



Not just aluminium, Novelis Aluminium.™

Novelis is the world's largest producer of rolled aluminum and the global leader in beverage can recycling. We are a growth-oriented company, drawing upon our industry-leading technology and expertise to develop and deliver an expanding portfolio of premium rolled aluminum products.

Novelis is an important part of the worldwide Aditya Birla Group of companies. By partnering with our customers to bring innovative products to market, by being a leader in recycling, and by operating with a mindset of sustainability, Novelis makes the world lighter, brighter and better.

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Certified to DIN EN ISO 9001, DIN EN ISO 14001,
DIN EN ISO 50001, OHSAS 18001.

All the information and technical data given reflect the
situation and our experience on the date when this
brochure went to print.

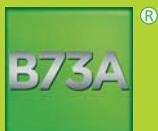
We reserve the right to make changes.



Novelis

Products

Novelis anodising quality and coil anodised – innovative and attractive



Novelis

Aluminium – Material of the future



Aluminium is the ideal material for innovative and demanding applications.

Quality, cost effectiveness, light weight, extremely durable and recyclable – are all key reasons for using aluminium as the material for attractive, technical and functional requirements.

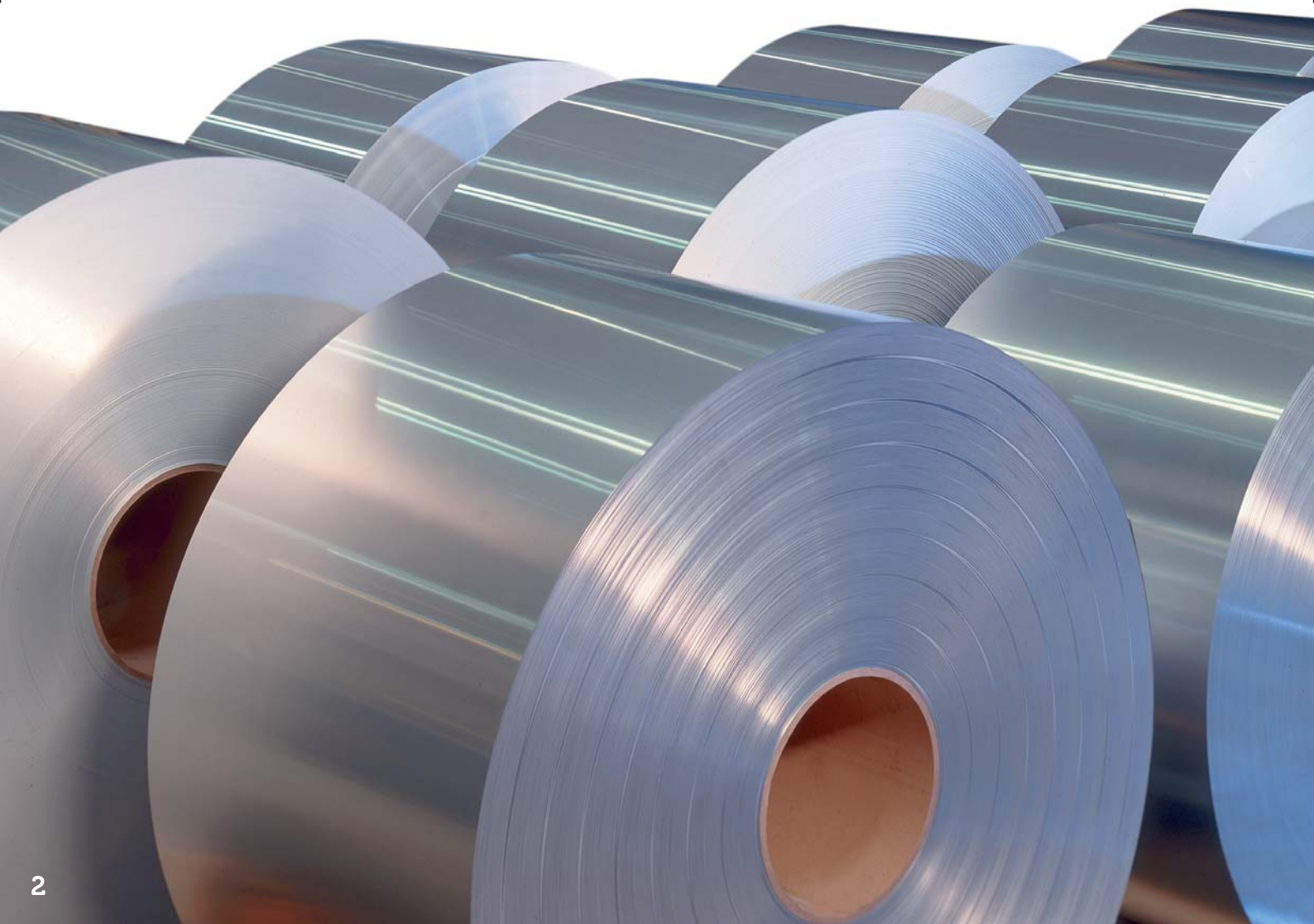
The most popular applications:

- Anodised facades
- Doors and windows
- Roof and wall systems
- Bridge and support structures
- Interior designs

Novelis anodising quality and coil anodised aluminium is ideal for a whole range of modern design possibilities. It can also be fully recycled.

The key properties of aluminium

- Lightweight yet strong
- Easy to work
- Numerous design possibilities
- Brilliant surfaces through cutting edge processing techniques
- Electrically and thermally conductive
- High weathering and corrosion resistance
- Extremely durable
- Environmentally sustainable, highly recyclable
- Non-Combustible (DIN 4102 /96/603/EG)



Aluminium in anodised quality: Attractive protection



Anodising is a process through which a defined aluminium oxide layer is artificially created to protect the natural aluminium surface.

The anodising layer generated is strong, durable and consistent which is both weather and corrosion resistant.

The most popular method of anodising is the direct current (D.C.) sulphuric acid process.

The initially colourless anodised surfaces are coloured using either adsorptive (immersion) or electrolytic dyeing process.

The metallurgical quality of the aluminium and the quality of the anodising process determine the quality of the decorative surface.

The special features of anodising quality (AQ)

- Fine grained, homogeneous structure
- Defined anodising surface (acc. DIN EN 17611 / ISO 7599)
- High and consistent quality due to longer manufacturing process of the rolling stock to semi-finished product

For functional and attractive application



Aluminium **B57S** – for batch anodising



Aluminium **B73A** – coil anodised

Anodising process

anodised aluminium

sealing

(colouring)

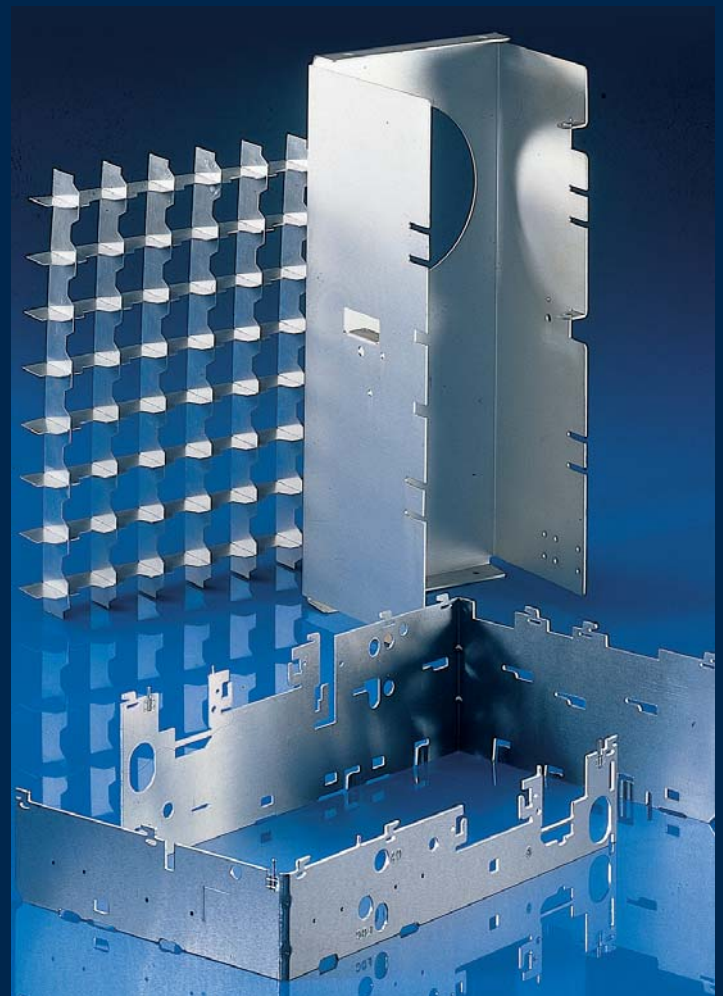
anodising

descaling

etching

degreasing

anodising quality (B57S)

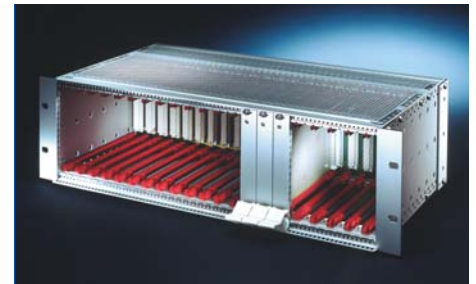


Higher levels of control for anodising quality



Tight process parameters and continuous process controls are key conditions for this quality.

Permanent production monitoring and traceability from slab casting to delivery to our customer secure best anodising results.



Control of Novelis manufacturing process

Ingot parameters

- Casting technology
- Casting parameters: temperature, speed, filtration
- Slab pretreatment (sawing, milling)

Hot rolling

- Homogenisation, temperature control and degree of rolling
- Rolling speed
- Surface control

Cold rolling

- Degree of rolling
- Intermediate annealing
- Surface and flatness

Checks on the end product

- Dimensions
- Flatness and squareness (only sheets) acc. EN 485-4
- Mechanical properties acc. EN 485-2
- Surface inspection
- Anodising tests per coil (monitoring of anodised surface acc. DIN 17611 / ISO 7599)

Anodising Quality (AQ) versus Commercial Quality (CQ)

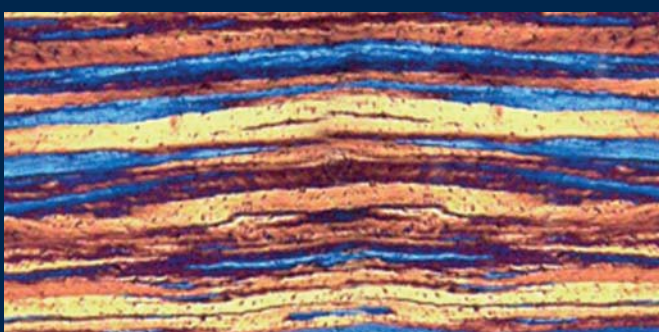
Anodising quality in comparison to commercial quality comes with better surface structure.

The anodised surface is free of metallurgical defects such as casting stripes or mechanical defects, which affects the final surface. Please respect the inspection distances acc. DIN 17611 / ISO 7599.

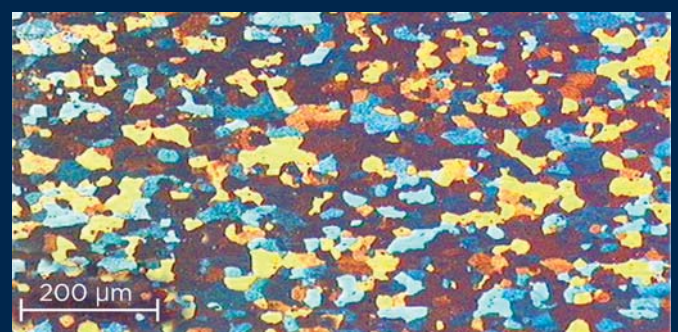
Due to the fine grain / homogeneous structure, anodising quality has better processing features: cutting, drilling, bending or punching is possible without any problems.

The difference between Commercial Quality (CQ) and Anodising Quality (AQ)

AlMg1H24 CQ (Commercial Quality)



Structure AlMg1H14 AQ (Anodising Quality)



Anodising quality combines attractive design with a high level of functionality



The excellent formability and technical capabilities are the basis for several applications in interior designs and facades, but also in tool and equipment manufacture, building or transport applications.

The excellent anodising surface is the result of constant metallurgical processes in conjunction with an optimal anodising process.



B57S - Properties of anodising quality

- Consistent and attractive anodising surface
- Excellent colour and gloss uniformity within one batch
- No defects of the anodised surface acc. DIN 17611 / ISO 7599
- Fine grained, homogeneous grain structure
- Excellent formability, bending and processing behaviour

Bending test 180° – B57S compared to AlMg1 standard quality

Thickness: 3.0 mm; longitudinal and transverse samples; standard specifications for 180°-edging and 3.0 mm thickness: Internal radius = 6.0 mm

	R = 0	R = 1.2	R = 1.5
AlMg1 (H24)			
B57S (H14)			

Quality for demanding requirements



A constant quality is the basis for demanding projects in interior or architectural facade applications.

Process parameters and essential product checks for high quality anodising surfaces

- Test anodising prior to delivery
- Surface control of the anodising sample and on the coil anodised surface (acc. ISO 7599)
- Cut to length: light oiling of the surface
- Flatness of sheets (1/2 EN on request)
- Identification of packs with special logo



Tight manufacturing and control parameters are the key for optimal anodising results and are the basis for versatile processing and varied fields of applications.

Co-operation between the aluminium producer, supplier of chemicals and

the anodiser are required for a high end product requiring sensitive technical solutions.

The metallurgical quality and appearance combined with versatile processing possibilities are requirements for such applications.

The surface of Novelis coil anodised material ensures a consistent high quality and is therefore the most cost effective solution for the customer and offers customised solutions with different functional and decorative requirements.



Nya Nordiska, Germany



Cutting and slitting

Hot and cold rolling
(heat treatment/surface quality)

Casting technology
(fine homogenous grain structure)

Aluminium & alloying elements
(chemicals and narrow tolerances)



Sealing
(durability and resistance)

Anodising

Pre-treatment incl. etching
(influences degree of gloss)

Optimal coordinated chemicals and additives

Optimum production

Optimum anodising process

Novelis B57S – Custom made anodising quality for demanding applications



Novelis anodising quality B57S is an AlMg1 alloy where a consistently high quality anodising is required for various technical and industrial applications.

B57S is the ideal material for demanding applications. The anodising quality B57S can be easily cut, drilled, punched, and has excellent bending characteristics.

Nya Nordiska, Germany



General characteristics

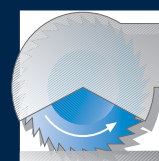
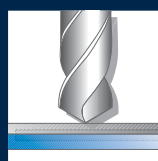
- Non combustible A1 according DIN 4102 or 96/603/EG (not in powder form)
- Food compliance according DIN EN 602 is possible
- Excellent recyclability

Surface

- Mill finish
- Anodising quality is warranted for the top side
- Surface acc. DIN 17611 / ISO 7599
- Lightly oiled
- Printed UV resistant 80 µm film

Processing possibilities for B57S

- drilling
- structured milling
- punching
- stud bolt welding
- bending
- Honeycomb panel production
- sawing
- roll-forming
- milling
- brushing



Novelis B73A

Coil anodised material



Anodised B73A is a systematic further development of Novelis anodising quality B57S.

During anodising of B57S to B73A using the coil anodising process, the same processing steps are used as in batch anodising.

Due to the continuous process, no contact marks will occur, which means B73A can be used for full sheet applications.

This quality is continuously checked to ensure the consistency of the anodised surface.

Our delivery program offers a wide variety of thicknesses, widths and different anodic layer thicknesses.



Numerous references highlight the fact that Novelis leads the market as a global supplier of coil anodised aluminium.

The coil anodising process

Pre-treatment

Degreasing
Pickling
Descaling

Anodising

Anodising
Colouration

Post-treatment

Compaction



plain aluminium coil (AQ)



coil anodised

Novelis B73A

Coil anodised material



General properties

- Non-combustible A1 acc. DIN 4102 or 96/603/EG (not in powder form)
- Excellent recyclability

Anodising layer

- Consists of aluminium hydroxide / oxide
- E6/EV1 (natural colour) anodised
- Inherent with the aluminium surface, very hard
- Attractive surface (warranted for top side)
- Controlling of the layer thickness acc. ISO 2360
- Typical gloss value 60° acc. ISO 7668: 20 to 30 units
- Controlling of the sealing acc. ISO 3210
- Reduced coefficient of thermal expansion, compared to base material, temperatures > 80°C may cause micro-cracks

Surface

- Printed UV resistant 80 µm protective film, with identification of rolling direction
- Lightly oiled surface
- Defined surface acc. ISO 7599

Corrosion resistance

- B73A is corrosion resistant within a pH value of 5.5 to 8.0

The following corrosion tests have been passed thus demonstrating the excellent corrosion resistance of the anodised surface:

- Neutral salt-spray test 1008 h acc. ISO 9227
- Kesternich test 1000 h acc. ISO 6988 (SO₂ atmosphere)
- UV test 1000 h acc. ISO 11341
- Weathering test 1999 h (tropical test) acc. ISO 6270



During the forming process, micro-cracks may occur. These have no impact on the corrosion resistance of the product because of the permanent bonding of the anodic layer onto the base material.

Guangzhou Stadium in China
Material: B73A/J73A



Physical properties (aluminium)

- Modulus of elasticity: approx. 70.000 MPa
- Density: approx. 27 t/m³
- Coefficient of thermal expansion: 0.0236 mm per Kelvin and meter
- Weldability: good/reasonable, with welding consumable (SG-ALMg3) *

* Due to heat input, the metal structure could be changed, and visual effect could be seen after anodising, or rather on the surface of the anodising layer of the continuous anodised material, micro-cracks could occur.

Chemical composition to DIN EN 573 part 3

Alloy DIN EN AW 5005 A (AlMg1-C)

Composition in percent by weight (max.)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	other	total
0.30	0.45	0.05	0.15	0.70-1.10	0.10	0.20	0.05	0.05	0.15

Dimensions

Dimensions

Width	Sheet length
1.000 mm	2.000 mm
1.250 mm	2.500 mm
1.500 mm	3.000 mm
1.500 mm	4.000 mm
2.000 mm	4.000 mm

Dimensional tolerances acc. DIN EN 485 part 4

Thickness (mm)

1.0	1.5	2.0	2.5	3.0	4.0
 	 	 	 	 	
 	 	 		 	
 	 	 		 	
		 		 	

 Coil  Sheet

Mechanical strength

Strength values to EN 485-2

Gauge (mm)	Temper	Tensile strength R _m	Yield Point R _{p0.2}	Elongation A ₅₀
0.5 - 1.5	H14	145 - 185 MPa	≥ 120 MPa	≥ 2%
2.0 - 2.5	H14	145 - 185 MPa	≥ 120 MPa	≥ 3%
3.0 - 4.0	H12	125 - 165 MPa	≥ 95 MPa	≥ 5%

Typical strength values to (not guaranteed)

Gauge (mm)	Temper	Tensile strength R _m	Yield Point R _{p0.2}	Elongation A ₅₀
0.5 - 1.5	H14	165 MPa	155 MPa	≥ 4%
2.0 - 2.5	H14	165 MPa	155 MPa	≥ 5%
3.0 - 4.0*	H12	140 MPa	125 MPa	≥ 7%

Bending radii at 90°

R = 1 x t: For the above-mentioned sheet thicknesses, the inner bending radii (R) are the same as the sheet thickness (t).

During bending, micro-cracks can arise in the anodised layer and become visible as lighter lines in the bending area.

*Thickness of continuous anodised material only up to 3.0 mm

Fire protection



B57S and B73A are not combustible
(DIN 4102 or 96/603/EG)

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Certificates

- DIN ISO 9001:2008
- Certificate of non-radioactive Al products
- DIN ISO 14001 / OHSAS 18001
- EU Declaration



Novelis Aluminium – a sustainable environmental solution

Aluminium is the material of the future and combines high durability with excellent reprocessing.

The recycling process requires just 5% of the energy needed to generate primary aluminium.

Recycled aluminium has the same properties and qualities as primary aluminium.

Sustainability goals of Novelis EHS: Environment, Health and Safety

- Novelis committed that 80 percent of its products will be made from recycled metal by 2020
- Novelis is planning major expansions of its recycling and remelting capacity around the globe
- Novelis is accelerating the development of new, high-recycled content alloys
- Reduced landfill waste
- World market leadership in recycling of used beverage cans
- Vision: No injuries and cases of disease
- Improved energy efficiency
- Lower greenhouse gas emissions

