MAHLE
Powertrain

MAHLE eSupercharged Downsizing Engine

High performance with low emissions

High torque at low speed

Fast response without lag

eSupercharger

MAHLE Powertrain has increased the specific output of the MAHLE downsizing engine to over 160 kW/litre through the application of 48V 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.

eSupercharged Downsizing Engine

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

*The above figures have all been verified during dyno testing.

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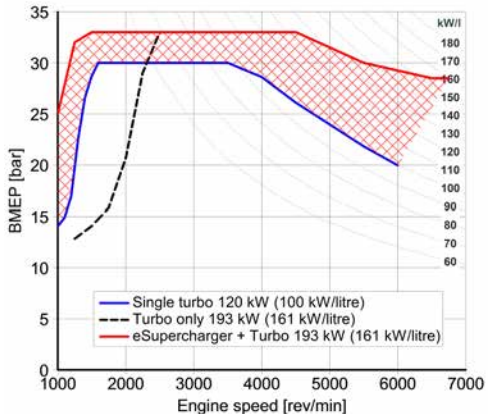
- 48 V system (including battery and BISG) enables considerable recuperation, resulting in direct $C0_2$ benefits.
- eSupercharger enables reoptimisation of main turbo charger for higher peak power without sacrificing low speed torque or driveability.
- Combustion and cooling systems have proven capability for extreme power and torque outputs.
- Engine calibrated to achieve 35 bar BMEP when battery state of charge allows.
- Higher specific power output enables greater degree of downsizing resulting in higher fuel economy potential.
- Same principles can be scaled for different vehicle applications (e.g. 120, 140 kW/L, which will reduce the electrical system load).
- Vehicle fuel economy benefits of >25% can be achieved in comparison to current TGDI engines (based on 2.0 L Golf GTi example).
- Degree of downsizing can be scaled to suit application.



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

Downsizing Performance

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