

# Underslating/drainage composite layers in metal roofings

Already in the mid-nineties Rheinzink and Colbond Geosynthetics commercialized the first underslating/drainage composite layer. After initial teething problems these novel composite layers made headway, especially for use in slightly inclined roofs. Thanks to numerous advantages over conventional underslatings, the utilization of these products turned from being the exception to becoming the rule. Nowadays the insertion of underslating/drainage composite interlayers is not only recommended by all leading zinc manufacturers and represents the state of the art; it is even prescribed in directives. In paragraph 3.2.3 of DIN 18339, regarding titanium-zinc roofs of up to 15° roof pitch, the express requirement is made for insertion of a composite layer having a drainage function, i.e. an underslating/drainage composite one. In the new concepts of construction recommendations for the roofers as well as plumbers' professional associations, the use of these new composite layers is prescribed too.

New construction-acoustical insight and practical experience show moreover that not only with titanium-zinc covers but with any kind of metal cover it makes technical sense to apply an underslating/drainage composite layer. Besides their function as a covering in the construction stage these products show essential advantages over conventional underslatings. They create a space between the substructure and the metal cover, thus providing a drainage layer. This technically required drainage layer allows to securely drain off any undesired moisture having seeped in due to the constructional layout, through minor leaks or from ice flakes. Any occluded moisture can diffuse out of the roof structure without difficulty. Slight irregularities in the substructure (formwork tolerances, nail imprints etc.) are compensated and will not show through at the metal surface. A further consideration in favor of applying an underslating/drainage composite layer should be the improvement of the "gliding capacity", especially with long metal sheets.





### **Present state of development in structured interlayers**

Basically two groups of underslating/drainage products can be distinguished. On the one hand there are the three-dimensional, structured polymer mats such as Enkamat 7008 of Colbond which are usually laid out on a separately installed underslating of glass-mat bitumen (V13) or on some other bedding. Occasionally such underslating is left away.

On the other hand there are the underslating/drainage composite layers. These are laminated products in which a three-dimensionally structured polymer mat is directly bonded to a vapour-open underslating.

This underslating is as a rule a waterproof vapour-open membrane, protected on both sides against mechanical damage by a nonwoven. Until recently, underslating/drainage composite layers, which were not vapour-open, were also available, but by now, these have virtually disappeared from the market.

All presently available underslating/drainage composite layers are 6 - 8 mm thick. They are applied in an identical manner to any conventional underslating. No special tools for their installation are required, nor are special fastenings to the overlying metal sheets.

The differences among the products on offer are in the choice of geometry of the three-dimensional structure (random, ribs, cusps), the polymer employed (polyester, polyamide) and the mode of bonding between the structured mat and the underslating (bituminous or thermal). In choosing the right underslating/drainage composite layer special attention should be paid to the ease of installation and the flatness of the mat. Selection of a too rigid structured mat can result in waviness of the support.

The butt joints are executed as with conventional underslatings: the strips of the product are given approximately 10 cm overlaps and are bonded.



**When does the use of an underslating/drainage composite layer serve the purpose?**

In ventilated roof designs the necessity of an underslating/drainage composite layer depends on several factors. In slightly inclined roofs ( $3^{\circ}$  -  $15^{\circ}$ ) an underslating/drainage composite layer must be installed in any event. Also, when wood or wood-based materials or large-sized roof elements are employed, then independently of the roof pitch the underslating/drainage composite layer should definitely not be omitted. With steep roofs ( $> 15^{\circ}$ ) where temporary moisture protection is needed (i.e. in the construction stage), its use makes sense too. In case a separate underslating is already in place, a bare structure mat (e.g. Enkamat 7008) should be used.



In the case of non-ventilated metal roofs, whatever the roof pitch and substructure, the rule should be to install an underslating/drainage composite layer between the thermal insulation and the metal cover. The thus ensured ventilation leads off moisture and - due to this effect - lengthens the life span of the insulation and the metal cover.

**Noise reduction by up to 50%**

Metal roofs are found on all types of buildings, mostly on buildings having slightly inclined roofs and high-grade residential dwellings. In these cases in particular, much value is placed on the high quality of dwelling and living. A substantial factor of influence here is the level of noise entering the premises. Of particular importance is the reduction of pounding noises generated on metal roofs in extended roof framings, since the living room directly adjoins the roof. Thus, underslating/drainage composite layers contribute in more than one way to the quality of metal roofings.

Recent tests executed by the WTCB institute have shown that the application of underslating/drainage composite layers considerably reduces the intensity of pounding noises. In particular the propagation of low frequencies can be reduced much.

Depending on their structure and material the various structured interlayers achieve slightly varying degrees of noise reduction. By installation of a Bauder Top Vent 02NSK, a Dörken DELTA TRELA or an Enkamat 7008 in combination with a glass-mat/ bitumen underslating, the noise level can be reduced by up to 50%. As far as construction acoustics are concerned, inserting solely a glass-mat/ bitumen underslating (V13) offers hardly any advantage. An only 1 dB reduction was measured, a difference not perceptible to the human ear.

