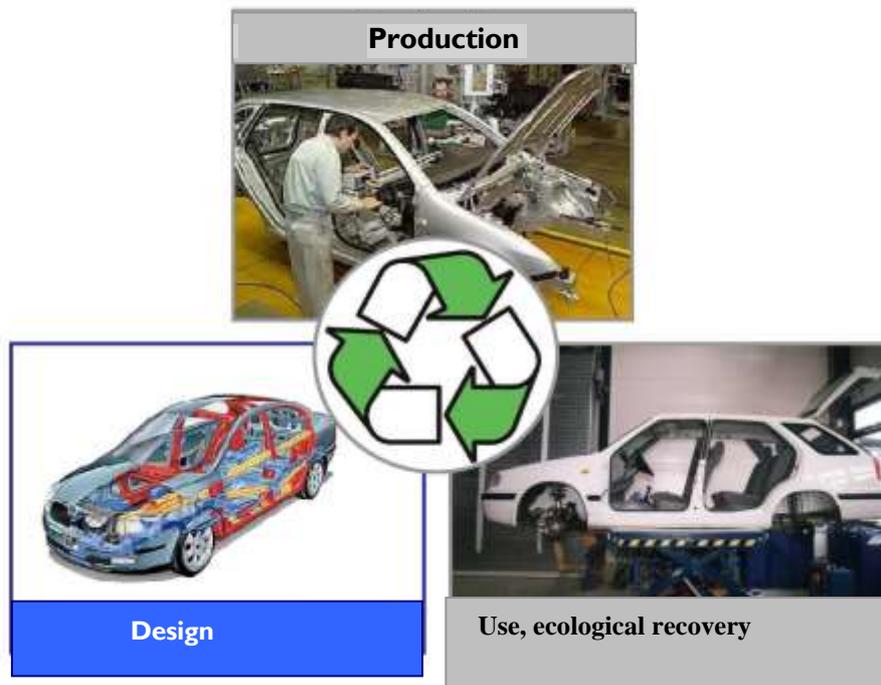


## Guaranteed possibility of vehicle recycling

The manufacturers in Volkswagen Group have satisfied in advance the requirements of the EU law governing the possibility of the end-of-life vehicle recycling. All vehicle types offered within the EU territory have been issued type approval certificates compliant with the requirements of the European Community Directive 2005/64/EC. They concern the materials used, part designation and obtaining a recovery level of at least 85% of a vehicle weight. It means that a decisive majority of the materials used must be suitable for reuse.

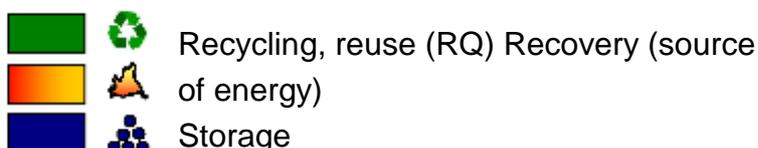
We think about vehicle recycling as early as in the design and production phases



*We pay attention to recycling in all phases of product life*

The main objective of vehicle recycling is to minimize the effect of the scrapped vehicles on the environment. The European Community requirements concerning end-of-life vehicles have been set out in the Directive 2000/53/EC. The most important objectives of the Directive are:

- 1) To fulfil the required material recovery level (RQ) during vehicle scrapping (percentage of vehicle weight).



In order to fulfil the recycling requirements in 2015, an appropriate RQ level must reach the target value in all new vehicles manufactured after December 2008.

## 2) Ban on the use of heavy metals.

As of July 2008 it is prohibited to use lead, mercury, cadmium and hexavalent chromium, with the exception of absolute necessities defined in the Directive.

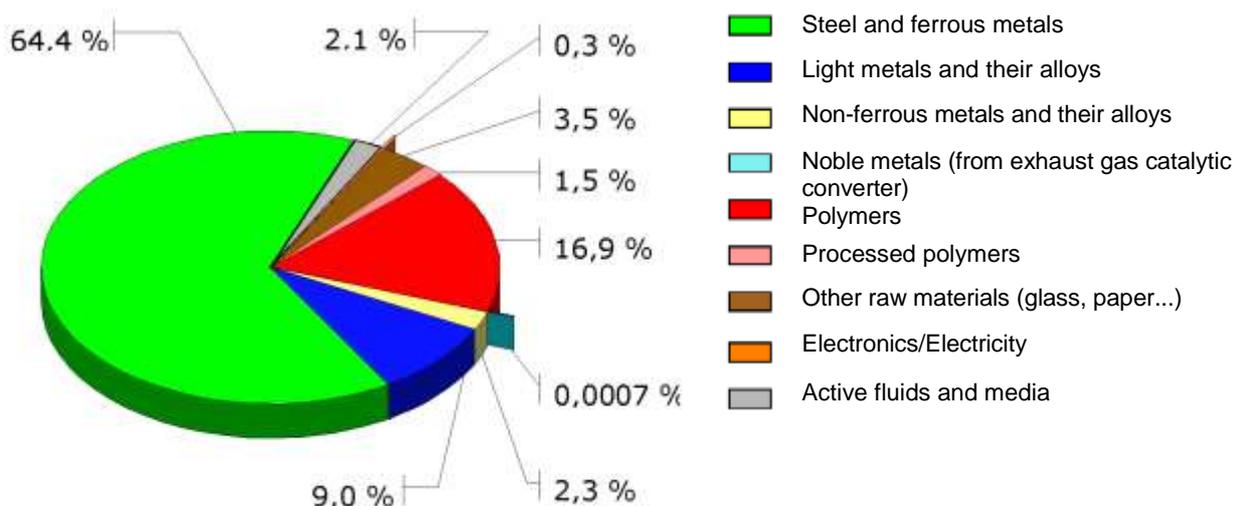
In the case of our vehicles, these requirements are fulfilled in all processes from design to ecological recovery. As part of the technical development concept, we have optimized the vehicle construction as regards recycling. We have mainly paid attention to:

- selection of materials suitable for recovery
- avoiding using hazardous substances
- part designation (identification)
- providing the information on material composition to the IMDS (International Material Data System)
- disassembly and part recycling capability

### What type of materials do we use?

Our customers value high quality materials which have excellent properties and fulfil the stringent environmental regulations and are environmentally friendly. We prefer materials suitable for recovery, and together with our suppliers we use recovered raw materials which have parameters comparable to those of the new ones.

We have created a process which enables compliance with legal requirements concerning the ban on and limitation of the use of lead, mercury, cadmium, hexavalent chromium, etc. We reduce the quantity of processed materials. In cooperation with our suppliers, we conduct a comprehensive analysis of the part raw material composition. The information on component composition is entered into the IMDS.



Sample raw material composition of Skoda Octavia 1.9 TDI, 74 kW, with 5-speed gearbox

For easier and clear identification of parts and their raw material composition, we consistently mark them according to relevant standards. The marking enables fast sorting of materials into groups and their subsequent recycling, or (optionally) energy recovery.



Sample part marking (top pillar C liner – Fabia)

**The course of our vehicle recycling process is developed already during their construction.**

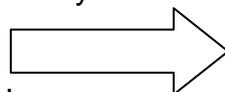
We have optimized vehicle structure according to the current state of knowledge in the fields of disassembly, recycling technology and legal requirements (Directive 2000/53/EU). We prefer the connection techniques which facilitate disassembly, and we minimize the number of details and types of materials used. We also focus our attention on the complete removal of fluids from a vehicle. Together with our suppliers, we have created a recycling concept and defined future procedures of ecological recovery for each part group.

By reducing and optimizing the vehicle weight, we save raw materials and reduce the quantity of waste. We have increased the share of structures made of light metals (non-ferrous metals, high strength profiles, plastics).

### Octavia I



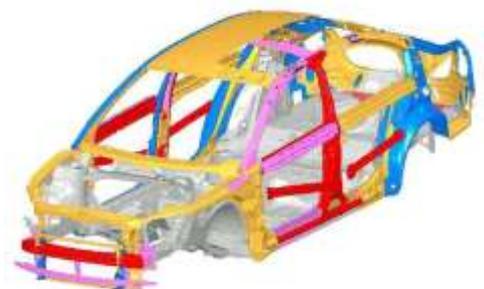
Higher safety



Lower weight

- $R_{p0,2} < 180$  MPa
- $R_{p0,2} 180-300$  MPa
- $R_{p0,2} 300-500$  MPa
- $R_{p0,2} > 500$  MPa

### Octavia II



Comparison of the strength of steel profiles used in the body of Octavia I and Octavia II. Higher value of  $R_{p0,2}$  index means higher strength.

## How do we verify compliance with the requirements?

As part of detailed disassembly tests, we check compliance with legal requirements, and adapt vehicles to the recycling capability. We monitor vehicle raw material composition, fulfilment of the required recycling levels, and we assess the disassembly capabilities in relation to given part groups.

We actively participate in creating the IDIS information system containing detailed disassembly, sorting and recovery instructions.



*Disassembly instructions – example concerning front door and rear seat armrest in Octavia.*

We have created processes which will enable compliance with legal requirements, and we are still improving them.

As part of the annual audit of the Integrated Management System (quality management system ISO 9001 + environmental management system ISO 14001) conducted by an independent, certified organization, we confirm the functionality and constant process improvement.

**We offer our customers environmentally friendly products, thus contributing to the realization of the society's sustainable development.**

**Poznań  
2012**