



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 qualities for innovative facades



Novelis

Aluminium – construction material with a future



Aluminium is the ideal material for innovative and demanding facade designs.

Quality, cost-effectiveness, exceptional protection and strength are all key reasons for using aluminium in construction projects.

This light metal is also easy to work and features a brilliant metallic appearance – two features that make it ideal for a whole range of customised and modern design possibilities in facade cladding. It is also durable and has excellent green credentials since it can be recycled with ease.

Novelis is the leading supplier of aluminium rolled products whose material properties have been matched precisely to the customer's needs.

The key properties of aluminium:

- Lightweight yet strong
- Easy to work; numerous design possibilities
- Brilliant surfaces through cutting-edge processing techniques
- High weathering and corrosion resistance
- Extremely durable
- Excellent electrical conductivity
- High thermal conductivity
- Environmentally sustainable, highly recyclable
- A1, non-combustible (96/603/EG) (not pulverised)

The most popular applications:

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



Anodised surfaces for demanding architecture



Anodised aluminium is the perfect material for high quality facades, roofs and interior cladding where attractive and innovative designs are needed.

The special surface combines decorative brilliance in terms of colour and material with excellent durability in the face of extreme loading and weathering.

One of the greatest architectural challenges is to design large-dimensional structures:

Anodised aluminium can be used for a whole range of applications and is also suitable for the facades of public buildings over 20 m tall.

High-quality anodised aluminium for permanent surfaces is the perfect facade material for character architecture.

The key properties of anodised aluminium

- Decorative, with permanent metallic gloss
- Large range of colours
- Corrosion resistant (in neutral ph range) and water resistant
- Firm bond with the metal surface, therefore no peeling, chipping or corrosion
- Durable and easy to maintain
- Non-toxic (hot-water sealing)
- Hard wearing
- Electrically insulated
- Highly recyclable



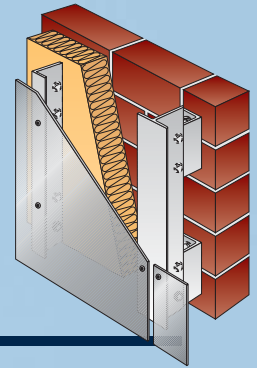
KTX Station,
East Daejeon, South Korea
Material: J73A®, natural anodised

Aluminium in anodising quality – for brilliant applications

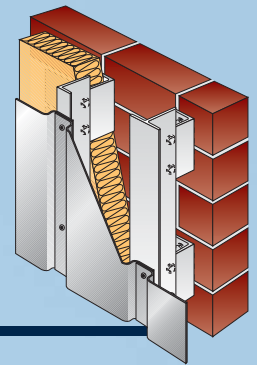
Novelis anodising quality is easy to work, thereby enabling customised facade designs and the use of various installation techniques.

Conventional fastening techniques for curtain-type, ventilated facades are possible, as well as modern bonding techniques for invisible fastening or stud welding.

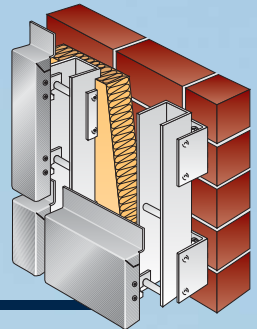
In addition to typical outdoor elements such as panels, cassettes or flat sheets, unusual facade types such as striking rhombus forms also meet the demands of modern architecture.



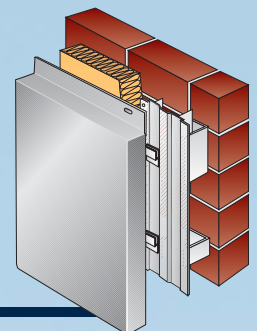
Flat sheet



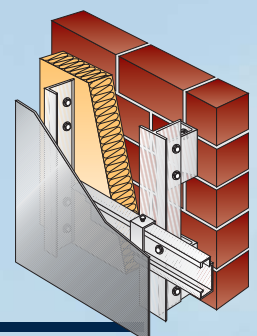
Panel



Cassette with bolt fastening



Cassette with concealed fastening



Invisible fastening: stud welding

Quality and colour with anodised aluminium



Anodising is a process through which a defined aluminium oxide layer is generated by immersing the aluminium in an electrolyte in the presence of an electric current.

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

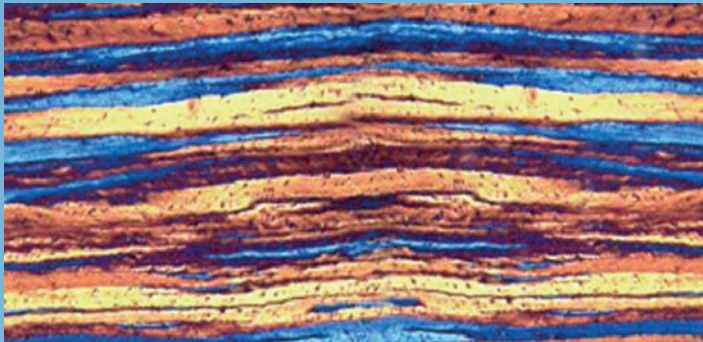
The initially colourless anodised surfaces are then coloured, if needed, using either adsorptive (immersion) or electrolytic dyeing processes.

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

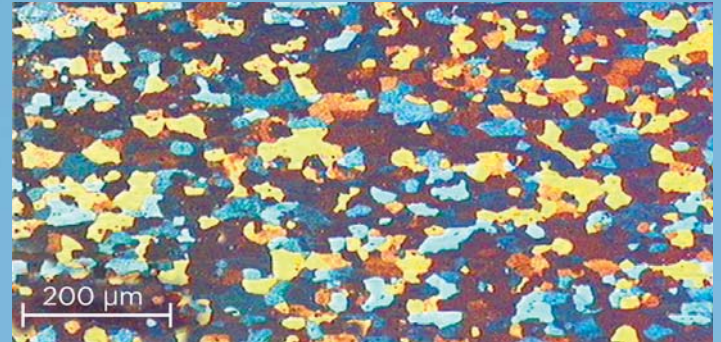
The special features of anodising quality (AQ)

- Fine grained, homogeneous structure
- Defined surface (DIN 17611/ISO 7599)
- High quality through increased manufacturing process from production of the rolling stock to the semi-finished product

The difference between commercial quality (CQ) and anodising quality (AQ)

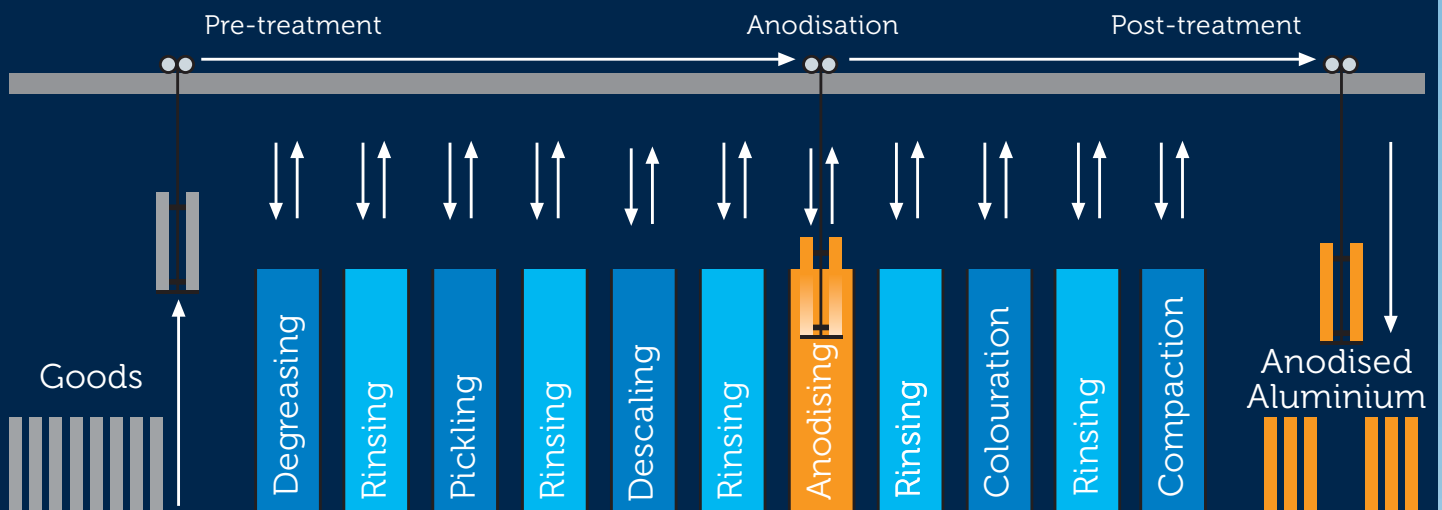


Structure AlMg1H24 CQ (commercial quality)

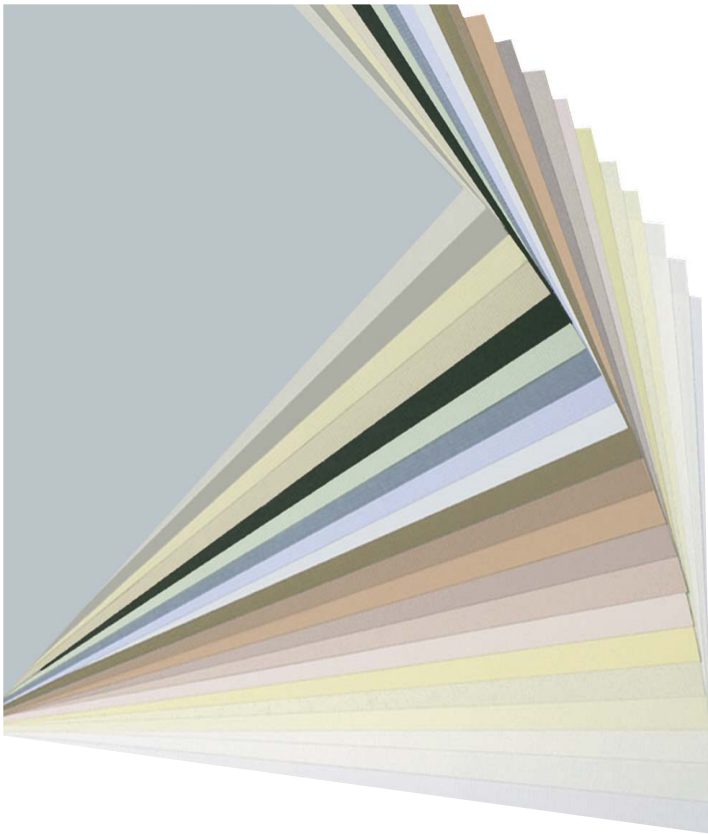


Structure AlMg1H14 AQ (anodising quality)

Anodising process



Colour solutions – for decorative anodised surfaces



A broad variety of UV-resistant colours ranging from a light bronze tone to black are available. Gold and other colourings are also possible.

Colours act as a crucial part in architecture and, in particular, for facades. Colour contrast areas and matching colours to the surrounding structures are key factors when developing construction projects.

Novelis aluminium can be coloured using either the electrolytic process with metal salt or the immersion process.



For quality architectural applications

Aluminium **J57S**® – for batch anodising

Aluminium **J73A**® – is supplied already anodised

Minggugong Station,
Nanjing/China
Material: J57S® Sandalor-Rot



Special anodising quality begins with a "J"

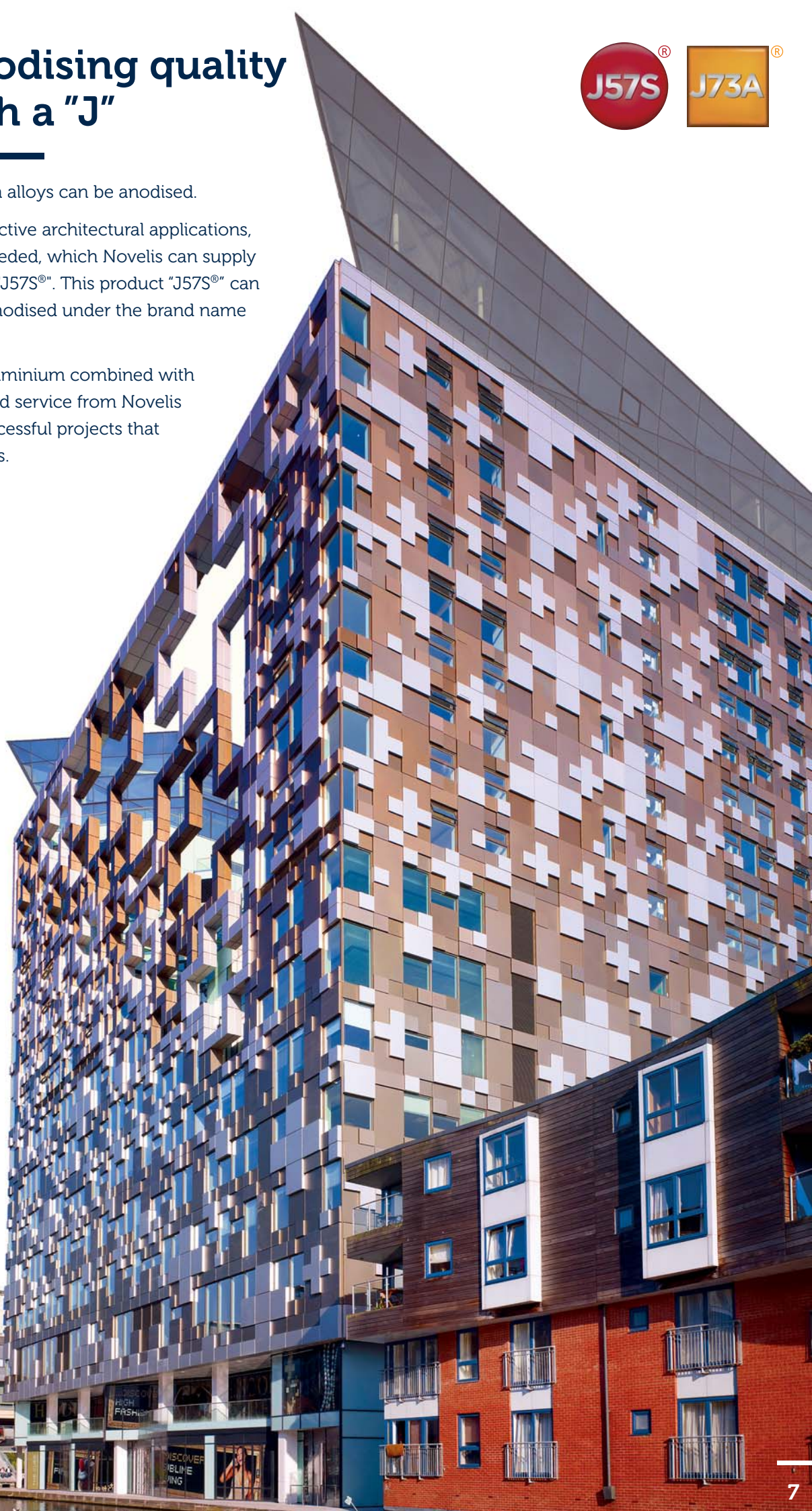


In principle, all aluminium alloys can be anodised.

For high-quality and attractive architectural applications, a special alloy grade is needed, which Novelis can supply under the product name "J57S®". This product "J57S®" can also be delivered ready anodised under the brand name "J73A®".

High-quality anodised aluminium combined with comprehensive advice and service from Novelis provides the basis for successful projects that deliver outstanding results.

The Cube,
Birmingham/England
Architect: MAKE Architects
Material: J57S®
(various colours)



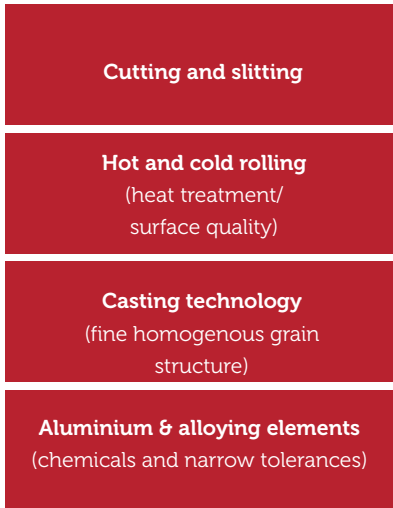
Anodising qualities in astonishing brilliance



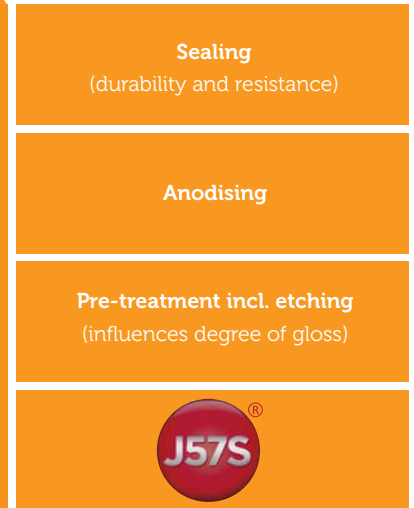
Qatar Science & Technology Park, Doha



Optimum Production



Optimum Anodising Process



Consistent alloy quality and optimum anodising processes provide the anodising quality from Novelis with their exceptional metallic gloss.

The special anodising properties coupled with a diverse range of possible treatments and applications deliver the perfect conditions for applications, demanded by architects.



MTR Austin Station, Hong Kong Subway
Facade constructor: ABP Taiwan
Material: J57S®

Novelis J57S[®]

Anodising quality – used for architecture worldwide



J57S[®] has been used successfully worldwide in ambitious architectural projects over several decades.

J57S[®] offers a consistent high quality, independent of the time of purchase. Therefore, the high quality of J57S[®] enables to reach colour- and gloss-uniformity after anodising, even if mixing the production lots.

Particularly the brilliant metallic appearance of the surface makes the difference between commercial quality and the specific J57S[®] alloy.

Impressive references around the globe demonstrate the diversity of possible applications J57S[®] provides for interior or exterior architecture.



Titanic Signature Project, Belfast
Material: J57S[®]

Novelis J57S[®]

Attractive anodising quality

The J57S[®] alloy has been specially developed to deliver brilliant surfaces in high quality. The very narrow tolerances of the chemical composition and manufacturing parameters are metallurgical key requirements, if the colour and gloss are to be uniform. After conducting any necessary further processing operations such as bending, punching, drilling etc., J57S[®] can be used for batch anodising.

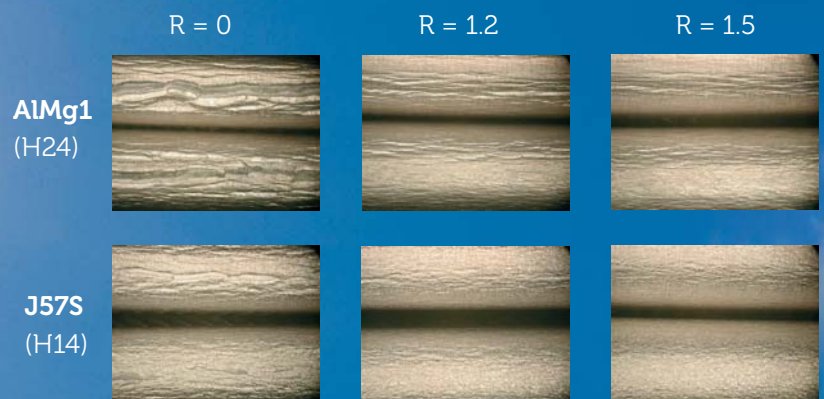
Two factors influence the anodising result - the metal and the anodising process!

High-quality anodising results are only possible if both processes are optimised.



Bending test 180° – J57S[®] compared to AlMg1 standard quality

Thickness: 3.0 mm; longitudinal and transverse samples;
standard specifications for 90°-edging and 3.0 mm thickness:
Internal radius = 6.0 mm



Special features of J57S[®]

- Excellent bending properties, even with small internal radii (min. 1 x material gauge at 90°)
- Brilliant metallic anodised surfaces compared with other anodising qualities
- The microstructure gives rise to a special etching structure and, as a result, the brilliance that is characteristic of J57S[®]
- Novelis also applies very narrow tolerances to the J57S[®] microstructure to ensure the best possible consistency for colour and gloss after anodising.
- Excellent processing ability such as bending, cutting, punching, drilling etc.
- Batches can be mixed, even combining different thicknesses and widths if necessary
- Availability at short notice

The manufacturing process - tight controlled production

To ensure consistently high quality, J57S® production operations are subject to strict quality checks covering the entire manufacturing process from initial casting right through leaving our plant.

Production checks

Ingot production

- Casting parameters, e.g. temperature control, speed and filtering
- Ingot pre-treatment, e.g. scalping, sawing

Pre-heating and hot-rolling

- Pre-heating, homogenisation, temperature control and degree of rolling

Cold rolling/intermediate annealing

- Degree of rolling, flatness and surface
- Intermediate annealing

Checks on the end product

- Dimensions and flatness to DIN EN 485-4
- Mechanical properties to DIN EN 485-2
- Surface check (accuracy)
- Anodising test per coil, assessment and approval before delivery

Novelis J57S® – The manufacturing process - quality made-to-measure



Quality assurance measures

- The red dot on the protective film and the pallet label enables J57S® to be easily identified.
- The sheets are identified on the reverse with a unique batch number and the rolling direction. This enables easy tracking in accordance with the product warranty.
- Regular product and process audits to DIN ISO 9001

Processing Guidelines

Please refer to the Processing Guidelines for J57S®.

The Processing Guidelines and the extended warranty provisions can be found at www.novelis.com

Recommended anodising companies:

Novelis works closely with anodising companies. Please contact us and we can provide contact details for one closest to you.

Westhafen Pier
Frankfurt,
Germany
Material: J57S®

Novelis J73A® – Continuous-anodised quality from a single source



Centrum Galerie, Dresden
Architect: Peter Kulka, Dresden
Material: J73A®



J73A® can be used in order to process a ready anodised aluminium sheet into a facade product in its many forms.

J73A® anodised aluminium is a systematic further development of Novelis anodising quality J57S®. Its quality is continuously checked to ensure the anodised surfaces are optimal uniform.

During anodising J73A® in a continuous anodising process, the same steps are used as for batch anodising processing. Through the continuous process, there are no contact points, which means J73A® can be used without cutting the edge.

Numerous reference projects highlight the fact that Novelis leads the market as a global supplier of coil-anodised aluminium for architecture.

Novelis J73A[®]

Continuous-anodised quality from a single source

Novelis J73A[®] coil-anodised aluminium combines its metallic surface with brilliant colour.

The excellent surface quality ensures a long service life. The 20 µm anodic layer makes the material resistant to UV light, corrosion, weathering and abrasion.

Many buildings with continuous-anodised facades, built up to 20 years ago, have been examined to determine the quality of the anodic layer.

The results are set out in a "Building Inspection Report" produced by an independent engineering office (Dr. Laszlo Palfy, Straditec).



Results of "building inspection report"

- No evidence of corrosion on anodic layer
- Thickness of anodic layer virtually unchanged
- Adhesive properties still intact. No flaws such as efflorescence, peeling or blistering
- No fading, yellowing or discolouration of natural and bronze anodised material

Corrosion tests

- Neutral salt-spray test 1008 h to DIN ISO 9227
- Kesternich test 1000 h to DIN ISO 6988 (SO₂ atmosphere)
- UV test 1000 h to DIN ISO 11341
- Weathering test 1000 h (tropical test) to DIN 50117



Guangzhou Stadium in China
Architect: Manica, USA
Material: J73A[®]/B73A[®]

Novelis J73A[®]

High-quality surfaces for a long service life



Corrosion-resistant surfaces

J73A[®] is corrosion-resistant over a pH value of approx. 5.5 to 8. The results of the corrosion tests confirm the very good corrosion resistance of the anodised surface, even if the material has been bent first.

Anodic layer ideal for outdoors

Novelis ensures that the anodic layer thickness has a minimum value over the entire length and width of the material's top side, thus exceeds the requirements of international standards!

High sealing quality ensures excellent resistance

The sealing quality has a significant influence on the corrosion resistance of anodised aluminium and is tested using the loss of mass test to DIN ISO 3210.

Thanks to its excellent sealing quality, Novelis achieves a nominally better result than set out in the standard. Microcracks may appear perpendicular to the rolling direction due to the manufacturing process.

The anodic layer cannot peel off.

Filiform corrosion is not possible due to the firm bond that exists to the base material.



Call Center Banco de Santander, Querétaro/Mexico
Architect: Estudio Lamela/Springall-Lira Arquitectos
Developer: Banco Santander
Material: J73A[®], natural anodised

Novelis J73A[®]

Surface properties at a glance

Conference Centre "Dalian", China
Architects: Coop Himmelb(l)au
Material: J73A[®]

Anodic layer

- Comprising aluminium oxide/hydroxide
- High uniformity on colour and gloss, even between material from different batches
- Top side: anodised with min. 20 µm in natural tone E6/EV1
Reverse side: anodic layer can be thinner according to continuous anodising process
- Decorative surface for the top side
- Firmly bonded to the aluminium surface and very hard
- Test of layer thickness acc. to DIN ISO 2360
- Test of sealing acc. to DIN ISO 3210
- Lower coefficient of thermal expansion than the base material; higher temperatures can cause microcracks, which do not generally adversely affect the corrosion resistance.

Surface

- The assessment of accuracy will be made at a distance of 2 m
- Slightly oiled surface
- Identification number and rolling direction marked on the reverse of the sheet
- Printed, UV-resistant 80 µm protective film
- Novelis Processing Guidelines and cleaning instructions must be respected

www.novelis.com



Novelis J73A[®]

Continuous-anodised quality for architecture – premium quality from Novelis



Quality features

- Base material J57S[®]: for metallic, brilliant anodised surfaces
- Excellent repetition thanks to continuous anodising process
- UV-resistant (colour-dependent)
- No contact points along the edges, therefore can be used over full area and is immediately ready for further processing
- Minimum layer thickness of 20 µm makes it ideal for outdoor use
- Project-specific warranty on request
- Everything from a single source

= Premium Quality

Cleaning instructions

J73A[®] facades must be cleaned regularly and professionally. We recommend commissioning a RAL-certified company to perform this work.

The cleaning instructions for Novelis J73A[®] are part of the warranty conditions and can be accessed at www.novelis.com

Processing Guidelines

The high quality properties of J73A[®] as a material for decorative anodised applications in architecture can only be ensured if the guidelines are adhered to.

The Processing Guidelines for Novelis J73A[®] can also be found at www.novelis.com

Physical properties of the base material

- Modulus of elasticity: approx. 70.000 MPa
- Density: approx. 2.7 t/m³
- Coefficient of thermal expansion: 0.0236 mm per Kelvin and meter

Chemical composition to DIN EN 573 part 3 - Alloy: DIN EN AW 5005 (AlMg1-B)

Composition in percent by weight (max.)

Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	other	total
0.30	0.70	0.20	0.20	0.50-1.10	0.10	0.25	0.05	0.05	0.15

Dimensions

- Sheet thicknesses: 0.8 to 3.0 mm (temper H14) and 4.0 mm (temper H12, applies only to J57S®)
- Width up to 2000 mm, only to 3.0 mm sheet thickness
- Length up to 7900 mm possible

Mechanical strength

Strength values to DIN EN 485-2

Gauge (mm)	Temper	Tensile strength R _m	Yield point R _{p0,2}	Elongation A ₅₀
0.8 - 1.5	H14	145 - 185 MPa	≥ 120 MPa	≥ 2%
2.0 - 3.0	H14	145 - 185 MPa	≥ 120 MPa	≥ 3%
4.0 (only J57S®)	H12	125 - 165 MPa	≥ 95 MPa	≥ 5%

Typical strength values (not guaranteed)

Gauge (mm)	Temper	Tensile strength R _m	Yield point R _{p0,2}	Elongation A ₅₀
0.8 - 1.5	H14	170 MPa	160 MPa	≥ 4%
2.0 - 3.0	H14	170 MPa	160 MPa	≥ 5%
4.0 (only J57S®)	H12	140 MPa	130 MPa	≥ 9%

Bending radii at 90°

$R = 1 \times t$: For the above-mentioned sheet thicknesses, the inner bending radii (R) are the same as the sheet thickness (t). During bending, microcracks can arise in the anodised layer and become visible as lighter lines in the bending area without any quality effect.

Fire protection



**J57S® and J73A®
are not combustible**
(DIN 4102 or 96/603/EG)

Certificates

- DIN EN ISO 9001:2008
- Certificate of non-radioactive Al products
- DIN EN ISO 50001
- EU Declaration



www.novelis.com

Novelis Aluminium – a sustainable environmental solution

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

Aluminium is 100% recyclable.

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
- World market leadership in recycling of used beverage cans
- Improved energy efficiency
- Lower greenhouse gas emissions
- Reduced landfill waste
- Vision: No injuries and cases of disease

