

MAHLE Powertrain eSupercharged Downsizing Engine

- > High performance with low emissions
- High torque at low speed
- Fast response without lag



eSupercharged Downsizing Engine

MAHLE Powertrain has increased the specific output of the MAHLE downsizing engine to over 160 kW/litre through the application of 48 V eSupercharging. A fast response electric supercharger, which can provide boost continuously, enables the engine to produce high torque at low speed and achieve excellent transient response, in conjunction with a larger conventional turbocharger to deliver peak power. This latest 'eSupercharged' downsizing engine achieves the same high fuel efficiency as the previous generation engine within the same operating area, but now delivers significantly higher performance.



>> eSupercharger

Technical specifications

Parameter	Value
Displacement	1.2 litres
Bore x stroke:	83.0 mm x 73.9 mm
Compression ratio:	9.3 : 1
Maximum power output	193 kW / 262 PS
Specific power	161 kW/L
Peak torque	315 Nm @ 1,500 rev/min (33 bar BMEP)
Flexibility	315 Nm from 1,500 to 4,500 rev/min
Minimum BSFC	237 g/kWh

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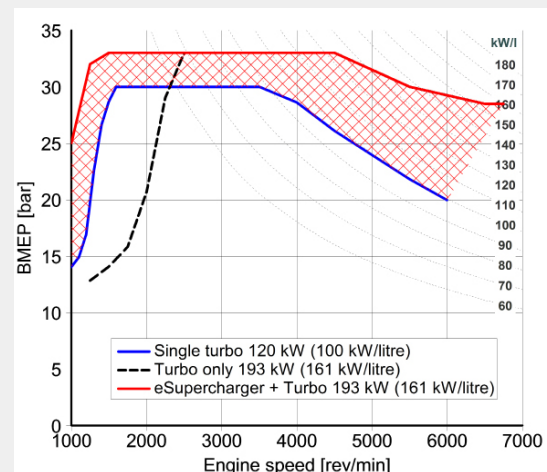
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Benefits

- 48 V system enables recuperation
 - › Provides direct CO₂ benefits
- eSupercharger enables reoptimisation of main turbo charger
 - › Higher peak power
 - › No losses in low speed torque or driveability
- Combustion & cooling systems optimised for extreme power & torque outputs
- 35 bar BMEP max torque output available at peak battery SOC
- Higher power output enables greater degree of downsizing
 - › Scalable for different vehicle applications
 - › Higher fuel economy potential
- Up to 25% FE benefit compared to current TGDl engines (based on 2.0 L Golf GTi example)

Technical Specifications

Technical specifications eSupercharger	
Parameter	Value
Compressor Type	Radial / Centrifugal
Motor	High-Speed Permanent Magnet
Max operating Speed	120,000 rev/min
Lubrication	Greased for Life
Cooling	Liquid
Input Voltage	48 V nominal
Unit Mass	4.2 kg



>> Torque curve



>> eSupercharged demonstrator vehicle

Summary

MAHLE Powertrain's eSupercharged downsizing engine provides high performance with a 48 V electric supercharger in combination with a conventional turbocharger. Whilst delivering high output along with fast response times and high torque at low speed, this engine achieves low emissions and excellent fuel economy.

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