

# High-Strength Novelis Aluminum for Sandwich Panels

## Find greater satisfaction in lighter and stronger panels

Plants and office buildings are valuable assets to be used for decades once built. They protect precious lives and costly machinery. The importance of making the right choices in their construction - from conception to materials to construction work - could hardly be overstated.

Aluminum is already in wide use as a sustainable construction material and is fast replacing steel. With advanced rolling technology and production facilities, Novelis has developed a high-strength aluminum that is as strong as steel but

retains the lightness of aluminum to make sandwich panels of unsurpassed quality. High-strength Novelis aluminum is a new solution to replace heavy, color-coated steel for sandwich panels and to provide an infinitely recyclable, environmentally friendly building material for tomorrow. Find greater satisfaction in high-strength Novelis aluminum. Now is the time to take an innovative step forward in building construction, with the help of Novelis innovation, technology and expertise.



### 1. Reliable

Material advantage is at the core of Novelis, the world's largest rolled aluminum producer and recycler.

### 2. Economical

Only one-third the weight of color-coated steel, aluminum reduces the cost of construction, is extremely resistant to corrosion and eliminates the need for maintenance and re-painting.

### 3. Durable

Highly durable, maintaining integrity and appearance without discoloration or cracking, even in coastal and industrial areas.

### 4. Easy Installation

Light weight and easy to handle. Easy installation for new construction or building renovations.

### 5. Environmentally Friendly

Aluminum is infinitely recyclable, making it not only an environmentally friendly metal, but also a more sustainable building material.

# Not just aluminum, Novelis Aluminum.™

Novelis is the world's premier producer of rolled aluminum and the global leader in aluminum recycling. With 25 production operations in Asia, North America, South America, and Europe and more than 11,000 employees, Novelis offers unique material advantages for high-tech products such as automobiles and consumer electronics as well as for construction and beverage cans. Novelis experts work closely with customers to develop next-generation products with the highest quality of innovation and design.

Novelis is the leading low-carbon aluminum producer. Much of Novelis aluminum is re-created from material already in the world today, saving natural resources and allowing for the creation of consumer products that have a lower environmental footprint. By 2020, Novelis aims to have 80% of our aluminum made from recycled material.

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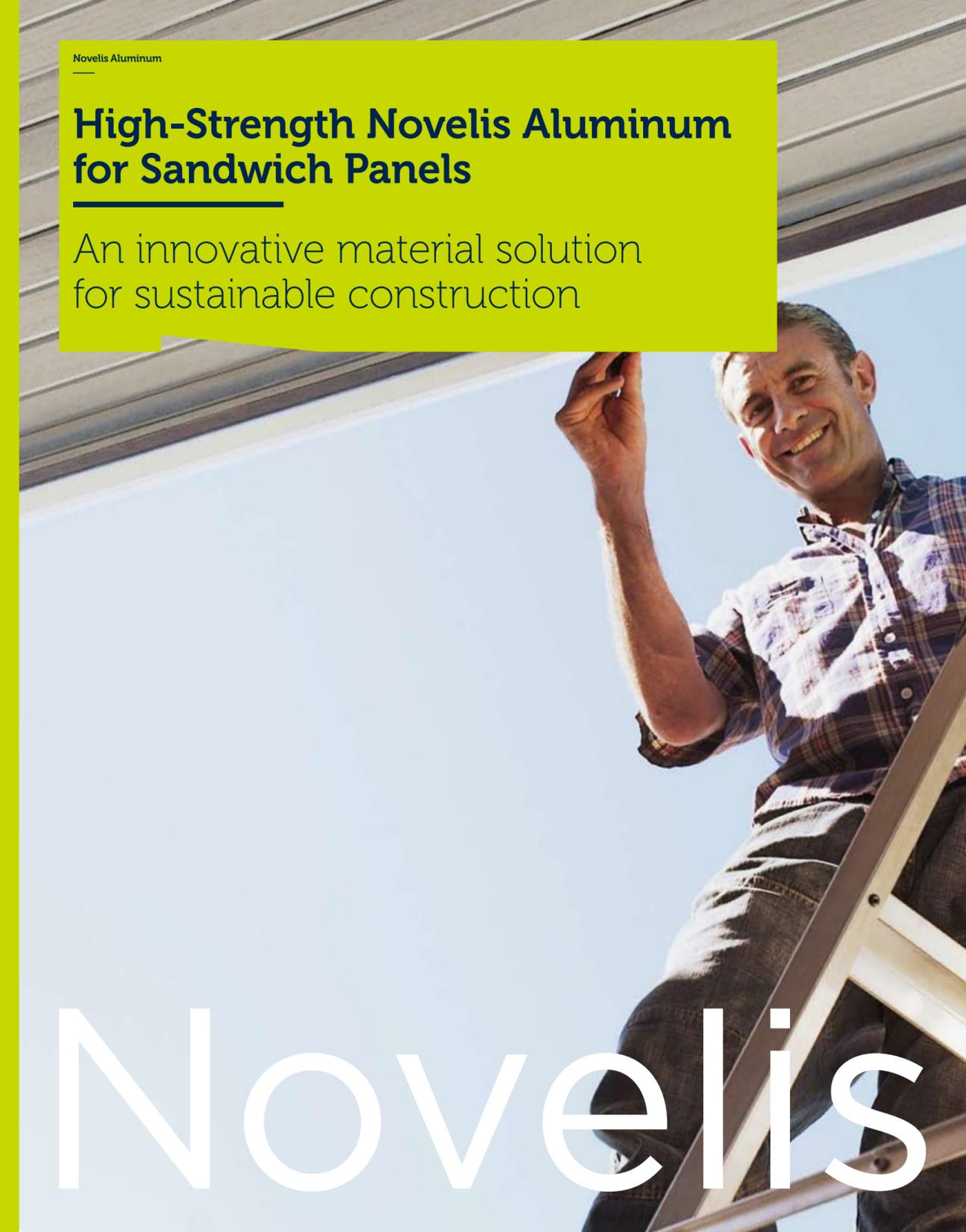


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## An innovative material solution for sustainable construction

# Novelis



# Common Issues with Color-Coated Steel Sheet

## Are you really satisfied with color-coated steel?

### What material did you use to build your company's core assets?

Steel roofs start corroding and leaking in a few years; steel walls are difficult to repair and dispose of; plants built with steel single panels are hot in summer and cold in winter. Building and maintaining plants and farm facilities is much easier with sandwich panels made with Novelis' high-strength aluminum.



Corrosion and leaking many years before they can be replaced  
Are you worried about their fast corrosion?

Issue 1

Hotter inside than outside in summer (in the case of a single-layer roof)

Are you worried about heating and cooling solutions and excessive energy bills?



Issue 2

Color-coated steel sheets have these problems!

Issue 3



Too heavy to easily install and consider load-carrying capacity in design

Are you worried about installation of panels and construction costs?



Issue 4



Difficult to dispose of  
Are you worried about construction waste?

Issue 5



Costly to maintain and repair  
Are you worried about their maintenance including painting and overlaying?

# Why Sandwich Panels with High-Strength Novelis Aluminum?

## Novelis' high-strength aluminum offers a solution to the many problems of color-coated steel sheet for sandwich panels

Why 1

With far better corrosion resistance than steel sheets, aluminum sandwich panels will not corrode even decades later.

Structures built with color-coated steel start corroding and cracking only a couple of years after construction. Plants and farm facilities in humid areas will corrode even faster. Novelis' high-strength aluminum never weakens and it retains its original appearance for decades.

### Results of Corrosion Resistance Testing in a Natural Environment

Corrosion-resistance of various metals when exposed to the air for 16 years

Material Tested		Coastal Air (1)			Inland Air (2)		
Metal	Alloy	Amount of corrosion (g/m <sup>2</sup> )	Average depth of corrosion (µm)	Normal rate of corrosion (µm/yr)	Amount of corrosion (g/m <sup>2</sup> )	Average depth of corrosion (µm)	Normal rate of corrosion (µm/yr)
Aluminum	A1000 series	8	3	< 0.25	5	2	< 0.25
	A5000 series	8	3	< 0.25	6	2	< 0.25
Non-ferrous metal	Zinc(99.5)	294	41	1.8	98	14	0.8
Steel	Carbon steel (0.25C)	3149	402	21	2277	290	14
Stainless steel	302(18Cr-8Ni)	3	0.5	< 0.25	0	0	0

(1) Place of exposure : Limon Bay in the Panama Canal  
(2) Place of exposure : 8 km from the coast of the Miraflores Locks of the Panama Canal

Why 2

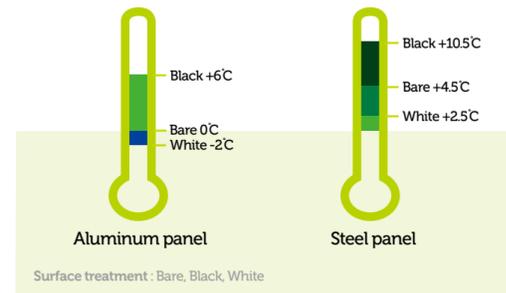


The temperatures of the upper and lower surfaces of each material were measured after one hour of exposure to direct sunlight

### Aluminum roofing helps reduce indoor temperatures in summer.

With a plant or livestock farming facility roofed with color-coated steel, you have to worry about the condition of your machinery or livestock in summer. Using high-strength aluminum roofing will eliminate those worries. An aluminum roof can reduce the indoor temperature by 4.5 °C on average compared with a color-coated steel roof.

(In the case of a single-layer roof)

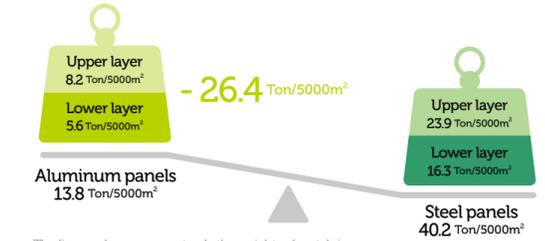


Why 3



Only one-third the weight of color-coated steel, aluminum sandwich panels are easy to install.

If you use high-strength aluminum sandwich panels - which are as strong as color-coated steel panels, but much lighter - for a roof of 5,000 m<sup>2</sup>, the roof will weigh about 13.8 metric tons. That is 2.91 times, or 26 metric tons, lighter than a color-coated steel-roof, which would weigh about 40.2 metric tons. This means easier installation, less weight on the substructure and much lower construction costs.



The figures above represent only the weights of metals in a roof of 5,000 m<sup>2</sup>. The weight of Styrofoam is not included.

Why 4



Being infinitely recyclable, aluminum sandwich panels will raise the economic and environmental value of your structure.

Aluminum scrap is more valuable than steel scrap, and even after long-term use, aluminum can be resold at a decent price. Aluminum can also be recycled over and over again without any reduction in quality, helping you protect nature and minimize your impact on the environment.

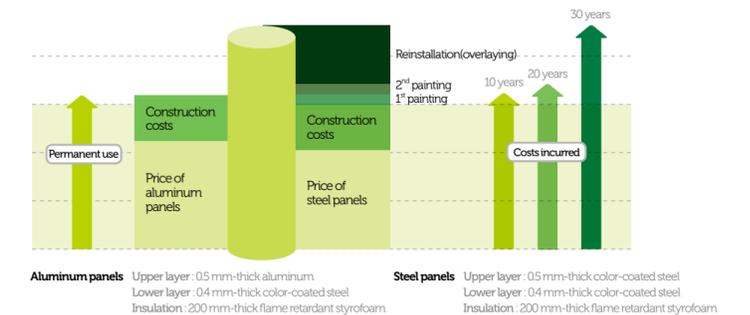
Why 5



Novelis' plant in Yeongju, Korea as new as it was built 12 years ago

With a near-permanent lifespan, aluminum sandwich panels will help you reduce maintenance costs.

Novelis' high-strength aluminum sandwich panels may cost you slightly more than color-coated steel panels at first, but will not require such regular maintenance work as painting and overlaying or reinstallation. If you have a long investment horizon, high-strength Novelis aluminum sandwich panels are the smart choice.



Painting and reinstallation are optional and the costs can vary.