

## GREEN ROOFS: SUSTAINABLE BENEFITS

Specifiers and developers increasingly have to look towards developing sustainable building solutions to achieve government targets in order to significantly reduce carbon emissions. Green roofs and the technology which surrounds it can have a significant effect on buildings sustainable credentials.

Structural metal decking involving standing seam systems has much to offer in the area of green technology and sustainability and members of the Metal Cladding and Roofing Manufacturers Association (MCRMA) are at the forefront of developing innovative solutions. Green roofing systems can not only improve the thermal performance of a building by providing protection against heat loss in the winter and heat gain in the summer but they can also help the building owner to manage the local environment and provide a social statement.



*Tuke School, Daniel Gardens in Peckham, South London. Image courtesy of Ash & Lacy Building Systems*

There are three basic types of green roof construction:

- Intensive roofs
- Extensive roofs
- Bio-diverse or brown roofs

Intensive roofs are suitable for heavy regular traffic and their formation frequently includes trees and bushes, as well as leaf and other vegetation. They are generally used in urban environments to create usable spaces raised off the floor and as they are designed to replicate a ground level garden space.

The intensive roof, as the name suggests, are generally high maintenance. However, due to the overall mass of the roof which can be considerable, intensive roofs are not generally suitable for metal roofing substrates. This type of roof would typically have a concrete deck.

The second type is the extensive roof - these are lightweight systems not normally intended to take roof traffic and are the most popular and regularly used type of green roof system. Extensive roof solutions include sedum blanket or plug plated systems. They are generally low maintenance and cost effective.



*West Ham Bus Garage. Image courtesy of Kalzip Limited*

Finally, there are bio-diverse or brown roofs; these are essentially a blank canvas onto which the local, naturally occurring plant species can flourish. They typically require little or no maintenance; however they usually require a significant period of time to fully establish themselves.

The standard extensive green roof can be achieved using a standing seam system as a robust component of the system which is overlaid with a secondary waterproof membrane. Aluminium standing seam sheets provide a robust structural layer and provide a work platform for the laying a lightweight growing medium and drainage over the membrane. Extensive green roofs can be subdivided into a range of different systems dependent upon the composition and depth of the substrate and on the plant species used.

Green roof systems with a metal roof substrate will provide protection from the effects of UV light, mechanical damage, high thermal temperature changes, for example freeze/thaw action, and therefore lead to a longer material life span. It is generally accepted that a greened roof can approximately double the life of the base impervious layers.



*Kingston Maurwood College, Dorset. Image courtesy of Euroclad Limited*

Extensive roofs offer low maintenance with little or no artificial irrigation requirement and improved rainwater management as the volume and rate of rainwater run-off from the roof is controlled and reduced dramatically. Buildings also benefit from a reduction in sound transmission through the roof because the multi-layer system increases the mass effect and hence dampens noise.

The advantages of aluminium have long been recognised; from its durability and strength to its flexible design potential and ability to be fully recycled. As the need for sustainable construction materials rises, the environmental advantages of aluminium are becoming increasingly significant in the specifying process.

Aluminium sheet can be fully recycled and the recycle process uses just five per cent of the original energy used. The structural aluminium layer provides an important and long lasting protection against the penetration of roofs and provides support to the membrane to resist local perforation and moisture penetration.

The benefits of extensive green roofs include their aesthetic appeal with a range of flower and foliage effects and the provision of habitat for wild life. In addition, green roofs provide an improvement of air quality by the removal of carbon dioxide, release of oxygen and water vapour, deposition of particulate pollutants, and absorption of organic volatiles.

Green roof technology is an environmentally friendly roofing system and whilst initial costs for green roofs can be higher than conventional roofs, the green roof technology provides significant savings for heating and cooling by more than 50 per cent.

Green roofs are also extremely durable with a design life in excess of 50 years and require minimal maintenance. Green roofs combined with other green technology such as solar thermal collectors and photovoltaic panels can help reduce costs further.

Green roof systems offer a sustainable and environmentally sensible option which, with due consideration, can provide an economic and trouble free installation. MCRMA members offer a range of solutions and recommend that a proposed scheme should be fully evaluated at the early stages by specialists or one of the independent roofing and cladding inspectors whose details can be found on the MCRMA web site at [www.mcrma.co.uk](http://www.mcrma.co.uk).

*This article first appeared in RCi Magazine, March 2014*