MAHLE
Powertrain

MAHLE eSupercharged Downsizing Demonstrator Vehicle

- Very high specific performance
- Improved fuel economy
- 48 V mild hybridisation

eSupercharged
Downsizing Engine

MAHLE Powertrain has integrated a 48 V eSupercharger into their latest downsized engine, along with a conventional exhaust driven turbocharger for high speed, full load performance.

A maximum power output level of 193 kW has been achieved during dynamometer testing, resulting in an increase in specific power output from 100 to 161 kW/litre whilst also achieving high torque (in excess of 33 bar BMEP) at low engine speeds. This enables a greater degree of engine downsizing to be achieved, thus yielding significant fuel economy improvements. This represents a new development in engine boosting technology by hybridisation of the air intake system, making the electrical charging device a fundamental part of the enabling technology. The eSupercharger is, in this application, no longer simply a transient device, but also a key contributor to the low speed steady state engine performance.

This eSupercharged engine has been installed in a demonstrator vehicle developed by MAHLE Powertrain. The 48 V platform used in this application comprises a 3-cell advanced lead acid battery pack, a DC/DC converter to maintain the state of charge of the 12 V battery (which supports the existing 12 V systems), the eSupercharger and a 10 kW BISG (belt integrated starter generator). The latter provides continuous electrical power to the eSupercharger, even when the 48 V battery is depleted. The combination of a heavily downsized gasoline engine, together with the 48 V hybridisation applied to this demonstrator vehicle, is expected to yield a combined CO_2 reduction of 25 % over the NEDC.

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MAHLE Product Information 07/2017

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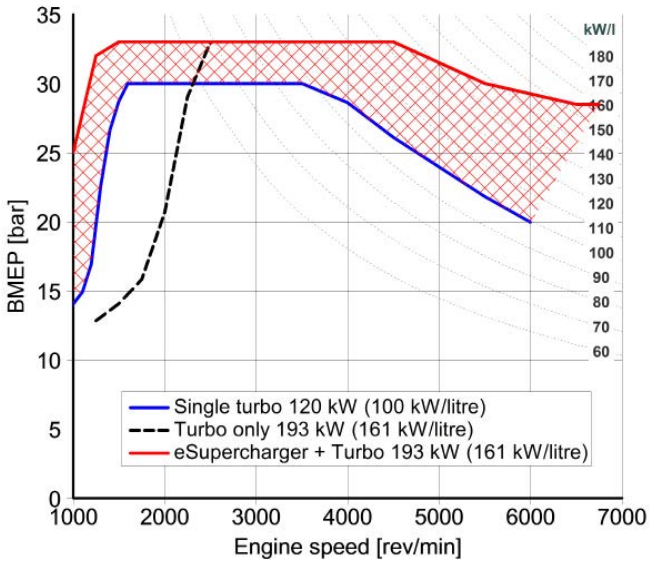
MAHLE Powertrain

MAHLE eSupercharged Downsizing Demonstrator Vehicle

- 48V hybridisation with electric supercharging
- Energy recuperation via a belt-integrated starter generator
- Extremely high specific power and torque
- Excellent transient response and driveability
- Increased levels of downsizing possible
- Greater CO_2 reduction potential



eSupercharged Demonstrator Vehicle

Technical specifications eSupercharged Downsizing Engine	
Displacemnet:	1.2 Litres
Bore x stroke:	83.0 mm x 73.9 mm
Specific power:	161 kW/L (~ 260 bhp)
Peak torque:	315 Nm @ 1,500 rev/min (33 bar BMEP)
Boosting System:	48 V eSupercharger & Turbo Charger

Vehicle Targets	
CO_2 output NEDC:	25% reduction compared to baseline
Emissions target:	EU6C
0-100 km/h:	6.4 s
Maximum Speed:	155 mph / 250 km/h
Kerb Weight:	1,545 kg

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