



gridforce

THE **ULTIMATE** IN GROUND REINFORCEMENT



www.gridforcedirect.co.uk

Ground Reinforcement Uses

Because Gridforce offers a unique and revolutionary tile system, it has many uses.



Technology & Key Features of Gridforce



Gridforce's lattice structure makes it ideal for slope reinforcement.



Gridforce meets the Building Regulations on Drainage and Waste Disposal for England.



Gridforce can be used to reinforce lawns that will need to bear heavy loads such as cars and caravans.



The weight bearing capabilities of Gridforce mean that it can be used in many construction projects.



Gridforce will secure embankments and protect from erosion - ideal for pathways or angled surfaces.



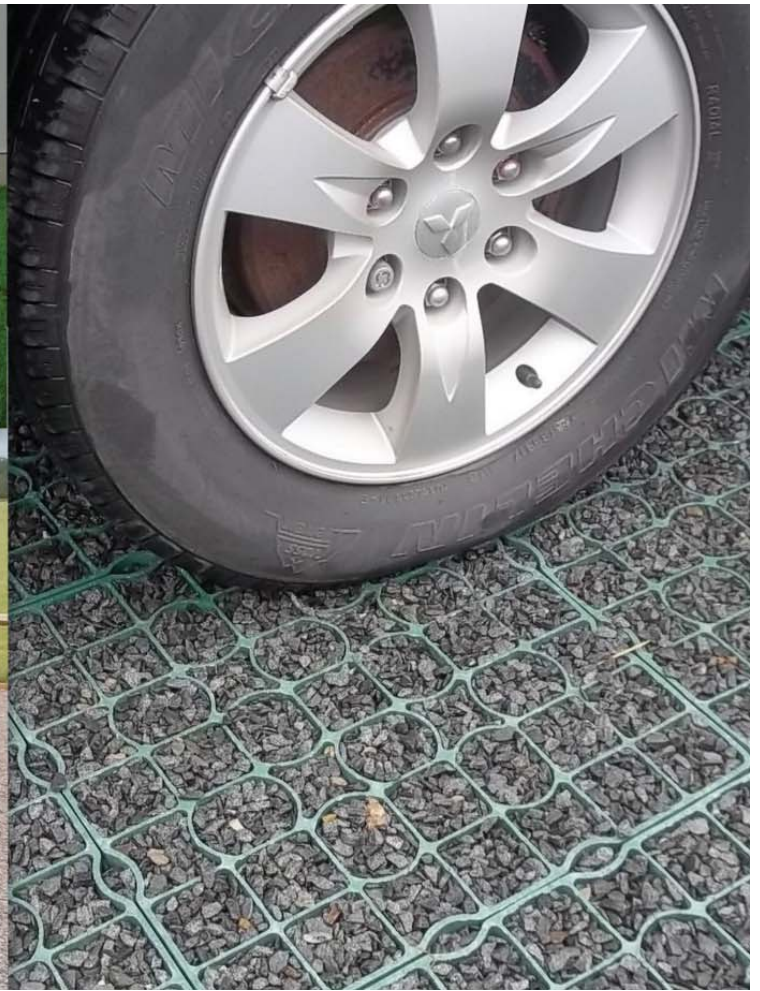
Made from 100% Recycled Plastic.



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The Importance of Sustainable Drainage Systems (SuDS)

Ongoing and increasing demand for housing and commercial/industrial development are the major factors driving the continuing urbanisation of our landscape. Add to this, climate change and the resultant changes in rainfall patterns, which have increased peak flow run-off rates, and the results are clear for all to see - overloading of drainage systems leading to their failure and consequent regular incidents of major flooding and pollution. In addition, increased flow rates also cause erosion and damage to local habitats through the pollutants from built up areas being washed into watercourses, harming fish and wildlife. As a consequence, the European Water Framework Directive requires that we manage our water resources in a more sustainable way and provide an enhanced level of protection to water quality. Sustainable Drainage Systems (SuDS) can make a key contribution in the reduction of urban flooding and pollution and are designed to return storm water to the water table as close as possible to where it falls.

The Building Regulations (Part H) state that, whenever possible, infiltration should be the method adopted for discharging storm water. This is further endorsed by the Environment Agency and SEPA, it's Scottish counterpart. The SuDS approach also embraces front gardens and, since 2008, planning permission has been required to lay traditional impermeable driveways that allow uncontrolled run off of rainwater from front gardens onto roads. In response to these needs, the Corden Group developed

the Gridforce range of permeable ground reinforcement systems. The range comprises 5 combinations of size and shape to cater for all applications from footpaths to HGV traffic and industrial storage areas. Once laid, the grid units are filled with either stone or grass according to client requirements.

The Role of Gridforce

Gridforce offers a unique and revolutionary paver system which provides permeable ground reinforcement solutions across an extremely wide range of applications.

The Gridforce range possesses an unequalled combination of highly engineered design, choice of 5 paver options and manufactured in low density polyethylene. **LDPE not only produces high compressive strength but also gives the pavers a flexibility and resilience which enables the system to satisfy all client requirements from footpaths to car parks, emergency fire access routes and HGV overrun. It also offers significant advantages over pavers manufactured from high density polyethylene (HDPE) which are more susceptible, over time, to brittleness and fracture at low temperatures. This gives us the ability to offer a 10 year product guarantee.**

Gridforce is normally laid on a free draining stone base, eliminating the requirement for drainage pipework, and returning storm water to the water table, thereby relieving pressure on sewers. Depending on ground conditions, we may also be able to offer a reduced dig or no dig solution.

Advantages of Gridforce

- **10 year product guarantee**
- **Manufactured from LDPE which, coupled with unique design and robust interlocking lugs and slots, enables Gridforce to cope with HGVs and other industrial traffic.**
- Drains to water table, relieving pressure on sewer systems.
- Complies with sustainable drainage best practice.
- Manufactured from 100% recycled plastic.
- Eliminates drainage pipework
- 5 paver options to cover all ground reinforcement applications.
- Cells can be filled with stone, or soil and seeded to achieve a grassed finish.
- Very high open area at surface (90%-96% dependent on paver selected) to maximize aesthetic appeal of stone or grass.
- Lightweight and easy to handle (unlike concrete units which contravene H&SE manual handling limits)
- Pavers palletised in layers of 4 no. preconnected units to maximise installation speed (up to 100m² per person per hour).
- Patented interlocking system eliminates need to pin pavers together.
- Easily cut with hand or power saw.
- Free design advice and site/customer visits can be arranged.
- Supply only or supply and install options available.

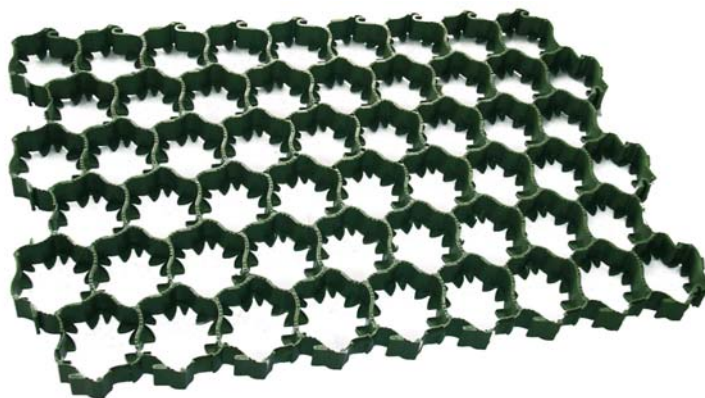
Gridforce Product Use Guide

	Park 30	Park 40	GF 30	GF 40	GF 50
Footpaths - Grass Fill		✓		✓	✓
Footpaths - Stone Fill	✓	✓	✓	✓	✓
Lawn Reinforcement (for car parking)		✓		✓	✓
Domestic Drive - Grass Fill		✓		✓	✓
Domestic Drive - Stone Fill	✓	✓	✓	✓	✓
Grass Verge Reinforcement (Unless guaranteed car over run only)				✓	✓
Overflow Car Parks - Grass or Stone Fill	✓	✓	✓	✓	✓
Regularly Used Car Parks - Grass or Stone Fill		✓	✓	✓	✓
Emergency Fire Lanes - Grass or Stone Fill				✓	✓
Coach, Lorry, Dust Cart & Fork Truck Trafficking - Grass or Stone Fill				✓	✓

Gridforce Park Range

The tough and durable "Park" range is designed primarily for lighter duty installations. Gridforce Park's unique hexagonal structure provides excellent load bearing and ground surface stability for both vehicles and pedestrians and is suitable for domestic and less demanding commercial applications.

For an attractive and practical finish, Gridforce Park can be filled with stone or with soil and seed if a grassed finish is required.



Park 30

Park40

Recommended Infill Media

Decorative aggregates

Decorative aggregates or seeded topsoil.

Applications

Driveways, additional parking, paths, patios and overspill or event parking

Driveways, paths, event parking, caravan parks, lawn & banking reinforcement, additional parking and ground reinforcement for landscape

Maximum Load Capability

200 tonnes/m²

200 tonnes/m²

Material Properties

100% recycled low density polyethylene (LDPE) UV Stable with operating temperature range of -35°C to 85°C

100% recycled low density polyethylene (LDPE) UV Stable with operating temperature range of -35°C to 85°C

Paver Specifications

Depth	30mm
Length	580mm
Width	390mm
Wall Thickness	2.5mm
Cell Detail	54 Cells of 70mm x 70mm
Open Surface Area	90%
Weight	0.75Kg per paver
Area - 4 paver (2x2)	0.90m ²
Colours	Standard: Green. Other colours available subject to quantity

Depth	40mm
Length	580mm
Width	390mm
Wall Thickness	2.5mm
Cell Detail	54 Cells of 70mm x 70mm
Open Surface Area	90%
Weight	1 Kg per paver
Area - 4 paver (2x2)	0.90m ²
Colours	Standard: Green. Other colours available subject to quantity

Transport Specification

Number of Pavers Per Pallet	320
Area of Coverage Per Pallet	72m ²
Pallet Size	780mm x 1160mm x 2550mm

Number of Pavers Per Pallet	240
Area of Coverage Per Pallet	54m ²
Pallet Size	780mm x 1160mm x 2550mm

Gridforce GF Range

Gridforce GF brings high strength, excellent durability and simple installation to heavy duty ground reinforcement applications and high traffic areas.

Manufactured to DIN 1072 standard, the GF range is ideal for use where larger vehicles or high traffic levels are present and is also approved for use on emergency access routes.

Incorporating three different depths to meet demanding specifications and diverse requirements, the 'GF' range is extremely versatile and is also certified as fire resistant to DIN4102 standard.



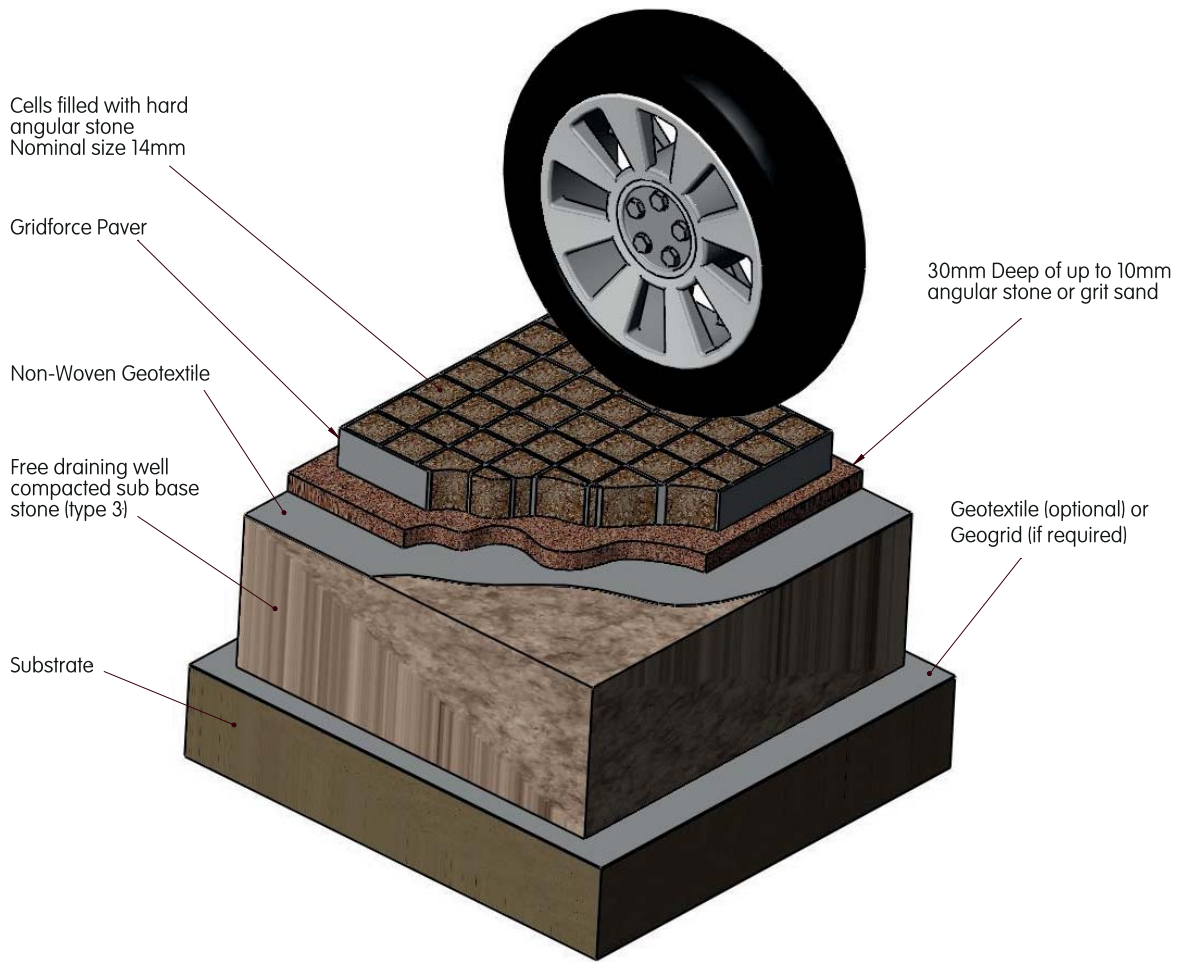
GF 30

GF40

GF50

Recommended Infill Media	Decorative aggregates	Decorative Aggregates or Seeded Topsoil	Decorative Aggregates or Seeded Topsoil
Applications	Car parks, driveways, footpaths and walkways	Car parks, road extensions, driveways, emergency access routes, storage areas, footpaths, walkways, external works and civil engineering	Car parks, road extensions, driveways, emergency access routes, storage areas, footpaths, walkways, external works and civil engineering together with ground strengthening and banking reinforcement for landscaping
Maximum Load Capability	400 tonnes/m ²	350 tonnes/m ²	350 tonnes/m ²
Material Properties	100% recycled low density polyethylene UV Stable with operating temperature range of -35°C to 85°C	100% recycled low density polyethylene UV Stable with operating temperature range of -35°C to 85°C	100% recycled low density polyethylene UV Stable with operating temperature range of -35°C to 85°C
Paver Specifications			
Depth	30mm	40mm	50mm
Length	500mm	500mm	500mm
Width	500mm	500mm	500mm
Wall Thickness	3.0mm	3.0mm	3.0mm
Cell Detail	49 Cells of 70mm x 70mm	49 Cells of 70mm x 70mm	49 Cells of 70mm x 70mm
Open Surface Area	96%	96%	96%
Weight	1.1Kg per paver	1.4Kg per paver	1.6Kg per paver
Area - 4 paver (2x2)	1.0m ²	1.0m ²	1.0m ²
Colours	Standard: Black. Other colours available subject to quantity	Standard: Black or Green. Other colours available subject to quantity	Standard: Black. Other colours available subject to quantity
Transport Specification			
Number of Pavers Per Pallet	320	240	192
Area of Coverage Per Pallet	80m ²	60m ²	48m ²
Pallet Size	1050mm x 1050mm x 2550mm	1050mm x 1050mm x 2550mm	1050mm x 1050mm x 2550mm

(A) Applications where cells to be infilled with stone

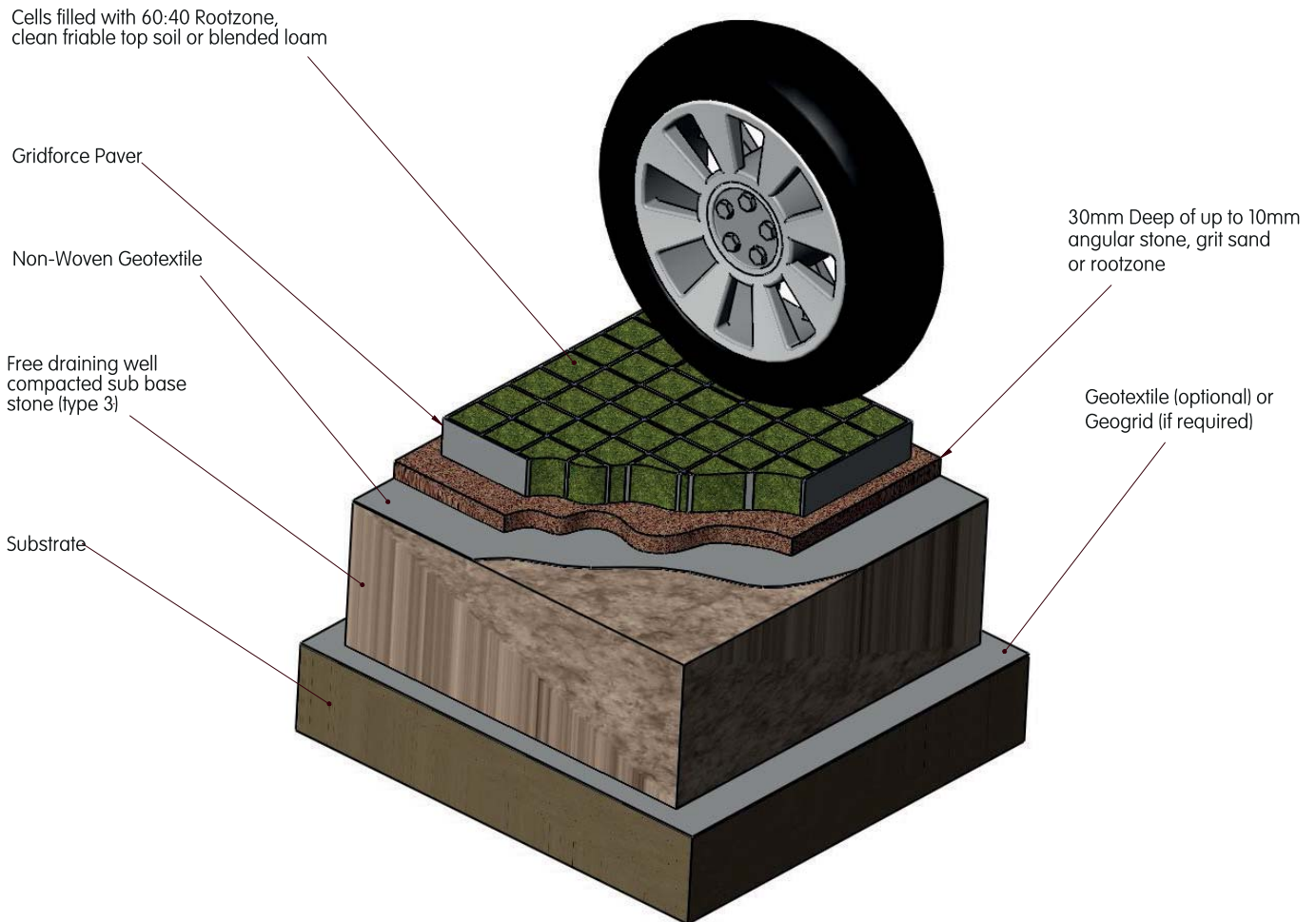


The base should consist of a free draining crushed stone. Although often used, MOT Type 1 is not suitable as it is, in most cases, not free draining. **MOT Type 3 is appropriate.** Depth of stone will depend on the drainage characteristics of the existing ground. Assuming reasonably free draining ground then the base for a car park would typically be 150-200 mm of stone depending on existing ground conditions (see below), well compacted and overlaid with a 30mm bedding layer as specified above.

Gridforce pavers are laid onto the bedding layer prior to filling with free draining angular stone nominal 10-14mm. Some clients prefer to cover the pavers under a layer of stone, but for a neat and more manageable finish, full enclosure of all stone within the cells is recommended. Free design advice is available and site/client visits can be arranged. Gridforce is available as supply only or as supply and lay.

Application / Load	CBR (%) Strength Of Subgrade Soil	Type 3 Sub-Base Thickness (mm)
Fire truck and occasional HGV Access	≥ 6	100
	= 4 < 6	120
	= 2 < 4	190
	= 1 < 2	380
Light vehicle access and overspill parking	≥ 6	100
	= 4 < 6	100
	= 2 < 4	135
	= 1 < 2	260

(B) Applications where grassed finish is required



The base should consist of a free draining crushed stone. Although often used, MOT Type 1 is not suitable as it is, in most cases, not free draining. **MOT Type 3 is appropriate**. Depth of stone will depend on the drainage characteristics of the existing ground. Assuming reasonably free draining ground then the base for a car park would typically be 150-200 mm of stone depending on existing ground conditions (see previous page), well compacted and overlaid with a 30mm bedding layer as specified above. Pavers are filled with 60:40 rootzone or clean friable topsoil but, for best results, consideration should be given to filling cells with blended loam.

(C) Reduced or no dig solutions

Reduced or no-dig installations may be feasible, depending on ground conditions and proposed usage. Please contact us for advice.

(D) 'Flip and Clip Solutions'

The Flip and Clip solution may be feasible for certain grass reinforcement applications. Please contact us for advice.

Accessories

Non-woven geotextile, Geogrid, Pins and white parking marker blocks are available. We also supply yellow parking marker indicators (GF pavers only) to form disabled parking bay logos (see right)

Where gradients are severe, a degree of pinning of pavers maybe required. - please contact us for advice.

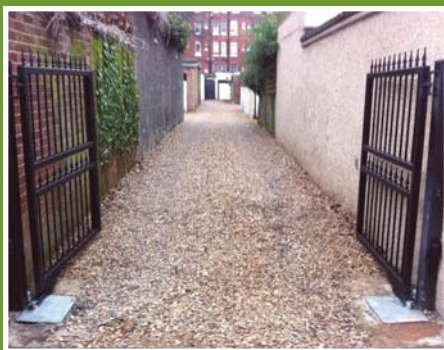


Installation of Gridforce

(A) Stone Infill to Cells

1. Excavate existing ground and compact surface
2. It may be necessary to lay a non-woven geotextile or geogrid, dependant on ground conditions.
3. Lay and compact free draining stone base Type 3 (NOT MOT Type 1) which should be within + or - 10mm of specified depth [see table on page 6].
4. Lay non-woven geotextile at this point or directly below grid.
5. Screed a bedding layer, 30mm of 4-10mm angular stone or grit sand.
6. Lay pavers, starting from the correct corner of the site so that subsequent pavers slot easily onto previous. Continue laying pavers, fanning out in a forwards and sideways direction. Grids may require pinning on sloped surfaces.
7. Fill cells with angular, free draining stone, ideally 10-14mm nominal size.
8. Ensure tops of all paver cells remain visible. Clients may prefer to cover the pavers with a layer of stone but best practice is to contain all stone within the cells

NB Cutting of pavers - Pavers are easily cut by a hand or Stihl saw, leaving minimum 15mm gap between grid and edge. It is preferable to fill such gaps with stone alone.



(B) Grass Infill to Cells

1. Excavate existing ground and compact surface
2. It may be necessary to lay a non-woven geotextile or geogrid, dependant on ground conditions.
3. Lay and compact free draining stone base Type 3 (NOT MOT Type 1) which should be within + or - 10mm of specified depth [see table on page 6].
4. Lay non-woven geotextile at this point, dependant on application.
5. Screed a bedding layer, 30mm of 4-10mm angular stone, grit sand or 60/40 rootzone.
6. Lay pavers, starting from the correct corner of the site so that subsequent pavers slot easily onto previous. Continue laying pavers, fanning out in a forwards and sideways direction. Grids may require pinning on sloped surfaces.
7. Fill cells with clean friable top soil, blended loam or 60/40 rootzone.
8. Ensure tops of all paver cells remain visible so infill settles just below top of pavers.

NB Cutting of pavers - Pavers are easily cut by a hand or Stihl saw, leaving minimum 15mm gap between grid and edge. It is preferable to fill such gaps with stone alone.



(C) "Mini-Ex" Reduced dig system

For schemes where existing ground conditions are firm and free draining, the gridforce GF "Mini-Ex" reduced dig system is suitable for light traffic and pedestrian use. It is particularly relevant where funding is limited and where there are constraints on excavation - for example where tree roots are close to the surface.

1. Excavate existing ground to depth of approximately 70mm and consolidate well.
2. Roll out "Mini-Ex" geogrid onto the prepared surface, overlapping joints by at least 200mm and pin down using Gridforce securing pins
3. Evenly spread a minimum 25mm of coarse grit sand over the base geogrid and consolidate, ensuring that the geogrid is not exposed.
4. Lay pavers, starting from the correct corner of the site so that subsequent pavers slot easily onto previous. Continue laying pavers, fanning out in a forwards and sideways direction. Grids may require pinning on sloped surfaces.
5. Fill cells with angular, free draining stone, ideally 10-14mm nominal size or clean friable top soil, blended loam or 60/40 rootzone.

(D) "Flip and Clip" Installation

In certain situations, it may be appropriate to dispense with a conventional base when installing Gridforce pavers. If the existing ground is grass covered, largely undamaged, reasonably even and considered to be suitably free draining, then the "Flip and clip" method can be adopted, utilising the Park range of products.

1. No real preparation is required although it is advisable to cut the grass short.
2. Turn a paver upside down and lay it on the grass. Take the next paver, correctly orientated, line up edge with first panel and apply foot pressure to complete connection.
3. When laying is complete, use a vibrating roller to push pavers into the ground. If possible, leave the pavers about 10mm proud of the surface to allow the grass to breath and aid growth.

Supply and Install Service

In addition to being the leading supplier of permeable ground reinforcement paver systems, we offer a full supply and installation service. Our installation teams operate nationally, are fully accredited and carry out installations across the whole spectrum, from domestic drives to commercial and heavy duty industrial applications. Work is completed to a consistently high standard and, of course, our installation package includes site surveys and assessments, along with design advice. Please get in touch with us to arrange a visit.



industrial estate south, park road, calverton, nottingham ng14 6bp
Freephone: **08000 890 111** fax **0115 965 5151** email **info@gridforce.co.uk** web **www.gridforcedirect.co.uk**

Gridforce accepts no liability if due diligence and standard horticultural and civil engineering practices are not adhered to by the customer. Similarly, when installing Gridforce it is the responsibility of the customer to ensure that the site is suitable for the proposed installation- if necessary the advice of a qualified engineer should be sought.