GROUNDTRAX GROUNDGRIDZ

Permeable Paving Solution

Images showing the correct methodology to pick up and handle a square metre of Groundgridz

INSTALLATION GUIDE

The product is asymmetric and must be lifted by placing the hands on the diagonally opposed corners of the central paver (as shown).

1. Place grids onto the prepared well consolidated bedding layer.

2. Connect the grids using the patent pending interference loops, progressing over the area in manageable sections. Additional pins can be used at edges to further strengthen the final installed project. Use protective gloves to avoid abrasions.

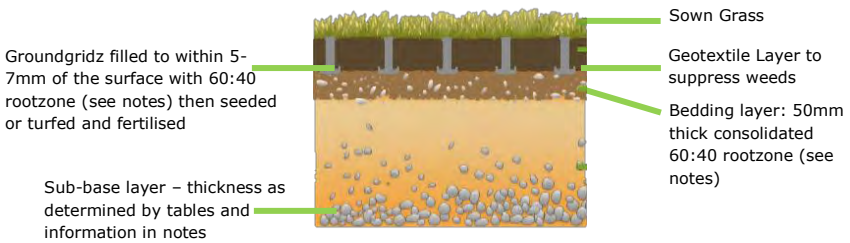
3. Grids can be cut using a hand or power saw to fit around obstructions and curves. Cut pieces which are less than 50% of original size should be avoided if at all possible.

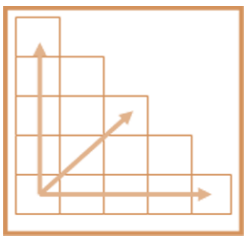
4. Fill pavers with appropriate material. If using grass please use the specified rootzone material. Finished levels should be 5-7mm below the top of the cells. Do not overfill the grids. A light vibrating plate can be used to consolidate the grids and to settle the rootzone infill if required.

5. Rootzone must be free-draining structurally sound sand/compost or sand/soil blend. Normally this should be a propriety blend of 60:40 or 70;30 ratio.

6. Sow seeds normally, fertilising and watering as required. A light top dressing may be applied to just cover the seed and to provide adequate germination conditions. Do not overfill the grids.

The surface may be trafficked immediately after filling but it is preferable to allow the grass to become established before full use.





Groundgridz Laying Diagram

1) Prepare the ground according to the use
2) Start to lay the Groundgridz in the corner and lay it step by step

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1) The area to be reinforced should be marked out and excavated to the appropriate depth (see table). Depending on soil conditions and intended use of the area to be stabilised, dig out the existing base e.g. typically for light vehicle traffic / parking areas, 200-300mm will suffice. With heavy wheel loads or a clay soil, 400mm may be necessary. Geo-textile membrane should first be laid on the earth before the base layer to create ground stability
NB. Seek engineering advice where appropriate.

2) If using concrete edging pieces, install them next.

3) Compact the sub-base using a plate compactor. Fill the excavated area with free draining gravel or crushed stone to 100mm (grass) or 80mm (gravel) below the finished level. Tamp down with a roller or plate compactor.

4) Level the area with a layer of fine aggregate or for grass sieve sand/compost/loam mix. Level using a rail or wooden batten, and compact as shown in the diagram across. This is used to level out any imperfections or hollows within the surface of the sub-base, and if the area is to be grassed over, it provides an ideal environment for grass root survival and growth.

5) Once the whole area is completely level, you can proceed to interlock and lay the paving grids. They come pre-assembled in one square metre sections. Any that need cutting should be measured and cut prior to installation and where possible cut in such a way to leave complete cells along the outer edge. With the area completely laid and positioned correctly, the whole area can be lightly compacted ensuring that they remain flat and level.

6) The area can then be back filled with the medium to be used. If using gravel, we recommend 10mm or less as this allows better filling of the chambers. If the area is to be grassed, we recommend using a 70/30 rootzone mixture which is essentially a mixture of quality topsoil and sharp sand. This prevents the hard compaction of topsoil alone which can limit grass growth. Initially the cells should be filled to approximately 10mm below the top surface, this will protect young seedlings during early establishment. The whole area can then be seeded and watered in.

Calculations for Quantities

Hardcore/Broken Stone required for the base layer

For cars = 300kg of hardcore/broken stone per m² (providing 150mm depth)

For trucks = 400kg of hardcore/broken stone per m² (providing 200mm depth)

Sand or Fine Chippings required for the leveling layer

For all grid types = 25kg of sharp sand (grass or gravel finish) or fine chippings (gravel finish only) per m^2

Topsoil required for a grass surface (per m2)

For 40mm grid = 65kg of topsoil

Aggregate required for a graveled area (per m2)

For 40mm grid = 72kg of gravel

Groundgridz Specification

Bedding Layer	30mm thick of 5 – 20mm angular aggregate (BS EN 13242)
Grid Fill	To top of grids using 5 – 20mm crushed aggregate (BS EN 13242)
Sub-base Layer	DoT Type 3 or modified porous sub-base layer. DoT Type 1 with drains

Typical Sub-Base Thickness

Application Load	CBR (%) Strength of Subgrade Soil (See Chart)	DoT Sub-Base Thickness (mm)
Fire Engine and occasional HGV Access	>=6 =4<6 =2<4 =1<2	100 120 190 380
Light Vehicle access and overspill car parking	>=6 =4<6 =2<4 =1<2	100 100 135 260

References:

- BS7533-3:2005 + A1:2009
- BS7533-7:2010
- BS7533-13:2009
- BS EN13242:2002 + A1:2007
- The Highways Agency: Specification for Highway Works
- The Environment Agency: Guidance on the permeable surfacing of front gardens
- Building Regulations 2010 Approved Document M1 Access and Use

The table showing sub-base thicknesses (*Page 6*) is intended as a general guide in accordance with BS7533. For further details on permeable paving design refer to BS7533 Part 13; for installation refer to BS7533 Part 3.

The design for pavements should satisfy two parts - to support the traffic load and to manage the surface water effectively.

Subgrade Assessment

The strength of a subgrade is measured by California Bearing Ratio (CBR). The design CBR should be obtained either by testing or by measurement of the plasticity index of the subgrade material. In the case of CBR testing, the method described in BS1377-4:1990+A2:2002, Clause 7 should be used.

The surface of the subgrade material should be prepared according to the Highways Agency's Specification for Highway Works, Clause 616. Detailed preparation of the subgrade should be in accordance with the recommendations in BS7533-3. An acceptable subgrade level should be free of any soft spots, reasonably parallel to the plane of construction. A capping layer may be required if the ground is structurally weak, likely to be subjected to exceptional loads or is significantly below the specified ideal formation level.

The table below gives typical values for the subgrade strengths (the CBR) normally encountered in the soils of Britain and Ireland

Consistency	Indicator			Strength	
	Tactile (Feel)	Visual (Observation)	Mechanical (Test)	CBR	CU
			SPT	%	kN/sqm
Very Soft	Hand sample squeezes through fingers	Man standing will sink >75mm	<2	<1	<25
Soft	Easily moulded by finger pressure	Man walking sinks 50-70 mm	2-4	Around 1	Around 25
Medium	Moulded by moderate finger pressure	Man walking sinks 25mm	4-8	1-2	25-43
Firm	Moulded by strong finger pressure	Utility truck ruts 10-25mm	8-15	2-4	40-75
Stiff	Cannot be moulded but can be indented by thumb	Loaded construction vehicle ruts by 25mm	15-30	4-6	75-150

Notes

- If the geotextile layer is omitted, then the total sub-base layer thickness should be increased by 50%
- A Department of Transport Type 1 sub-base may be used provided that an adequate drainage system is installed. Alternatively a porous sub-base layer may be specified however this should be covered with either a geotextile filter membrane and/or suitable clean gravel blinding layer to avoid fine particles entering the sub-base layer.
- Specific advice regarding ground conditions should be sought from the manufacturer.
- Drainage details; 100mm diameter perforated pipe drain laid at a minimum gradient 1:100 bedded on gravel trench backfilled with suitable drainage aggregate, covered or wrapped with a suitable geotextile fabric and leading to a suitable outfall or soak away. For specific advice contact the manufacturer.
- Rootzone bedding and grid fill must be free draining, structurally sound proprietary blend of sand/soil or sand/compost, this is normally identified as a 60:40 or 70:30 ratio blend and in-situ blending is not recommended.
- Max advised gradient for traffic applications is 12%. Pegging may be required.
- R-Pave complies with BS8300:2001
- The preparation of the subgrade, the construction of the sub-base and the construction and type of road base (if present) should generally be in accordance with relevant current practice as described in the Highways Agency's Specification for Highway Works.
- It is essential that the sub-base compaction is thorough, using a vibrating plate compactor or vibrating roller.
- The thickness of the laying course after final compaction of the surface course should be 40 - 50mm, within an accepted surface level tolerance. All areas of prepared laying course material should be protected and not left exposed overnight.
- The laying course may be placed and screeded using a mechanical device.
- It is necessary to include a substantial edge restraint when constructing Groundgridz permeable paving with grass / gravel finishes. Edge restraints need to be sufficiently robust to withstand override by any anticipated traffic, to withstand thermal expansion and to prevent loss of laying course material. Typical examples of edge restraints are kerbs, channels, established structures, and rigid abutments such as securely fixed paving units.

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Reduced Dig Systems

Gravel

1. Cut the grass closely to the surface or where necessary remove the turf and topsoil to a depth of <75mm and dispose of all debris. Level the formation layer and lightly consolidate.
2. Install edge retaining boards or kerbs if required
3. Place a layer of ground stabilisation mesh or geotextile fabric on the formation layer and ensure that it is flat to the surface by pinning as required. An optional geotextile fabric layer can be placed on the formation layer prior to the ground mesh installation to prevent migration & contamination.
4. Place a 35mm thick layer of 10mm diameter gravel / aggregate evenly over the ground mesh. The ground mesh must not be allowed to become exposed above the gravel / aggregate layer.
5. Place the Groundgridz onto the screeded gravel / aggregate layer. Connect the pavers using the ground spikes and loops, progressing over the area in rows. Use protective gloves to avoid abrasions.
6. Pavers can be cut using a hand or power saw fit around obstructions and curves. Cut pieces which are less than half the original size should be avoided where possible. Pavers can be firmed in place using a light vibrating whacker plate if required.
7. Fill the pavers with the specified gravel or aggregate. Preferably a clean, well graded angular material within the range of 5-14mm diameter. Fully rounded 'pea gravel' is not recommended.
8. Consolidate the surface using a light vibratory whacker plate if required.
9. Refill any localized low areas with gravel and repeat consolidation until satisfied with the final compacted finish.
10. The surface can be trafficked immediately.

Grass

1. Follow steps 1-6 as for gravel. Note: It is not necessary to install the optional geotextile fabric layer as stated in Step 3 (gravel).
2. Fill the pavers with the specified propriety rootzone. Finished levels should be 5-7mm below the top of the cells after settlement. Do not overfill the paver cells. A light vibrating plate can be used to consolidate the pavers and to settle the rootzone infill if required.
3. Rootzone must be a free-draining structurally sound sand:compost or sand:soil blend. This is a nominal propriety blend of 60:40 or 70:30 ratio. Self-blending is not recommended.
4. Carry out a normal seeding, fertilising and watering programme. A very light top dressing may be applied to just cover the seed and to provide adequate germination conditions. Do not overfill the paver cells. Alternately thin-cut turf can be rolled into the surface if required.
5. The surface may be trafficked immediately, but it is preferable to allow the grass to fully establish prior to use.

Full details are on our website
www.groundtrax.com

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GROUNDTRAX
Ground Protection and Reinforcement