

GERMANY: STATIONARY ENGINES: EMISSIONS

Background

The *Technical Instructions on Air Quality Control* (Technische Anleitung zur Reinhaltung der Luft), referred to as *TA Luft*, is a regulation covering air quality requirements—including emissions, ambient exposures and their control methods—applicable to a number of pollutants from a range of stationary sources. The TA Luft regulation, based on the Federal Air Pollution Control Act (Bundes-Immissionsschutzgesetz), has been introduced and is enforced by the German Environment Ministry (BMU) (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit).

The TA Luft regulation was first introduced in 1986. The most recent revision, known as TA Luft 2002, was adopted on 24 July 2002. Compared to the previous requirements, TA Luft 2002 has introduced more stringent emission limits for particulate matter, sulfur oxides, and nitrogen oxides from internal combustion engines.

Among other sources, the TA Luft regulation covers emissions of pollutants from stationary internal combustion engines.

The TA Luft requirements have been widely applied to stationary gas and diesel engines not only in Germany, but also in several other European markets.

Technical Standards

a. Engine Emission Standards

TA Luft 2002 emission limits for PM, CO, and NOx are given in the following tables. Different limits exist for compression ignition (CI) and for spark ignited (SI) engines. Gas fueled CI engines (dual fuel with diesel pilot ignition) often enjoy more relaxed limits, especially if fueled by biogas (such as sewage or landfill gas).

PM Emission Limits for Internal Combustion Engines, mg/Nm ³ @ 5% O ₂	
Category	PM
CI liquid fueled	20
CI liquid fueled stand-by [†]	80
CI gas fueled (dual fuel) or SI	no limit
Notes: [†] emergency operation only or peak shaving operation for less than 300 hrs per year	

CO Emission Limits for Internal Combustion Engines, g/Nm ³ @ 5% O ₂		
Category	CO [†]	
	≥ 3 MW	< 3 MW
All, excluding biogas and mine gas fueled	0.3	
CI biogas (dual fuel)	0.65	2.0
SI biogas	0.65	1.0
SI mine gas	0.65	

Notes:

† CO limits do not apply to emergency engines or engines used for peak shaving for less than 300 hrs per year

NO_x Emission Limits for Internal Combustion Engines, g/Nm³ @ 5% O₂

Category	NO _x †	
	≥ 3 MW	< 3 MW
CI liquid fueled CI biogas (dual fuel)	0.5	1.0
SI biogas or SI lean-burn using other gas fuels CI (dual fuel) using other gas fuels	0.5	
Other 4-stroke Otto engines	0.25	
2-stroke engines	0.8	

Notes:

† NO_x limits do not apply to emergency engines or engines used for peak shaving for less than 300 hrs per year

All of the above engine emission limits are expressed as dry gas concentrations at Standard temperature and pressure (0°C; 101.3 kPa) (STP) conditions, that have been corrected to a 5% oxygen content using the following formula:

$$E_B = E_M \times (21 - O_B)/(21 - O_M)$$

Where:

E_B - mass concentration of pollutant corrected for the reference

O₂ concentration,

E_M - measured mass concentration of pollutant,

O_B - reference O₂ concentration, vol. %,

O_M - measured O_2 concentration, vol. %.

The TA Luft 2002 limits for diesel engines are rather strict. The NO_x limit of 0.5 g/Nm³ typically requires the use of SCR catalysts on large diesel engines.

b. Sulfur Regulations

According to TA Luft 2002, a liquid fired stationary engine is to burn a light fuel oil according to DIN 51603 Part 1 (March 1998) containing max. 0.2% (wt.) sulfur and with a lower heating value > 42.6 MJ/kg, or to reach an equivalent SO_2 limit by installing a flue gas desulfurization unit. The equivalent SO_2 limit resulting from the above fuel requirement is about 110 mg/Nm³ @ 15% O_2 = approx. 300 mg/Nm³ @ 5% O_2 .

Source:

http://transportpolicy.net/index.php?title=Germany:_Stationary_Engines:_Emissions