

Gasoline Systems

Extreme Downsizing with direct gasoline injection



BOSCH

Invented for life

Extreme Downsizing engine



Customer benefits

- ▶ Fuel consumption reduced by about 30% and accordingly lower CO₂ output
- ▶ Optimum cost-benefit relation for maximum CO₂ reduction
- ▶ Consumption concept suitable for mass markets with attractive driving performance and driving characteristics

Future vehicle engines will have to meet high demands concerning fuel economy and low CO₂ output. Extreme Downsizing is one specific method of utilizing the potentials of gasoline engines.

Task

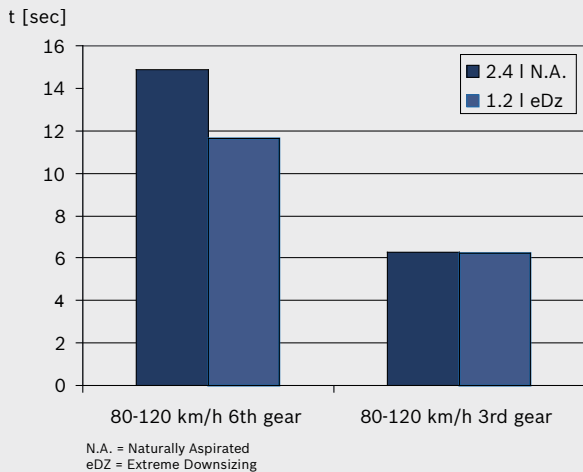
With Extreme Downsizing, engine displacement is radically reduced, while driveability and engine performance are kept unchanged.

For realizing Extreme Downsizing Bosch is combining several of its competences:

- ▶ the engine control unit with sensors and application
- ▶ the development of the combustion process
- ▶ the design of fuel injection and ignition
- ▶ the development and design of the turbocharger and its peripheral devices

Bosch also contributes its expertise in construction and design of the engine and its main components as well as the basic development of engine thermodynamics and mechanics.

Comparison of driving performances (example)



Function

With single-stage turbocharging, the engine displacement can be reduced by 50%. This enables a fuel consumption benefit of more than 30%.

At the same time, after undergoing Extreme Downsizing, engines feature impressive driving performance with very high torque over a wide rpm range, even at low engine speed, e.g. when driving off. Even after Extreme Downsizing, the engine’s driving performance is comparable to that of a corresponding naturally aspirated engine.

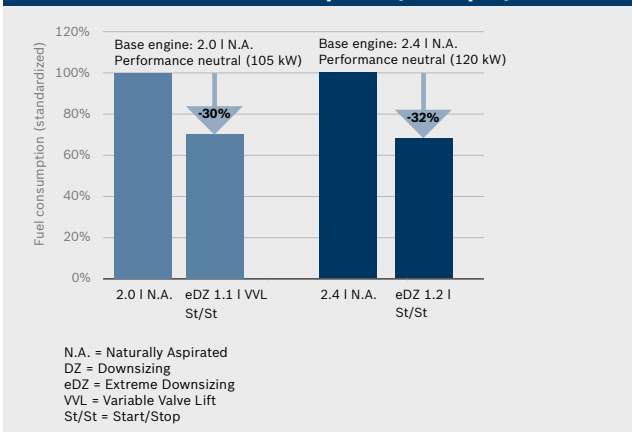
Outlook

With further evolutionary steps and additions to the technology packages new potentials in fuel consumption will be made available. One example is variable valve lift. Hybridization or the combination with specifically adapted transmissions, in addition to downsizing, can contribute to further increasing the consumption benefits.

Technical features

	Example (demonstrator)
Engine displacement	1.2 l
No. of cylinders	3
Bore/stroke	83.0/73.9 mm
Compression ratio	9.3
Fuel injection	Multihole DI 200 bar (Bosch)
Sparkplug ø thread	Bosch M10
Engine control	Bosch Motronic MED17
Turbocharger	BMTS single stage
Power @ rpm	120 kW 5,000–6,000 min ⁻¹
Max. torque @ rpm	286 Nm 1,600–3,500 min ⁻¹
Torque @ 1,200 min ⁻¹	161 Nm
Engine weight	125 kg
Fuel consumption NEDC equals CO ₂ output	5.8 l/100 km (40 mpg) 139 g/km
80–120 km/5th gear	8.1 s
Emission target	Euro 6

Reduction of fuel consumption (example)



Robert Bosch GmbH
Gasoline Systems

Postfach 300240
70442 Stuttgart
Deutschland

www.bosch-automotivetechnology.com

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