

Road to 95

**On the road to
95 g CO₂/100 km**



- Downsizing
- Optimised transmission
- Lightweight design
- Demand-oriented accessories
- Dethrottling
- Optimised combustion
- Reduced friction

Challenges

New challenges – Rheinmetall Automotive is ready!



The political specifications for future CO₂ emissions in Europe have been outlined. The maximum fleet emissions of 95 g CO₂ per 100 kilometres still permitted from 2020 is presenting new challenges to engineers and materials.

In particular, the new test cycle "World Harmonized Light-Duty Vehicles Test Procedure" (WLTP), which is intended to be introduced in 2017, demands new efforts in many different sections of development.

Rheinmetall Automotive, a combination of the renowned companies KOLBENSCHMIDT and PIERBURG, is well equipped for this developed with its long-standing experience in emission control and reduction in fuel consumption.

It is no coincidence that seven of the vehicles honoured with the title "Ten Best Engines" by the American specialist magazine "Ward's Auto World" have been fitted with products by Rheinmetall Automotive.

High requirements



The raw emissions such as carbon monoxide, nitrogen oxides and hydrocarbons formed during combustion are controlled with the existing internal and external engine measures to reduce emissions.

Yet at the end of the process, carbon dioxide is still an end product of combustion, alongside the non-poisonous substances water and nitrogen.

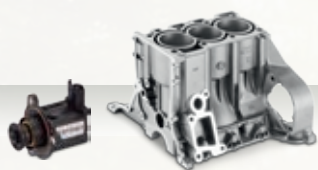
Carbon dioxide can only be reduced by reducing consumption. That is why the drastic reduction in fuel consumption will be a key focus over the next few years.

Savings potential

Carbon dioxide reduction [CO ₂ /km]	
Transmission optimisation	2 g
Piston optimisation	2.3 g
Piston ring packages/cylinder sliding surfaces	3.3 g
Reduction c _w value (per 0.01)	1 g (NEDC)
Steel pistons for passenger car diesel engines	2.5 g
Latest generation of vacuum pumps	0.4 – 1 g
Fuel saving	
Reduced mass per 100 kg	up to 0.3 l/100 km
Piston ring packages/cylinder sliding surfaces	1.9 %
Start/stop system	8 % (NEDC; 15% in real urban traffic)
Steel pistons for passenger car diesel engines	3 – 4 %
Variable electrical coolant pumps	up to 3 % (NEDC)
Variable valve train systems	3 – 6 %
External EGR with petrol engines	up to 2 %
Demand-orientated control of coolant agent, oil and vacuum pumps	1.5 – 3 %
Petrol engines with high supercharging, very high compression ratios and low-pressure EGR	5 – 6 %

Downsizing

Smaller engines with the same performance – only possible through supercharging. Our recirculating air valves, wastegate actuators and pressure regulating valves for exhaust gas turbocharger help with this.



Optimised combustion

Variable intake manifolds, cooled exhaust gas recirculation or clever shaping of the combustion chamber can have a great influence on the combustion.



Lightweight design

"Less weight = less consumption" – Rheinmetall Automotive contributes to this simple formula with components such as pistons, crankcase, cylinder heads or EGR cooler made of aluminium.



Demand-oriented accessories

Whether in terms of fuel supply or oil, water or vacuum pumps – in future, only what is actually needed will be made available.



Dethrottling

The flexible control of the valve strokes and valve timing with UniValve® and FlexValve®, through to cylinder shut-off as well as modern concepts of exhaust gas recirculation ensure that losses can be significantly reduced by a partially closed throttle valve.



Optimised transmission

Automatic transmission units with nine gears are more efficient than their predecessor, but require engine bearings that withstand stresses and electrical oil pumps that maintain the oil pressure even during start-stop operation.



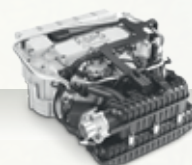
Reduced friction

Smaller widths of engine bearings, optimisation of the piston skirt, defined piston ring packages, steel pistons for high pressures and special coatings are only a handful of the measures to reduce friction in the piston system.



Alternative drive forms

With the Range Extender, Rheinmetall Automotive is building a bridge between hybrid vehicles and electric mobility.



Motorservice app Mobile access to technical know-how



Find out more

www.ms-motorservice.com/app

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