

Unit 1 (G-H), Hudson Road, Elms Farm Industrial Estate, Bedford, Bedfordshire, MK41 0LZ

www.marleyalutec.co.uk

Ivona Nicol, Tel: +44 (0) 1234 321980, ivona.nicol@marleyalutec.co.uk

CPD Article

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Aluminium Rainwater, Fascia and Soffit Systems (Durable Eaves Solutions)

Introduction

This article specifically addresses the unique benefits of aluminium eaves solutions.

Aluminium eaves systems offer distinct advantages over more traditional materials, such as ease of installation, superb sustainability credentials and vastly improved life expectancy of 50 years that is virtually maintenance free, making it the ideal material for specification and use in modern construction.

This article explains which specific types of aluminium are most suited for rainwater systems and is supported by information on correct system specification and design, it will also provide updated information on new and forthcoming British Standards, eaves ventilation requirements and life cost analyses.

Key Learning outcomes

- Develop knowledge about the credentials of aluminium
- What to consider when designing eaves systems
- Familiarise specifiers with the application of aluminium composite fascia and soffit
- Learn about the standards and accreditations for aluminium rainwater systems
- Understand the life cost of various materials for eaves systems

1.0 Credentials of aluminium

Aluminium, a sustainable building material:

For a material to be considered sustainable, it must be recyclable, have a long life expectancy and a low impact on the environment. Aluminium has all these qualities and more.

Aluminium is the third most abundant element in the world, after oxygen and silicone. Eight per cent of the earth's crust is Bauxite which is the source of aluminium. Bauxite lies close to the surface and is extracted using open cast mining. 97% of all bauxite mines in the world operate rehabilitation projects, returning the land to its original condition after mining is finished.

Hydro-electric or geo-thermal green energy accounts for 60% of global primary aluminium production, minimising aluminium's environmental impact.

Infinitely recyclable:

Aluminium can be recycled again and again without loss of quality, in fact 75% of all aluminium ever produced is still in use today. The recycling of aluminium requires little energy. It saves up to 95% of the energy required for primary aluminium production.

Durability and life expectancy:

Aluminium is highly corrosion resistant as naturally generates a protective oxide coating. Should the painted surface be damaged, the aluminium simply oxidises to protect itself. Furthermore, if marine grade aluminium is used in combination with architectural grade polyester powder coating it provides an attractive, durable and maintenance free finish for up to 50 years life expectancy. This is in contrast to steel, where galvanising only offers limited protection and cast iron, which requires regular repainting.



Marine grade aluminium rainwater, fascia and soffit system with BS 6496 architectural grade polyester powder coat in grey colour

2.0 What to consider when designing eaves systems

Eaves design is concerned with finding the balance between looks and functionality – throughout the building’s entire life. The below factors are just few to be considered by the specifier when designing eaves systems:

Consider that designing rainwater systems efficiently at the top end of their flow capacity, while cost effective, may not provide the designer with the ability to choose the position of the rainwater pipes which can compromise the overall look. Consider the number of surrounding trees to determine whether the use of a leaf guard will prevent blockages or the performance of the rainwater gutter being compromised. Although it is aesthetically desirable to use hidden gutters, consider whether maintenance to the gutter is possible – also the consequence of the hidden gutter failing. Consider the correct positioning of gutter at eaves - for optimum gutter performance and to prevent snow damage. Consider providing adequate eaves ventilation, which can have indirect but adverse effects on other areas of the building.

Certain materials on the exterior of a building are likely to degrade during a building’s life, some may need regular redecorating. Consider that the higher you go, the more regular maintenance will cost. Consider the impact of mixing materials, for example aluminium gutter and timber fascia, you would expect the gutter to outlast the fascia, however maintenance or replacement of the fascia would require the otherwise sound gutter to be removed and reinstalled each time. Consider a uniform eaves material which does not require maintenance, decorative or otherwise, such as composite fascia and polyester coated or even unpainted aluminium of a marine grade to remove this risk. Consider the use of a material which gives the designer greater colour choice. Consider sustainability, the likelihood of recycling eaves materials at the end of the building’s life.



Mix of materials – aluminium gutters and downpipes installed on timber fascia and soffit

3.0 The application of aluminium composite fascia and soffit

Composite aluminium panel consists of a lightweight polyethylene core sandwiched between two layers of aluminium to produce a dimensionally and structurally stable, highly durable alternative to aluminium sheet that is easy to handle. Composite aluminium has many uses internally or externally and in application, it has several advantages over other materials.

Fixing to building structure

Traditionally, hard backing is provided for sheet cladding systems to provide a level and structurally sound substrate for the cladding material. The strong, rigid nature of composite material means it can be fixed directly to a timber frame without the need for this, hard backing is only required at joints. The panels are fixed at 600mm centres using colour matched pins or nailed directly to rafter ends cut level. Gutters can then be directly fixed to the installed eaves fascia panel using self-tapping screws. As well as its rigidity, the sound attenuation properties of composite also mean it can also be directly fixed to a secondary steel frame. Composite material can also be bonded to the building structure to remove the number of visible fixings – it is recommended that bonding plates are fixed first at the required centres to provide sound adhesion.

Jointing

Jointing composite aluminium fascia provides the option of either butting in a way similar to fibre cement panels, or cover strips similar to PVC. The end result is clean finished lines on the building that are never prone to rippling or warping.

Required for installation

Installing composite fascia requires exactly the same tools and approach expected when installing a PVC fascia – no requirement for bulky cutting benches or powered cutting equipment. Composite material is easily cut using either a handsaw or jigsaw for detailing, using fine tooth blades for a clean cut. The carrier film can be left on the panel and removed at the end of the installation for protection from incidental damage to the finished surface. For finishing touches, composite aluminium is the only material that can be adapted on site, easily formed by routing and then folding, to produce a quality of finish you would expect in a factory. Folding on site removes the downtime inevitable when dimensioning and ordering bespoke or purpose made building components.

Composite material can also be curved to a mean radius for use on a curved bay/turret or as a bargeboard on a curved roof – this would need to be carried out at works.



Aluminium composite fascia and soffit system can be cut and formed on site

4.0 Standards and accreditations for aluminium rainwater systems

Sustainable design creates products with a lower carbon footprint, longevity and low maintenance. When specifying aluminium rainwater, fascia and soffit products for your project it is important to know their source. The choice of manufacturer is crucially significant too. It is essential for a manufacturer to demonstrate environmental responsibility. They should comply with environmental standards and demonstrate their commitment to reducing the environmental impacts in daily operations. That may be a challenge, but it is also an opportunity to demonstrate an environmental responsibility, stand out from the competition and show existing and potential customers the proof of their commitment.

The most popular accreditation in this aspect is ISO 14001 - Environmental Management Systems.

Also, for additional peace in mind, the products should be manufactured to and in excess of the appropriate BS or EN Standards, including:

- BS 9101 - Steel and aluminium rainwater systems – specification
- BS 8530 - Traditional style aluminium gutter systems
- BS EN ISO 9227 - Corrosion tests in artificial atmospheres – salt spray tests
- BS EN 12206 - Paints and varnishes – Coating of aluminium and aluminium alloys for architectural purposes
- BS EN 1462 - Brackets for eaves gutters – Requirements and testing



Sustainable, durable and high performance aluminium rainwater system

5.0 Life cost of aluminium eaves systems

The costs associated with on-going planned maintenance seem to depend on a combination of anticipated frequency, scope of work, requirement for client/tenant liaison and provision for access at height. Frequency/scope of maintenance and its consequential effect on tenants/clients and surroundings are an additional cost to maintenance. Material choice can have a significant bearing on future maintenance and ultimately the life cost of a building.

When weighing up the relative life cost benefits of different eaves materials, it is worth considering their anticipated maintenance free life expectancy.

PVC

15 - 20 years – replacement required
Timber

7 - 10 years – repainting required
Cast iron

5 - 10 years - repainting required
Aluminium 50 years +

This can be further complicated when you consider each material has limitations in terms of what product is available. You would expect an aluminium gutter to outlast a timber fascia; however maintenance or replacement of the fascia would necessitate the additional cost of removing and reinstalling an otherwise sound gutter. When using dissimilar materials, the maintenance free life at eaves depends on the material installed with the shortest life expectancy.

Choosing an eaves system with no repainting, where all eaves components are made from uniform material, offers two mainstream choices - PVC or aluminium. Both can be installed in around the same amount of time, limiting the time and cost of labour and access provision. It is likely, however that the PVC eaves will require removing, disposing of and replacing within the building's design life. Above the raw cost of the labour and materials, at this point the issue of indirect costs related to the provision of safe access and disruption to the operation of the premises and safety of its occupants should be factored in. All these cost elements are difficult to predict, therefore present a degree of financial risk.

It could be argued the higher you build, the more maintenance is likely to cost. Choosing a total eaves solution which lasts fifty years, requiring no maintenance is the only way to mitigate any of the above factors.



Aluminium rainwater system can be the ultimate replacement for cast iron on listed and period style properties