



Possibility of 20% hydrogen blending without component modification in V12 natural gas engines from MAN Engines

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Turbocharged engines and naturally aspirated engines in the E3262 series already H₂-ready; CO₂-reduction of up to 11.2%; efficiency increase in case of E3262 LE202

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Stationary gas engines of types MAN E3262 LE202 (turbocharged lean-burn engine) and MAN E3262 E302 (naturally aspirated Lambda-1 engine) are designed for a hydrogen blending of up to 20% by volume (H₂) when operated with natural gas. This is verified by extensive investigations on the part of the engine manufacturer. As such, MAN Engines supports operators in setting up their CHP units as “hydrogen readiness” plants, something the German government is currently assessing with a view to promoting it within the framework of the Combined Heat and Power Act (KWK-Gesetz).

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No design modifications are required for either type of MAN V12 natural gas engine for operation with hydrogen-containing fuels with up to 20% hydrogen blending by volume. This means that “hydrogen readiness” up to 20% by volume applies to all types of engine in existing installations (with knock detection) as well as to new deliveries. “As the market leader in our field of activity and a long-standing facilitator to our customers, we are able to offer a high degree of operational reliability. This is demonstrated not only by pure product quality, but also by new, innovative product features such as H₂ readiness,” says Günther Zibes, Head of Sales Power MAN Engines.

With blending of 20% hydrogen by volume, the E3262 E302 Lambda-1 engine achieves a CO₂ (carbon dioxide) reduction of 5.7% and an HC (hydrocarbon) reduction of 23.0%. The turbocharged lean-burn E3262 LE202 engine achieves a CO₂ reduction of 11.2% and an HC reduction of 17.4%. In addition, an efficiency increase of 1.2 percentage points is achieved in this case.

MAN Truck & Bus is one of Europe's leading commercial vehicle manufacturers and transport solution providers, with an annual revenue of more than 9,5 billion euros (2020). The company's product portfolio includes vans, trucks, buses/coaches and diesel and gas engines along with services related to passenger and cargo transport. MAN Truck & Bus is a company of TRATON SE and employs more than 37,000 people worldwide.



Power supply companies are planning to add up to 20% H₂ by volume to the natural gas network. According to the Federal Ministry for Economic Affairs and Energy, this “transformation process towards higher concentrations of hydrogen” is to be implemented over the medium term in order to achieve an immediate reduction in CO₂. Due to the high number of around 22,000 MAN gas engines that are installed in existing combined heat and power plants (CHP), CO₂ savings of approximately four million tons are realized every year worldwide. This substitution is achieved as a result of the highly efficient generation of electricity and heat by gas engines in CHP plants instead of energy generation using conventional technologies. Adding as little as 1% hydrogen by volume, which burns CO₂ neutrally, would prevent the emission of around 100,000 tons of CO₂. For this reason, MAN Engines will also be assessing other engine types in its existing gas engine portfolio for hydrogen blending opportunities.

Hydrogen blending for MAN V12 gas engines

MAN E3262 E302 output 275 kW at 1,500 rpm; Lambda=1



Emission	unit	0 Vol.-% H ₂	10 Vol.-% H ₂	20 Vol.-% H ₂	Savings in % for 20 Vol.-% H ₂
CO	ppm	747	740	738	1.3
CO ₂	%	11.6	11.3	11.0	5.7
effective efficiency	%	38.0	38.0	38.0	neutral in efficiency

MAN E3262 LE202 output 550 kW at 1,500 rpm; Constant NO_x Emission setup 500 mg/Nm³ (at 5% residual oxygen)



Emission	unit	0 Vol.-% H ₂	10 Vol.-% H ₂	20 Vol.-% H ₂	Savings in % for 20 Vol.-% H ₂
CO	ppm	392	349	310	21.0
CO ₂	%	7.05	6.7	6.3	11.2
effective efficiency	%	40.4	41.1	41.6	efficiency advantage 1.2 % pt.

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