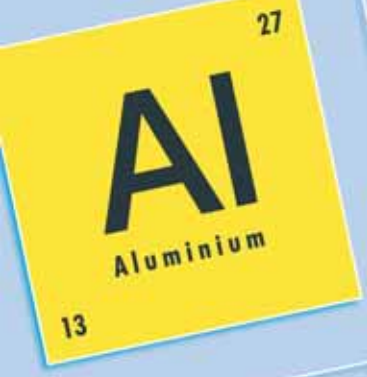
SURFACE TREATMENT

Surface treatment of *aluminium*

NOA



element no 13

Aluminium is a light and durable material and the third most common element of the earth's crust

Aluminium is easy to process. Complex sections can be extruded in only one production stage. The result is a light, corrosion resistant and competitively priced product. Aluminium is easy to recycle and friendly to the environment thanks to the low amount of energy which is needed for remelting. This is only 5 % of the amount needed for the production of primary aluminium. The natural corrosion resistance of the metal can be further improved by surface treatment, e.g. anodising. Anodising gives the aluminium an extremely hard surface, which does not affect the recycling.

Nordic Aluminium profiles are used in different applications in the construction, electrical and general technical fields as well as in transportation and traffic. You will find them in homes as well as in offices. Since 1962 more than 23 000 different aluminium profile shapes have been manufactured. Our design department will help you to create a profile that best suits your demands.

Surface treatment of aluminium

When the colour is important and the natural colours of the metal are not appropriate, the surface can be given a desired colour by anodising or painting. The shades we offer are silvery grey, gold, red, warm bronze shades and black. Powder coated aluminium offers more alternative colours than anodising. Powder coating offers several alternative colours and gloss grades because the entire RAL-colour range is at your disposal. Our decorative surface treatment method DECORAL offers even more alternatives.

Anodised aluminium has a metallic surface

NOA

anodising

Anodising of aluminium

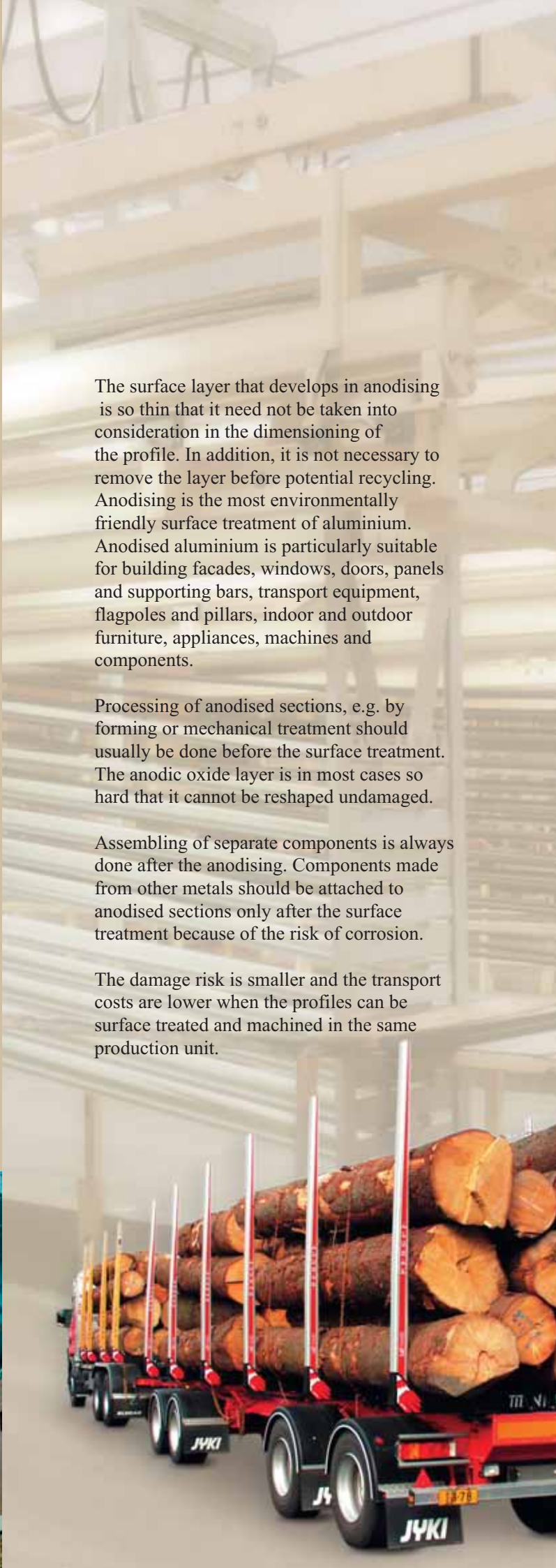
Anodising is an electrochemical method for surface treatment of aluminium. It gives the aluminium surface a durable, compact and permanent oxide layer of a fixed thickness. Anodised surfaces endure mechanical abrasion and corrosion well. Besides natural colour anodising, electrochemical colouring is the most commonly used weatherproof and light resistant anodising method. The process consists of a conventional sulphuric acid anodising followed by a separate colouring in a metallic salt bath. In addition to the colour shade of the metal itself, other UV-light resistant shades, such as reddish, gold, bronze and black are also produced by this method. The colour is not dependent on the oxide layer thickness, but on the current density and voltage used in the colour bath. The colour bath consists of inorganic metallic salts. The colouring agent is precipitated in the pore bottoms, giving better protection against mechanical abrasion. Graduations in colour and gloss grade are caused in anodising by variations in the amount of alloying elements allowed by the raw material standards. The gloss grade of the anodizing can be affected either by mechanical treatment before or after the surface treatment or by adjusting the etching time.

The surface layer that develops in anodising is so thin that it need not be taken into consideration in the dimensioning of the profile. In addition, it is not necessary to remove the layer before potential recycling. Anodising is the most environmentally friendly surface treatment of aluminium. Anodised aluminium is particularly suitable for building facades, windows, doors, panels and supporting bars, transport equipment, flagpoles and pillars, indoor and outdoor furniture, appliances, machines and components.

Processing of anodised sections, e.g. by forming or mechanical treatment should usually be done before the surface treatment. The anodic oxide layer is in most cases so hard that it cannot be reshaped undamaged.

Assembling of separate components is always done after the anodising. Components made from other metals should be attached to anodised sections only after the surface treatment because of the risk of corrosion.

The damage risk is smaller and the transport costs are lower when the profiles can be surface treated and machined in the same production unit.



Anodising colour shades

- Natural coloured (EN 000)
- Bronze shades (EK 22, EK 24 and EK 26)
- Black (EK 29)
- Red (EK 30 and EK 34)
- Gold (EK 40, EK 42 and EK 44)

Target of usage

Anodised aluminium is suitable for
- building facades
- windows and doors
- panels and supporting bars
- flagpoles and pillars
- indoor and outdoor furniture
- appliances, machines and components.

Quality control

The manufacturer is responsible for a continuous quality control in accordance with the anodising standards. The quality demands and the most important quality control methods in anodising of aluminium and aluminium alloys are shown in the standards SS-EN 12373, SS-EN ISO 2360 and SS-ISO 2932.

Maximum size of anodised pieces

- Length 7000 mm
- Height 2000 mm
- Width 500 mm

Facts

- **Mat surface with discreet colour shade**
- **Hard, abrasion resistant surface**
- **Good weatherproofing and UV-light resistance**
- **Excellent corrosion resistance**
- **Particularly suitable for recycling**
- **Very small effect on the dimensions**
- **Different alloys cause small colour and gloss differences**
- **Maximum dimensions 7000 x 2000 x 500 mm**

Colours give freedom of choice

powder coating

New efficient production line

The aluminium profiles are powder coated in a new environmentally friendly vertical powder coating line which is the first of its kind in Scandinavia. The maximum length of the profiles is 8 metres. We also offer efficient cutting service, which makes it possible for the clients to concentrate on their core activities. In anticipation of tightening of future environmental legislation we have ceased to use pre-treatment which is detrimental to the environment due to chromium compounds. In addition, the methods used in the line are not harmful to the environment as the waste water is processed in a separate, modern waterworks. This is a natural result of the fact that Nordic Aluminium has chosen to apply an environmental policy in accordance with ISO 14001.

Powder coating of aluminium

Powder coating is an environmentally friendly process, which is carefully monitored. The adhesion of the surface is achieved with a thorough pre-treatment. The profile surface is covered with a uniform powder layer, which is melted in the heat treatment, and when it is hardened it will adhere to the aluminium surface without the use of solvents. The surface is elastic and endures strong UV-light and the extreme temperature variations of our climate.

Aluminium is pre-treated to ensure the quality and adhesion of the surface. The pre-treatment consists of several phases, i.e. washing, etching and reactive treatments. Owing to these processes the powder coating is firmly adhered to the surface.

Colour alternatives

Generally we use colours according to the RAL-colour chart and with gloss grade 75. The powder manufacturers' stock colours have the most flexible delivery time. Special colours can also be ordered.

Quality control

The surface layer thickness and the coating quality are checked with laboratory tests. The test samples are specified in the German GSB approval procedure. Generally the profile will be processed after the surfacecoating - e.g. by drilling holes or cutting. The coating must endure processing without cracking. This feature is controlled with a grid test according to ISO 2409.

Maximum size of powder coated profiles

- Length 8000 mm
- Width 250 mm
- Height 100 mm

Target of usage

Powder coated profiles are suitable for
- facades
- windows and doors
- interior decoration and furniture
- ceilings and panelst

Facts

- **Wide colour range**
- **Environmentally friendly pre-treatment**
- **Good abrasion resistance**
- **Good light resistance and weatherproofing**
- **Good corrosion resistance**
- **Powder coating with different gloss grades**
- **The powder coated surface can be reshaped undamaged**
- **The coating layer affects the dimensioning of the sections (e.g. tolerances)**

Decoral - surface treatment method

surface treatment

Decoral - the decorative surface treatment method

Decoral - the decorative surface treatment method has been developed for surface treatment of aluminium profiles and sheet. The colourpigments penetrate the priming coat individually and thus it is not only a thin membrane on the surface. With this method you can get a surface which is equivalent to wood, rock or almost anything. This treatment is based on powder coating and some images are also particularly suitable for outdoor use thanks to excellent weatherproofing and UV-light resistance. Decoral surface treated profiles or sheets can be processed with the same methods as traditionally powder coated profiles. Surface treated products can be cut, drilled and reshaped. Due to the hardness of the coating cutting should be performed with extra care to eliminate vibrations.

Even in outdoor use Decoral coatings do not require any special maintenance. Dirt can be removed from the surface by washing. International institutes have tested the weather and chemical resistance of the coating, as well as abrasion resistance.

Decoral surface treated products can also be recycled, as well as powder coated profiles.

Quality control

The requirements of architectural aluminium products have been defined by different European standards. Concerning weather resistance in outdoor use, powder coated and Decoral surface treated products are of an acceptable standard. The minimum thickness of the Decoral coating layer is 60 µm. The corresponding hardness is at least 80 according to the Buchholz scale. The gloss grade is 30 ± 5 according to the standard ISO 2360. The adhesion of the surface is checked both with grid testing and shock testing according to the standards ISO 2409 and ISO 1520. It should be possible to bend Decoral surface treated products around a mandrel of 8 mm diameter without visible cracks appearing. In the Kesternich accelerated corrosion test the penetration under the coating should be maximum 1 mm from the edge of the test cut.

The chemical resistance of the coating has been found to be excellent, i.e. the tests and chemicals listed below had no effect on the surface.

The test temperature at the testing was 25 °C, except with hydrochloric acid and lye where it was 60 °C.

Testing material	*Impact time*
Methyl ketone	10 sweeps with linen fabric
Acetone	10 sweeps with linen fabric
Acetone/ethyl acetate, mixture 1:1	5 min
Xylene	5 min
Mobil brake fluid	5 min
Petrol	1 h
Ethanol	1 h
Hydrochloric acid, 10 %	4 h
Lye, 10 %	4 h

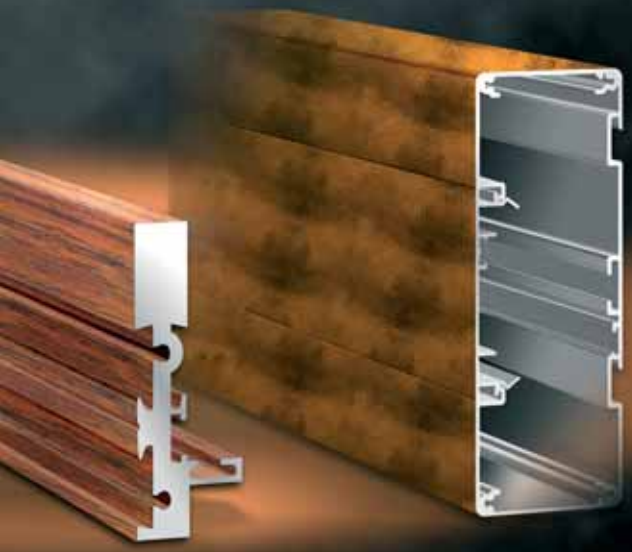
Decoral® fulfils your WILDEST dreams

Maximum size of decorative surface treated profiles

- Length 7000 mm
- Width 1250 mm
- Height 250 mm
- Sheet: 3500 x 1500 mm

Target of usage

Profiles or sheet with decorative surface treatment are suitable for
- interior solutions
- furniture
- facades
- windows and doors
- ceilings and panels



Facts

- **Almost unlimited pattern range**
- **Good abrasion resistance**
- **Good light resistance and weather-proofing (UV-light resistant qualities)**
- **Good corrosion resistance**
- **Gloss grade of the powder coating is 30**
- **The surface can be reshaped undamaged**
- **The coating layer affects the dimensioning of the sections (e.g. tolerances)**
- **The maximum profile size is 7000 x 1250 x 250 mm**
- **The maximum sheet size is 3500 x 1500 mm**

SURFACE TREATMENT

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