HYDRO

Aluminium in the wind energy

Aluminium platform constructions made of sheet and extrusions for offshore wind turbine foundations, built by Aluwind A/S.

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As societies aim to catch wind power more and more offshore, e.g. in the North Sea, a new, dynamic industry prepares for the creation of huge, long-life wind power parks.

Choosing the right mix of materials, will be crucial for the overall efficiency, performance and ultimate sustainability of these large-scale installations:

- in their conceptual set-up, where a clear and simple plan has to look for the best blend of effects for the subsequent steps in the product cycle yet onto the end of life phase as well
- in their transport to sea, where the lightweight of huge parts and the option to ship entire components provide clear advantages, also for the carbon footprint of the manufacture
- in their assembly, where ease of handling and tight tolerances of prefabricated modules and, again, light weight of the parts to join contribute to swift and efficient operations
- in their service over many years, where reliable functionality and low maintenance pay off in saving on inspection routines and the need for replacement parts
- in their recycling, where aluminium offers the best output, in terms of value for money just as ecological gains.

All these benefits are provided by aluminium only. Offshore, it will help wind energy to accomplish a higher yield, through reliable service – as a truly sustainable way to catch the wind.

Aluminium in Offshore Wind Turbines

Also in turbines, the lightweight, corrosion-resistant, 100% recyclable benefits of aluminium will pay off in

- Transition pieces monopile to turbine tower
- Inner Platforms in the turbine tower
- Railings, gates and ladder
- Helicopter Hoist Platforms
- Nacelle outer skin
- Heat exchangers, electrical cabinets, transformers

There are lots of applications, where aluminium can set your winning mark in the offshore wind industry:

- Offshore Substations
- Helidecks
- Living Quarters
- Container
- Cables
- Supply and maintenance vessels
- Subsea cables and HVDC-GIL lines

May the sea be rough or salty …

In maritime applications, aluminium has a growing track record for over 40 years, as a proven long-life material in shipbuilding: Yachts, high- speed ferries, patrol boats and the superstructures of cruise-liners gain speed at less weight and offer durable service, free of maintenance. Flat-rolled metal is used in many ways, ranging from plate and stiffener to large tubular constructions.

On sea, also offshore accommodation modules and helicopter decks, gangways, bridges and railings, buoys and subsea structures benefit from some of the advantageous properties of aluminium:

- Under optimal design & manufacturing methods, aluminium will show no corrosion.
- Aluminium constructions have no need for surface treatment to guarantee corrosion resistance – steel must be galvanised, heavily painted or stainless steel must be used.
- The bare aluminium surface has no need for maintenance as its natural oxide layer is protecting its surface.
- Even in harshest conditions, aluminium proves its durability.
- Aluminium is incombustible and does not contribute to a fire – in contrast to GRP.
- Aluminium means built-in lightning protection and has no electrostatic load potential

Sustainability

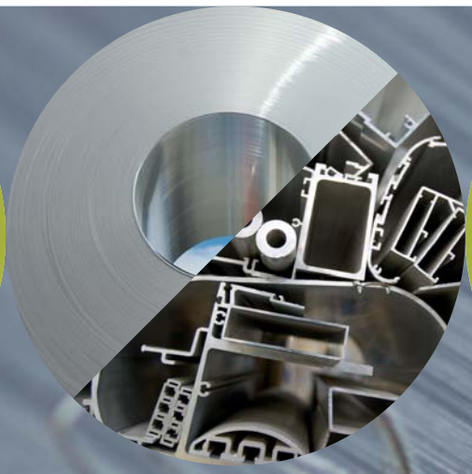
While the re-use of GRP is limited to inferior applications like the cement industry, aluminium can be 100% recycled – at an energy saving of 95% compared to its primary production. Of all the aluminium ever produced, since its industrial processes began in 1886, 75% still are in use today, in their first, second, third or umpteenth life cycle. As demand for aluminium still is growing in so many segments and market regions, so do the capacities for production and for recycling.

Floating, but rust-free

After 35 years of permanent service, the North Sea Buoy NSB II was taken from its station 120 kilometers west of Sylt for a thorough inspection. While comparable steel structures had needed several interim breaks for a fresh repaint or replacement of rusty parts, this buoy, built from 1974 to 1976 in Kiel and made of the aluminium alloy 5042, only got a high-pressure cleaning. When algae and dirt, starfish and crawfish were brushed away, the aluminium emerged – just as intact as it was in the 1970s.

Aluminium at all tides: Helicopter deck, 100-bed living quarters and container on the Oseberg Oil Platform

Main benefits of aluminium



Build better, build alu-smart

We help you build aluminium competence with dedicated training and seminars; choose the right material and alloy; select the best semis for your specific need; customize extruded profiles; review design and calculation for loads, corrosion, maintenance or joining issues, also through our own, strong R&D.

- *Corrosion resistant*
- *Lightweight and strong*
- *Non-magnetic*
- *Numerous surface functions and treatments*
- *Excellent formability either in extruded, cast, drawn and milled processing*
- *Good thermal and electrical conductor*
- *Incombustible and does not contribute to a fire*
- *Good welding and adhesive bonding properties*
- *Versatility of semi-fabricated materials: rolled products, extrusion profiles, castings*
- *100% recyclable, always and ever*

Hydro is a global supplier of aluminium and aluminium products. Based in Norway, the company employs 20,000 people in 40 countries and has activities on all continents. As a worldwide leader in rolled aluminium products, Hydro operates a network of six rolling mills in four countries, with major, world-leading assets in Germany.

Each year, we supply around 1 million tonnes in a range from 12 mm thick plates down to foils as thin as 6.0 µm, as coils or cut to size: to make mobility lighter, protect food and medicine, help build efficient homes, print newspapers and energize sustainable business, including sun – and wind.

Hydro Aluminium Rolled Products GmbH

Aluminiumstr. 1
41515 Grevenbroich

Tel: +49 2181 66-1588
Fax: +49 2181 66-1715
rolled.wind@hydro.com

Hydro.com

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