



Nvelope Rainscreen Systems Ltd

NVELOPE: Nvelope brackets and rails are manufactured in the UK – EN12020-2:2008 alloy and quality standards. Manufactured in the UK from extruded aluminium alloys conforming to EN573-3 (alloy / material and EN755 production standards.

Sustainability of Aluminium

OVERVIEW: Aluminium is the second most widely used metal after iron. This is due to its unique combination of features.

The low weight and high strength, malleability, simplicity of fabrication, corrosion resistance and good ability to conduct heat and electricity are some of the most important characteristics of Aluminium. Furthermore, Aluminium is very easy to recycle, needing only 5% of the energy required for primary production.

WEIGHT: Aluminium density is 2.7kg/m^3 , or approximately one third that of steel.

Strength: Aluminium alloys have tensile strengths of between 70 and 700N/mm^2 .

In contrast to most steel alloys, at low temperatures the strength of Aluminium increases, without any embrittlement of the metal.

At high temperatures the strength decreases. At constant temperatures over 100°C consideration must be given to the effect on the structural strength of the material.

LINEAR EXPANSION: Compared with other metals aluminium has a relatively large coefficient of linear expansion. In some fabrications it is necessary to take account of this.

CONDUCTIVITY: Aluminium is an excellent conductor of heat and electricity. An aluminium cable weighs approximately half as much as a copper cable with the same conductive capacity.

MALLEABILITY: Good malleability, which is necessary for aluminium extruding, allows bending and other forming operations in both hot and cold conditions.

FABRICATION: Aluminium is simple to fabricate with most punching and machining techniques. Furthermore there are advanced bonding and welding methods now available.

REFLECTIVITY: Aluminium has good reflectivity over a wide range of wavelengths.

NON-TOXIC: Aluminium is nature's most common metal with no less than 8% of the Earth's crust consisting of many different forms of aluminium compounds, which also naturally occur in our food.

LONGEVITY / CORROSION: As with most other metals, aluminium reacts with the oxygen in the air. The oxide layer, which is created on the surface of the material, is very thin and compact and provides a natural high level of corrosion protection. If this oxide layer is damaged it spontaneously reforms itself.

Aluminium has a good hardness and endurance in neutral and slightly acid surroundings. However, in highly acidic surroundings corrosion can quickly develop.

The corrosion of metal in the atmosphere depends on the time of exposure and the composition of the electrolyte on the surface. All metals are at risk of corrosion when the relative surface moisture exceeds 80% and the temperature exceeds 0°C at the same time.

In a mainland atmosphere and in moderate sulphurous atmosphere the durability of aluminium is excellent.

In strong sulphurous atmospheres it is possible that small level of corrosion may appear on the surface. But generally the durability of Aluminium is better than that of either carbon or galvanised steel.

The occurrence of salts, especially chlorides, in the atmosphere only slightly reduces this durability by comparison with other metals.

Mostly the maximum depth of small pits is only a fraction of the thickness of the material. So, the characteristics of durability are nearly constant. Those of carbon steel are totally different.

The Swedish Institute of Research into Corrosion has carried out comparative open-air experiments with different untreated metals. These show the losses in weight of sheet metals with untreated surfaces after 8 years exposure at a coastal location in Sweden.

Coastal Location	
Material	Weight Loss
Aluminium	7g/m ²
Copper	57g/m ²
Zinc	133g/m ²
Carbon Steel	933g/m ²

The average for the deepest corrosion on aluminium sheets after 8 years was 70µm (0.07mm) approximately 1/100 that of carbon steel and 1/10 that of galvanised steel (see zinc in the table).

The rate of corrosion decreases rapidly at only a small distance from the sea. At 1 kilometre distance the characteristics are the same as an inland location.

Inland Location	
Material	Weight Loss
Aluminium	2g/m ²
Copper	31g/m ²
Zinc	61g/m ²
Carbon Steel	676g/m ²

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Other sources of information / Literature references for aluminium fabrication, design and for construction

The Aluminium Federation Ltd
 Broadway House
 Calthorpe Road
 Birmingham
 B5 1TN

European Recommendations for
 Aluminium Structures Fatigue Design
 ECCS No 68 1992

CP118
 The Code of Practise
 for the Structural
 use of Aluminium

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