

DAKU

LA NATURA SUL TETTO

DAKU EXTENSIVE PITCHED INSTALLATION MANUAL

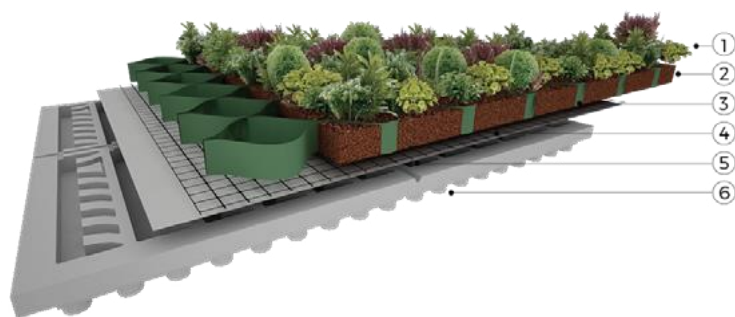


DAKU EXTENSIVE PITCHED ROOFTOP GARDEN

DAKU EXTENSIVE PITCHED is a garden designed for pitched rooftops or for rooftops with complex geometrical shapes, while maintaining the same features and performances of a garden on a flat surface. Gardens can be installed on rooftops with a maximum slope of 35°.

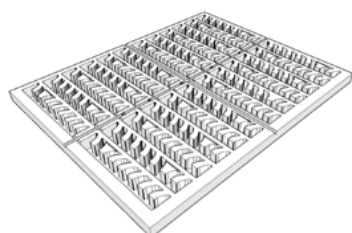


MATERIALS



1. DAKU SEDUM plants mixture
2. DAKU ROOF SOIL substrate
3. DAKU GEO retainment cell
4. DAKU GRID confinement grid
5. DAKU STABILFILTER filtering component
6. DAKU FSD 20 panels

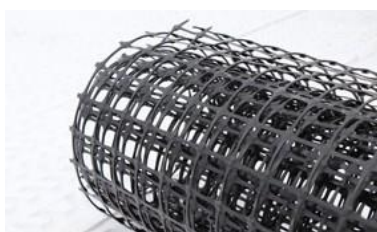
Thickness of the system (without plants)	16 cm
Weight when saturated (without plants)	103 kg/m ²
Total amount of water for the plants	38,50 l/m ²
Air volume at pF1	49,50 l/m ²



DAKU FSD 20 panels are made of expanded polystyrene, with a size of 1.25x1.00 m. They are used for water storage and drainage.



DAKU STABILFILTER filters are geotextiles in polypropylene and are used as a separation layer between the **DAKU FSD** panels and the **DAKU ROOF SOIL** substrate.



DAKU GRID is a cellular confinement grid. It is made of polypropylene, has a bi-oriented structure, is quadrangular in shape and black in color. The grid is used if the slope is steeper than 5°.



DAKU GEO are retainment components made of polyethylene, with a cellular structure that prevents corrosion. They are green in color and have a three-dimensional ovoid shape. These components are used if the slope is steeper than 18°. They prevent other components from sliding and stopping surface runoffs.



DAKU ROOF SOIL is a light substrate made of volcanic mineral materials, suitably combined with organic substances. Thanks to its features, the substrate is suited for DAKU EXTENSIVE gardens with low overall thickness (8 cm minimum).



SEDUMS are plants belonging to the “Crassulaceae” family. They can live in extreme environments, characterized by long periods of drought, high and low temperatures.

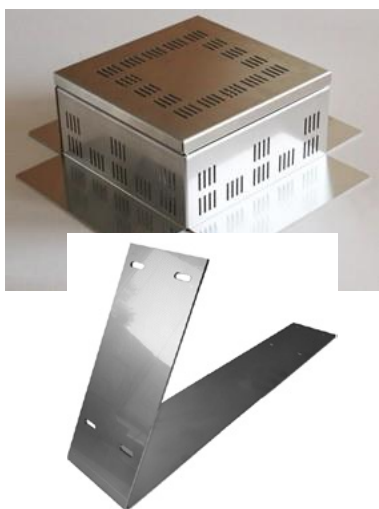


DAKU PLUS is an additional nutrition compost for rooftop gardens. It is made of fertilizing granules, covered by a biodegradable polymeric membrane, which gradually releases nutritive substances, depending on the soil temperature.

ACCESSORIES



DAKU PRO series is a set of components, made of an aluminum-magnesium alloy, used for separation and containment. These components separate the DAKU ROOF SOIL substrates from the other materials. The components are welded to the roof, without mechanical fixing.



DAKU CONTROLLER components are made for inspecting easily and safely the drainage and ventilation pipes. They are made of aluminum-magnesium, are 25x25 cm wide and 10 cm tall.

DAKU PRO STF components are used as containment elements on pitched gardens. They are made of aluminum-magnesium. To assure their strength, they are connected to the rooftop using mechanical fixings.

MATERIALS HANDLING

PACKAGING:

During productions, all the materials are packaged. The type of package depends on the dimensions and characteristics of each material.

DAKU FSD 20 panels are usually packaged in pallets made of 2 half-size pallets wrapped in polyethylene packaging film. The pallets are then put on bars made of EPS so that they can be moved with forklifts or cargo nets.

DAKU STABILFILTER geotextiles are made of rolls (dimensions: 200x30x30 cm), wrapped in a single polyethylene package. Each roll can be carried separately or, depending on the quantity needed, a set of rolls can be loaded on a pallet and wrapped in polyethylene.

DAKU GRID is made of rolls (dimensions 4x50 m) wrapped in polyethylene.

DAKU GEO components do not have a specific package. Depending on the quantity needed, they can be carried on pallets to make transport easier.

DAKU ROOF SOIL substrate is usually packaged in a 1 m³ polypropylene bag, with a drain valve on the bottom. There are 4 loops for lifting and moving the bag. The substrate can be packaged also in smaller bags, with a capacity of 33 l each. Bags can be put on a pallet, wrapped in a polyethylene film. The substrate can also be delivered loose.

DAKU PLUS is packaged in 5-10 kg polyethylene bags.

DAKU CONTROLLER and DAKU PRO accessories are usually packaged in cardboard boxes or in pluriballs and polyethylene films.

SHIPMENT:

All materials are delivered to the construction sites with trucks. All materials must be loaded and unloaded by qualified workers, in compliance with the safety regulations, by using forklifts and cranes.

STORAGE:

Store the materials on plain surfaces, on a dry indoor environment and far away from heat sources or flames. In the construction site, store the materials outdoor only for the time necessary for their installation. Store the materials in a safe area, in compliance with the safety measures of the site. Do not pile pallets or big bags.

LIFTING AND MOVEMENT:

Use forks or cargo nets to lift the materials to the rooftop. Make sure the lifting equipment is compatible with the materials. Lift the big bags by using ALL THE 4 LOOPS that equip the bag. If the lifting is done by using forks, make sure the forks are smooth and rounded ahead, without edges, as they may damage the equipment. All workers must maintain a safe distance from suspended loads when they are being moved.



INSTALLATION STEPS

1) PREPARING THE ROOFTOP SURFACE

Make sure that there is no debris and no water stagnation on the rooftop surface.



2) LAYING THE DAKU FSD 20 DRAINAGE AND WATER STORAGE PANELS

DAKU FSD 20 panels for drainage and water storage must be laid manually. Lay the panels starting from one side of the rooftop.

Each panel has a rabbet joint on each side to easily lay and connect it with other panels without using glue or other type of fixing.

Lay the panels putting the side with the truncated-cone feet downward, directly on the rooftop surface. The other side, with the storage cells, will be upward (figure 1). Lay the FSD panels so that the upper storage cells have the long side perpendicular to the slope of the roof (figure 2).

If needed, the panels can be shaped to fit the shape of the rooftop. Handsaws and cutters can be used, paying attention not to cut through the storage cells (figure 3). If a panel covers an area above a drain, make a hole on the section of the panel directly above the drain with a handsaw or a cutter. Then fix on the hole the DAKU CONTROLLER inspection component. This will make inspection easier.

figure 1



figure 2

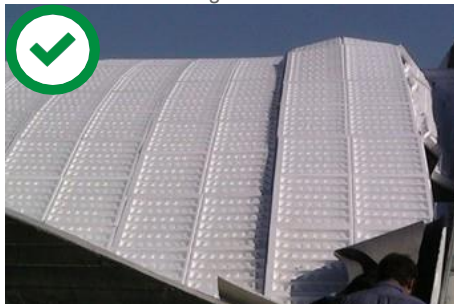
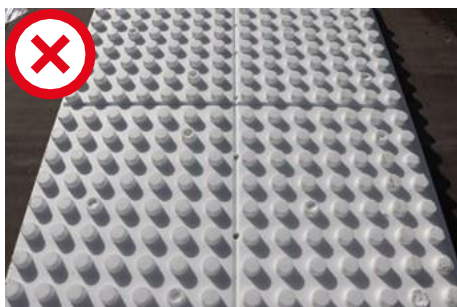


figure 3



3) LAYING THE DAKU SFI FILTERING SHEET

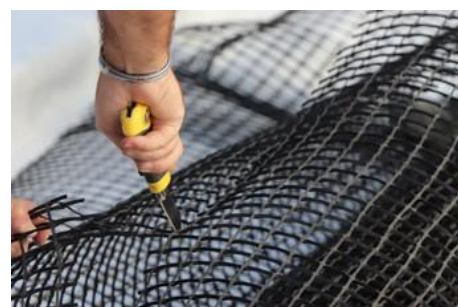
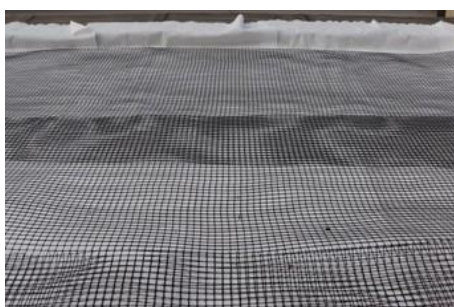
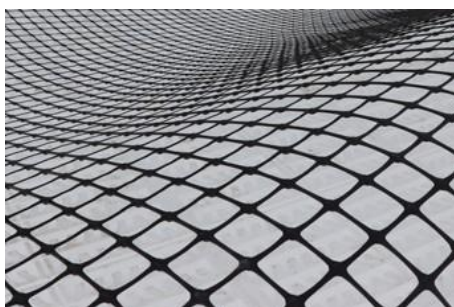
Unroll and lay the DAKU STABILFILTER filtering sheets, by covering the whole surface of the FSD panels. On the edges of the rooftop, fold the sheets upwards, with a margin of 10-15 cm. Cover with the sheets also all the vertical surfaces (edges, chimneys, et cetera), making sure the height of the vertical cover matches the thickness of the garden's substrate. DAKU STABILFILTER sheets can be cut with



cutters or scissors.

4) LAYING THE DAKU GRID COMPONENT (on slopes > 10°)

DAKU GRID confinement grid is laid on the DAKU STABILFILTER separation layer before the DAKU GEO components (if needed) and the substrate are installed. The grid should be laid starting from the top of the slope. Connect it carefully to the top of the slope or to intermediate supports if present on the surface. Joints, if necessary, can be made by tying together the meshes of the grid. To improve the confinement performance of the grid, irrigate the substrate when the installation has been completed. DAKU GRID can be cut with handsaws or cutters. BE CAREFUL: if the grid is being cut directly on the waterproof surface of the roof, the cut pieces can damage the surface.



5) LAYING THE DAKU GEO COMPONENT (on slopes > 15°)

Lay DAKU GEO components directly on the DAKU GRID confinement grid. The components are tied to the grid with nylon zip ties. The dimensions and number of the zip ties depends on the weight they need to sustain, which needs to be calculated (figure 1). If the shape and the steepness of the slope allow it, the components can be lay directly on the DAKU STABILFILTER filters. Start laying the cells from the top of the slope. The cells must be laid following the orientation of the slope. After that, fill gradually each DAKU GEO cell with the DAKU ROOF SOIL substrate. Make sure that each cell is full of substrate (figure 3). Finally, irrigate the substrate to improve its stability. DAKU GEO can be cut with handsaws or cutters.

figure 1

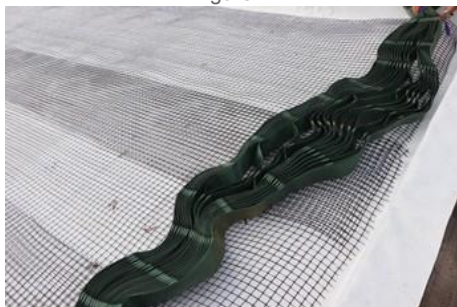
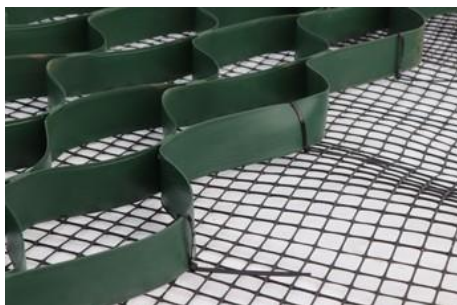


figure 2

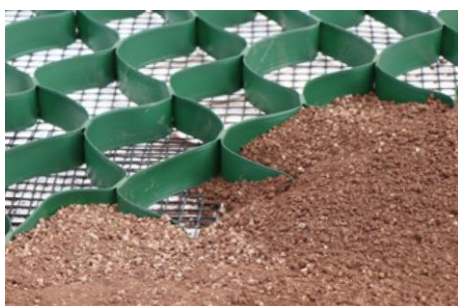


figure 3



6) LAYING THE DAKU ROOF SOIL SUBSTRATE

Lay the DAKU ROOF SOIL substrate directly on the DAKU GRID or inside the DAKU GEO cells. The thickness of the substrate will depend on the type of garden and plants to be used. In a standard extensive garden, the thickness of the substrate is of 8 cm. Lay the substrate starting from the top of the slope, so that it is easier to lay it downward. The substrate must be laid using hand tools, such as rakes and shovels. If DAKU GEO components are required, make sure that each single cell is full of substrate. Big bags can be easily emptied by opening the drain valve. DO NOT stand under a big bag while it is being moved.



7) LAYING THE PERIMETRAL GRAVEL

On extensive rooftop gardens, it is necessary to lay a strip of gravel on the edges (50 cm wide minimum), so that the components are not carried away by the wind. Strips of gravel can be also put around vertical surfaces (edges, chimneys, et cetera). Also, these strips should be at least 50 cm wide. The width of the strips can be reduced by 30% if there are perimeter edges with a height equal or greater than 50 cm.

8) ADDING THE DAKU PLUS FERTILIZER



INSTALLATION: Before milling the surface and before planting the sedums, spread the fertilizer directly on the DAKU ROOF SOIL substrate. Spread 8 gr/m² for each cm of thickness of the substrate. On extensive gardens, DAKU PLUS is used also as fertilizer during routine maintenance after the winter, when the plants are still resting. During maintenance, 40/50 gr/m² are spread on the whole garden's surface.



9) PLANTING THE SEDUMS

Spread DAKU SEDUM TALEA substrate, using 80/100 gr/m², directly on the DAKU ROOF SOIL substrate (compounded with DAKU PLUS fertilizer). Roll the substrate with the DAKU ROLL roller rake. Check if the substrate is partially buried and if not, do it manually. After the substrate has been rolled, irrigate the garden (10 l/m²). After the installation, irrigation cycles must be scheduled, in accordance with the maintenance manual.



