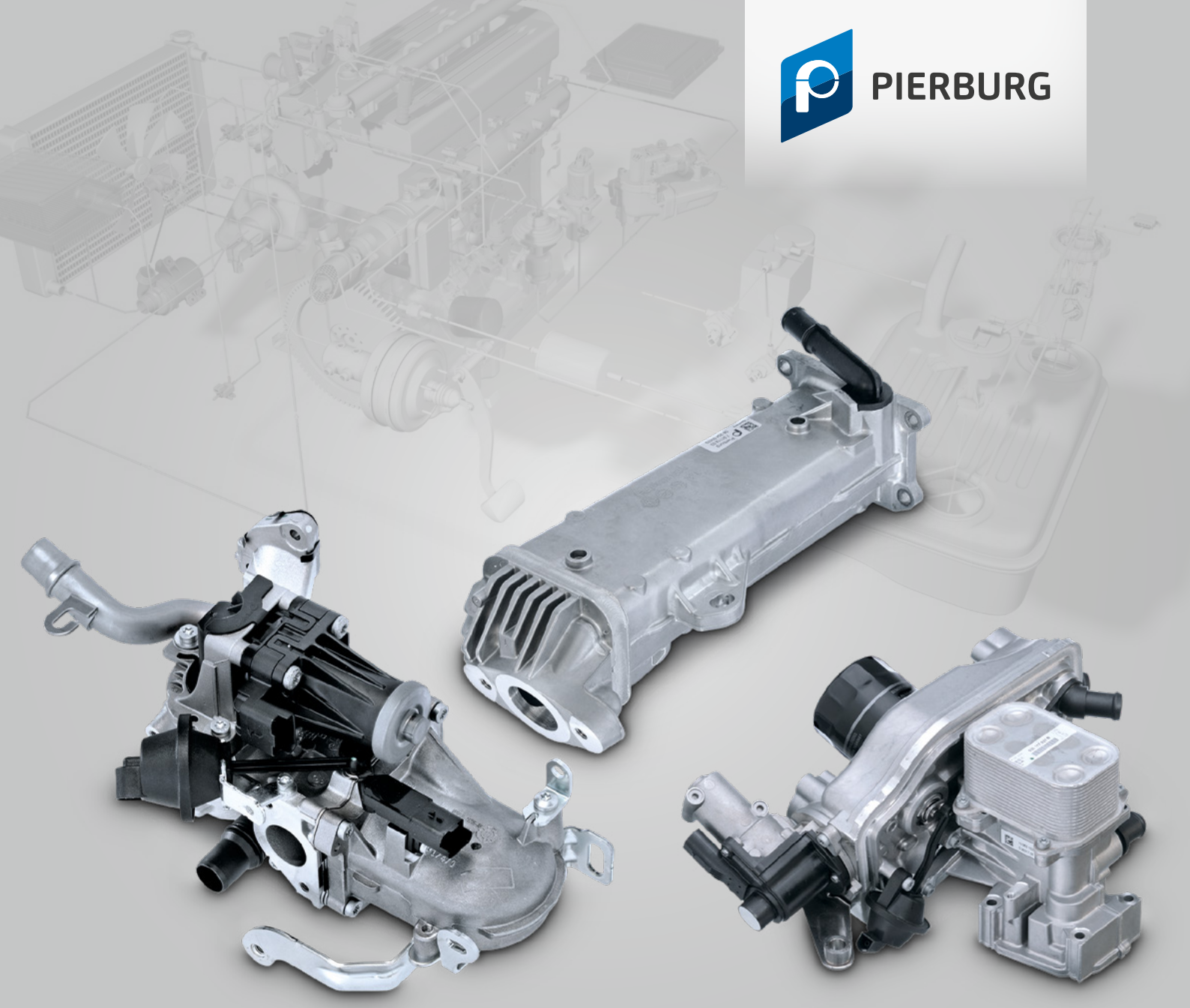
PIERBURG



SYSTEMKNOWLEDGE

COOLED EXHAUST GAS RECIRCULATION
FOR EVEN LOWER POLLUTANT EMISSIONS

PASSION FOR **TECHNOLOGY.**

RHEINMETALL

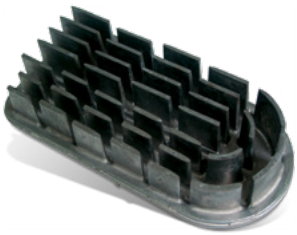
As a specialist with many years of experience in emission control, Pierburg is an expert OE supplier of systems for cooled exhaust gas recirculation. Now, Motorservice is bringing this technology to the aftermarket.

Ever more stringent emission regulations require a constant improvement in emission control methods. For diesel engines, this particularly applies to a further reduction in nitrogen oxides (NO_x). This is why cooled exhaust gas recirculation (EGR) is used here: It lowers the combustion chamber temperatures, thus reducing the formation of nitrogen oxides.

Based on years of experience in the development and manufacture of EGR systems, the Rheinmetall AG has designed a range of EGR cooler modules to permit the precise cooling of exhaust gases.

Sophisticated technology in the smallest space

Increased integration: EGR cooler module with oil cooler and oil filter in one component



The lamella geometry developed by Pierburg reduces the danger of sooting in the radiator

WHY “COOLED EXHAUST GAS RECIRCULATION”?

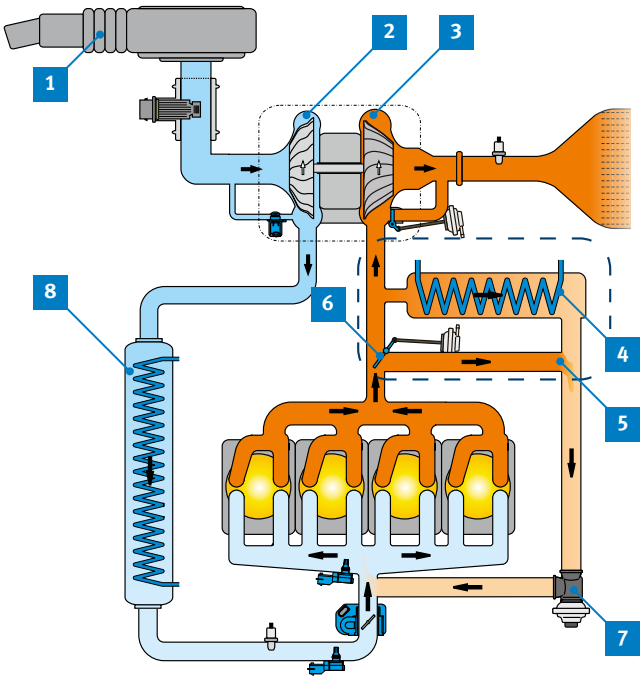
With gases there is a close relationship between pressure, temperature and volume. In simple terms:

- Heating a certain volume of a gas causes it to expand; if the gas is cooled, the volume decreases.
- If the volume is restricted, as is the case in a cylinder, for example, the pressure increases with increasing temperature and drops when cooled.

This shows that a fixed volume can absorb more gas when the gas is cooled.

Consequence: The greater the amount of exhaust gas in the cylinder charge, the lower the oxygen content will be.
The exhaust gas itself is not involved in the combustion process, but can absorb large quantities of heat thanks to its high “thermal capacity”.

Both of these effects cause the temperature peaks to sink and the combustion velocity to decrease during combustion, and thereby reduce the NO_x emissions.

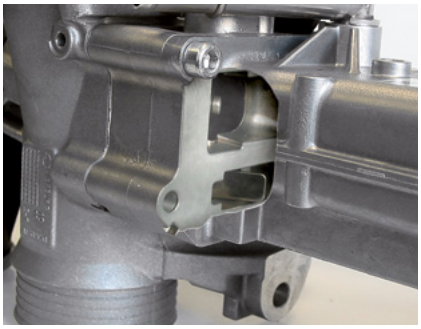


Cooled exhaust gas recirculation (schematic)

01 Air filter
02 Turbocharger (compressor)
03 Turbocharger (turbine)
04 EGR cooler
05 Bypass duct
06 Bypass flap (vacuum-controlled in this case)
07 EGR valve
08 Charge air cooler

BYPASS FLAP IN THE EGR COOLER

Many of today‘s EGR coolers feature an electrically or pneumatically operated bypass flap. This bypass flap allows the exhaust gases to be directed past the EGR cooler in the warm-up phase so that the engine and catalytic converter achieve their operating temperature more quickly. A further advantage here is a reduction in noise generation, the so-called “diesel knock”, as well as in the level of raw hydrocarbon emissions in the warm-up phase. A bypass is also possible if high exhaust gas temperatures are required, for example in the recovery of diesel particulate filters.



Bypass flap in the EGR cooler
(cut away view)

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