



INSTALLATION MANUAL

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1. INTRODUCTION

Roofingreen® is a unique modular system for outdoor flooring creating green surfaces in urban architectural environments. The Roofingreen system offers a wide range of advantages (aesthetical, functional, sustainability, flexibility, no maintenance) and is suitable in multiple scenarios - roof terraces, rooftops, balconies, patios, courtyards, temporary flooring, etc. - and is suitable for all types of climates, usable the whole year round.

The installation of Roofingreen® is not particular complicated and has many similarities to the installation of other type of (raised) outdoor flooring. There are, however a number aspects that are specific to the Roofingreen system that need to be well understood in order to get the maximum result. The final objective is clear: to obtain a homogenous, natural looking grass surface that perfectly integrates in its surroundings.

The specific characteristics relate to the type of materials of which Roofingreen is

composed and the shape of the single pieces – the bespoke dovetail design which are joined together as a puzzle.

In the Roofingreen language the single pieces are generally referred to as **modules**. There are a number of synonyms that may be used indifferently: tiles, trays, slabs.

The level of expertise and experience required to make a successful and efficient installation does also depend on the type of product that is used. The installation of thin LEAF modules can be performed by a DIY client, whereas the proper installation in combination with a height adjustable pedestal system requires a more professional experience.

Roofingreen offers modular systems for both horizontal and vertical surfaces; the latter presents some specific characteristics which are dealt with in a separate document.

Enjoy your Roofingreen installation!

2. PROJECT DEFINITION

For a successful and efficient project completion the planning stage is fundamental. This obviously starts during the preparation of the Roofingreen proposal. The following information is quite important to make the most appropriate choice of product (combination):

- the type of project (roof terrace, courtyard, etc.)
- the surface on which Roofingreen will be installed
- the exact surface measurements in cm or mm based on a detailed drawing
- in case of a raised surface, the required height levels (min. height, max. height, slope, location of drainage points)
- perimeters of the surface: against a wall, open or adjacent to other type of flooring
- main functionalities required (draining, isolating, shock absorbing)
- optional features: integrated lighting, integrated footpath

It is usually very helpful and necessary to share detailed drawings (in dwg or pdf format) with Roofingreen, ideally combined with some photographs, as this will allow us to calculate the exact quantities of material required and understand if there are particular challenges to address.

Roofingreen's proposal will take into account the provided information, and calculate quantities taking into account the necessary cuttings, rounding off to obtain full boxes of material.

In the case of a raised surface on pedestals, to make sure that the exact right products are supplied it is recommended that the height measurements are double checked after the surface preparation (roof membrane, borders) has been completed and before the materials are shipped. Having the wrong materials on site will lead to significant loss of time and money.

3. INSTALLATION TOOLS

Being a complete dry and self-locking (puzzle shape) system, the amount of tools to install Roofingreen are few and simple:

- length and height measuring tools (traditional or electronic)
- electrical table circle saw or manual electrical saw – for module cutting
- Easyfix installation profile – for seamless module fitting

- metal comb (resistant, usually for large dogs) – to pull up grass pile stuck between modules
- manual brush or brushing-cleaning machine (optional, for large surfaces) – to clean the finished surface and pull up the grass pile

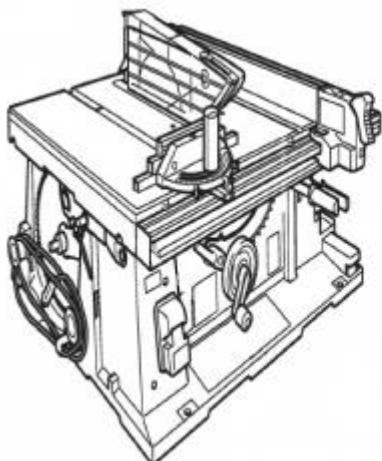
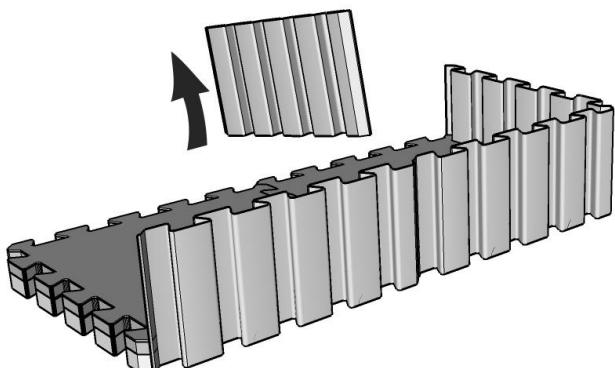


table saw



hand held saw



Easyfix profiles



metal dog comb



Brushing & Cleaning Machine (optional)

4. GENERAL INSTALLATION TECHNIQUES

The Roofingreen system is quite easy to install and does not require any particular skills or competences, but to obtain the best result it is fundamental to follow a few rules. It is important to remember that in some respect installing the Roofingreen system is different from other outdoor materials like wood decking, stone slabs or ceramic tiles. These are

related to the shape & design of the modules (no flat base, swallowtail shape), and the fact that the modules will touch each other to obtain a continuous surface.

The instructions are intended to achieve one objective: to obtain a homogeneous grass surface without visibility of separation lines.

4.1 Module Cutting

It is quite easy to cut Roofingreen modules. The most efficient and safest tool is an electrical table circle saw (see installation tools sections). The modules that will be placed at the edge of the surface to cover will always be cut: 1) to make them fit the surface and 2) to obtain a straight module edge leaving no open gaps.

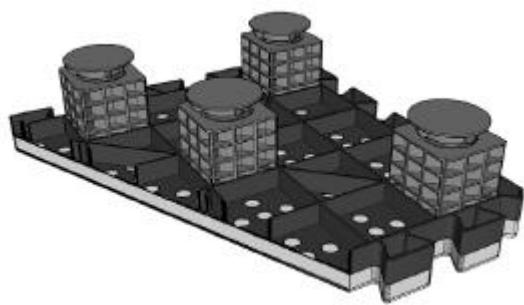
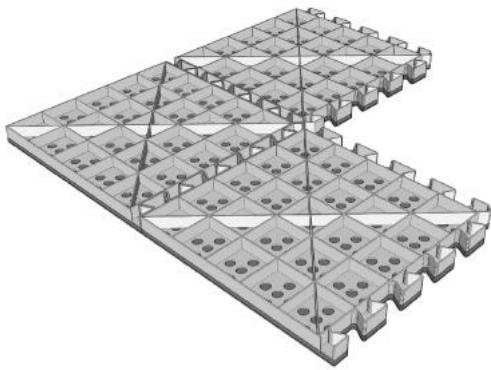
Cutting modules should be them respecting the various safety measures (see dedicated section, and equipment manuals). Make sure to wear gloves when handling cut pieces as they may have some sharp edges.

Important: Because of the grass direction (see dedicated section) it should be carefully considered in which direction to cut the

module. Cutting in the wrong sense usually results in the loss of material or imperfect surfaces.

Generally, it is better to cut the modules upside down as it easier to respect the exact place where to start the cutting. It is recommended to put signs (ink or tape) on the base of the tile before doing the cutting.

Modules can be cut straight, at an angle, or even with a curved profile when desired. Important is to avoid that cut pieces are too small, in particular in the case of raised floors (see also raised floor section) as it may result in unstable parts. When it is not possible to avoid this (for example when a surface perimeter does not have 90° angles) small pieces can be stabilized by placing some support like a brick or wood below.



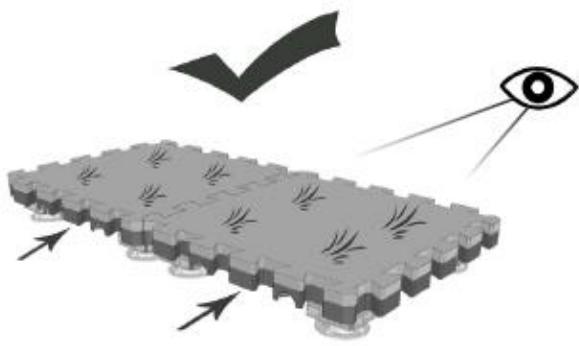
Note: Whereas the net length and width of installed modules is 50cm x 50 cm, remember that when the swallowtail edges are cut off at both sides the length is actually reduced by approx. 3cm. So if the surface length is for example precisely 400 cm, eight modules will

not be enough to cover the whole length, a ninth module is required. As it is not desirable to have modules cut in too small parts (in particular for raised surfaces), it is recommended to cut both the first and the last module of the row in such a situation.

4.2 Grass Direction

As the artificial grass of the Roofingreen modules is woven directionally, it is fundamental that all modules are oriented in the same sense. If this principle is not

respected the result will be a non-homogeneous surface appearance non-conform to Roofingreen quality standards.





Example of surface with consistent grass direction

When taking the modules out of the boxes, the grass will be flattened and it is recommended to brush the surface to better identify the real grass direction.



Example of surface with varying grass direction

To help laying in the same direction, there are two markers in the form of a semi-circle cut out marks (Nature module series) located on one side of each module. In the case of LEAF there is a small cut-out triangle on one side of the module base.



NATURE module with semi-circle cut out marks



LEAF with triangular cut out mark

Important: occasionally the marks may not be on the correct side. It is therefore necessary to do also a visual check after having placed the module in position. Best is to look at the surface from two different angles in case of doubt.

Because artificial grass has a direction, the visual aspect actually changes according to

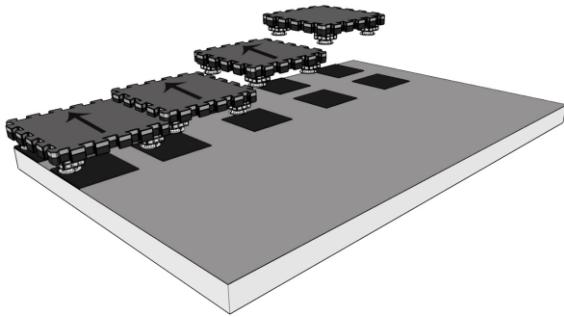
the angle from which you look at the grass (in particular under direct sunlight). In one direction it will appear a bit glossy, from the other side more matt. As the latter is more natural, this can be taken into account when deciding in which direction the install the modules. Usually, this will be in function of the side from where the surface is typically accessed (door) or observed (window).

4.3 Installation Direction

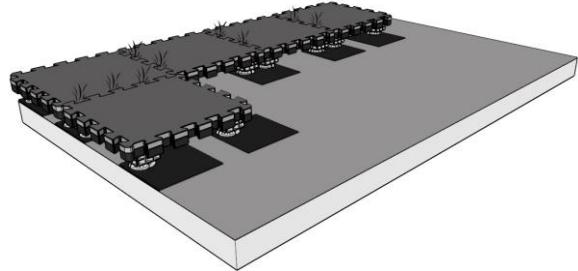
The grass direction is also important to decide in which direction the installation will take place, in other words where to start and to finish the installation process. The reason for this is that the grass direction (see previous section) is also a significant factor when trying to avoid that grass fibers remain stuck in the junction of two modules. When this happens, the grass fibers that are

pointing downwards will create visible separation lines along the module intersection, which should obviously be avoided.

The way to avoid this from happening is to install the modules in the opposite sense from the grass direction (see images below). This implies that the cut out marks will be facing the installer.



This implies that the most common starting side of installation is the side from where the surface is commonly accessed or observed. The most common starting point of installation is in a corner with a 90° angle.



The modules can be added row by row, or in a diagonal manner; the latter is preferable when the rows are relatively long and when the surface is not perfectly rectangular. In this manner it is ensured that the modules will be perfectly in axis, which is important to avoid friction between modules which may lead to noise generation.

4.4 Fitting Modules

Once the installation direction is decided, the starting point (corner) decided, and the first modules for that zone cut with straight edges (see previous sections), the process of fitting the modules together like a puzzle can start. The indications how to combine the modules with the support systems (B- and NM-series) are dealt with in a dedicated section.

Installing with **Easyfix**:

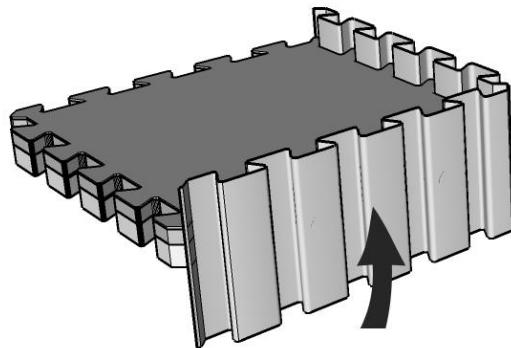
Roofingreen has introduced a specific installation tool called Easyfix which, after some practice, makes installation more efficient and gives the best results. Easyfix is a

plastic mould with the same dovetail shape as the module edges. When properly used, Easyfix will result in a homogenous grass surface with no visible separation lines without the need to pull up entrapped grass fibers.

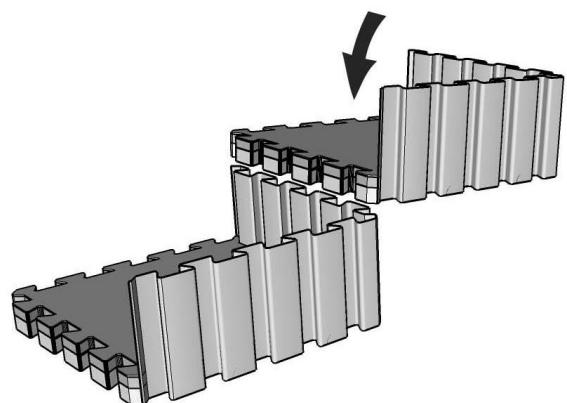
The minimum amount of Easyfix profiles required for each installation is two, but it is recommended to have a larger number available, as damage may occur to the profiles and because “preparing” a certain quantity of modules with the Easyfix already inserted is usually a more efficient way of working.

On the following pages the sequence of the steps to follow are described:

- 1) Wrap the upper part of first two Easyfix profiles onto the sides of the module that is already in place on the ground by slightly lifting it up, then push down the module.

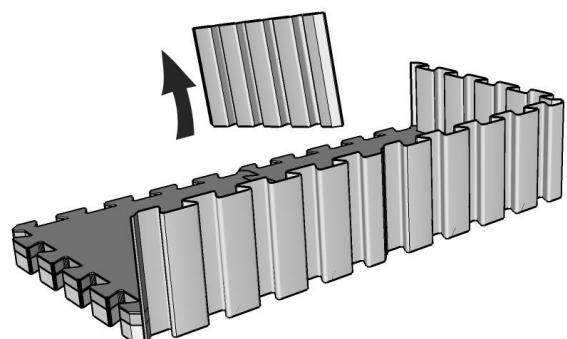


- 2) Prepare the next module in exactly the same manner; then insert the module from the top into the channels of the Easyfix of the first module as per the image below. Make sure the insertion is complete so the second module can be pushed down without much effort. Push down the second module using either two hands or feet, until the two modules are aligned.

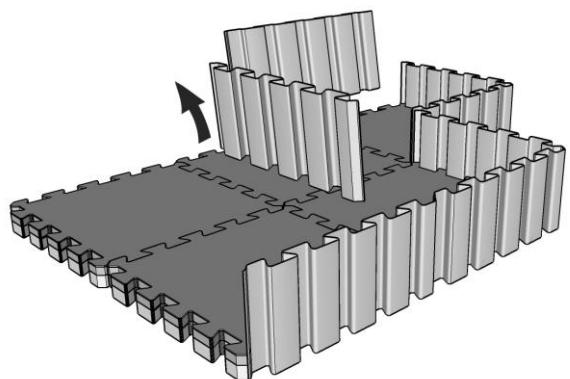
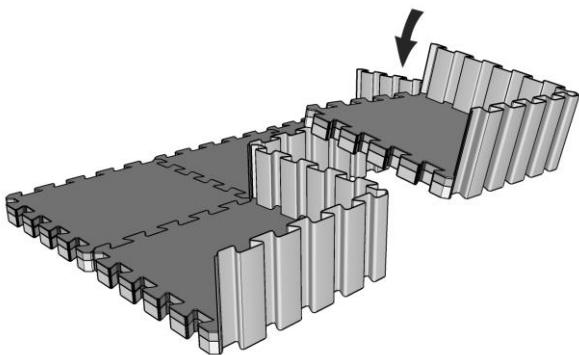


- 3) Remove the Easyfix profile between the two modules by lifting it up with two hands using the available holes in the Easyfix profiles to have a good grip. Make sure to apply a steady force rather than pulling violently as this may create damage to the Easyfix profiles. Make also sure to have your feet on the two modules when you pull to act as counterweight. Once this action is completed you should see that the two modules are perfectly

aligned without a visible separation line due to grass fibers being stuck in between.



4) Proceed by adding more modules in the same manner, either expanding the surface row by row or diagonally. The Easyfix profiles that have been pulled out can obviously be used again.

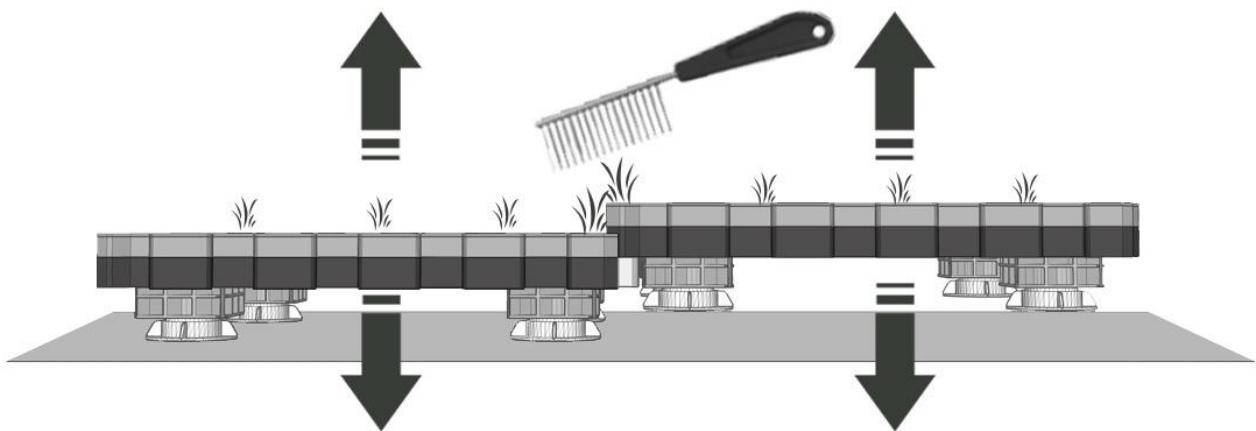


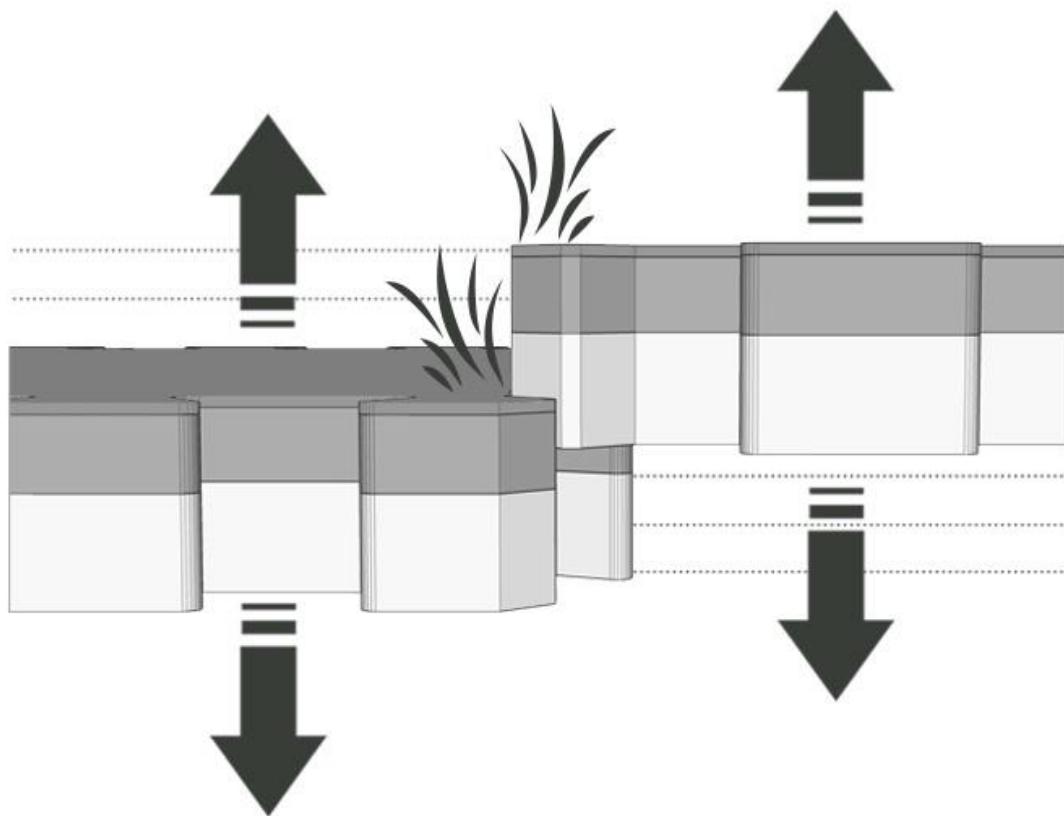
Alternative fitting technique:

When Easyfix profiles are not available, the modules can of course be slotted into each other directly. It is important to respect the instructions concerning installation direction. The next module should be inserted from the top.

To minimize the grass fibers from getting stuck between modules, move the modules

up and down in a controlled manner. To pull up any grass that is still stuck use a robust **metal comb** (see section 3. Installation Tools) in a rather energetic way. Do not be concerned about some grass fibers coming loose: these are only fibers at the edges of the modules; once the modules have been slotted together there will be no empty grass areas.





4.5 Final Steps

To finalise the installation the surface shall be cleared off loose grass and other small debris present as a result of the installation. At the same the grass shall be pulled up to give the surface its final, homogenous look.

These actions can be carried out using standard tools like brush, broom and / or vacuum cleaner. For larger surfaces in particular, it is worth using a dedicated electrical Brushing and Cleaning Machine (see section Installation Tools). This will result in a

clean and homogenous grass surface with a realistic and natural appearance.



5. MODULES FOR DIRECT FLOORING

The module types included in this group are those that are installed without support feet or pedestals. They include:

- LEAF
- STEP
- NATURE M10 DRAIN
- NATURE M20 & M50 ANTISHOCK

Usually these modules are separated from the base surface by a layer of a geotextile supplied by Roofingreen named Geodreno:

- Geodreno 07
- Geodreno 16

For technical data & specifications please refer to the Product Data Sheets of the single products.

The procedure for installing this type of flooring is very simple and consists of only two stages:

- 1) Covering the surface completely with Geodreno, which comes in rolls and is very easy to cut to size.
- 2) Installing the modules using the indications provided in section Installation Techniques.

Notes:

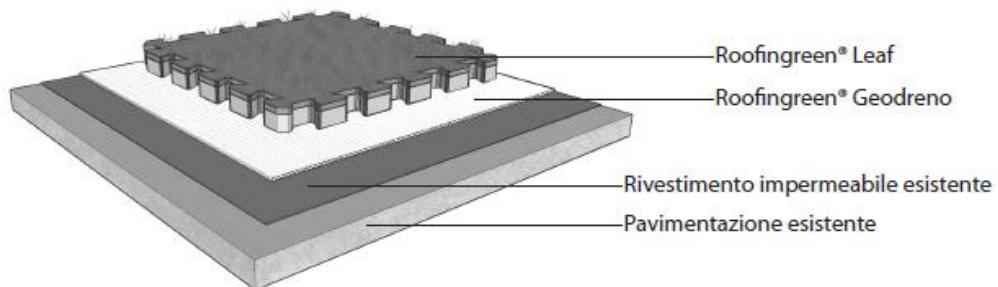
- make sure that the channels of the core structure of Geodreno are placed in the

same direction as the water flow; this will optimize the drainage

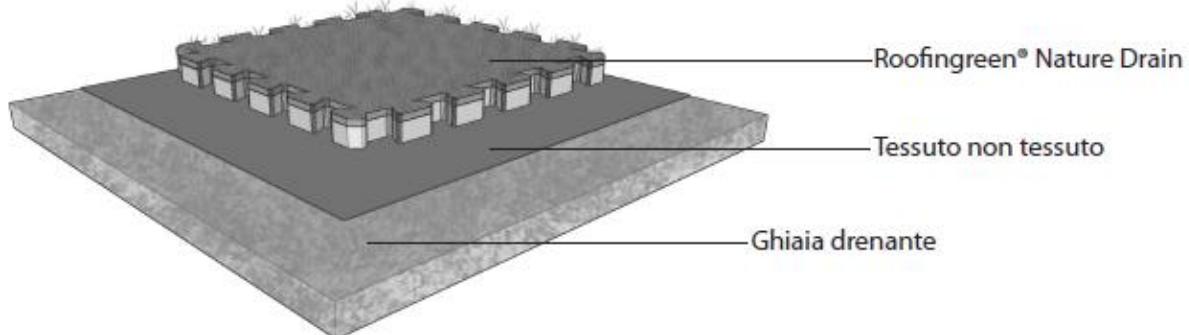
- When installing on the ground, the surface should be prepared in such a manner to avoid ground instability – also in extreme climatic conditions like heavy rainfall – as this will also affect the stability of the Roofingreen surface. Special care shall be taken in cold climates with long periods of frost as significant variations in the height level of the ground may occur. It is fundamental that the surface has either no or a constant slope, and is not irregular.
- The use of gravel or small stones as a draining layer – both on the ground and on roofs – is quite common. When the diameter of the top layer is relatively small (2 – 8mm range) LEAF is quite suitable; when the diameter is higher it is usually preferable to work with NATURE M10 DRAIN modules as they will offer better stability.
- when installing on gravel, small stones or compacted earth (all draining surfaces) the use of Geodreno is not necessary. However it is recommended to place a woven non-woven sheet (typically PP) below the gravel or under the modules, to stop the growth of weed.
- There is no need to use any filler (like sand) on the finished grass surface.

Typical scenarios of direct flooring installations:

- 1) LEAF on existing waterproof surface



- 2) M10 DRAIN on gravel



Note: it is also possible to lay the sheets of woven-non woven material below the gravel

6. RAISED FLOORING

This group includes the module types that are installed in combination with support feet or a pedestal system to create a raised surface. The products included are:

- NATURE M20 DRAIN
- NATURE M20 & M50
- NATURE LED M20 & M50

Roofingreen offers two support systems:

- B-series support feet
- NM-series pedestal system

6.1 Support Systems

The support systems are both composed of a range of modular and height adjustable bases, which can be adapted to the slope of the underlying waterproof layer surface, to obtain a completely flat, stable and homogenous flooring.

Generally, a slope up to 3% represents no problem. If the slope is higher some specific measures may have to be taken to ensure a problem-free installation.

For product details, technical data & specifications please refer to the Product Data Sheets of both systems.

The choice which support system to use depends on a series of factors – both technical and commercial - as each has its pro's and con's depending on the specific project characteristics. Ask Roofingreen for advice.

The installation procedure for the B and NM systems is quite distinct:

B-series:

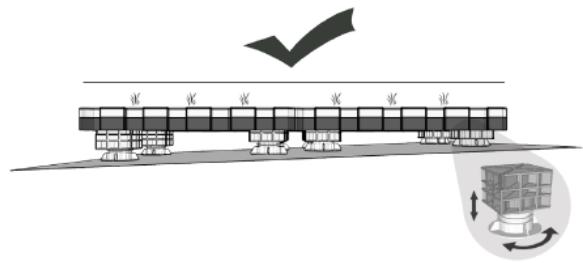
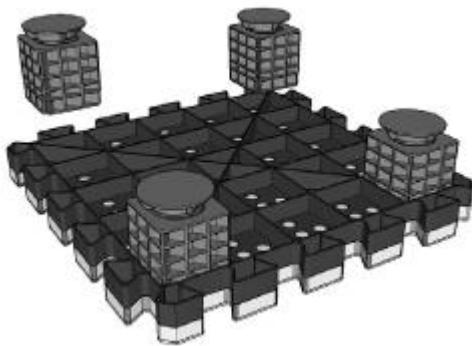
The support feet have to be fixed onto the modules before positioning these onto the underlying surface. Make sure that the support feet are well inserted using manual pressure.

The range of support feet consists of three different products (B50, B100, B180) that allow to adjust for possible differences in height of the underlying surface. The support feet can be individually adjusted for height using the screwable part. It should at all times be avoided to turn the adjustable part beyond its maximum extension as this may cause the round base to come off under weight load with resulting damage.

To avoid direct contact between the feet and the waterproof layer, and to improve stability, GroundCare® pads may be used. Each square pad can cover four feet and will distribute the weight load.

After the support feet are put into place, the module shall be turned around and fitted into place using the techniques described in section Installation Techniques. As a final step the feet height shall be adjusted to ensure the grass surface is flat. It is recommended to check this frequently with a spirit level, since later adjustments can be rather cumbersome to perform.

Normally each module has four support feet inserted in the corners of the module. In case of significant weight load - either on the whole surface or on specific points - it is recommended to add another support in the center of the module to give additional stability.

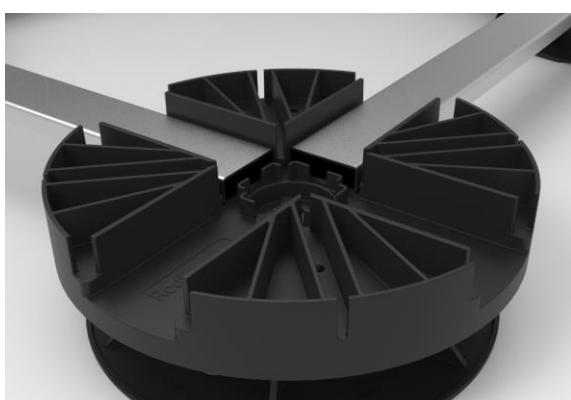


NM-series:

The NM-series pedestal system is based on technology from the leading Italian pedestal system manufacturer Eterno Ivica (www.eternoivica.com), completed with a purpose designed connection piece (RIG Head) to make the pedestals compatible with the specific base design of Roofingreen NATURE modules for raised flooring.

Each support will be placed at the intersection of the grass modules. The build-up of the different parts composing the NM system is straightforward, in the following order:

- 1) NM1, NM2, NM3, NM4 or NM5 pedestal depending on height level to be obtained
- 2) NM Extension if necessary to obtain a certain height
- 3) Fitting of the RIG Head (or Flat Head at the surface perimeter)



- 4) Positioning of the metal support bars (with a strip rubber tape on the top side)
- 5) Fitting of the grass modules in the channels, using the techniques described in the section Installation Techniques.



Important: with the NM system it is recommended to first install part of or the complete pedestal support structure, before proceeding to fitting the grass modules. During the installation of the pedestal system with the support of a spirit level the correct height shall be measured and, if necessary, adjusted with the support of the special Installation Key or with a suitable screwdriver.

For further details on the NM pedestal system, please refer to the Eterno Ivica website <https://www.pedestal-eternoivica.com/en/pages/downloads> or the installation video available on Youtube: <https://www.youtube.com/watch?v=r297Vxad5gc>

6.2 Module Types

The Roofingreen grass modules used for raised surfaces have a base of polycarbonate, a rigid and resistant material, to support high weight loads (see technical specifications)

Nature M20 DRAIN

Thanks to the presence of invisible drainage holes in the modules (for technical details refer to the Product Data Sheet), the system can be installed with a perfectly flat grass surface, making use of the adjustable height levels of both support systems.

Nature M20 & Nature M50

When properly installed on a pedestal system, these modules have the capacity to generate a significant thermal insulation effect on the underlying (roof) surface, both in summer and winter. For technical data refer to the Product Data Sheet and dedicated documentation about the advantages in terms of comfort and energy savings available from Roofingreen.

To obtain a good insulation effect it is important to make sure that the air circulation level below the grass modules is well controlled. Some ventilation should be maintained, but shall be limited as otherwise the insulation effect is significantly reduced.

To make sure that surface water is properly drained it is recommended to install the modules

maintaining a minimum amount of surface slope in the direction of the underlying drainage points. In this way, the water will flow off over the grass surface.

Important: the Roofingreen modular surface is not hermetic and a limited degree of humidity will always pass between the modules to the underlying surface. This implies that installing Roofingreen cannot be a solution for surfaces that have problems with stagnant water.

Nature LED M20 & M50

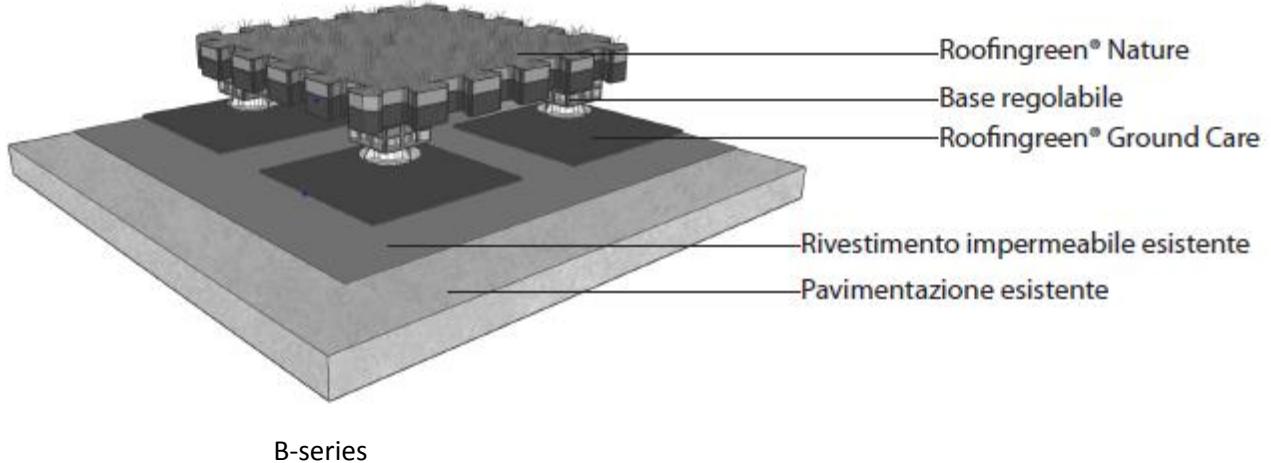
The LED units supplied by Roofingreen are easily fitted into a whole cut into a standard NATURE module respecting the corresponding diameter. There is some limitation to the exact positioning of the hole: it shall not be cut in the center of the module, as this will weaken the mechanical strength of the module structure. Also it shall not be cut at the edge of a module, as this may result in a non-homogenous grass surface.

The quantity and positioning of the LED's in the Roofingreen surface is the choice of the designer or final customer. Typically however, the recommendation is to maintain at least 1.50m between one LED unit and the next one.

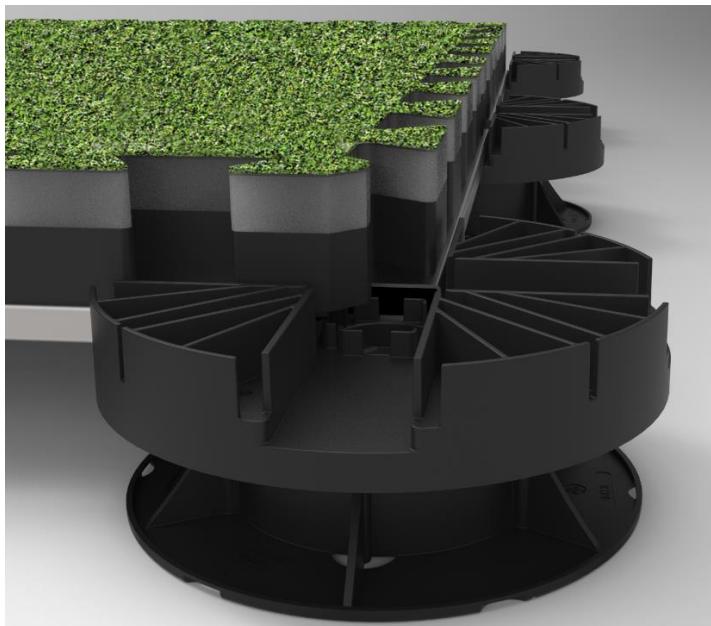
The LED's are wired to a power adaptor and from there to the mains. The power adaptor supplied by Roofingreen can connect up to 6 LED's if the distance is not too large.

In any case, a certified local electrician shall be employed to approve the installation lay out and ensure proper and safe connections.

Examples of typical raised floor build-up:



B-series



NM-series

7. MAINTENANCE

7.1 Cleaning

Once installed, the surface requires little attention. To remove dust or other materials with low weight and size like sand, etc. a jet of air or suction is sufficient. A standard vacuum cleaner will be sufficient. Alternatively, rinsing or spraying with water will have the same effect.

The before mentioned (see sections 3 Installation Tools and 4.5 Final Steps) electrical Brushing & Cleaning machine can be used periodically for the removal of larger debris like leaves, small stones, pine cones, etc. from the surface, and will at the same time "revitalize" the appearance of the grass surface by straightening the tuft. The frequency should depend primarily on the intensity of usage of the surface.

In case of presence of stains, moist organic materials or fatty liquids on the grass from food etc. there are a number of options.

Generally, washing with warm water and a standard, mild floor detergent will be sufficient. It is recommended to avoid the use of abrasive materials or aggressive chemicals.

- Do not wash the grass with highly alkaline detergents (such as: caustic soda, ammonia).
- Do not wash the lawn with acids (such as muriatic acid, phosphoric acid, etc.).
- Do not wash the lawn with solvents (such as: acetone, trichlorethylene, white spirit, etc.).
- Do not wash the grass with strong oxidizers (such as hypochlorites, hydrogen peroxide, etc.)

7.2 Damage and Module Replacement

Another advantage of Roofingreen's modular system is that in case of damage to a module due to an accident or improper use, it is quite easy to remove the damaged part(s) and replace them with substitute modules without having to intervene on the substructure,

For thorough cleaning of the synthetic grass surface the use of Roofingreen® **Green & Clean** is recommended. It is a concentrated alkaline detergent, formulated specifically for synthetic grass surfaces. Thanks to its specific formulation, it acts rapidly on the surface, eliminating dirt, stains and dust. The product has the following benefits:

- leaves no stains
- anti-bacterial : sanitizes, prevent mold formation
- anti-static: prevents formation of static electricity, prevents accumulation of dust
- pleasant smell



Green & Clean – dosage instructions on labels

The intervention takes place only where the actual damage is, there is no need to take out a whole surface; without the need to use chemicals, the new part is simply slotted into place.