



GREEN DEVELOPMENT

Volvo Penta industrial power for progress
in tune with the environment



**VOLVO
PENTA**

POWERFUL PROGRESS

PROGRESS AND ENVIRONMENTAL AWARENESS. COMBINED.

Combining economic growth with environmentally sustainable development is one of the major challenges of our time. Each year Volvo Penta devotes massive development resources to develop state-of-the-art products that satisfy our customers' demands for increased productivity, high performance and reduced environmental impact.

RESOURCES FOR DEVELOPMENT

Environmental care in all operations is an integral part of Volvo Penta's commitment to customers and end users, employees and the community. As a supplier of diesel engines we have a responsibility to reduce the environmental impact from our products both under production and during their complete lifetime.

Proactive environmental programmes, covering the whole company including product development and production as well as sales and service departments, do this.

Special attention is given to energy efficiency, manufacturing, emissions and noise, material efficiency, technology for the future and environmental management.

All our manufacturing units are certified to ISO 14001.

The Volvo Penta range of engines is built upon the stable foundation of the Volvo Group's medium and heavy duty engines and

where Quality, Safety and Environmental Care are paramount and an integral part of the development process right from the start.

The advanced engines are designed using world leading CAD tools and finite element analysis and then developed and verified in one of the world's foremost testing laboratories.

Field testing to ensure durability, reliability and suitability for the application in the environment where they are to be used is conducted to secure quality.

The latest advances in engine technology are used to ensure that the engines meet existing and future emission legislation.

The complete Volvo Group technology is open to Volvo Penta. To make the right choice it is vital to have extensive knowledge coupled with application know-how. Many years of experience have given Volvo Penta's application engineers just this!



EMISSIONS AND NOISE

We are constantly looking to improve not only exhaust emissions, but also noise emissions. Much of this work is concentrated on fuel injection equipment, block and cylinder head design. We can also offer an electrically driven variable fan to some of our engines which not only reduces noise, but also fuel consumption.



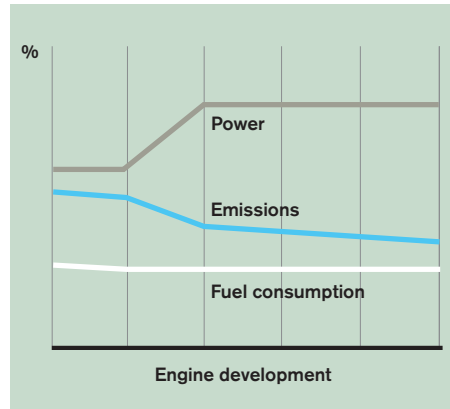
TECHNOLOGY FOR THE FUTURE

Our commitment is to develop high performance products that meet or exceed global emission standards and combine Volvo core values with reliability, durability and lowest cost of operation.

Our technology choice to meet legislative demands in Europe and the United States in 2011, reducing exhaust gas emissions and fuel consumption, for our all-speed off-road and stationary engines is Selective Catalytic Reduction, or SCR. To meet the next stage of legislation in 2014 SCR will be coupled with additional advanced technologies developed within the Volvo Group. Constant speed engines will meet 2011 legislation using EGR, exhaust gas recirculation.

ENVIRONMENTAL MANAGEMENT

LCA- (life cycle assessment) is a tool for evaluating and comparing environmental impact from products during the whole life cycle - from cradle to grave. Raw material consumption, emission of harmful substances, waste generation etc of a product are investigated and assigned a scientifically based "environmental load unit", ELU. One LCA tool that is used at Volvo is EPS - "Environmental Priority Strategies in product design". EPS was developed in Sweden by a number of project partners initiated by Volvo.



ENERGY EFFICIENCY

Our engines are designed to be dependable and robust and, with our internal demands on deterioration factors, to meet environmental demands year after year.

Volvo Penta's engineers are the Volvo Group's experts at performance development and the power density of our range has risen steadily with little effect on specific fuel consumption.

A good choice for the environment!



MATERIALS EFFICIENCY

It is not only the engine and engine mounted components that are taken into account by our development process. We also pay attention to the type and size of the transport packaging.

We offer our customers solutions to minimize logistic waste and our packaging is optimised to encourage the most effective usage of containers and trailers to reduce the effects on the environment.



MANUFACTURING

All production units must comply with our minimum requirements of environmental performance and have an on-going improvement program. The requirements include that energy consumption, waste amounts, emissions to air and water have to be monitored, as well as specifying maximum emission levels to air and water. Most plants are well above the minimum requirements and show a steady improvement. The Volvo Groups commitment for the future is that all plants within the Volvo Group shall be CO₂ neutral.



THE VOLVO PENTA GREEN COMMITMENT

Together with safety and quality, the environment is one of Volvo's core values. "The Volvo Penta Green Commitment" is the comprehensive theme for all our efforts in the following areas:



- Design guidelines and methods
- Development of diesel engines that can operate on future renewable fuels
- Ultramodern engines that combine higher performance with emission compliance – well in advance of new regulations
- Dealer operating standards to reduce environmental impact
- Improvement of fuel consumption and reduction of environmental footprint
- Research and development of hybrid solutions to significantly reduce emissions
- Engines approved for B30 Biodiesel blends
- Cooperation with OEM in drive-cycle analysis to optimize fuel consumption
- Continued advances in combustion technology that dramatically reduces emissions

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