

GREEN PAVING



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GRASS PAVING

The city of the future will need to take account of an increasing risk of flooding resulting from climate change. An increase in paving in urban areas is leading to the existence of so-called urban heat islands; places where sunlight is absorbed more rapidly as well as being preserved longer.

Whenever the lay-out of an urban environment is rearranged, climate adaptation necessitates several simultaneous solutions. It is a huge challenge to realise a spatial layout that is comfortable for its users in all prevailing circumstances, both in normal situations and under extreme weather conditions. Adequate solutions are then called for, e.g. greenery which has a cooling effect and urban spaces including water storage to cope with extreme precipitation.

Local authorities are increasingly having to face the challenge of climate-proofing both for existing and new projects. This means adjusting urban redevelopment to climate change so that residents can live and enjoy recreation safely and comfortably. One of those solutions is to have more greenery within pavements. Greenery enhances public spaces and makes it more attractive to users, retains less heat and has a cooling effect because of water evaporation. In addition, grass pavements ensures, by virtue of its open character, that rain water can be absorbed into the soil.

However, traditional paving remains necessary to ensure the convenience and accessibility of public spaces. Alternating pavement and greenery increases the quality of life in urban areas.

This brochure aims to present a comprehensive range of products and solutions for a sustainable living environment, in which greenery, water and traditional pavements have been appropriately combined and integrated.



GREEN PAVERS – ATTRACTIVE GREEN ENVIRONMENTS

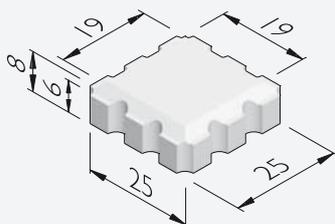
Green pavers fit in perfectly with any street scene and they provide extra benefits when it comes to spatial effects, drainage and even traffic signalling. They have grown in popularity from the desire to enable grass growth by using pavers with large recesses.

Green pavers have extra-large recesses all round to establish a green street scene without the need to install separate spacers. Filling the openings with tree sand helps to create attractive green scenery. The greenery ensures that some of the water evaporates while some of it is absorbed. Whenever a much higher degree of permeability is the decisive factor, stone chippings can be used as a jointing material.

The square pavers (25 x 25 cm) can be applied for pathways, parking bays, driveways and green belts, either as block paving or stretcher bond paving.

BENEFITS

- Growable surface 15%
- Water infiltration
- Modular dimensions
- Block paving and stretcher bond paving
- Low maintenance
- Budget-friendly
- Suitable for light vehicular traffic



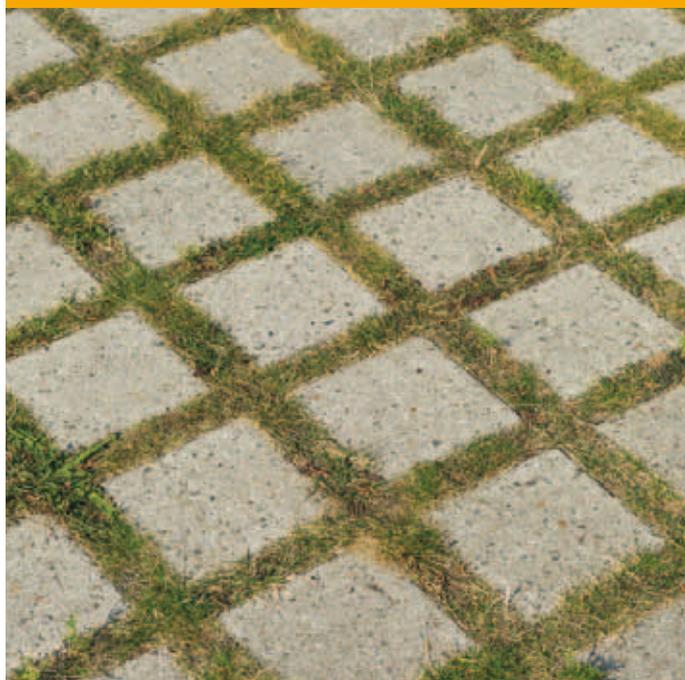
SPECIFICATIONS

Dimensions	25 x 25 x 8 cm
Weight	9.24 kg
Number per m ²	16 pieces
Growable surface	15%
Permeability (sand 0/2) *	150 l/sec/ha

* indicative values

Bangert District – Hoorn, The Netherlands

Green pavers are ideally suited to applications that are not supposed to interfere with the street scene. In the Bangert district in Hoorn, the green paver belt separates the roadway from the footpath, while the belt also functions as a driveway to residential houses. In addition, it ensures drainage from the upper buildings, without any impediment to the vehicular area. Also, the parallel strip of grass ensures a pleasant design effect between pavements of the same colour.







GREENBRICK – COLOURFUL GRASS PAVING

Greenbrick allows for the possibility to combine attractive paving with grass, and to install markings when laying out parking bays. Wherever concrete grass pavers fail to harmonise with the environment, Greenbrick provides complete freedom to mellow the appropriate paving to include greenery.

Most concrete grass pavers are grey and, in spite of being interspersed with greenery, they always maintain a concrete-like appearance. This is an appearance that may not blend with adjacent facades or natural surroundings. The use of Greenbrick creates the freedom to opt for appropriate paving and to tone it down with greenery at the same time. This is how Greenbrick contributes towards the required water infiltration for extensive paved surfaces.

All in all, this is a functional green pavement that allows for a perfect combination with the other areas of public space, whereby any required markings can be realised.

Hollow brick

To achieve a greener effect, simply removing the occasional paver from the pavement is not sufficient.

In practice it will detract from the overall coherence of the pavement and the pavement will end up askew. The Greenbrick is a hollow plastic brick which ensures a good connection in the laying pattern and in which grass has sufficient room to grow. The dedicated reinforced ribs ensure strength and stability, enabling the pavers or slabs around the Greenbrick to remain neatly in place. The Greenbrick is constructed with an open membrane as compared to standard grass concrete pavers, thus allowing the grass itself extra nutrition and growing space for optimum desired results.

Sizes and tolerances of Greenbrick are exactly tailored to our paver sizes (21 x 10.5 x 8 cm). The circumference of Greenbrick is slightly smaller and they sit somewhat lower as well, so that they sink further down within the pavement.



Venlo-Oost Talentencampus, The Netherlands

Carve Engineering Design designed, especially for a Comprehensive School, a pavement with a panther motif including approximately 140 parking bays and more than 30 special parking bays for small commercial vehicles. Solving the parking and water infiltration issues was the biggest challenge of the project. The edges of the square were used to achieve the large number of parking spaces required; this meant, however, that an extensive paved surface would arise. Mitigation of this structure led to a new grass paver that was specially devised for this project: the Greenbrick.



Coupling system

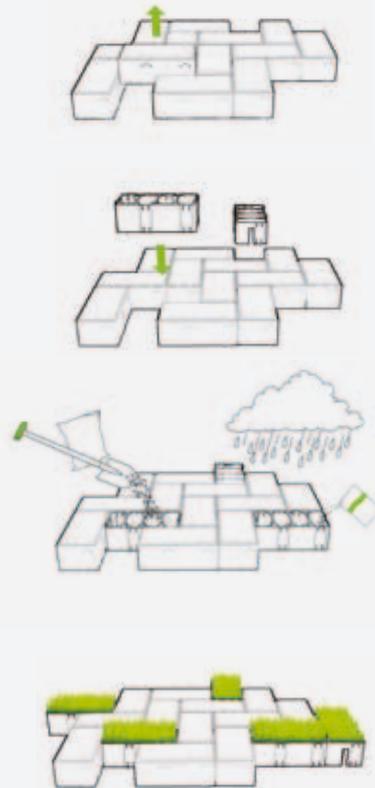
By placing the Greenbricks end to end a narrow green strip/line effect can be plotted into the pavement. These lines are highly decisive for the overall appearance of extensive paved terrain. This is how they constitute an aesthetic complement to a mainly functional pavement. In order to ensure a firm connection, the Greenbricks are fastened together by

two plastic spring clips. At the top of each block are two standard clips which, if necessary, could be easily removed from the inside of the block by just turning the clips by hand. By placing the spring clip over the two walls of the block, both Greenbricks can be fastened tightly against each other. Greenbrick is a patented product.

Advice for installation

- Always install the Greenbrick in a slightly sunken (4 mm) position
- Do not combine with cut pavers or slabs
- Fill up Greenbricks with tree sand 500
- Advice for sowing: grass seed mixture (sowing density 20g/m²)
- Apply water immediately after sowing

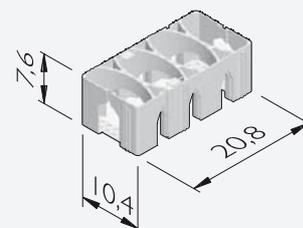
Greenbrick is not bound by any particular laying pattern. Greenbrick may be left out from some parts of the pavement, e.g. to lay out walking routes.



SPECIFICATIONS	
Dimensions	21 x 10.5 x 7.8 cm
Material	HDPE
Weight	0.165 kg
Number per m ²	max. 13 pieces
Growable surface	29%
Permeability (sand 0/2) *	290 l/sec/ha

* indicative values

Black is the standard colour; other colours, green for instance, available on demand.



Ursula Estate - Nieuwveen, The Netherlands

This estate has a splendid landscaping structure including lots of monumental trees. Part of the accommodation had to be replaced and the existing infrastructure was cluttered; a green and achievable infrastructure was called for. The parking area has been so designed so that it has a green appearance. Parking bays are marked out by means of green zones. Visitors can walk comfortably on the adjacent paved bands, which also accommodates people with decreased mobility living in the area. Based upon this design for open pavement, the customer opted for Greenbrick; an appropriate solution and easy to walk on.

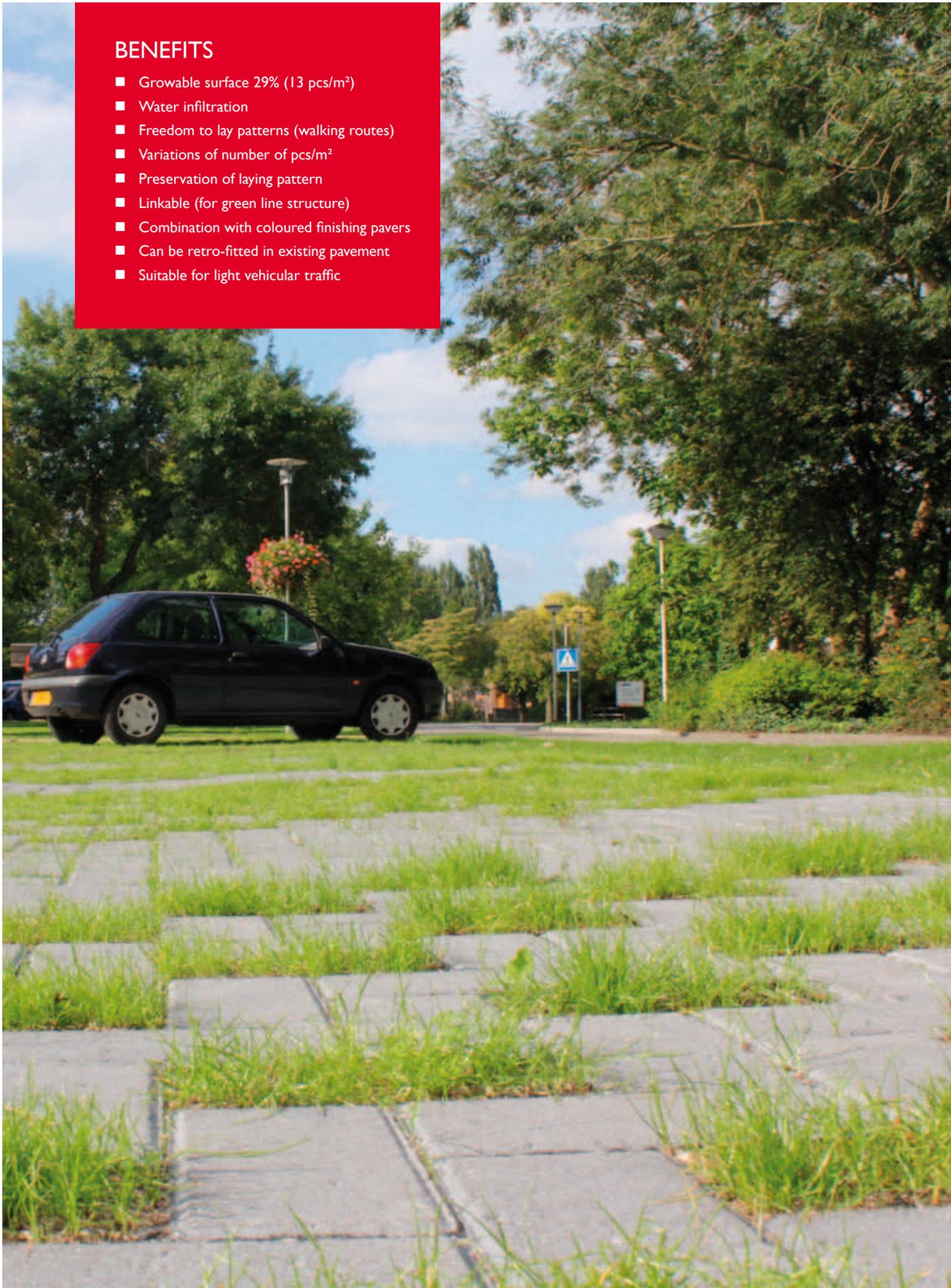
Solution for water storage

An open pavement is increasingly used due to increasingly rigid demands on water storage. The use of the Greenbrick grass pavement is an ideal solution. Greenbrick fits in perfectly with landscaped areas because of its green appearance. The grass pattern ensures a visual interruption of extensive pavement surfaces. Improved drainage means that part of the water storage issue has already been solved. Greenbrick makes it easy to simply design various patterns for open and closed pavement areas.



BENEFITS

- Growable surface 29% (13 pcs/m²)
- Water infiltration
- Freedom to lay patterns (walking routes)
- Variations of number of pcs/m²
- Preservation of laying pattern
- Linkable (for green line structure)
- Combination with coloured finishing pavers
- Can be retro-fitted in existing pavement
- Suitable for light vehicular traffic



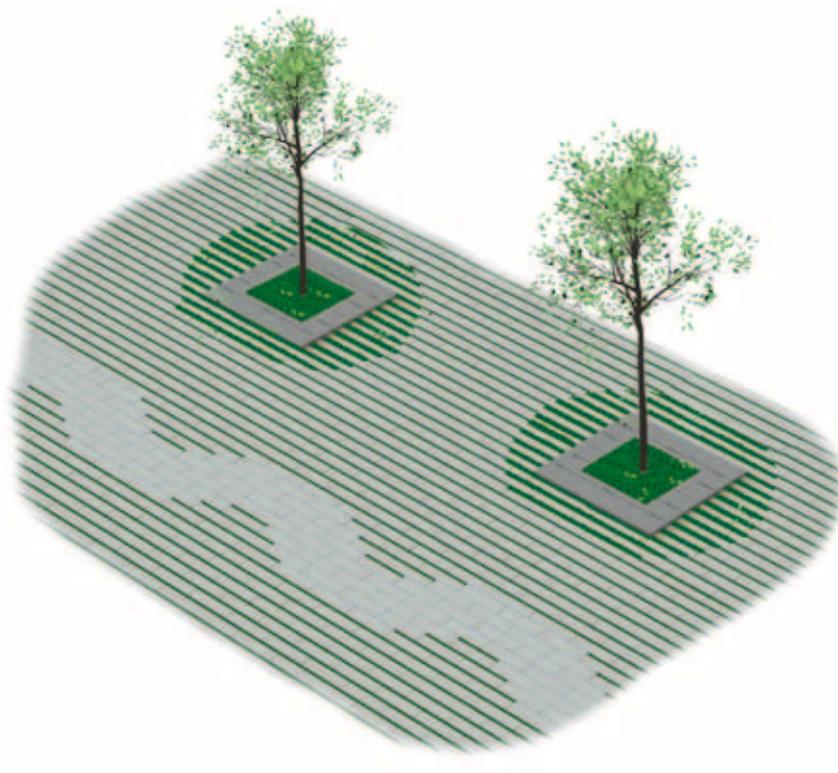


HYDRO LINEO – GRASS LINES OR GRAVEL RIBBONS

Current regulations persuade the specifier to take a different approach to greenery in pavements. The natural balance between pavement, greenery and the environment is gaining in importance. Greenery is becoming a more essential element in public spaces. Hydro Lineo responds to this development with a smooth transition from closed to open pavements.

Hydro Lineo includes three different models of concrete pavers. These three models have a uniform nominal outer size. The width of the widened joint is the only variation per model. The three different models can therefore be used individually as well as being mutually exchangeable. Thanks to the increasing width of the widened joint, the street scene shows Hydro Lineo in a smooth transition from a closed to an open pavement, and back again.

By varying the different Hydro Lineo models, you can arrange with lines and patterns within a spectrum. This ensures ample freedom of design. An example: the pavement surrounding plants and water areas gradually transforms into a greener environment. On the other hand, Hydro Lineo creates clear-cut walking lines so that the water-permeating pavement does not detract from navigation, even taking into account those people with reduced mobility.



The use of purely concrete water-permeating pavements makes it hard to create specific line patterns, especially in the case of smooth transitions from greenery to concrete. Hydro Lineo pavers have been specifically designed to give shape to that kind of transition.

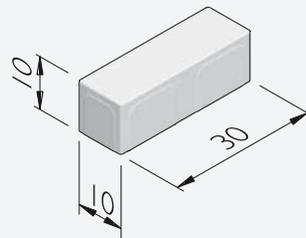
The Hydro Lineo 22 has a growable surface of 22%; for the Hydro Lineo 40 it is 40%.

Both models can be combined with the standard Hydro Lineo 30 x 10 x 10 cm concrete paver. All Hydro Lineo stones are available in standard (untreated) specification or in the Lavarò version (washed).

Winner of the 2015 Elements Awards, category Small Scale Precast by FEBE (Federation of the Belgian Prefab Concrete Industry).

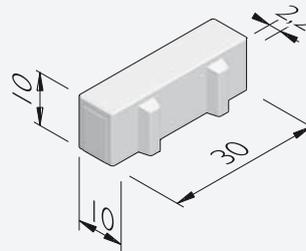
SPECIFICATIONS	
Dimensions	30 x 10 x 10 cm
Weight	6.9 kg
Number per m ²	33.33 pieces
Growable surface	0%
Permeability (sand 0/2) *	0 l/sec/ha

* indicative values



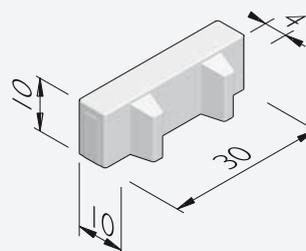
SPECIFICATIONS	
Dimensions	30 x 10 x 10 cm
Weight	5.5 kg
Number per m ²	33.33 pieces
Growable surface	22%
Permeability (sand 0/2) *	220 l/sec/ha

* indicative values



SPECIFICATIONS	
Dimensions	30 x 10 x 10 cm
Weight	4.5 kg
Number per m ²	33.33 pieces
Growable surface	40%
Permeability (sand 0/2) *	400 l/sec/ha

* indicative values





BENEFITS

- Growable surface 22% / 44%
- Water infiltration
- Mutually exchangeable
- Smooth transition from closed to open pavement
- Small spacers keep the ridges from shifting
- Exceptionally fast installation
- Many colours and textures
- Suitable for medium-heavy traffic
- Comes with BENOR attestation



SQUARE – ROBUST, PROVIDING FREEDOM OF CONFIGURATION

The application of many models of concrete grass pavers leads to a nondescript street scene, with hardly any possibilities for variation. Square provides the possibility to create three combinations with one single paver: stretcher bond paving, alternate stretcher bond paving and a random laying pattern. Each pattern results in specific nuances for the eventual street scene. In addition, parts of Square pavers can be closed off with a standard concrete slab.

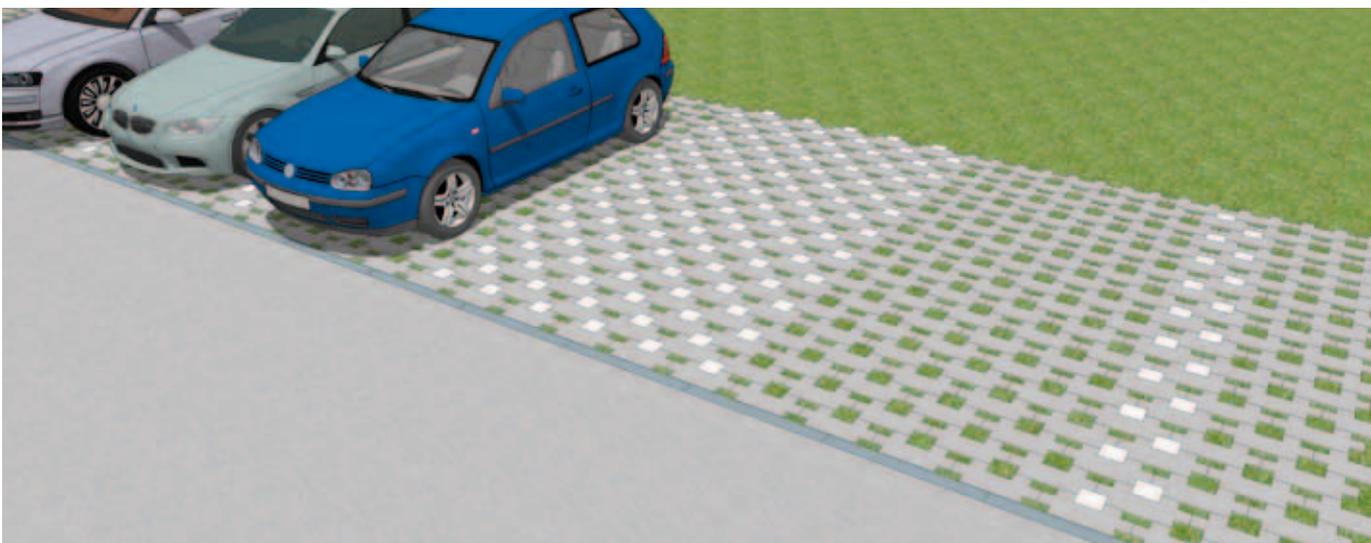
Combining and designing with concrete grass pavers was the starting point for the Square design by Marseille Buiten. These combinations imply enhanced scope and freedom for designers. Thanks to the dimensions of Square concrete grass pavers, standard concrete slabs can be used to lay out a path, mark a parking bay or create a mini-square. It is also possible to lay out a diagonal path across the pavement without interrupting the pattern; the use of half slabs makes it even possible to fill up the entire surface.

The open pavement provides the image of a mosaic and one third of the surface is green. The large size of the grass surfaces (20 x 20 cm) ensures optimal

conditions for growth. Square can be flexibly applied for parking lots and recreation zones.

BENEFITS

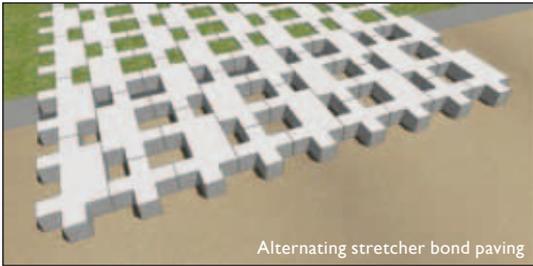
- Growable surface 33% or 44%
- Water infiltration
- Three unique patterns with one single paver
- Can be combined with large formats: 90 x 30 cm, 60 x 30 cm and 30 x 30 cm
- Footways with filler stones 20 x 20 cm
- Top coating in many colours and textures
- Suitable for light vehicular traffic



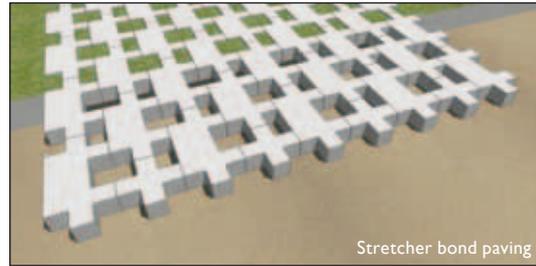
Non-superficial

Due particularly to its simple shape, the Square concrete grass paver has a striking appearance. Three combinations within a stretcher bond paving pattern, and filling laying patterns with half slabs, ensure that Square is one of the most distinctive grass pavements. Square's image matches that of a mosaic with an incessantly changing composition. The unpredictability of the patterns lends both a natural character and a striking appearance to the pavement.

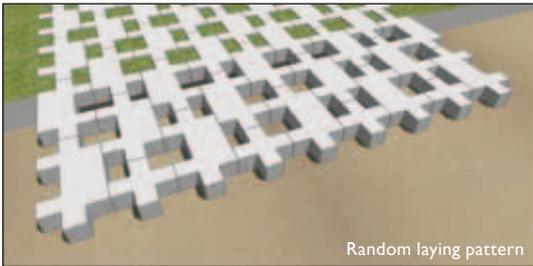




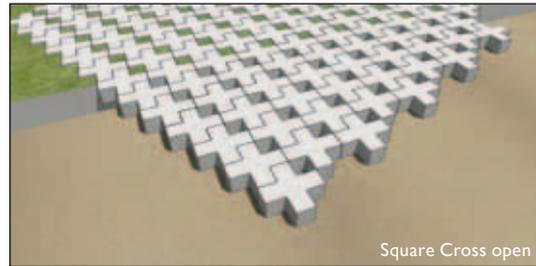
Alternating stretcher bond paving



Stretcher bond paving



Random laying pattern



Square Cross open

All Square combinations can be applied in a stretcher bond pattern, which is the strongest for this format of concrete grass paver. Three figures can be composed within this pattern:

Stretcher bond paving

Within this pattern, all concrete grass pavers are laid in the same direction, in a stretcher bond configuration. The dimensions of the openings that are thus created are 20 x 20 cm and 10 x 20 cm; they are alternately situated on the X and Y axis.

Alternating stretcher bond paving

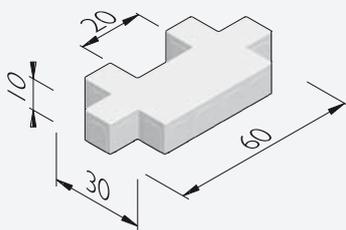
Alternate mirroring of rows creates a different image; the openings are in a consistently adjacent position.

Random laying pattern

Square is ideally suited to a random laying pattern by virtue of its modular size. The result is a rich, playful and cheerful paving surface.

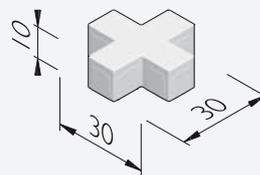
Square-cross accessory

The Square-cross accessory is ideally suited to being used as an autonomous element. The Square-cross accessories can be partly hooked up, which leads to a stable laying pattern with openings of 10 x 10 cm. Slightly shifting the adjacent row causes the elements to fit in completely so that closed walkways are created.



SPECIFICATIONS	
Dimensions	60 x 30 x 10 cm
Weight	28.2 kg
Number per m ²	5.5 pieces
Growable surface	33%
Permeability (sand 0/2) *	330 l/sec/ha

* indicative values



SPECIFICATIONS	
Dimensions	30 x 30 x 10 cm
Weight	11,8 kg
Number per m ²	11 pieces
Growable surface	20%
Permeability (sand 0/2) *	220 l/sec/ha

* indicative values



VIRAGE – HARMONY IN GREEN

By introducing the Virage green pavers, the designers have launched an ecological design alternative for the classical water-permeable pavements that are available on today's market. Virage offers 'human' patterns in natural shapes.

There is a fixed ecological value for water-permeable pavement: rain water that can seep through, preventing sewers from getting overloaded. At the same time, deployment of water-permeable pavement requires a sturdy underground for a parking bay, driveway or natural pavement in green zones.

Virage green pavers ensure that the natural character is superbly expressed. The modular set-up of these pavers makes it possible to create different patterns. The balance between concrete and grass or pebbles creates a symmetry of lines that gives every surface a remarkable character and design.

The harmonious shape of the pavers themselves ensures that the 'human' predictability of the patterns has a natural appearance.

BENEFITS

- Growable surface 46%
- Water infiltration
- Original design
- Six unique patterns with one single paver
- Spacers ensure mutual locking
- A tight, closed top layer
- Suitable for light vehicular traffic



Patterns

The unique design of the Virage green concrete paver makes it possible to create six unique patterns with only a single paver. The repetitiveness of the patterns does not detract from the natural character. Quite the opposite; some patterns derive their very appearance from natural streamlining.



Pearl string pattern



Shackle pattern



Porous pattern



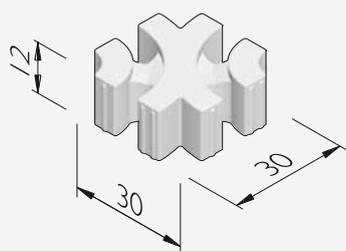
Geological pattern



Isobar pattern



Water ripple pattern



SPECIFICATIONS

Afmeting	30 x 30 x 12 cm
Weight	15.8 kg
Number per m ²	11 pieces
Growable surface	46%
Permeability (sand 0/2) *	460 l/sec/ha

* indicative values

Winner of the 2014 Elements Awards, category Small Scale Precast by FEBE (Federation of the Belgian Prefab Concrete Industry).

Textures

GREEN PAVER



Standard

Concrete appearance,
grey or coloured.

HYDRO LINEO



Standard

Concrete appearance,
grey or coloured.



Lavaro

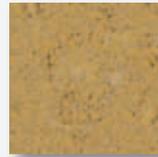
Washed top coating of fractured
natural stone.

SQUARE



Standaard

Concrete appearance,
grey or coloured.



Baleno

Colourfast, fractured natural stone,
not washed.



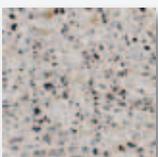
Lavaro

Washed top coating of fractured
natural stone.



Breccia

100% natural stone top coating,
lightly washed.



Liscio

Ground.



Sferio

100% fine natural stone top coating,
ground and stainless steel shot -blasted.

VIRAGE



Standaard

Concrete appearance,
grey or coloured.

Please refer to our website www.hardscape.co.uk for an overview of our standard colours for all textures.

Instructions for laying

Green paving is especially suited to pedestrian zones, residential access roads and parking bays with light vehicular traffic.

Sub-soil

The sub-soil must be sufficiently water-permeable and additional compacting is required. With a view to avoiding excessive settlement, the sub-soil should have a sufficient load-bearing capacity for the selected road category. Apply a foundation with a closed surface and ensure absolute-level finishing. We recommend that engineers be always consulted to determine correct compaction.

Streets

Position the pavers consistently for height, squareness and alignment, always ensuring sufficient room for jointing. The pavers have preferably been hardened for at least 35 days before being processed.

Street layer and jointing material (with focus on green)

We advise that the street layer is composed of coarse, sharp 0/4mm sand or 500-type tree sand, depending upon the percentage of greenery in relation to the number of m² of pavement; apply a layer thickness of 4 to 5 cm. As the installation progresses, the joints of the paved surface should be filled with crushed sand (0-2 mm) containing an excess of fine particles.

To achieve a good green result, we recommend that the 'green recesses' be filled up with 500-type tree sand in keeping with BRL 9335-4. This is single-peaked tree sand that constitutes a nutritional foundation for the greenery as well as providing a stable underground for pavement lay-outs. This is a clean material with a sufficient humus content to ensure optimal growth. Advice for sowing: grass seed mixture (sowing density 20g/m²).

Street layer and jointing material (with focus on infiltration)

For the street layer we recommend fractured natural stone (1/3 or 2/5) with a sufficient fracture-resistance and squareness. Thickness of the street layer should be between 4 and 5cm. If the street layer can blend with the foundation, these two layers should be separated

from one another by some form of water-permeable geotextile. Apply 1/3 or 2/5 for jointing material and recesses as well. It is recommended to sweep the stones prior to compacting, so that the pavers already have a slightly more stable position.

Compacting and sweeping

Firstly, compact the pavers using a tile vibrator or roller; use a paver vibrator during the second pass. With a view to avoiding damage to the pavers, the vibrator or roller should be fitted with a plastic protector. Sweep again after compacting and remove excess material. The joints should be fully swept to ensure sufficient completion.

Mechanical paving

According to the model, the pavers can be processed mechanically by applying either a vacuum or a clamp. The clamp is preferably fitted with a rubber protection. If heavy equipment is deployed, the weight should be distributed over the pavement by means of a plastic plate. ATTENTION: do not use a wheelbarrow to supply pavers that will not be laid mechanically, as this might cause damage to the pavers.

Standards

The material is manufactured to BSEN 1338 / 1339 and meets the performance and technical requirements of those standards. The material can also be used as a permeable surface in line with guidance's contained within BS7533 part 13.

Disclaimer

This processing advice is not a guideline for the design, lay-out and maintenance of water-permeable pavement systems. Various factors (traffic, permissible flooding risk, further pavements, natural sub-soil, vegetation etc.) may impact on the result over a longer period of time. Therefore the manufacturer does not accept any liability for the permeability of the pavers.

Hardscape

Hardscape can help to re-define the public realm when it comes to the layout of public spaces. Our product range includes pavement materials and solutions designed and developed from an aesthetically, economically and socially responsible perspective.

Street  Art

inspiring street images with a complete spectrum of materials

Street  Works

easy to process, use and maintain

Street  Safe

traffic-safe situations

Street  Care

sustainable living environments



HARDSCAPE
Inspire : Select : Supply

