MINI RECYCLING.
HARD FACTS.

DESIGN FOR RECYCLING.

In the early stages of product development, MINI specialists ensure that hazardous materials are excluded from all parts and components. The strategic use of recyclates for component production leads to the reduction of the amount of resources required. Environmentally-friendly recycling processes already exist for metallic components, and it was possible to develop similar recycling processes particularly for the ever-increasing number of plastic parts. In terms of weight, 10 % of all plastic parts used in the MINI are made up of recyclates.

An optimum recycling quota for the materials used in the construction of the MINI is achieved by placing emphasis on recycling-friendly construction of all components at a very early stage of development. Design engineers are supported by specially developed standards that guide recycling-friendly vehicle construction.

Optimised joining techniques and material selection make the economical dismantling of many of MINI components possible. For example, the outer cover of the instrument panel and the shelf below make up a ‘one-material system’ consisting of <ABS+PC>.

The loading shelf and the seat panelling covers are examples of pure <PP>materials. The loading shelf cover is fastened by only an expanding rivet, and can be detached from the MINI within seconds. After a side screw has been loosened, the front seat’s rear panel can be levered from its clip and rivet joints. These components can then be recycled completely.

Overall, the stringent implementation of the "Design for Recycling" philosophy at MINI Development ensured that, as soon as production had begun in 2001, the MINI had already met the recycling quotas stipulated by the EU directive on end-of-life vehicles for 2015.

THE DEPOLLUTION PROCESS.

Pre-treatment first starts with deployment of the airbags and other pyrotechnic devises. The MINI then gets moved on to what is known as the depollution rig, where the majority of the work is carried out. To simplify this process, the MINI has easily accessible drainage screws and marked drilling points to allow quick and easy access to the operation fluids. Refrigerant and air conditioning gases are drained off. Brake fluid, cooling fluids, engine and transmission oils and any remaining fuels are then removed using a number of specially designed suction tools and intrinsically safe drills. The different liquids are then filtered and cleaned for reuse, where possible.

Pyrotechnical components
Pyrotechnical components, such as airbags and seatbelt pretensioners, are triggered using a standardised activation device. This neutralises them, eliminating any risks they may have posed during the rest of the recycling/dismantling process.

Battery
After the battery has been unclamped and removed, it is sent to a specialised recycling plant, where it is shredded completely. The <PP> plastics are removed and regranulated, with the regranulate used to manufacture new <PP> plastic parts. The lead in the battery is melted down and made into blocks. These lead blocks are then used as raw materials for the lead-processing industry.

Oil
Discharged oils can be refined and reused in the production of new oil.

Petrol
In the course of dismantling, petrol is removed from the MINI by drilling a hole in the tank at the deepest point, suctioning off the petrol and then sealing the hole. The petrol is either burned for energy production or to refuel other cars.

Brake fluid
The discharged brake fluid can be purified via vacuum film evaporation in order to reduce the amount of water it contains. The output can be used for brake fluid again.

THE DISMANTLING PROCESS.

Reuse and recovery increases the recycling quota of end-of-life vehicles. For metal parts, reuse or recycling is already a well-established process. Ferrous metal is the principal material in a MINI and as such accounts for the vast majority of recycled material, and is directly supplied back into the metal industry. Parts and components can be disassembled to be used for the same purpose for which they were originally conceived and manufactured. Glass and many plastics can also be recovered and recycled either at the dismantler or after the shredding process.

Engine
Depending on its condition, the engine of the MINI is either disassembled or torn out using a manipulator. It is then either sold or sent to the MINI exchange parts production unit. Here, the engine is dismantled and cleaned, and any worn parts are replaced. It is then reassembled and is available for customers as a replacement engine. Alternatively, the engine and transmission are used as metal-rich scrap. The scrap is shredded and sorted, and the metal fractions (iron, aluminium and magnesium) are then reused in metal production.

Catalytic converter
The MINI's catalytic converter is removed using hydraulic shears, and the precious metals (e.g. platinum, rhodium, palladium) are returned to the materials cycle. They are used, among others, for the manufacture of new catalytic converters for the MINI.

Glass
During the dismantling process, the MINI's front windscreen is removed using sawing or milling equipment, and the rear and side windows are knocked out. The glass is then sent to a sheet-glass recycling plant. The pieces of glass are then ground down. The pea-sized pieces of glass are sorted, with tinted glass and any foreign bodies being shot out with air blasts. Recycled glass is an integral part of the glassmaking industry, with most of it being used in the manufacture of bottles and jars.

Alloy wheels
During the dismantling process, the wheels are removed from their axles and the rims and tyres are separated. The alloy wheels are then melted down and recycled to form secondary aluminium.

Bumper trims
After the bumper has been removed from the MINI, it is separated into metal and plastic parts. Rapid dismantling of the large bumper trims, which are made of plastic, is already guaranteed in the early stages of the product development process. All fastening elements are easily accessible, and the construction of the trims enables economical dismantling.

The aluminium parts of the bumper trims are sent off to be recycled, and the plastics are ground down, stripped of their paint finish and regranulated. The recyclates are used in the manufacture of parts, such as wheel housings (in terms of weight, 10% of all plastic parts used in the MINI are made up of recyclates).

Rear seat panelling
After being dismantled, the rear seat panelling in the MINI is shredded and then melted down to form plastic regranulate.

Instrument panel cover
The instrument panel cover and shelf are made of 'one-material' systems consisting of <ABS+PC>. These components are destined for economical recycling, aided by a joining technique with quick-release torque screws. The instrument panel cover is shredded, melted down, filtered and then granulated to form plastics regranulate. All plastic components are labelled with the materials they are made of, for rapid identification for separation and optimum recycling.

THE SHREDDING PROCESS.

The remainder of the MINI is transported, often partially crushed or flattened, to the shredder. Here the hulks are fed through a variety of mechanical and physical shredding and cutting processes as part of a mixed feed. They are finally sorted into their different metal fractions, sizes and remaining materials including plastics, textiles, glass and foam.

Body
The shredder reduces the hulk to palm-sized pieces. An air separator is used to sort light plastic parts, leather, carpets and textiles, which are then used for energy production. Parts containing iron are separated using a magnet. The remaining non-iron parts will be broken down in a specialised plant in float/sink reprocessing units into aluminium, copper and magnesium fractions, and then used in metallurgical processes.