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## **Euro Environmental Standards**

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European emission standards for exhaust gases are created to define the maximum allowed levels of total gases produced by the motor vehicles, offered in European car markets. The name of each standard consists of the word "Euro" and a number after it.

The specific detail is that for cars and light-duty vehicles are used the Arabic numbers (from 1 to 6), while for heavy-duty vehicles are used Roman numbers (from I to VI). The numbering is updated regularly, as it grows chronologically with each new standard. So, up to the present days for cars, vans and light-duty vehicles the standards are from "Euro 1" to "Euro 6", and for heavy-duty ones, respectively - from "Euro 1" to "Euro 6".

The requirements vary depending on automobiles fuel, type and mass. The growing number of the standards marks the update of European norms and directives, concerning emissions and air quality.

The European Parliament is expected to provide even more stringent measures for reducing exhaust gases emissions in the closest future [1].

The Euro environmental standard is a system of environmental standards that regulate the requirements for the content of harmful substances in vehicle exhaust gases. The environmental class of a vehicle is a special classification code that characterizes automotive equipment in accordance with the level of pollutant emissions. Pollutants include engine exhaust

gases and fuel vapors containing carbon monoxide - CO, derivatives of hydrocarbons - CmHn, nitrogen oxides - NOx, as well as dispersed particles.

Euro standards were introduced by the United Nations Economic Commission for Europe.

The first environmental standard Euro-1 was adopted in the European Union in 1992 and began to operate in 1993. This standard regulated the content of CO, CH and NO in exhausts and applied to all vehicles. Each subsequent one is a continuation of the previous one, that is, the larger the standard number, the harder the requirements for exhaust gases. The amount of these gases depends not only on the car, but also on the fuel. Therefore, there are corresponding standards for gasoline and diesel fuel.

Euro 2, introduced in 1995, tightened CO emission standards almost in 3 times.

The Euro 3 standards adopted by the European Union in 1999 regulated the reduction of emissions by 30-40%, and for gasoline engines a norm for the amount of hydrocarbons in the exhaust appeared.

The Euro 4 standards came into effect in the EU in 2005 - and emissions became cleaner by another 65-70%.

In 2009, the European Union introduced the Euro 5 standard, which significantly reduced the amount of suspended particles in the exhaust of diesel engines and introduced standards for volatile organic substances in gasoline engines.

Euro 6, adopted in 2015, is considered the latest environmental standard that defines even more requirements for the exhaust gases of cars with diesel and gasoline engines. First of all, this concerns the content of nitrogen oxides emitted by diesel engines into the atmosphere. Since October 2008, the Euro-4 standard has been updated - the Euro-5 standard. Within the framework of the Customs Union between Russia, Belarus and Kazakhstan, the mandatory introduction of Euro-4

and Euro-5 was planned. Now Belarus uses Euro-4 and Euro-5 standards, but the transition to Euro-6 is not yet possible.

For the heavy-duty vehicle, which mass exceed 3,5 tons, there are also European standards. For them, the numbers used are the Roman instead of the Arabic ones. This category also includes some trucks and buses, using diesel engines. A significant difference in standards is that for heavy-duty vehicles the emissions are calculated in gr/kW and are related to the engine maximum power output, while for the light-duty vehicles the exhaust gases are measured in gr/km and are related to the range of the automobile. This makes the comparison between the standards for light and heavy-duty vehicles impossible. That's why it is so important to know how exactly to write down every standard name, you are looking for. Machines using diesel aggregates, but not usually used for road driving are the so-called “Non-Road Mobile Machinery”(NRMM). They should also comply with the specific European emission standard. The well known Euro standards do not apply to them. Their stringent tiers are comprised gradually known as Stage I–V standards, as the last one - Stage IV is active since 2014. As of 1 January 2015, EU Member States have to ensure that ships in the Baltic, the North Sea and the English Channel are using fuels with a sulphur content of no more than 0.10%. Higher levels are allowed only in the case that an appropriate exhaust cleaning systems are in place.

#### References:

1. European emission standards explained [Electronic resource]: – Mode of access: <https://www.auto-data.net/en/european-emission-standards-explained-document-258>. – Date of access: 02.04.2022.