



Building Solutions



# Dow Building Solutions

Specifying insulation for inverted roofs:  
getting it right from the start

By Richard Powell, Roofing Manager,  
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As Roofing Manager for Dow Building Solutions – manufacturer of STYROFOAM™ thermal insulation – I know a roof may be only 2% of the overall budget of a build. However, I also know that in terms of the usability, longevity and performance of a structure, a roof's value far outweighs its cost, meaning it's vital that the right decisions are made when it comes to system design, material choice and installation.

With much of our product going into large scale inverted flat roofing projects I spend a lot of time on the roofs of schools, retail outlets and commercial office space discussing delivery, installation and design challenges – but in recent months long term performance and drainage issues have been dominating my conversations as teams tackle decisions about thermal insulation choice for inverted roofs.

Of course considerations such as thermal efficiency requirements, product availability, ease of installation and cost come first. However, besides these requirements, there are two key things to remember when it comes to specifying insulation for inverted flat roofs, and too often I see them being considered at too late a stage:

1. Has the roof been designed with an inverted roof solution in mind?
2. Have all the relevant correction factors necessary for a U-value calculation been taken into account?

With every client counting the cost of fuel – and so much importance being placed on meeting energy standards and aiming for energy saving – it's key that such issues are taken into account in helping to allow an inverted roof system to perform against required demands.



## Ensuring adequate drainage

Our position at Dow is in line with BS 6229:2003: that an appropriate fall be accommodated within the roof design and that the roof must be adequately drained to prevent ponding. The location, size and number of rainwater outlets should be designed in accordance with BS EN 12056-3:2000 and the deck should be without deflections or depressions in which water may pond. Drainage points should provide drainage at two levels: above the insulation and at roof deck waterproofing levels.

We all know that for cost reasons, 'zero-pitch' roofs are not uncommon. BBA Information Bulletin No 4 advises that in such cases it is particularly important to identify correct locations for drainage points and to ensure that the drainage provided is sufficient and adequate. However, it is clear that ANY roof should not have areas of ponding as a result of back falls - and because insulation must not be permanently immersed or submerged in water, they should be removed before insulation is installed.



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Various solutions are available which help to design out deflections without resorting to the additional cost of laying additional screed – but such design issues should be adequately tackled at an early stage and not left until after the roof waterproofing has been chosen and installed.

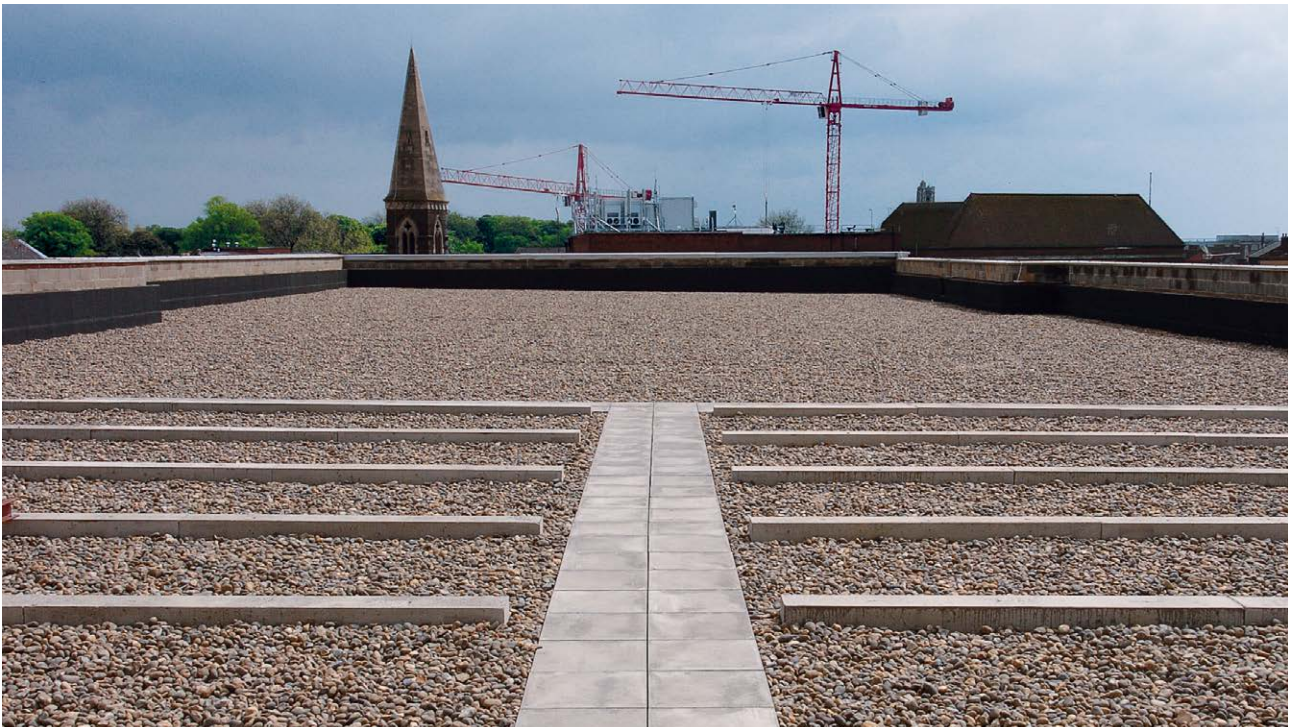
## Thermal resistance

European Technical Approval Guideline (ETAG) 031-1 – which sets out performance requirements for inverted roof insulation kits – advises that the declared thermal conductivity for insulation should be corrected due to the special nature of the inverted roof application and the fact insulation is being used in exposed rooftop conditions.

ETAG 031-1 states that possible water absorption over time is determined by evaluating the performance of

the insulation in respect of two mechanisms for water absorption: by diffusion and post freeze/thaw. Corrected thermal values are determined by assessing the total water absorption potential – and it is these corrected values which ETAG 031-1 advises should be used in any U-value calculations for inverted roof systems.

ROOFMATE™ SL-A, the STYROFOAM™ extruded polystyrene product we offer for inverted roofs, has a closed cell structure which results in low water pick-up over time, despite the rigorous conditions on exposed rooftops. For example, tests shows that even after 300 cycles of freezing and thawing, STYROFOAM™ will absorb less than 1% moisture by volume, one of the reasons it continues to be specified for inverted roofs and other applications\*.



\* All STYROFOAM™ products are manufactured in accordance with BS EN 13164.

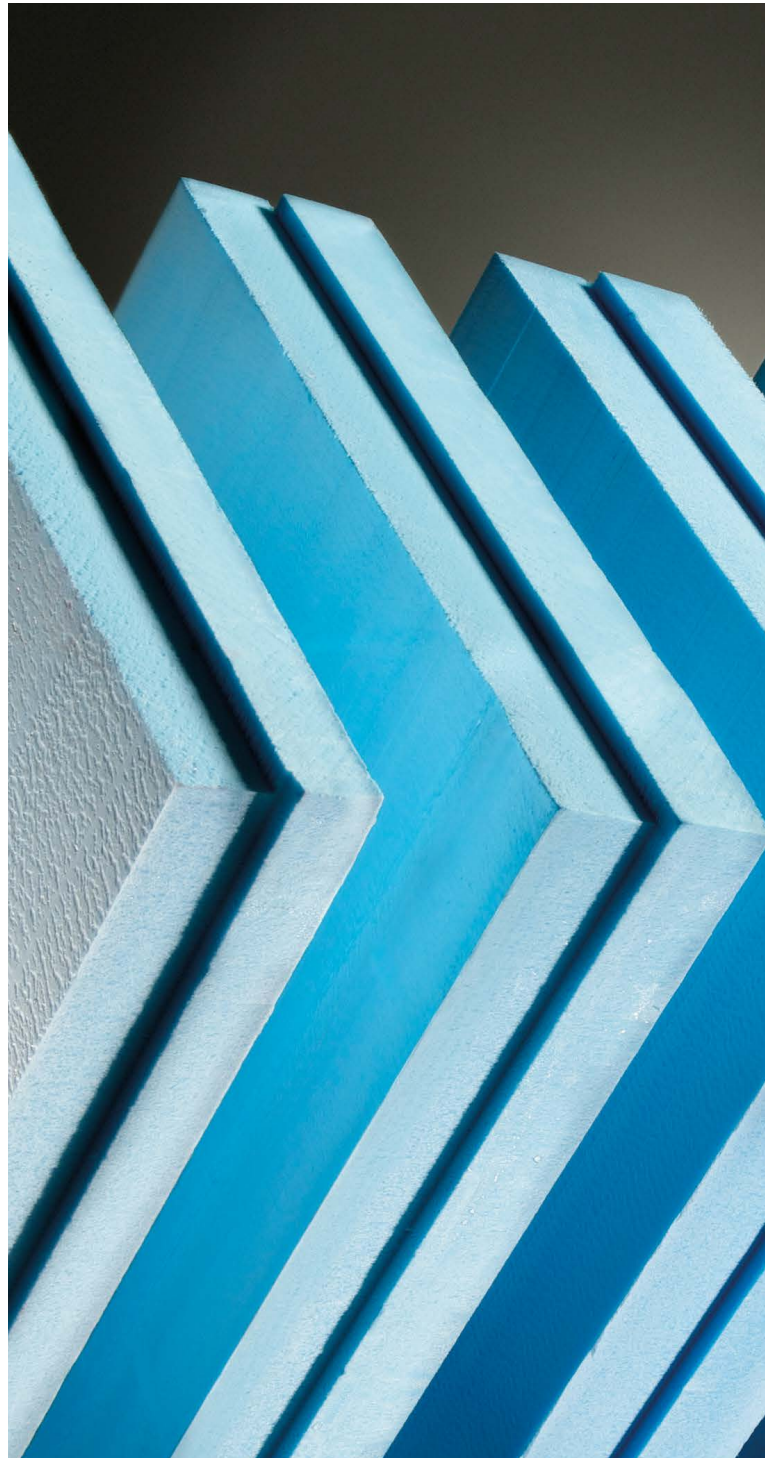
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## Rainwater cooling

Rainwater able to reach the waterproofing layer on an inverted roof will absorb heat from the underlying structure and affect the thermal performance of a roof system. Therefore, the initial U-value of a roof system must also be corrected by adding a rainwater correction factor according to Section 7 and Annex D.4 of BS EN ISO 6946:2007.

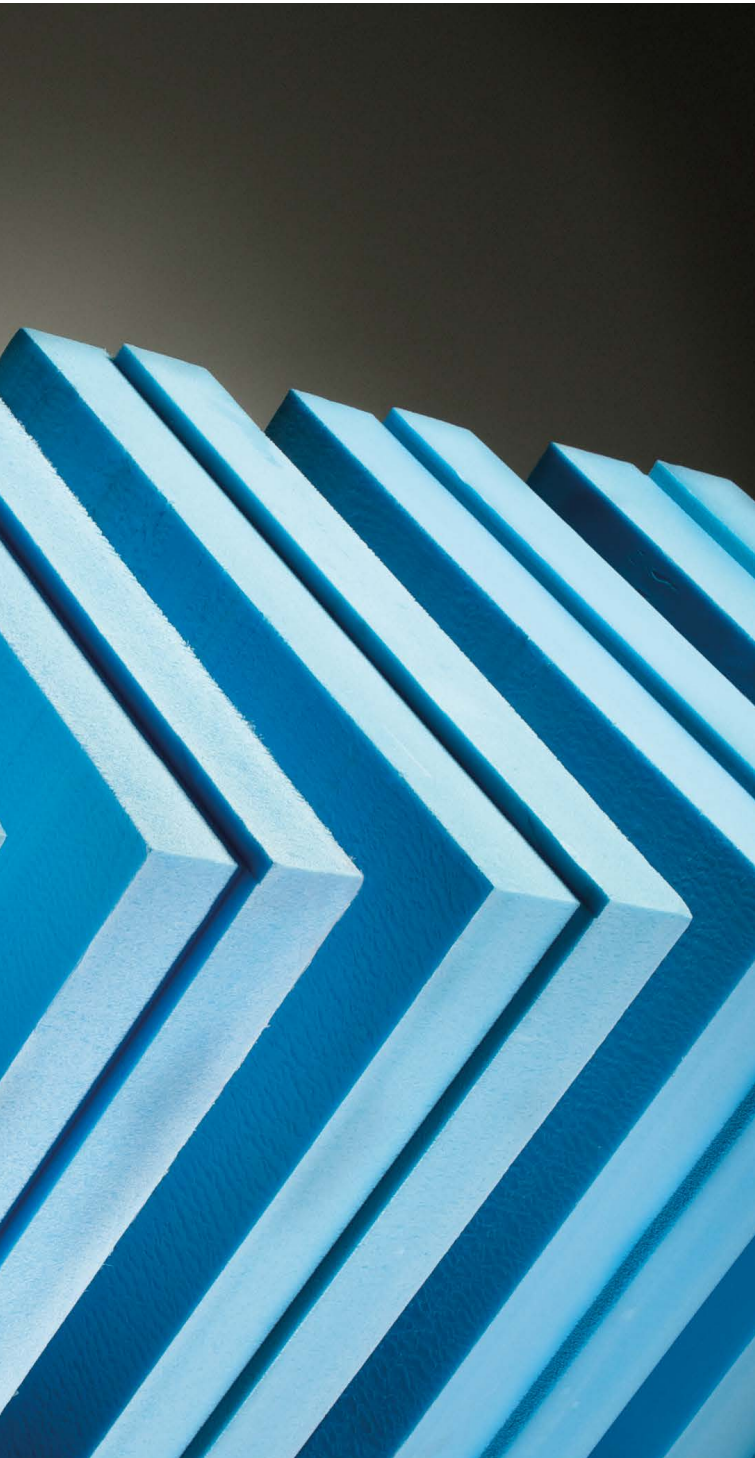
The corrected U-value of an inverted roof will be dependent on the amount of rainfall falling on the roof - which means it will be location specific - and the proportion of rainwater which can reach the waterproof layer. Dow Building Solutions offers a water-flow reducing layer, ROOFMATE™ MK, which reduces the proportion of rainwater reaching the waterproofing. Using ROOFMATE™ MK in combination with ROOFMATE™ SL-A helps to minimise heat loss due to rainwater cooling and therefore the amount of insulation required.





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## Taking a holistic view

Construction grades of STYROFOAM™ products are CE-marked, meaning specifiers, installers and end-users can rely on the fact that declared lambda values are made in accordance with BS EN 13164:2012 and BBA datasheet No 40/10.

However, we know that statements about product performance alone are not enough: decisions about inverted roof insulation choices need to take into account lifetime performance in real conditions on a real roof, not just the laboratory or factory – that's where the true test begins.

STYROFOAM™ products have been used for inverted roofs in the UK since the 1960s and well before that in North America. Specifiers and roofing contractors can not only rely on that longstanding industry performance when making decisions about insulation materials but helpful advice from our technical desk when making appropriate U-value calculations which take relevant factors into account: making it easier for everyone to get it right from the start.

*For technical support or help calculating a U-value contact our Technical Services Team on **FKLTECH@dow.com**.*

*Literature and a stockist list can be found at*

**www.styrofoam.co.uk**.

*For more details contact Dow Building Solutions by email on **dbsuk@dow.com** and one of the account managers will be in touch.*

## Recommendations

STYROFOAM™ products include FLOORMATE™, ROOFMATE™ and PERIMATE™.

STYROFOAM™ products contain a flame retardant additive to inhibit accidental ignition from a small fire source. STYROFOAM™ is, however, combustible and if exposed to an intensive fire may burn rapidly.

During shipment, storage, installation and use STYROFOAM™ products should not be exposed to flames or other ignition sources. Fire classification is based on small scale tests, which may not reflect the reaction of the products in its end use state under actual fire conditions. STYROFOAM™ products should, when installed, be adequately protected from direct exposure to fire.

Recommendations about the methods, use of materials and construction details are given as a service to designers and contractors. These are based on the experience of Dow with the use of STYROFOAM™ products.

Any drawings offered by Dow are meant only to illustrate various possible applications and should not be taken as a basis for design. Since Dow is a materials supplier and exercises no control over the installation of STYROFOAM™ products, no responsibility is accepted for such drawings and recommendations.

In particular, no responsibility is accepted by Dow for the systems in which STYROFOAM™ is used or the method of application by which it is installed. The legal obligations of Dow in respect of any sale of STYROFOAM™ products shall be determined solely by the terms of the respective sales contract.

### Note:

The information and data contained in this brochure do not represent exact sales specifications. The features of the products mentioned may vary. The information contained in this document has been provided in good faith, however Dow excludes as far as possible any liability relating to it and does not give any guarantee or assurance of product performance. It is the purchaser's responsibility to determine whether these Dow products are suitable for the application desired and to ensure that the site of work and method of application conform with current legislation. No licence is hereby granted for the use of patents or other industrial or intellectual property rights. If Dow products are purchased, we advise following the most up-to-date suggestions and recommendations.

Visit [www.styrofoam.co.uk](http://www.styrofoam.co.uk) for further information on STYROFOAM-A insulation products and adhesives and sealants from Dow Building Solutions, or email [dbsuk@dow.com](mailto:dbsuk@dow.com) and one of the account managers will be in touch.

For technical enquiries email [FKLTECH@dow.com](mailto:FKLTECH@dow.com).

Alternatively, please contact us at:



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