

Green roof design boundaries extended

Steve Greaves, UK Sales Director, Flag UK Ltd explains

With property development opportunities in cities now so limited and costly, it makes economic sense to put otherwise wasted roof areas to purposeful use. The environmental benefits of green roofs are now widely accepted but their tangible contribution to building efficiency has had just as much to do with their increased use.

The opportunity to reduce heat loss and energy costs presents an obvious long-term financial argument to any building owner; but there are other practical benefits. There is a fair degree of justifiable cynicism surrounding claims relating to sustainability in construction but in terms of thermal and acoustic benefits in particular, the performance of many green roof systems is beyond doubt. In terms of storm water attenuation too, as the number of green roofs grows, their contribution will certainly increase. Even roofing membranes benefit from the protection that green roofs provide.

Despite the positive impact on biodiversity, and CO₂ emissions, long-term performance depends heavily on the components of any green roof being fully compatible. Whether an intensive, extensive or biodiverse option is involved, systems invariably utilise up to ten elements. These typically include insulation, waterproofing membrane, moisture mat, root barrier and drainage layer; in addition to the ultimate choice of planting and growing medium. Because of potential structural considerations, scope for designers has been increased, with options now ranging from the traditional 'natural' roofs to those of lightweight construction. Flag UK, for example, offers no less than nine systems including thermal, rainwater retention, natural and lightweight solutions. The common factor to all is replication of the conditions in which plants thrive in their natural environment.

Though now so widely specified for both new build and refurbishment, choice of system is by no means

straightforward. Understanding the contribution of individual components makes specification of a system far easier. Specialist manufacturers provide detailed information on the implications of using different types of green roof and their construction and maintenance. They can also provide a wealth of detailed information, including data on imposed loads, Part L calculation, acoustic performance, integration with rainwater harvesting systems and regional climatic (most notably wind) variations. Provision of NBS is a good starting point for any specification, but information which begins with a report on the state of a roof is a valuable benchmark from which to start. Ongoing involvement at all stages of a build programme and a warranty based on a comprehensive final inspection does much to provide assurance that the finished landscape will perform as intended.

A proper maintenance programme is essential if optimum conditions for plant growth are to be provided. Achieving the right balance between irrigation, water retention and root aeration is, as any avid gardener will tell you, fundamental to good cultivation. Most architects and FM managers would probably hold their hands up and accept their need for guidance on a subject which, with the use of plant varieties such as grasses, herbs, shrubs and trees, now requires specialist advice. Many early green roofs were intended to function without irrigation, the sedum varieties used having been chosen because their fleshy, water retaining leaf structure restricts loss of water by transpiration. This makes it ideal to withstand the UK's variable climate without additional support, even periods of relative



drought. Many green roofs today, however, are designed to be fully functional roof gardens or biodiverse roof environments which provide natural habitat for wildlife. With the variety of planting options available, maintenance requirements understandably vary. During the initial growth phase, watering is required together with periodic fertilization, re-seeding and removal of self-sown weeds. Long-term fertilizers now enable a slow, controlled release of nutrients over a period of 8-9 months. As Flag UK's Sales Director Steve Greaves commented "Our green roof care programmes are phased with 'completion care' and 'development care' over periods of 2-4 years until the vegetation cover has achieved around 90% of its intended density. Because of the type of fertilizer we use, there is no risk of nutrients being washed out into the drainage system".

Control and delay of water discharge can be achieved independent of local soil and groundwater drainage. With choices of system available to suit a building's intended purpose, structure and roof pitch, the economics are likely to become even more attractive in the face of greater need for defined water retention. Despite enhancement of Building Regulations favouring use of such systems, the UK still has some way to go to meet the standards of performance seen in countries such as Germany. Even so, the case for cleaner air, reduced CO₂ emissions and greener cities has created a momentum which even ten years ago would have been considerable inconceivable.

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BREEAM A rating first for Flag

As an objective measure of the environmental performance of buildings and the products used to construct them, there is now widespread awareness of the value of BREEAM assessment. Despite the voluntary nature of BREEAM schemes, many organizations have decided to use them to ensure that the environmental impact of their developments, whether new build or refurbishment, is minimised. The eight categories of assessment enable a comprehensive evaluation to be made, from initial procurement to final construction. Higher ratings are set to be introduced in early 2009, with the likely introduction of an 'outstanding' rating for zero-carbon structures in addition to the current 'excellent' rating. For individual products, an A+ rating will be introduced above the current best 'A' rating.

As the principal method of calculating Part L compliance in

the drive towards more thermally efficient and sustainable buildings, successful BREEAM assessment is likely to have a major effect on materials specified. For the benefit of Eco Point calculation, specifiers of single ply membranes will currently find only one product with an 'A' rating. Flag UK's FLAGON TPO roofing membranes combine exceptional flexibility at low temperatures with a correspondingly high puncture resistance. It is non-toxic, containing no harmful chlorine, bromine or halogen compounds. Tests were carried out relating to re-use and recovery of

wastes from the manufacturing process and product to assess impact through design life to the point of disposal.

Green Guide ratings range from A to E and cover 13 aspects of potential environmental impact. Building materials and components are assessed within comparable specifications to enable comparison of, for example, roofing products with far greater assurance. The BRE Green Guide already provides an extensive catalogue of building specifications evaluating environmental performance. As products come under greater scrutiny than ever before, the profile of those having an A+ rating will undoubtedly be heightened.

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