



Aluminium



HYDRO

Shate Products



Hydro – Progress of a different nature

Hydro is a Fortune 500 energy and aluminium supplier operating in more than 40 countries. We are a leading offshore producer of oil and gas and the world's third-largest aluminium supplier.

As one of the world's top integrated aluminium companies, Hydro offers customers a wide range of high-quality products.

Hydro Aluminium, with its 27,000 employees in Europe, the Americas, Australia and Asia, forms a worldwide network that builds on 85 years of experience in the production and fabrication of aluminium as well as a strong commitment to research and design, to create innovative and sustainable solutions for today's challenges and tomorrow's opportunities.

Our focus on innovation, quality and cost-efficient solutions has led us to achieve market leadership in many of the industry's most important market segments in the automotive, construction, packaging and printing industries.

Hydro Aluminium has achieved a leading role in market segments like in foil, lithographic strip, building systems, engine blocks and cylinder heads, heat transfer systems and structural components for the automotive industry as well as magnesium.

Rolled products from Hydro for a widespread range of applications



Hydro Aluminium, with its Business Sector Rolled Products, plays an important role in the European market. The activities of Rolled Products Business Unit Strip are focused on the production of plain and converted aluminium strip for selected market segments in the construction, automotive, packaging and consumer industries. Our high-quality strip and sheet are specially suited to applications in the transport and marine sectors. In Europe, Hydro Aluminium is the market leader in several of these growth segments.

Through its Product Area Shate, the Business Unit provides its customers with a comprehensive range of hot and cold-rolled plain strip and sheet – specifically tailored to meet their individual requirements in a variety of applications.

For example:

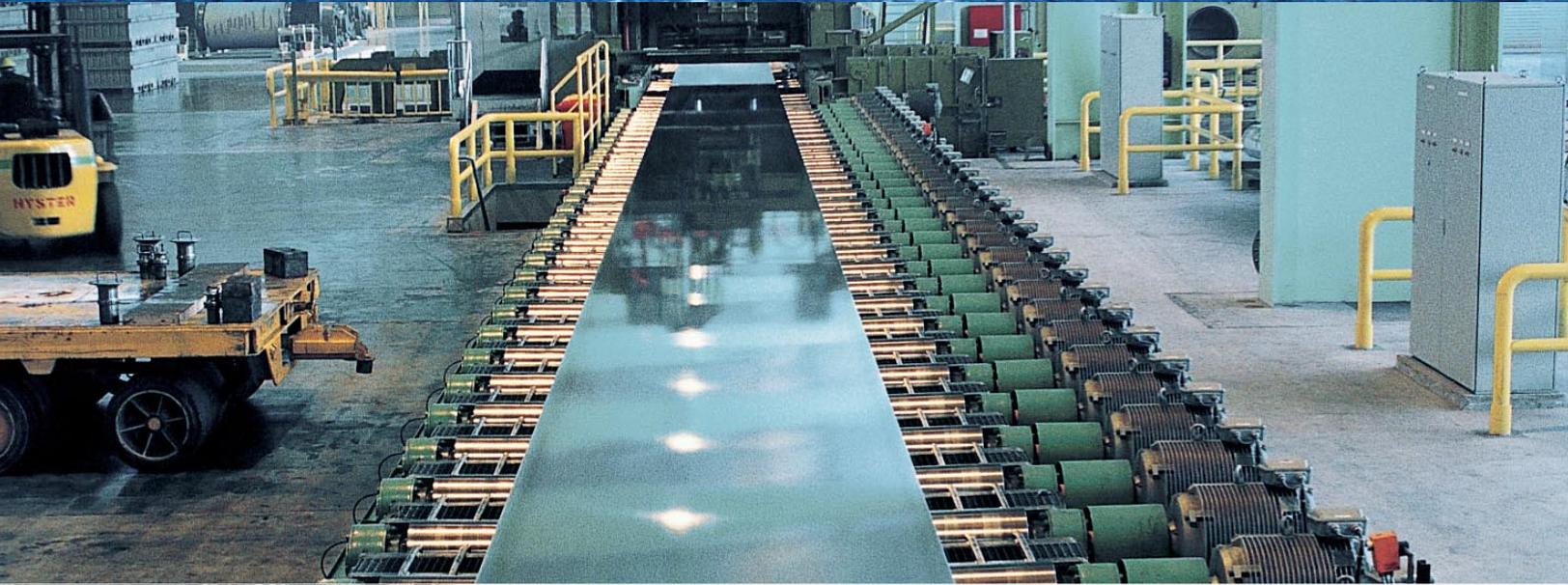
- > Heavy goods vehicles, such as road tankers and dry bulk transporters, articulated tipping trailers and bulk containers
- > Silo and tank construction
- > Ship and yacht building and
- > Diverse industrial applications – such as spiral-welded tubes and cryogenic applications

Everywhere, in fact, where aluminium has its established place as an engineering material. At Hydro Aluminium, state-of-the-art manufacturing processes, quality assurance and environmental protection combine to form an integral whole. Our production facilities are certified in accordance with ISO 14001, the international environmental protection standard, and employ a comprehensive Quality Management System which is in full compliance with the worldwide-accepted requirements of DIN EN ISO 9001 and ISO/TS 16949.



Higher efficiency leads to shorter delivery times – we increasingly concentrate on the manufacture of standard hot-rolled strip. In this way, we can take coils directly from our storeroom and cut them to length quickly and precisely. Our lead times – from receiving an order for aluminium strip to its manufacture, subsequent treatment and delivery – have thus been reduced substantially.

Our **production sites** boast sophisticated manufacturing technology for high-quality rolled products



On our wide hot-rolling mill at Aluminium Norf GmbH, we can produce aluminium strip in widths of up to 2,600 mm. Using the downstream, 4-high tandem rolling mill, it is possible to roll strip down to a final thickness of 2 mm.

We produce our aluminium strip on technologically advanced hot and cold-rolling mills at two production sites: Aluminium Norf GmbH, Hydro's subsidiary in Neuss and in our wholly-owned plant in Hamburg. Our state-of-the-art manufacturing processes ensure consistent high-quality aluminium strip which meets all demands with regard to a streak-free, decorative and abrasion-resistant surface, and are suitable for a broad range of aluminium alloys. Furthermore, the strip has an extremely homogeneous microstructure as a result of precise temperature control during the manufacturing process.

Hot-rolled strip ranges in thickness from 3 to 12 mm while cold-rolled strip is between 0.5 and 6.35 mm. We continually and meticulously check the flatness, shape and thickness of the strip by means of fully automated measuring and regulating equipment. By carrying out a subsequent visual surface check, we make sure that only first-class products leave our factory gate.

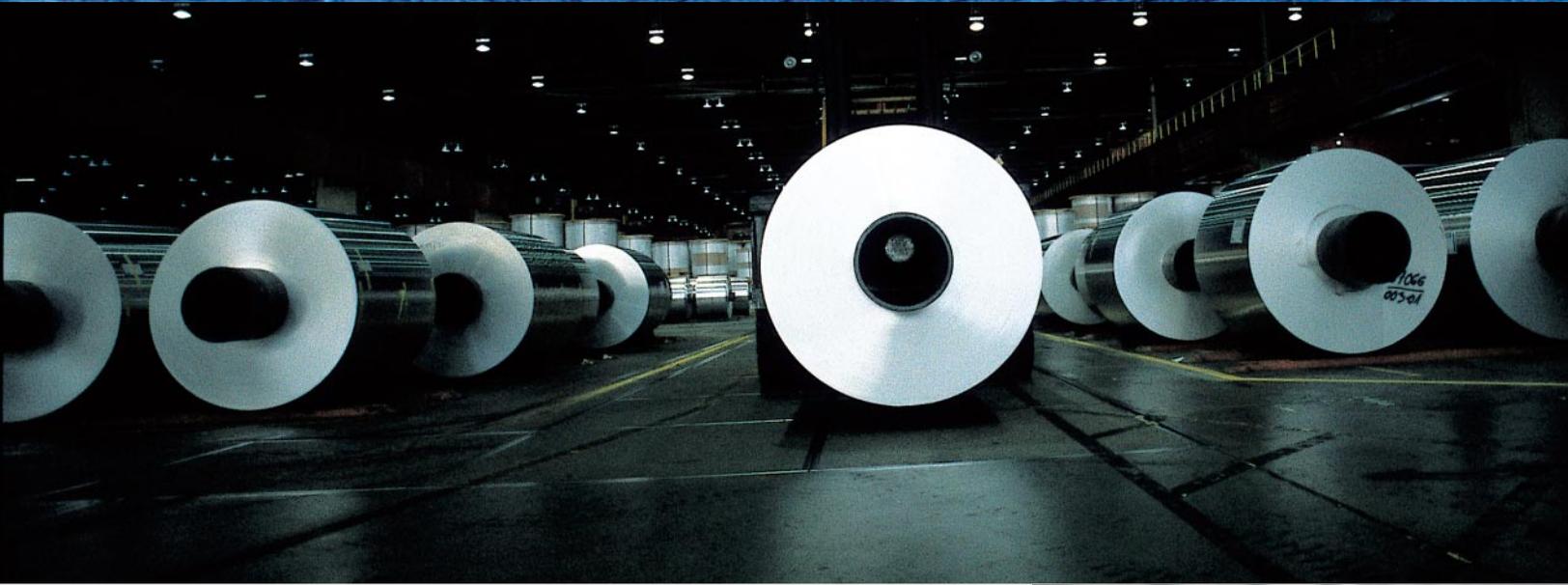
Aluminium Norf GmbH

Aluminium Norf GmbH, a 50-per-cent subsidiary of Hydro, is the largest and most modern aluminium rolling mill in the world. Around 1.4 million tonnes of hot-rolled strip and 950,000 tonnes of cold-rolled strip are produced on technically sophisticated rolling stands every year. By using only high-quality starting materials from Hydro Aluminium's own secure metal base, we ensure that our input stock is of consistent composition. Our rolled products – with their extremely tight tolerances and excellent surface finish – are therefore ideal for use in the construction of heavy goods vehicles, silos and in the ship-building industry.

Hamburg plant

In addition to standard rolled products, our Hamburg Plant specialises in the production of thick-gauge sheet for the construction of silos, heavy goods vehicles and ships. With an annual capacity of approximately 200,000 tonnes and state-of-the-art rolling equipment after extensive investment and modernisation, we meet the essential prerequisites of our customers and deliver consistent product quality.

Know-how is our most important asset



We focus all our activities on meeting the needs of our customers. This means not only producing strip and sheet which meet customers' exact specifications but also providing consulting services and solutions to product-related problems – a challenge we particularly relish.

Our employees in applications engineering and sales have a high degree of technical expertise. From the beginning of product development, they use their extensive materials-related know-how to give customers technical support. Comprehensive knowledge about the manufacturing processes is another decisive advantage in making the optimum use of aluminium.

Many decades of experience in the manufacture and subsequent fabrication of alu-

minium have helped us to become experts in the product. Hydro Aluminium's Research and Development also gives vital impetus to the optimisation of alloys and special manufacturing processes which we further develop to meet our set goals. High product quality combined with cost-effective solutions and short lead times are key criteria for us.

Our guiding principle is "customer service par excellence" – this finds expression in our consulting services and materials expertise as well as in our schedule effectiveness, reliability of supply and planning predictability. Furthermore, as a result of increased market orientation, we are now closer to our customers: with sales offices worldwide; we are there where you need us – close at hand and in direct contact.



From our broad range of aluminium strip in widely different alloys, we can cut sheet to length to meet our customers' specific product requirements – even with sawn edges for optimum subsequent welding.

Tailored materials for heavy goods vehicle construction



Tipping dry-bulk transporter

Aluminium in heavy goods vehicles shows clearly what consistent product development can achieve. The material's high strength-to-weight ratio combined with its good buckling performance ensures structural crashworthiness – an important safety aspect in the event of a crash, especially for trucks transporting hazardous materials. In addition, aluminium's good welding characteristics and high resistance to corrosion make it the material of choice for the construction of heavy goods vehicles.

We enhance these positive technical specifications during the manufacture of our sheet to meet the most exacting requirements with regard to surface quality and process tolerances. On request, we can supply sheet with sawn edges for optimum welding. Whether it is for a road tanker, a dry-bulk transporter or an articulated tipping

trailer, we offer the right solution for each and every application. It is not without reason that the largest manufacturers of dry-bulk transporters and tankers in Europe count among our clientele.

Besides the two main alloys EN AW 5086 (AlMg4) and EN AW 5083 (AlMg4.5Mn), which are also available in two variants respectively, we have developed new innovative alloys like Elongal®. In addition, we continuously optimise existing alloys and create new variants to offer our customers the best solution for their specific applications in trailer construction. Our plants in Norf and Hamburg are also certified suppliers of aluminium alloys in accordance with Germany's pressure vessel regulations AD 2000 W/O and TRB 100, and the European Pressure Equipment Directive (PED) 97/23/EU.

High-strength aluminium sheet for **ships, boats** and **yachts**

The development of ever faster high-speed ferries and patrol boats, as well as motor boats and sailing yachts for the leisure sector, over the last few years has led to a sharp rise in the demand for alloys which are resistant to seawater. Aluminium alloys produced by Hydro Aluminium provide the ideal answer.

Thanks to Hydro Aluminium's comprehensive knowledge of materials and its experience gained over many years of in-house research and development work on seawater-resistant alloys, we are now the No.1 contact address for matters relating to "aluminium in shipbuilding". We have become specialists in the materials used in the construction of superstructures for cruiseliners, high-speed ferries, yachts and small boats, such as those used in the fishing industry.

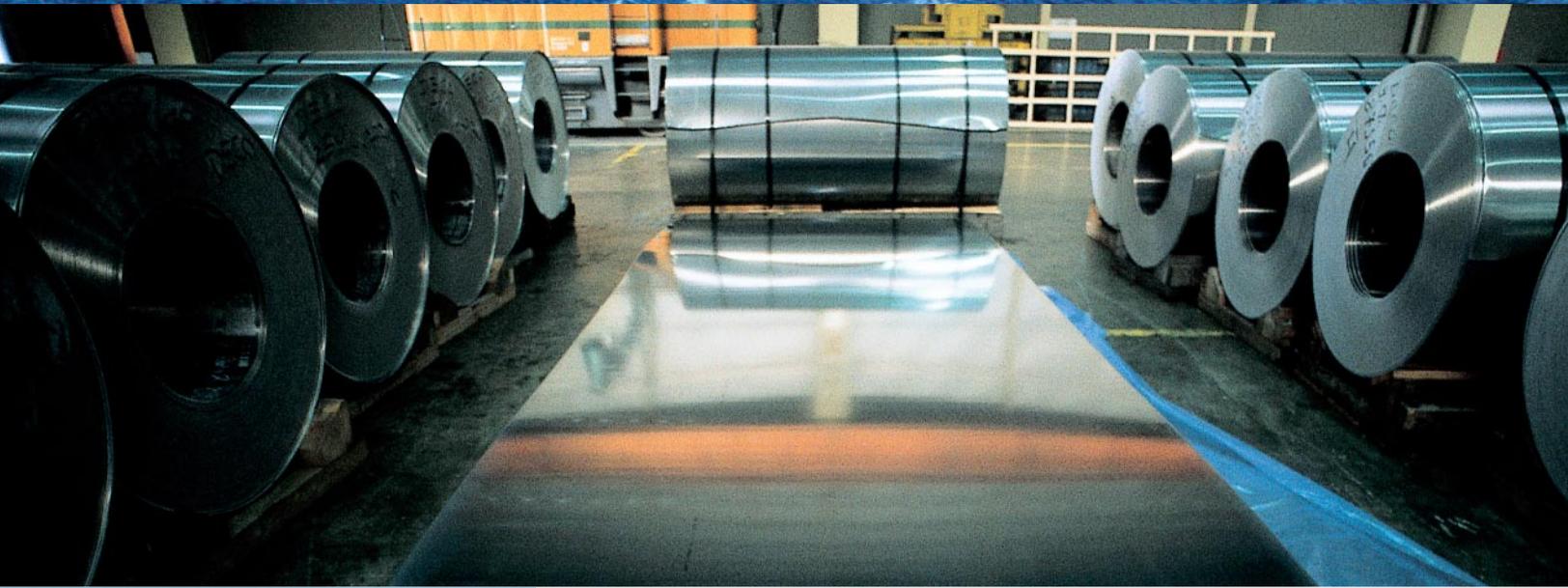
Compared with classic materials, Hydro Aluminium alloys display their advantages most clearly in ship, boat and yacht building: they are extremely resistant to corrosion, light and, despite being very strong, can be formed and welded extremely easily.

The sheet which we produce for use in shipbuilding is manufactured on ultra-modern rolling equipment then cut to length for subsequent fabrication. In addition, the materials we supply are certified by all well-known classification societies, such as Det Norske Veritas, Bureau Veritas, the American Bureau of Shipping, Lloyds Register of Shipping and Germanischer Lloyd.



Catamaran

Robust solutions for silo and tank construction



**Silos for the storage
of plastic granules**

Materials used in the construction of silos have to meet very strict criteria: they must combine proven functionality with a long service life. In this sector, it is now difficult to do without aluminium. With its outstanding properties, the light metal seems almost predestined to be used in this particular application:

- > Low weight with high rigidity
- > High resistance to a wide variety of contents
- > High resistance to corrosion

Our materials, with excellent surface quality provide robust solutions for the construction of silos and tanks used in the plastics and food industries as well as the chemicals industry.

We are already the market leader in this growth segment in Europe. Besides supplying a wide product range and excellent surface quality, we have an added advantage. With our high-tech manufacturing processes, we can produce strip in widths of up to 2,600 mm with a thickness up to 12 mm, as well as sheet with a maximum length of 26 m.

To match the solution with the end use in an optimal way, we offer two variants of EN AW 5754 (AlMg3). One variant is characterised by high rigidity and is specially suited to large silos while the other is particularly easy to work.

Diverse applications in industry



We are experts in the production of aluminium strip and sheet for the transport industry. The versatility of our materials enables us to offer our customers the optimum solution for their particular product needs and applications.

We supply tailored materials for the production of:

- > Spiral-welded tubes
- > Sheet for cryogenic applications
- > Electrotechnical components in power plants

In these applications, lightness, superior mechanical and electrical properties of aluminium play an important role. The material's long service life and extremely easy fabrication are other key advantages. Industrial applications demand ever higher quality standards, strength limits and thickness tolerances – stringent requirements which we meet by continuously optimising our materials and extending our manufacturing competence.



Heat exchanger in the cryogenic industry



Hydro creates a more viable society
by developing natural resources and products
in innovative and efficient ways.



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