



New gas turbine generation from MAN convinces with extremely low nitrogen oxide emissions

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MAN Diesel & Turbo undershoots the legal requirements for NOx emissions several times through the use of combustion chambers with premix technology

Not only highly efficient, but also particularly low in pollution: MAN Diesel & Turbo has managed to reduce the nitrogen oxide emissions of their new MGT gas turbine generation to an extremely low level in test stand runs. "In addition to the particularly high efficiency, one of our primary development aims was that the new gas turbine family had to be equally economic and environmentally-friendly all the way down the line," says Dr. Sven-Hendrik Wiers, Vice President Gas Turbines. "The single digit NOx values now realized in the load range between 50 and 100 percent with the MGT 6100, the single-shaft version of the new MGT gas turbine family, impressively prove that we have achieved this aim."

Less than ten ppm nitrogen oxide (ppm = parts per million, in this case parts per million of the total volume) were detected in the exhaust gas on the test stand in Oberhausen during all operating conditions between half and full performance of the gas turbine. In comparison: The German Federal Immission Control Act currently specifies a limit value of 36.5 ppm (equivalent to 75mg/Nm³) in the "Technical Instructions on Air Quality Control (TA Luft)".

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"We are convinced that we can repeat this excellent result in further versions of the same type. In a further step, we are planning on guaranteeing our customers very low nitrogen oxide values based on the test results, thereby increasing the competitiveness of the gas turbine," says Frank Reiss, Head of Combustion Technology. The development department in Oberhausen achieved these extremely low emission values with an ACC combustion chamber modified and further developed for the new gas turbine generation.

MAN Diesel & Turbo has already developed and successfully implemented an "Advanced Can Combustor" (ACC) for their time-proven THM gas turbine family. These can-type combustion chambers work on the principle of premix technology. The fuel is already premixed homogeneously with the combustion air before entering the combustion chamber. The result: Fuel-rich hot strands are avoided. This means that significantly less nitrogen oxides, which are harmful to both living beings and plants at higher concentrations, are formed in the exhaust gas.

The new gas turbine generation with six to eight megawatt output has a great potential to drive the energy revolution forwards. The turbines can be started up comparatively fast with values of under ten minutes and can ideally supplement strongly fluctuating renewable energy sources such as wind or solar power as generator drives. Funding was received for development of the new gas turbine under the North Rhine-Westphalia Objective 2 Programme 2007-2013 "Regional Competitiveness and Employment (ERDF)".



"With regard to this aspect it is particularly important that we have achieved low nitrogen oxide emissions in a wide load range. Because it is exactly this flexibility that will be in demand in future, especially for decentralized power generation," explains Dr. Wiers. SolVin was the first customer to put into operation a two-shaft MGT 6200 at their Rheinberg site at the end of June. As a cogeneration system (CHP), it produces power and process heat for the manufacturer of basic chemicals, with a total efficiency of over 80 percent.



The six AAC combustors are fitted with instruments for testing.



The new MGT 6100 single-shaft gas turbine before being put through its paces on the test bench in Oberhausen

MAN Diesel & Turbo SE, based in Augsburg, Germany, is the world's leading provider of large-bore diesel engines and turbomachinery for marine and stationary applications. It designs two-stroke and four-stroke engines that are manufactured both by the company and by its licensees. The engines have power outputs ranging from 450 kW to 87 MW. MAN Diesel & Turbo also designs and manufactures gas turbines of up to 50 MW, steam turbines of up to 150 MW and compressors with volume flows of up to 1.5 million m³/h and pressures of up to 1,000 bar. The product range is rounded off by turbochargers, propellers, gas engines and chemical reactors. MAN Diesel & Turbo's range of goods includes complete marine propulsion systems, turbomachinery units for the oil & gas as well as the process industries and turnkey power plants. Customers receive worldwide after-sales services marketed under the MAN PrimeServ brand. The company employs around 15,000 staff at more than 100 international sites, primarily in Germany, Denmark, France, Switzerland, the Czech Republic, India and China. MAN Diesel & Turbo is a company in the Power Engineering business area of MAN SE.