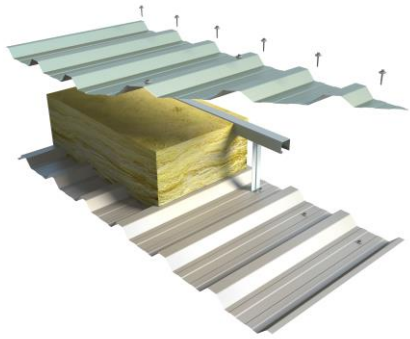
PROTECT AND SERVE

Launched online, a new CPD module has been introduced by the Metal Cladding and Roofing Association (MCRMA) based on its guidance document GD28 Mineral wool insulation installation best practice guide, Carlton Jones has the details.

The Metal Cladding and Roofing Manufacturers Association (MCRMA) has launched a new online CPD module based on its guidance document *GD28 Mineral wool insulation installation: best practice guide*. The CPD module, accredited by the CPD Certification Service, sets out an overview of the factors that need to be taken into account when considering the storage, handling and installation of mineral wool insulation in built-up metal roof and wall cladding systems. In addition, the CPD examines the design factors that must be considered when specifying mineral wool insulation, including the importance of the accurate calculation of the design lambda values and corresponding U-values.

All buildings whatever their use must provide protection from the external environment and the requirements of the internal environment will depend upon the intended use of the building. Insulating a building is one of the most cost-effective ways of saving energy and reducing heating and cooling bills. Installation practices and procedures at the construction phase must ensure that the insulation of the building fabric, including details and junctions, meets with the design stage calculations, manufacturer's guidance and Building Regulations.

The most common form of thermal insulation in built-up metal cladding systems is glass or rock mineral wool quilt insulation which is favoured due to its non-combustibility, lightweight, low thermal conductivity, ease of handling and as a cost effective and sustainable solution.

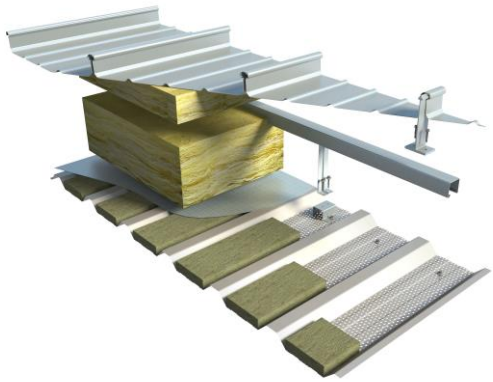


Typical trapezoidal twin skin roofing system

Mineral wool insulation also has inherent acoustic absorption and transmittance properties which mean excellent sound reduction can be achieved with correctly designed constructions and the acoustic performance can be tailored or engineered to meet exacting specifications for individual buildings.

Examples of this include airport terminals, concert halls or factory units which house noisy production facilities. In addition to its thermal and acoustic performance, both glass and rock mineral wool insulation products achieve a European Reaction to Fire Rating Classification of A1 (equivalent to non-combustible) as defined in BS EN 13501–1 making them ideal for separating firewalls and constructions subject to boundary conditions

With regard to the thermal performance the design lambda value (λ) for the material needs to be selected by the designer, taking into account the specific internal and external design Conditions (temperature, humidity) which can influence the performance of the material once installed.



Typical standing seam roof system with perforated liner for sound absorption

The accurate calculation of U-values is a fundamental requirement to meet Building Regulations and must be carried out at the design stage. In metal roofing and cladding, U-values are calculated to BS EN 10211-1 and take into account bridging effects caused by spacer systems. MCRMA systems manufacturers provide U-value calculations and tables compliant with BS EN ISO 10211 for their systems. These specify the nett insulation thickness and the corresponding lambda value (λ) for particular systems.

It is important to ensure that these values and the design specification is followed through into the as-built construction as any deviation can impact on the building's sustainability credentials and in-use operating performance.

Design details, flashings and junctions between adjacent systems or roof and wall interfaces should also be part of the thermal, acoustic and fire design process and hence the correct specification and installation of insulation is equally as important in these parts as those for the body of the fabric or envelope. Thermal loss through flashings and interfaces can have a major effect on the construction purely due to the fact that they form a significant proportion of the building.

In every case, the insulation should be specified to fit the insulation cavity within the build-up and hence be in contact with the underside of the external sheet. The insulation must fit the size of the gap in the cavity gap, letting the installer and insulation manufacturer select the appropriate insulation roll thickness to allow for slight (not excessive) compression.

It is regarded as common practice to specify insulation under slight compression within the cavity (system manufacturers typically recommend a figure of up to 10 per cent) and to ensure contact with the external sheet. This arrangement ensures that there is no continuous airspace in the construction other than that created by the cladding profiles.

The insulation products recommended for metal built-up systems will be supplied compression-wrapped in polythene on pallets, protected by waterproof shrouding which allows the product to be stored outside for a limited period of time. Compression-wrapping also provides advantages for handling, transportation and handling but does add to on-site waste disposal.

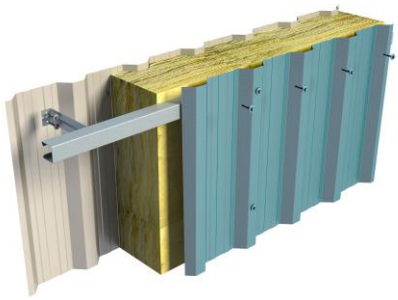
In order to recover to the manufactured thickness, air will need to be re-introduced into the wool; the EN standard for mineral wool (EN 13162) references EN 823 for determination of thickness and recognises that mineral wool behaves this way. To ensure recovery to the specified thickness refer to the declared thickness and recovery rate (final thickness) as shown in BS EN 13162:2012+A1:2015 and the accompanying CE mark for the product.

Quilt insulation is normally manufactured in 1200mm widths as standard and the chosen design thickness is fitted between the profiled metal outer cladding sheets and inner lining sheets. For roof installation, the rolls of insulation should be distributed at each ridge to eaves run and where the inner and outer metal cladding sheets are separated by rail and bracket systems or preformed spacer systems

The insulation is tucked under the rails, with all quilt edges tightly butted as gaps in the insulation must be minimised. Where a double layer insulation system is required end and side butt joints should be staggered where possible to ensure continuity of insulation and to minimise thermal bridging between gaps.

Insulation should not be adversely walked on or compressed as this will damage the fibres, and will result in a loss of thickness and thermal performance. If excess damage should occur then replacement material must be installed.

For a wall installation, where the profiles run vertically the insulation products should be clamped across the full width at the head of the wall construction to avoid slump. The support rail and bracket system can then be used to clamp the insulation or additional pins may be incorporated to support the insulation to avoid slumping and to assist installation and minimise damage due to tearing.



Typical trapezoidal twin skin wall system

No matter which insulation is used, it is vital that the material is installed carefully throughout, ensuring junction and details such as apertures, ridges, eaves and corners are fully filled with no gaps. Care and consideration should also be taken when laying insulation around roof lights. Ensure that a clean edge runs the length of the rooflight to maintain a continuous run of insulation. Ensuring that no gaps are present and that a high standard of workmanship has been employed is essential to the performance of the system as a whole.

MCRMA member companies can advise on the suitability and performance of materials, systems and assemblies to ensure that insulation requirements are calculated properly and specified accordingly. In addition, design information can be obtained from any of the independent roofing and cladding inspectors featured on the MCRMA web site at www.mcrma.co.uk

For more information about the online CPD visit www.mcrma.co.uk/online-cpds/

This article first appeared in Building Products, June 2017