Connecting rod:	Drop-forged steel rod
Crankshaft and big-end bearings:	Ready-to-install bi-metal bearings
Crankshaft:	Cast iron in 3 cylinder Steel forged in 4 cylinder and turbo
Camshaft:	Chilled cast iron
Lubrication system:	Gear driven lubricating oil pump
Lube oil cooler:	Externally arranged water cooled (optional)
Lube oil filter:	Full flow spin-on cartridge filter
Injection pump/ Governor:	Rotary fuel injection pump, fixed and variable speed governors
Fuel lift pump:	Diaphragm
Injection nozzle:	Multi hole nozzle
Fuel filter:	Replaceable cartridge with water trap
Alternator:	Three-phase alternator, 14 V; 50 A (Standard)
Starter motor:	2,0 kW; 12 V
Options:	Intake manifold connections, exhaust manifolds connections, hydraulic pump drives, engine mounts, multi oil pan drains, dipsticks, SAE 4/5 flywheel housings, fly wheel drives, alternator 12V, oil filter position horizontal, vertical and remote, oil filler in cylinder head cover and low level fill on side of crankcase

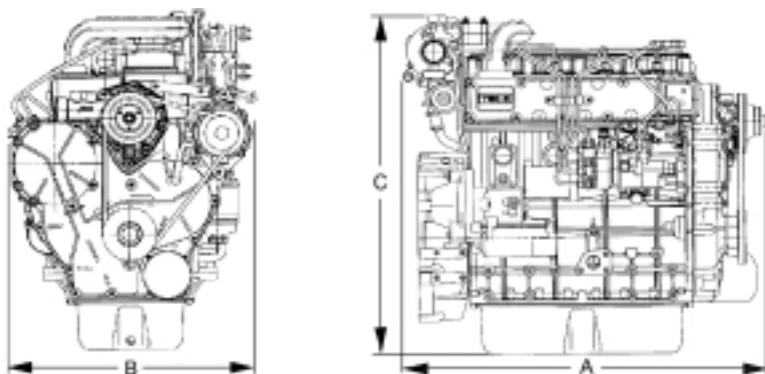
## ► Technical Data

Engine Type		D 2009 L 3	D 2009 L 4	TD 2009 L 4
Number of cylinders		3	4	4
Bore/stroke	mm   inch	90/90   3.5/3.5	90/90   3.5/3.5	90/90   3.5/3.5
Displacement	l   cu inch	1.72   105	2.29   140	2.29   140
Compression ratio		19.6	19.6	18
Max. rated speed	min <sup>-1</sup>   rpm	3000	3000	3000
Mean piston speed	m/s   ft/sec	9   30	9   30	9   30

### Power ratings for construction equipment engines<sup>1)</sup>

Power ratings for automotive- and industrial engines <sup>2)</sup>	kW   hp	28   37	36   48	50   67
at speed	min <sup>-1</sup>   rpm	3000	3000	3000
Mean effective pressure	bar   psi	6.5   94.2	6.3   91.3	8.7   126.2
Power ratings for continuous operation <sup>3)</sup>	kW   hp	25   34	32   43	45   60
at speed	min <sup>-1</sup>   rpm	3000	3000	3000
Mean effective pressure	bar   psi	5.9   85.6	5.7   82.7	7.9   114.9
Max. torque	Nm   lb-ft	104   77	143   105	210   155
at speed	min <sup>-1</sup>   rpm	2000	2000	2000
Minimum idle speed	min <sup>-1</sup>   rpm	900	900	900
Specific fuel consumption <sup>4)</sup>	g/kWh   lb/hp-hr	235   0.381	235   0.381	235   0.381
Weight to DIN 70020, Part 7A	kg   lb	180   397	205   452	210   463

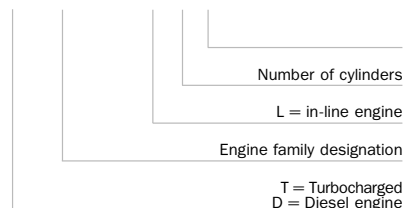
## ► Dimensions



Engine type		A	B	C
D 2009 L 3	mm   inch	597   23.5	490   19.3	612   24.1
D 2009 L 4	mm   inch	680   26.7	490   19.3	612   24.1
TD 2009 L 4	mm   inch	696   27.4	518   20.4	633   24.9

## ► Model designation

### TD 2009 L 4



1) Power ratings at flywheel net, without cooling system

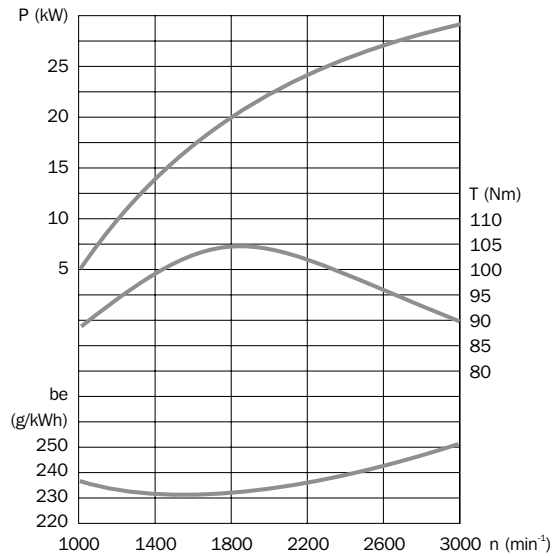
2) For intermittent operation to ISO 3043-1/ISO 1585

3) For stop power acc. to 3046/1 (ICXN)

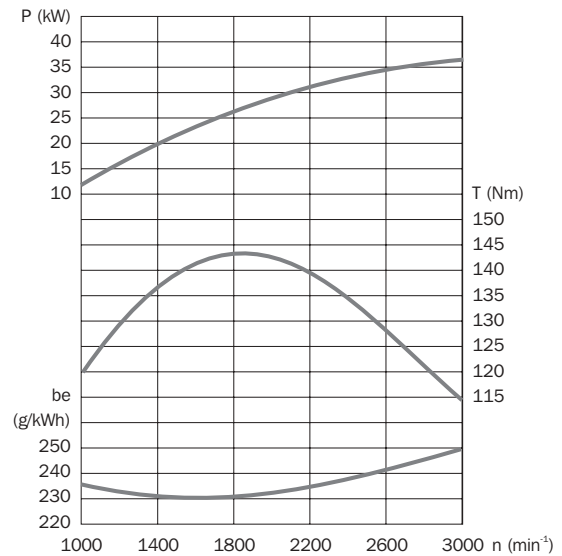
4) At optimal operating point. Specific fuel consumption based on diesel fuel with a specific gravity of 0.835 kg/dm<sup>3</sup> at 15°C

The values given in this data sheet are for information purposes only and not binding. The information given in the offer is decisive.

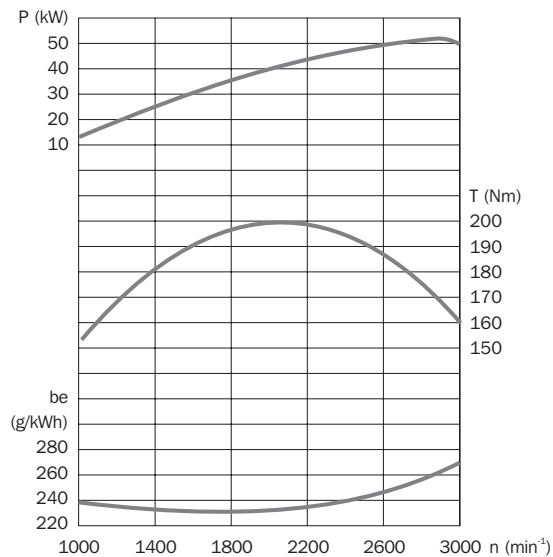
## ► Standard engines



► D 2009 L 3



► D 2009 L 4



► TD 2009 L 4



The engine company.

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