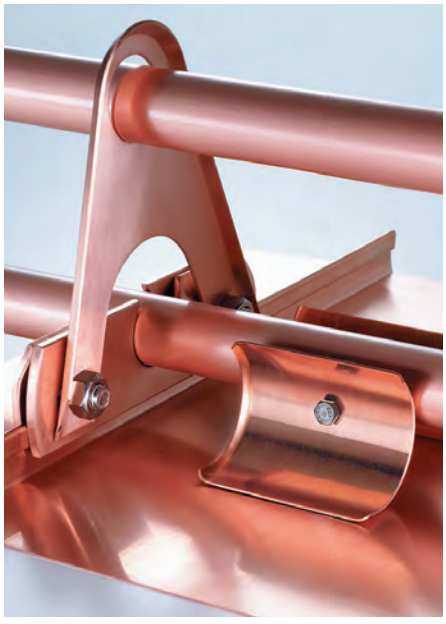
Gutter board clamping system for standing seam sheet metal roofs

Georg Rees
Master of Roofing



Pict. 1: This detail photo shows the fastening of the tubes at the longitudinal standing seams by clamping lugs.

The gutter board clamping system consists of zinc coated tubes, aluminium tubes or copper tubes with approximately 32 mm outer diameter and a wall thickness of 2 to 3,5 mm. Smaller tube dimensions can be used in exceptional cases.

These tubes are clamped to the longitudinal standing seams of the metal roofs by means of clamping lugs (photo 1. and 2.). For the roofing of angle lock seams, a special type of the system is available. As small screws can penetrate and thus damage the vapour barrier, the power flux of the snow thrust is passed on to the wooden substructure (boarding and rafter) via lock seams and fixing bondings. For this reason, the mounting links should be installed at every standing seam. A precondition for a secure hold without damaging the vapour barrier is, however, that several of these tube gutter boards are distributed over the whole roofage (photo 3.). Per 100 m2 roofage, approximately 10 to 30 m tubes, dependent on the expected amount of snow, are to be provided.
Through a sheet distribution of thrust, this system combines the functionality of the “snow catcher” with the characteristic features of the metal roofage, as the higher thermal expansion which occurs above all with NE metals such as zinc, copper and

Pict. 2:The gutter board tubes shown here are made of copper. The are fastened by copper clamping lugs on the standing seam roof.

Pict. 3: This photo shows the distribution of tube gutter boards over the whole roofage. On the one hand, this ensures a secure hold, on the other hand the roof does not get damaged.

Pict. 4: A sheet system divides up the large forces appearing into several smaller ones. Therefore, only small snow masses start to move.

aluminium is absorbed and slip bondings can be used. The pressing of the vapour barrier against the substructure
– as occuring with screwed gutter systems – and the obstruction of expansion related to this are thus avoided. At the eaves, over entryways or traffic areas it is recommendable to install an additional element for two tubes situated over each other. As a protection against sliding thin snow and ice plates, snow stops can be clamped between tube and vapour barrier which, distributed over the whole roofage, additionally provide for a perfect protection against fluttering sounds in case of strong winds.
In order to get a working protection against snow and ice, the following points are a precondition:
• a correctly dimensioned thermal isolation with superimposed aeration
• when it comes to the division of space, one has to be careful that more gutter board mountings are installed at the lower half of the roof than at the upper half, as snow shifts downwards in the course of time. In the ridge area, no mountings should be installed so that snow can move downwards and thus release the ridge aeration.
• do not use coppered gutter boards! It is appropriate to use the same material as the roofing has. Copper is to be used with copper roofs, aluminium with zinc coated steel, aluminium and zinc sheet steel which can be connected to zinc or zinc coated sheet steel without any corrosive effects. Of course, zinc coated steel can also be used here.
• gutter board systems with low overall heights (single-tube = 60 mm) are to be preferred because of the smaller lever action. In connection with additional gutter boards which are distributed as described above, double-tube gutter boards do only make sense at the eaves.

Why a sheet system?

A sheet system subdivides the sometimes large forces appearing into small, partial forces which can be controlled more easily (photo 4.). Avalanche barriers at the slopes of the Alps serve as a model for this. This system can be particularly well applied on metal roofs (the surface of which is very smooth), as only small areas begin to move. With high weight loads, the rule of thumb is: 1 m of tube gutter board per 3,0 m² roofage. In case of lower snow height one can also be somewhat more economical. For static reasons, a one-sided installation of gutter boards, for example only on one side of the roof, is to be avoided. This

Pict. 4: A sheet system divides up the large forces appearing into several smaller ones. Therefore, only small snow masses start to move.

puts the roof truss under high stress because of an unfavourable distribution of forces.

Another advantage in the form of strong air swirls results from the square pattern which contributes to the stability of the roofs, above all in windy regions. The high weight stress under certain snow levels, for example in 1100 m altitude 1000 kg/m2, naturally requires the strict observation of the bonding distance according to the ZVSHK expert rules of the plumber craft.

Long-term installation experience on steep roofs up to approximately 60° is given (photo 5.). The experience derived from avalanche protection of base lining is thus also applicable here. Within a short time, snow weighs down and builds a solid hard-snow and ice layer at the basis, i.e. at the bearing area; this layer again bonds well to the tube gutter board. Floating snow or spherical gliding layers have almost no triggering thrust effect, as individual snow fields are created by the tubes distributed over the space and thus stress is hardly given (photo 6.).This is also an explanation for the fact that the low height of only 60 mm is absolutely sufficient even on steep roofs.

Of course it cannot be completely excluded that snow sometimes slips from a steeper roof. As with a waterfall in a torrent control, however, the same happens in this case: the thrust is broken by the wreathing snow. According to the individual roof pitch, the right distance lies between 1,50 and 4,00 m. Highest attention must be paid to the fact that distances which are too big can cause damages to the roof. The building regulations of different countries prescribe devices for protection against falling ice or snow. In the expert rules of the plumber craft of the central organisation ZVSHK and the recommendations of different producers of metal plates and strips, the standing seam clamping system has conquered an important place – it is a technical state.

Pict. 4: Due to the sheet distribution of tubes, individual snow fields are created; therefore, almost no sheet stress exists even on steep roofs.