



# WHAT DO THE EMISSIONS CONTAIN?

When driving an engine, undesirable substances are created and released as a result of the combustion of fossil fuels. Some substances are covered by emission regulations while others are not. In the table below you see specific information about the substances and the affect they have on you and the environment.

By choosing a new Volvo Penta engine that complies with the most stringent international emission regulations, you help to minimise the amount of unwanted emissions – a benefit for you and the environment as a whole.

Components covered by emission regulations	Description	With a new Volvo Penta engine you avoid
<b>Particulate matters, PM</b>	Small particles of different sizes and origin (mainly carbon) that are hazardous to inhale and cause general dirtiness.	<ul style="list-style-type: none"> <li>• Unhealthy smoke</li> <li>• Dirty surfaces</li> </ul>
<b>Hydrocarbons, HC</b>	A lot of different compounds of unburned or partly burned fuel. Some are odorous, toxic and hazardous to the environment	<ul style="list-style-type: none"> <li>• Odorous and unhealthy smoke</li> <li>• “Petroleum mirror” on the water</li> </ul>
<b>Nitrogen oxides, NO<sub>x</sub></b>	Gases that are formed at high temperatures. They are irritating to lungs and cause acidification and other environmental disturbances.	<ul style="list-style-type: none"> <li>• Odorous and irritating exhaust emissions</li> </ul>
<b>Carbon monoxide, CO</b>	A toxic gas formed when combustion is incomplete.	<ul style="list-style-type: none"> <li>• Unhealthy exhaust emissions</li> </ul>
<b>Non-regulated emission components</b>		
<b>Sulphur dioxide, SO<sub>2</sub></b>	Odorous, acidic and hazardous gas formed from sulphur present in the fuel.	<ul style="list-style-type: none"> <li>• Odorous and irritating exhaust emissions</li> </ul>
<b>Carbon dioxide, CO<sub>2</sub></b>	A greenhouse gas. Ultimate product from combustion of oil/gasoline. The amount of CO <sub>2</sub> is directly linked to fuel consumption.	<ul style="list-style-type: none"> <li>• Contributing to global warming</li> </ul>



## Authorities set the requirements

2006 will see the introduction in the EU and the USA of requirements that apply to almost all new leisure boats sold within the respective markets.

### USA

**EPA** (United States Environmental Protection Agency). The government body that issues federal environmental requirements. EPA's regulations must be complied with by boats and diesel engines sold in the USA.

**CARB** (California Air Resources Board) is a local authority in California. The authority's requirements apply locally in California but often act as a precedent for the rest of the USA and Europe.

### EUROPE

**The EU** (European Union) issues directives that set requirements for emissions from leisure boat engines. The regulations must be complied with by boats and engines sold in the EU. **Local regulations.** There are local regulations in Europe for certain lakes, canals and other watercourses.

## Clean engines are marked

To make it easier for you as a customer to see which engines produce low emissions, Volvo Penta uses the following markings.



Volvo Penta uses this mark to identify diesel engines that comply with the emission requirements introduced in the EU and USA as from 2006.



The local California Air Resources Board (CARB) has introduced an environmental program, Star, that is used in California and elsewhere to classify emission levels for gasoline engines in leisure boats. The more stars, the cleaner the engine. Volvo Penta engines have been awarded three stars and thus belong to the cleanest category of engines on the market.

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