



HYDRO

Aluminium – about Hydro and buildings

We are creating windows of opportunities





Our solutions



Chelsea Football Club Training Academy, United Kingdom

- Technal's "Trame Horizontale" façade system, maximizing natural light and providing natural ventilation;
- Designed to blend into the rural surroundings;
- Preferred supplier for the two phases of the project (2007, 2009)



Verslo Centras 1000, Kaunas, Lithuania

- High-tech aluminium and windows facades which resembles a Lithuanian banknote
- 35 tonnes of aluminium in the form of Wicona's Wictec 50 SG facades used



Aldán house, Vilariño, Spain

- Urban modern style residential building
- Complex design in Alumafel-brand products
- Fit for aggressive sea-side environment
- "Juana de Vega" Architecture Award-winning

Life-long aluminium solutions for low-energy buildings

Aluminium – HOW?

How do windows influence a building's energy performance ?

To assess a window's influence all the parameters affecting its performance need to be considered and combined in a balanced and optimized way. Characteristics such as U-value, g-value, daylight transmittance and air leakage go hand in hand and allow optimization of energy loss, energy gains, solar protection and natural light gains as well as fresh air exchange. The location of the building and its use are also important factors to take into account.

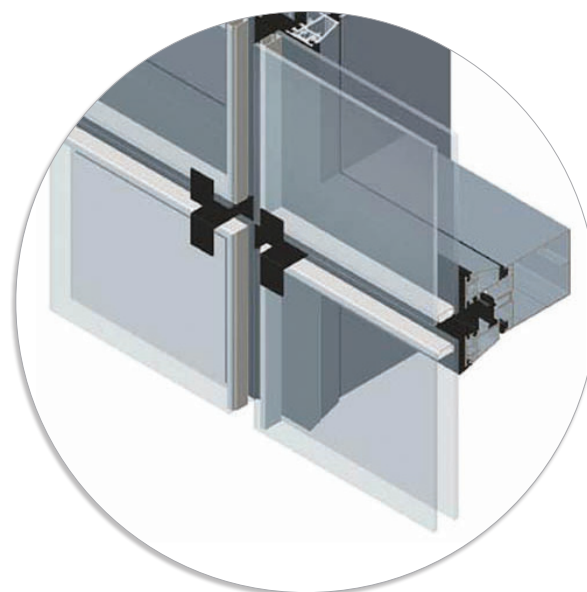
The capacity of a window to let light through is defined as "visible transmittance" or "daylight potential" (PT). The higher the PT, the more daylight is transmitted through the window. As more glazing maximizes the amount of daylight, the frame should be as thin as possible. The frame section represents around 20-30 percent of a window's area, depending on the materials chosen. Metal frames are the smallest available on the market.

The insulating value of a window – i.e. its capacity to reduce heat loss – is called the "U-value". The higher the U-value the more heat is passing through. Though aluminium is a good conductor of heat, smart profile design and use of low conductivity materials for thermal breaks help overcoming this disadvantage. This property can even become a benefit when using aluminum for solar thermal heat collectors.

The "g-value" expresses how much heat can come through a window and thus naturally warm the interior of a building – the heat gains. A high g-value means that a large amount of heat passes through the window.

Special coatings can also be applied to the glazing and the frame to reduce the transfer of heat while still allowing a high amount of sunlight to pass through.

Heat gains and losses can also occur from the leakage of air around the edges and spacings of the window frame. Several levels of gaskets, seals and drainage systems help insulate the system from natural elements like air or water.



Glazings are complex systems

How do we work within the supply chain?

Each of our brands offer distinct and tailored solutions to our customers and their markets' needs. The majority of our customers are small and medium-sized enterprises. We are working closely with other actors in the construction supply chain, architects and metal builders, to ensure that their specifications are met.

With architects, we work on matching design requirements and technical feasibility. Following our instructions and trainings, window manufacturers assemble our extruded products, getting the highly efficient windows ready for installation on site. We also provide any performance certificates and run the required tests for CE marking or national quality marks purposes.

● **Windows**

A window's main function is to separate the internal building from the external, but it actually plays a key role in regulating heat gains and losses as well as in bringing daylight to the occupants. Improvements in its design can therefore allow significant savings in a sector that contributes to 40 percent of the energy demand.

A window is not only a frame and glass – it is a system with sealants, gaskets, gases, mechanical components, special coating. All these factors affect the window's influence on heating, cooling and ventilation, thereby changing the energy performance of a building and the occupants' comfort.

The parameters can be adapted to fit the building use type and the local climate. At a sunny location, photovoltaic modules can even be integrated into a shading system, powering the building with clean, renewable energy.

● **Zero-energy buildings**

Aluminium's strength, low density, corrosion resistance and design flexibility make it the ideal material for building applications. With a strong network of research centers in France, Italy, Germany and Norway, Hydro is developing "intelligent" solutions for zero-energy buildings. By producing energy from renewable sources, those buildings can function on a high autarky level, almost autonomously from the grid supply, and can even feed back the surplus to the network in peak season, thereby contributing to the reduction of greenhouse gas emissions.



Aluminium – WHAT?

Hydro is a major global supplier of aluminium-based building systems. With our wide range of advanced products, we can offer the most energy-efficient and cost-effective solutions to residential and industrial customers in windows, doors, curtain walls, shutters, conservatories and other products. Hydro markets its building systems in Europe under four brands: Alumafel, Domal, Technal and Wicona.



● Bauxite

Bauxite is aluminium's raw material. This reddish coloured mineral is mostly found in Australia, China, Africa and South America. Bauxite is refined into alumina – a white powder which looks a bit like table salt. In Brazil, Hydro owns two bauxite mines and one alumina refinery. Four kilos of bauxite give two kilos of alumina which are then necessary to produce one kilo of aluminium.

● Processing

The performance of our building components is linked to the high quality of the metal they are made from. Our advanced technological expertise allows the production of unwrought aluminium in a wide range of shapes and alloys to fit any use. Pure aluminium is produced through a chemical reaction under intensity electrical current. Hydro has reduced its direct emissions of CO₂ from electrolysis by more than 70 percent since 1990.

● Extrusion

Our building systems solutions are based on aluminium extrusions. Extrusion is a key process to form aluminium, turning metal ingots into various shapes. There is virtually no end to what shape aluminium products can take to meet customer needs. With 19 extrusion plants, Hydro is ideally placed to supply the European market.

● Recycling

Recyclability is one of aluminium's greatest benefits. Aluminium can be recycled over and over again without losing its initial properties. Moreover, remelting used metal requires up to 95 percent less energy than for the primary production. In our twelve European remelting and recycling facilities, we reuse our own production waste and recycle scrap from our customers, such as old building scrap reclaimed through established collection schemes.

Hydro is a global supplier of aluminium with activities throughout the value chain, from bauxite extraction to the production of rolled and extruded aluminium products and building systems. Based in Norway, the company employs 23,000 people in more than 40 countries.

Rooted in a century of experience in renewable energy production, technology development and progressive partnerships, Hydro is committed to strengthening the viability of the customers and communities we serve.

Hydro

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