Installation Instructions
System Build-up Steep Pitched Green Roof with Georaster®

These installation instructions describe the basic steps of the application of this system build-up. Please consider also all relevant standards and regulations, in particular the provisions on occupational safety.

Preliminary Mark

A precondition for a green roof applied on a steep pitched roof is a root-resistant waterproofing on the entire roof surface and a sufficient load bearing capacity (System build-up weight water saturated approx. 155 kg/m²).

The core piece of the system build-up "Steep Pitched Green Roof" are Georaster®-elements. To make their installation possible solid eaves up-stands are necessary which are to support the Georaster®-elements. For larger areas or steeper inclinations additional shear barriers within the roof surface might be necessary. Shear barriers within the roof area must be designed in a way they allow for unhindered drainage of excess water. If Georaster®-elements are applied with more than one layer the up-stands or shear barriers must be correspondingly higher.

In order to perform ongoing maintenance works safely on the roof, a fall protection system firmly connected to the roof structure needs to be given. Fall protection systems which work by superimposed load, such as Fallnet® can only be applied on roof areas with an inclination of less than 5°.

Wooden eaves up-stand before the waterproofing.

Waterproofed, interrupted shear barriers.

Shear barriers made of slotted profiles supported by shear brackets.

Protection Layer and Georaster®-Elements

In the first working step the waterproofing is to be protected by covering it with the Protection Mat BSM 64 (up to 25°) resp. the Protection Mat WSM 150 (in case of steeper inclination). If slotted profiles are used as shear barriers the protection mat is not to be taken up over the profiles. We recommend to apply the protection mat first, to cut it wherever profiles are to be installed and then to set up the profiles.

The Georaster®-elements are to be laid starting from the bottom left. The reinforced central bar, which derives shear forces, needs to be aligned perpendicular to the eaves up-stand (see arrow on the elements). The elements are to be connected via their integrated T-profiles, which have to engage distinctly when installed correctly. This connection can only be released again if the engaging knob is pushed back for example with a sturdy screwdriver.

Object-specific installation solutions, such as Georaster®-elements attached to a geogrid, are only possible in consultation with the ZinCo Technical Department.

If necessary Georaster®-elements can be cut with a jigsaw, a conventional angle grinder or a circular table saw. The load deriving central bars should remain undamaged if possible (possibly centralize elements starting from the first row). When cutting the elements please make sure not to damage any of the previously installed layers, the waterproofing in particular.

In case of slanting roof verges or just below the ridge, it might be useful to move the top row of Georaster®-elements by half an element width; these cannot be connected to the other elements then (see picture on the next page 'Special Installation'). This way it is possible to apply Georaster®-elements even on roofs with a complex geometry, as can be seen in the example above.

Application of the Protection Mat WSM 150.

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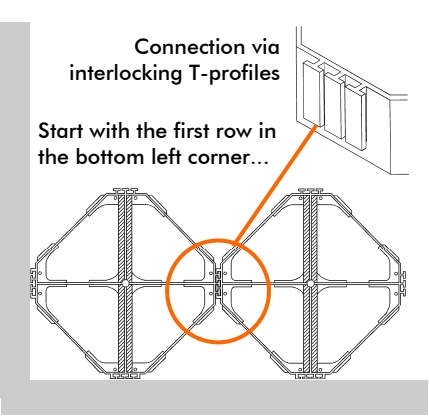
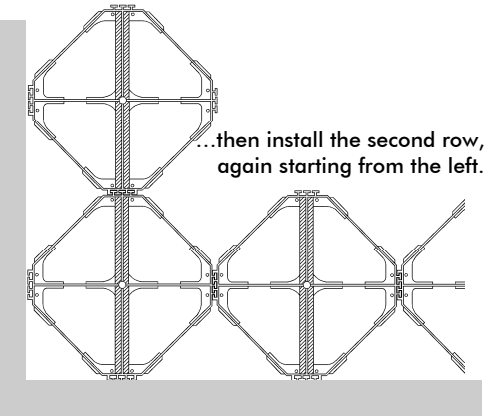
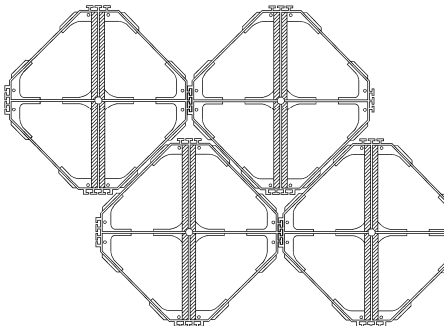
Standard Installation:





Special Installation:



Inspection Chamber for Pitched Roofs SKS 12 resp. Eaves Profile TRP 140

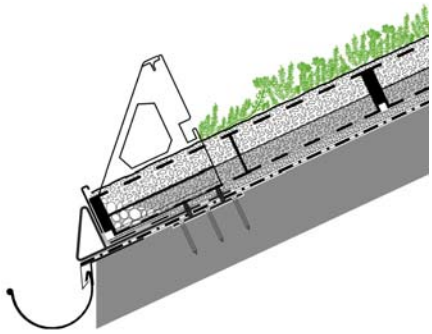
In case of an internal water outlet the Inspection Chamber for Pitched Roofs SKS 12 is applied. It is to be installed and surrounded by gravel before the application of substrate. If water is to be drained away via an external gutter, the shear forces resulting from the green roof build-up are to be derived into the roof structure via slotted profiles and Support Brackets or ShearFixes - the brackets need to be screwed directly into the roof structure. Please consider the separate installation instructions for the Support Brackets or the ShearFix.

Internal water outlet with Inspection Chamber SKS 12

External drainage with Eaves Profile TRP 140 and Shear Brackets

Snow Guard Support and Snow Guard Grid

To prevent snow from sliding down the surface of a steep pitched roof snow guard grids can be attached. Based on the Georaster®-elements ZinCo provides an effective solution which can be installed without any tools (no penetration of the roof waterproofing). The supports are plugged directly onto the Georaster®-elements and provide a base for the guard grids. The snow grid is then inserted into the notches of the supports. The dimensioning of the snow grids is to be designed according to individual object aspects.



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Life on Roofs

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Substrate Application

The System Substrate "Heather with Lavender-Light" is part of the system build-up "Steep Pitched Green Roof" and is preferably to be used as infill for the Georaster®-elements. The use of the standard System Substrate "Heather with Lavender" would increase the system build-up weight! The system substrate "Heather with Lavender-Light" can be applied either using BigBags, Silo or manually.

In case of a mono-layer installation of Georaster®-elements these are to be filled and covered with approx. 100 mm of substrate. If more than one layer is to be applied the first layer of Georaster®-elements needs to be completely filled with substrate and levelled before the next one is applied above. If a partial increase of substrate depth is to be realized, a set of Georaster®-elements can also be attached to the first layer using stable cable binders made of stainless steel.

The Georaster®-elements should be covered with approx. 100 mm of substrate, in order to protect them from direct sunlight.

In case of a multi-layer application, the first layer is to be filled before the next one is applied.

Plant Selection and Plant Application

The Georaster®-elements filled with the System Substrate "Heather with Lavender-Light" can either be planted with plug plants or be covered with pre-cultivated vegetation mats. The plant selection of course needs to be appropriate for the extreme conditions of a pitched roof. For further information on plant selection please consider our plant list "Pitched Green Roof". The "small group perennials" from this list are only to be seen as supplements.

If plug plants are used, make sure to place at least two plants into each chamber of the Georaster®-elements. Approximately 30 plug plants are required per m². For inclinations of more than of 30°, only pre-cultivated vegetation mats are recommended. The vegetation mats are to be placed in a way the substrate remains free of cavities. Therefore, the substrate must be compacted and well levelled in advance.

Before the vegetation mats are rolled out the substrate is to be compacted and levelled.

In order to achieve a dense vegetation layer, it is essential to apply two plants within each chamber of the Georaster®-elements.

A rapidly closed dense plant cover protects against wind and rain related erosion.

In order to achieve a closed vegetation cover as soon as possible, irrigation is essential during the initial growth phase, particularly on any south exposed roof areas. Long-term coverage needs to be ensured by maintenance and fertilization measures, as this contributes significantly to protection against erosion.

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