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# "KEEN ON GREEN"

## ➲ ALUMINIUM

### Aluminium general

- Verstatile material; strong, durable, flexible and light weight
- Produced from bauxite; one of the earths' most plentiful elements (8%)
- Appr. 5 cubic meters of bauxite are needed to produce 1000 kg aluminium
- Density of 2700 kg/m³ makes aluminium two thirds lighter than steel
- Primary aluminium is energy intensive to produce. Modern smelters need about 13 kWh to produce 1 kg of primary aluminium
- More than 55% of the world's primary aluminium is produced using hydro-electric power which is clean, CO2 free and renewable
- Rolling, casting and other further production steps require a relatively small quantity of energy because of the low melting point / processing temperature of aluminium
- Shipping aluminium goods requires relatively little energy because of its positive mass/weight proportion

### Life cycle of aluminium

- Aluminium is 100% recyclable without any loss of quality
- Recycling is done at only 5% of the cost of primary aluminium production without any loss of performance. This makes aluminium a real "energy bank"
- Its energy bank properties make aluminium stronger with every kg of primary aluminium that enters the cycle. Aluminium is therefore regarded as the material of the future.
- Evermore aluminium is entering this attractive and endless recycling process
- Aluminium scrap has a high rest value which makes collection / recycling very beneficial
- The average recycling rate in building, construction and transport is appr. 85% (NL: 94%)

### Aluminium in building

- Light in weight - low loads on buildings
- Lighter construction – higher cost efficiency
- Easier handling – short building lead times
- Enormous versatility in panels – great aesthetics
- Extends life expectancy of whole building
- Temporarily investment parked in a building
- Aluminium building components show no leaching – causing no emissions into the ground
- Emphasis on sustainability and lifetime costs make aluminium a material of natural choice
- Ease of maintenance – low maintenance costs
- Perfectly fits the "Design for Dismantling" (re-use elements) and "Design for Recycling" (re-use materials in their own cycle) principles

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**Euramax specific**

- A first investigation amongst our coil suppliers shows that 90 to 95% of the input for 3004 and 3005 alloys has its origin in recycling content. This figure is based on 2008 deliveries to Euramax.
- The recycling content rate is being influenced by the world aluminium demand and the offer of recycling content. Over a longer time the recycling rate for 3004 and 3005 alloys is expected to be at least 80 to 90%.

Melting

Casting

Rolling

Coating

Cladding

Recycling

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## ➲ COIL COATING

Coil coating is carried out in a controlled production facility which is the foundation of its quality and environmental performance. Subsequent advantages are:

- *Optimized paint layer*
  Optimum cleaning, pre-treatment and primer applications are utilized. Consequentially an evenly spread, perfectly finished paint layer is achieved.

- *Minimum paint waste*
  Coating application is done by roll coaters that pick up paint from paint trays. Paint is applied on to the coil meaning that overspray (spray paint that does not end up on the surface) is eliminated.

- *Solvents captured / water cleaned*
  Normal painting can result in pre-treatment chemicals, paint solvents and waste water being released into the atmosphere, whereas coil coating in an enclosed environment allows the capture of volatile organic solvents which are transformed into heat which is used in the curing ovens. Water is also closely controlled and processed in an in-house water purification unit before release.

- *Chrome free production / no heavy metals*
  Euramax aims to produce 100% chrome and heavy metal free products by the first of September 2010. Part of our production is already chrome free and the relatively small group of paints containing lead and other heavy metals are gradually being replaced by their more environmental counterparts which use special organic pigments.

- *Long life time*
  Coil coating generally gives improved corrosion resistance due to high grade pre-treatment. Better resistance means less early maintenance, less touch up and less excessive cleaning providing longer life and less impact on the environment.

Bronnen:
- www.eccacoil.com
- www.aluminiumcentrum.nl

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www.building.co.uk/cpd

# Introduction to aluminium

Aluminium is a durable material which may be recycled without loss of quality. Recycling one tonne of aluminium saves approximately four tonnes of bauxite and 95% of the energy required to produce primary aluminium. This saves nine tonnes of carbon dioxide emissions. The recycling of aluminium scrap currently saves 80 million tonnes of greenhouse gas emissions every year - equivalent to removing 15 million cars from the world's roads. It is extremely important that suppliers constantly innovate to improve the recyclability of their products.

According to the Council for Aluminium in Building, one third of all aluminium being used today is from recycled metal, and 75% of aluminium used in the 1880s is still in use today. Suppliers of non-recycled aluminium have also greatly improved their processes to minimise energy use. Since 1900, aluminium extraction and refining companies have reduced their energy requirements by almost 70% and are using a growing percentage, now 50%, of hydroelectric energy.

# Extraction and manufacture

Aluminium is the most abundant metal on Earth, making up 8% of the Earth's crust. The primary source of aluminium is bauxite, mined from reserves close to the Earth's surface in tropical and subtropical regions.

- Smelting: Aluminium oxide, known as alumina, is extracted from the bauxite ore, and aluminium metal is produced through smelting. The alumina is dissolved in cryolite, and an electric current is passed through the solution to produce molten aluminium at 98% purity. The amount of energy used during this process has been reduced, from 40kWh in 1900 to only 13kWh today.
- Fabrication: aluminium products can be fabricated in various ways including rolling, forming, extrusion, casting and forging. In window fabrication, the method used is extrusion, which means the aluminium can be extruded into almost any size and shape. A cylinder of the metal is heated to 500°C and then squeezed through a die to form a profile with the desired cross-section. This process creates multi-chambered profiles, drainage channels and location grooves for guiding fixings and tools.
- Recycling: many metals can be recycled, but few can be recycled repeatedly without losing quality. Aluminium can be repeatedly recycled with no loss of quality, and the process of recycling aluminium requires 5% of the energy required to produce primary metal. This ratio is low, partly because the production of primary aluminium requires a great deal of energy to break the aluminium-oxygen bond in aluminium oxide.