

**FOR THE
ENVIRONMENT**



Clean without additives

Euro 4, Euro 5 and EEV – solutions from MAN and NEOPLAN





Environmental protection – a matter of technique

Clean ways to the future.

Increasingly strict exhaust-gas standards in Europe are presenting bus manufacturers and operators with new challenges.

One thing is clear: Exhaust-gas control must give the environment lasting protection while, nevertheless, ensuring the entrepreneur a secure future. That is why MAN and NEOPLAN are working on technological solutions to offer customers environment-friendly transport at the same time as attractive prices.

Their approach to cleaner air is already right on track:

Compared with Euro 3 the Euro 4 limits considerably reduce the share of nitrogen oxides by about 30 % and the share of particulates by about 80 %. The Euro 5 standard valid from October 2009 again specifies yet another sustained reduction in the share of nitrogen oxides.

Modern exhaust-gas technology for your buses without additives.

Buses and coaches from MAN and NEOPLAN are the right solution for every area of application – not just for the currently valid Euro 4 standard (valid to 2009) and the coming even stricter Euro 5 standard. With our innovative technology we even voluntarily fulfil the EEV standard which stipulates yet lower values than the Euro 5 standard. This is based on the **MAN PURE DIESEL®** concept with solutions that are guaranteed to do without additives. Find out all the details on the following pages.



*MAN Lion's City – a force to be reckoned with in local city transport.
Fit even for EEV thanks to innovative exhaust-gas technology without additives.*



Solution for Euro 4: Reliable exhaust-gas treatment



A major challenge demands a strong combination:
MAN Common Rail diesel units with cooled exhaust-gas recirculation (EGR) and turbocharging additionally use the mainte-

nance-free MAN PM KAT[®] as a standard particulate filter.
As an option city buses can be fitted with the closed particulate filter CRTec[®].

Range of engines

- MAN D08 Common Rail, vertical, 6.9 l, 240 hp/177 kW to 280 hp/206 kW
- MAN D20 Common Rail, horizontal up to 390 hp/287 kW, vertical up to 440 hp/324 kW 10.5 l
- MAN D26 Common Rail, vertical, 12.4 l, 480 hp/353 kW

Special features

- Engine downsizing
- Consumption reduction compared with Euro 3: at least 2 percent
- State-of-the-art engine technology
- Use in chassis and complete buses for overseas markets where Euro standards do not apply

PURE DIESEL[®] – powered by MAN

PLUS

MAN and NEOPLAN buses offer the ideal exhaust-gas treatment for any application – without additives!



Solution for Euro 5: Exhaust-gas treatment with particulate filter



The higher you get the thinner the air? Not with MAN and NEOPLAN! Our Common Rail diesel units of the 2nd generation work with increased injection pressure from the eight-hole nozzles – with multiple and pilot injection combined with cooled, variable exhaust-gas recirculation (EGR) and its higher recirculation quota a larger reduction of nitrogen oxides is achieved within the engine.

Exhaust gases are directed to the combustion process in the double turbocharger with intercooling, a maintenance-free MAN PM KAT[®] serves as the particulate filter. City buses already more than fulfil the Euro 5 standard with the EEV engines, and intercity buses and coaches will be available in Euro 5 or EEV in 2008 and 2009 respectively, i.e. even before the legal introduction.

Range of engines

- MAN D20 Common Rail horizontal (intercity buses), 10.5 l, 320 hp/235 kW to 400 hp/294 kW
- MAN D20 Common Rail vertical (chassis for coaches), 10.5 l, 400 hp/294 kW bis 440 hp/324 kW
- MAN D26 Common Rail vertical (chassis fo coaches), 12.4 l, 440 hp/324 kW and 480 hp/353 kW

Special features

- Engine downsizing
- State-of-the-art engine technology with double turbocharging and intercooling
- For chassis and high-floor intercity buses with high power output
- Consumption no higher than with Euro 4



Solution for EEV: Controlled exhaust-gas treatment



EEV (Enhanced Environmentally friendly Vehicle) is currently the most demanding exhaust-gas standard for buses and trucks. The limits of this voluntary standard are even beneath those of the Euro 5 standard valid from 2009. Buses from MAN and NEOPLAN

already comply with EEV today – and that quite without additives! The Common Rail engine with two-stage turbocharging, cooled exhaust-gas recirculation (EGR) and the innovative CRTec® particulate filter stays well below the reference values.

Range of engines

- MAN D08 Common Rail vertical (city buses), 6.9 l, 250 hp/184 kW, 290 hp/213 kW
- MAN D20 Common Rail horizontal (low-floor city/intercity buses), 10.5 l, 280 hp/206 kW, 320 hp/235 kW, 360 hp/265 kW,
- MAN D20 Common Rail horizontal (high-floor intercity buses), 10.5 l, 320 hp/235 kW, 360 hp/265 kW
- MAN D20 Common Rail vertical, (Coaches / chassis), 400 hp/294 kW, 10,5 l
- MAN D26 Common Rail vertical, (Coaches / chassis), 440 hp up to 505 hp, 12,4l

Special features

- State-of-the-art engine technology with downsizing, low-temperature cooling, variable EGR and two-stage turbocharging
- No change in consumption compared with Euro 4 with the same output data with maintenance-free MAN PM-KAT or electronically monitored CRTec particulate filter, depending on application



Technologies for exhaust-gas control – made by MAN

Modern MAN Common Rail diesel units

- Third-generation common-rail injection system with injection pressures up to 1800 bar
- Pilot and multiple injections with eight-hole nozzles
- New low-temperature cooling with separate water circuit resulting in further increase in cooling output



Exhaust-gas recirculation

- Cooled variable exhaust-gas recirculation controlled by lambda probes with an increased recirculation quota which permits a NO_x reduction within the engine without use of additives



Double turbocharging

- Double turbocharging for different speed ranges
- for Euro 5 and EEV with intercooling



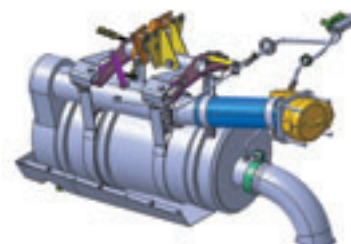
MAN PM-KAT®

- Robust, maintenance-free, clog-resistant
- Designed for the engine's service life
- Tamper-proof
- Particulate separation level over 90 % for fine dust (10-40 nm)
- Low additional weight (30 kg)
- Awarded the BDI environment and innovation prize in 2006



Particulate filter CRTec®

- Closed filter system for the most exacting tender conditions
- Electronically monitored, therefore no risk of clogging
- Dynamic, service-specific maintenance display
- Overall particulate separation quota over 95 – 99 percent
- Practical for city - and intercity buses







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