

WHITE PAPER

WHY ALUMINUM



DESIGNED TO ADVANCE, BUILT TO LAST: THE BEAUTY OF ALUMINUM



ABOUT ALUMINUM

Aluminum is a lightweight, durable, multifaceted metal with many valuable properties. Its high strength-to-weight ratio and corrosion resistance are intrinsic characteristics that have enabled it to have a major impact on human progress over the last century. Aluminum has changed the way we live. From transportation and construction to food and beverage packaging, aluminum is a part of our everyday lives.

Aluminum doesn't occur naturally; rather, it must be isolated from other elements, which previously contributed to aluminum's association with high cost. However, technological advances in the electrolysis process have reduced the cost of production significantly, enabling it to become a versatile, dynamic and widely used material for the past hundred years.

WHY USE ALUMINUM IN BUILDING CONSTRUCTION?

In terms of energy efficiency, durability and design flexibility, aluminum is unrivaled as a building material.

Aluminum can be cast, forged, extruded, rolled or welded, which adds to its ease of use and the variety of projects it suits. The combination of aluminum's versatility with its high strength-to-weight ratio makes it an attractive option for any project.

Aluminum's formability unlocks the potential for authentic architectural creativity, making it possible to build and easily maintain structures unachievable with wood, plastic or steel.



BENEFITS OF ALUMINUM

Aluminum is a long-lasting material with many properties that make it well suited to meet the demands of modern construction.

It stands up to all types of weather, allowing it to be used in a range of climates.

Aluminum frames can be **prefabricated off-site**, facilitating modular construction and allowing for more efficient installation to keep projects on track.

As a metal, it is **inherently corrosion resistant**, and is protected by a thin oxide layer which forms upon exposure to air. This structurally bound surface protects the metal from oxidation, and despite its thin nature, this transparent oxide layer prevents moisture and air penetration. Under controlled conditions, an aluminum oxide layer can be formed as an anodized finish to beautify and protect aluminum from the environment. This long-lasting and proven coating resists scratching, abrasion and corrosion from marine or industrial atmospheres and provides excellent protection from the sun's damaging ultraviolet rays.

Consequently, aluminum does not require special maintenance. Whether the metal is raw or lacquered, a simple solution of soap and water can be used to clean it without causing corrosion.

In addition, aluminum provides **greater design flexibility** for architects, allowing for creative building designs that stand out in the landscape. Aluminum allows architects to include curves, radiuses and splayed openings in their projects. Aluminum can also accommodate large, wide openings, giving architects the ability to incorporate **more natural light** into their designs, which has proven benefits in buildings such as schools and hospitals.

Moreover, its ability to take on any color means it delivers impressive projects that combine **unparalleled aesthetics and design flexibility**. Although anodized finishes remain a frequently specified choice for architectural aluminum, market demand for a variety of colors and types has resulted in increased use of painted finishes – also known as organic coatings. Substantial improvements in paint technology provide long-term performance and durability in a wide range of climates and environments.

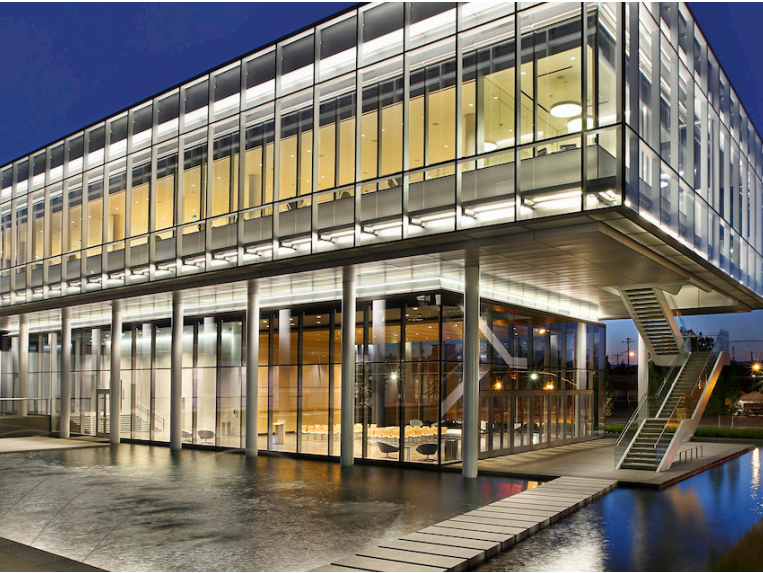


SUSTAINABILITY OF ALUMINUM

As a building material, aluminum contributes to strong, resilient buildings that can be recycled at the end of their lifespan. It is **fully recyclable**, meaning none of its diverse natural qualities are lost in the recycling process.

Because of its recyclability, aluminum allows Kawneer to have a **closed-loop production process**, where any production process waste is reused, helping reduce the overall carbon footprint of a project.

Aluminum can also make buildings more energy efficient with thermally and solar efficient products that help to reduce building's operational energy use.



PRODUCT TRANSPARENCY

To further assess the environment and health impact of our products, Kawneer drives positive change through greater transparency by sharing company and product specific **EPDs** (Environmental Product Declarations) and **Declare labels**.

We have partnered with the International Living Future Institute to create Declare labels for a number of our products. These products are certified Red List Free for anodized finishes and manufactured in the United States and Canada. We have product certification under Cradle to Cradle standard, that evaluates a product and company on five categories – material health, material reutilization, renewable energy and carbon management, water stewardship and social fairness.

Our thoughtful product design and responsible manufacturing help to inspire distinctive buildings and make a sustainable difference around the world.

THERMAL BREAK TECHNOLOGY WITH ALUMINUM

Since aluminum is a highly conducting material, a thermal barrier must be integrated into the system to minimize heat transfer. Without thermal barriers, weather extremes can permeate under-designed fenestrations, lowering the comfort of occupants and raising operating energy costs.

Sustainable thermal break technologies allow aluminum fenestration products to meet and exceed the energy performance requirements needed for various projects and become strong, long-lasting and energy-efficient materials.

The unique nature of our thermal break technologies allows for more complex aluminum extrusion shapes and a wider choice of locking option hardware for thermally broken doors.

Made from low conductive materials, our **durable thermal barriers** are used within framing systems to separate the interior metal from the exterior metal and reduce heat loss.

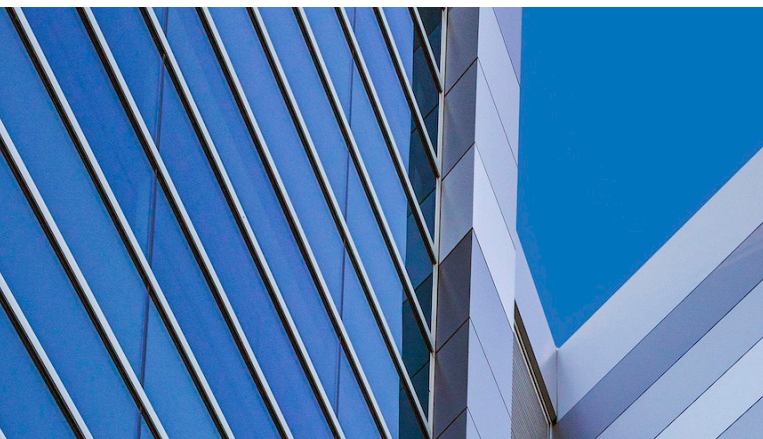
We have a wide range of thermal barriers and products that cater to the structural load of different projects and consider the impact of tension, torsion and shear.

For example, our **IsoLock® process** can be achieved by one of two means. Prior to the pouring operation, the aluminum is either lanced into the cavity at increments of 3/4", or the interior of the thermal pocket is abraded.



The lanced or abraded surface creates a mechanical lock in the urethane before it hardens, eliminating any potential for shrinkage. The mechanical locks, combined with the adhesive bond of the urethane to the aluminum, create a composite section used to meet design wind loads.

By accounting for internal and external forces they might encounter, our separators and IGU types can be **thermal, high-thermal and ultra-thermal in performance**. This technology offers design flexibility for different exterior and interior finishes, enabling architects, contractors and building owners to advance architectural design by improving the performance, productivity and protection of buildings, regardless of climate or location.



THE FUTURE OF ALUMINUM

The consumption of aluminum has increased by more than 100% since 2000, and this is likely to continue well into the future. In construction, the increased focus on sustainability means demand is expected to grow continuously through 2050. Aluminum is recognized as an essential material for the transition to a decarbonized economy due to its sustainable properties.

Kawneer leads the aluminum facade industry in sustainable design and innovation. With advanced technology processes and highly recyclable aluminum products, Kawneer is focused on reducing our environmental footprint while meeting the demand for this remarkable material.

