

# Hy-Text **Hy-Pave™** Permeable Paving and Grass Reinforcement Tiles

## Hy-Pave™ Installation

**Hy-Pave™ permeable paver grid is the new recycled plastic sustainable drainage system (SUDS) compliant solution.**

**Using a patent pending design to avoid breakage problems on installation, Hy-Pave™ is a high performance, durable and virtually maintenance free solution for use with grass or gravel.**



Areas subject to pedestrian, vehicular traffic or animal movements are all subject to some degree of erosion resulting in potential damage to the area. Hy-Pave™ is designed to offer these areas surface reinforcement whilst

### Benefits:

- SUDS compliant Hy-Pave™ permeable paving with grass or gravel can improve project ratings in accordance with BREEAM & the Code for Sustainable Homes
- When installed, Hy-Pave™ offers excellent water permeation through the surface. It reduces the potential for clogging compared to any in situ concrete paving systems.
- Load bearing capability at 250 - 350 tonnes/m<sup>2</sup>, on a correctly specified and compacted sub-base
- NBS Specification support in accordance with Q23 for gravel surfacing or Q30 for seeding/turfing
- Hy-Pave™ conforms to Part M of the Building regulations and is Disability Discrimination Act compliant when it is correctly laid and maintained
- Durable, non-rotting and weather resistant with over 10 year expected product life
- The lightweight interlocking patented design enables ease and speed of installation. Optimal laying time is 90 - 100m<sup>2</sup> per person per hour onto a prepared base.
- Low maintenance & cost effective throughout the product life.

### Applications:

- Car / Coach parks (Grass or Gravel)
- Emergency / HGV service access routes
- Aircraft taxiways & Helipads
- Walkways and Disabled access
- Golf buggy paths
- Driveways & Residential parking
- SUDS source control

Please note : All Hy-Pave™ applications must be provided with sufficient and adequate drainage facilities in order to function as intended. Failure to ensure this may compromise overall performance.

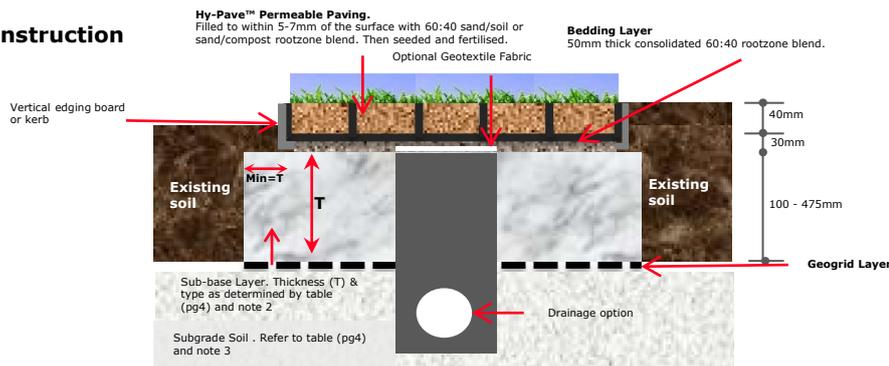
# Hy-Text Hy-Pave™ Permeable Paving and Grass Reinforcement Tiles

## Hy-Pave™ Installation Instructions

### Grassed Surface Installation

#### Installation of Hy-Pave™ Permeable Paving Solution in combination with a grass surface

##### Typical Construction



1. Place paver units onto the prepared well consolidated bedding layer. Edging boards or kerbs can be used where required, according to existing soil conditions.
2. Connect the pavers using the interference connectors progressing over the area in rows. Use protective gloves to avoid abrasions.
3. Pavers can be cut using a hand or power saw to fit around obstructions and curves. Cut pieces which are less than half the original size should be avoided where possible.
4. Fill 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.
5. Rootzone must be 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 of paver fill and bedding material is not recommended.
6. 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.
7. The surface may be trafficked immediately, but it is preferable to allow the grass to fully establish prior to use.

##### Notes:

1. If the geogrid layer is omitted, then the total sub-base layer thickness (T) must be increased by 50%.
2. A'DoT Type 1' sub-base may be used, provided that an adequate drainage system is installed (refer to note 4). Alternatively a porous/open-graded (reduced fines) sub-base layer may be specified, e.g as part of a Sustainable Urban Drainage System (SUDS) application. If a 'reduced fines' sub-base layer is specified, this must be covered with either a geotextile filter membrane and/or a suitable clean gravel blinding layer, to avoid fine particles entering the sub-base layer.
3. Specific advice on ground conditions, CBR% and construction over ground with a CBR less than 1% is available on request. CBR% = California Bearing Ratio, a measurement of subgrade soil strength.
4. Typical drainage details; 100mm diameter perforated pipe drain laid at minimum gradient 1:100, bedded on gravel in trench backfilled with 'DoT Type A' drainage aggregate, covered or wrapped with a suitable geotextile fabric and leading to a suitable outfall or soakaway. Drains placed down centre or one edge of access routes up to 5m wide. Wider areas may require additional drains at 5m - 10m centres. Drainage design to be determined by the specifier based on specific conditions on site. Specific advice on Drainage and Sustainable Urban Drainage Systems (SUDS) is available on request.
5. Rootzone bedding and paver fill must be a free-draining, structurally sound propriety blend of sand: soil or sand: compost such as that used in sports/golf construction. This is normally identified as a 60:40 or 70:30 ratio blend and in-situ self-blending is NOT recommended.
6. Maximum advised gradient for traffic applications is 12% (1:8) 7°. Pegging may be required. Specific advice for the use of Hy-Pave™ on slopes can be obtained Hy-Text (UK) Limited.
7. Hy-Pave™ complies with BS8300:2001 - "Design of buildings and their approaches to meet the needs of disabled people" - Code of Practice. (ISBN 0580384381)

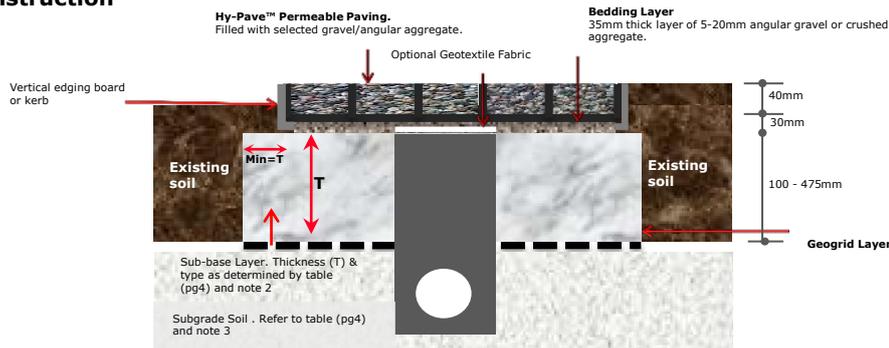
# Hy-Text Hy-Pave™ Permeable Paving and Grass Reinforcement Tiles

## Hy-Pave™ Installation Instructions

### Gravel Surface Installation

#### Installation of Hy-Pave™ Permeable Paving Solution in combination with a gravel surface

##### Typical Construction



1. Place paver units onto the prepared sub-base + bedding layer (see note 2). Edging boards or kerbs are recommended, to aid gravel retention.
2. Connect the pavers using the interference connectors, progressing over the area in rows. Use protective gloves to avoid abrasions.
3. Pavers can be cut using a hand or power saw to fit around obstructions and curves. Cut pieces which are less than half the original size should be avoided where possible.
4. Fill the pavers to the top of the cells with the specified angular decorative aggregate. If required, use a light vibrating plate to consolidate the aggregate into the cells. Top up cells with aggregate as necessary. Fully rounded 'pea gravel' is not recommended.
5. If the area is to be used as horse paddock, it is preferable to cover the area with a 50-100mm thick layer of fine sand/mulch
6. The surface may be trafficked immediately.

##### Notes

1. If the geogrid layer is omitted, then the total sub-base layer thickness (T) must be increased by 50%.
2. A DoT 'Type 1' sub-base may be used, provided that an adequate drainage system is installed (refer to note 4). Alternatively a porous/open-graded (reduced fines) sub-base layer may be specified, e.g as part of a Sustainable Urban Drainage System (SUDS) application. If a 'reduced fines' sub-base layer is specified, this must be covered with either a geotextile filter membrane and/or a suitable clean gravel blinding layer, to avoid fine particles entering the sub-base layer. Do not use sand for the paver bedding layer.
3. Specific advice on ground conditions, CBR% and construction over ground with a CBR less than 1% is available on request. CBR% = California Bearing Ratio, a measurement of subgrade soil strength.
4. Typical drainage details; 100mm diameter perforated pipe drain laid at minimum gradient 1:100, bedded on gravel in trench backfilled with 'DoT Type A' drainage aggregate, covered or wrapped with a suitable geotextile fabric and leading to a suitable outfall or soakaway. Drains placed down centre or one edge of access routes up to 5m wide. Wider areas may require additional drains at 5m - 10m centres. Drainage design to be determined by the specifier based on specific conditions on site. Specific advice on Drainage and Sustainable Urban Drainage Systems (SUDS) is available on request.
5. Maximum advised gradient for traffic applications is 12% (1:8) 7°. Pegging may be required. Specific advice for the use of Hy-Pave™ on slopes can be obtained from Hy-Text (UK) Limited.
6. Hy-Pave™ complies with BS8300:2001 - "Design of buildings and their approaches to meet the needs of disabled people" - Code of

# Hy-Tex Hy-Pave™ Permeable Paving and Grass Reinforcement Tiles

## Hy-Pave™ Installation

### Technical Information

#### 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	100
	=4<6	120
	=2<4	190
	=1<2	380
Light Vehicle access and overspill car parking	>=6	100
	=4<6	100
	=2<4	135
	=1<2	260

The table showing sub-base thicknesses 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 the 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.

Consistency	Indicator			Strength	
	Tactile (Feel)	Visual (Observation)	Mechanical (Test)	CBR	CU
Very Soft	Hand sample squeezes through fingers	Man standing will sink >75mm	SPT <2	% <1	kN/sqm <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

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.

#### Notes

- The preparation of the subgrade, the construction of the sub-base and the construction and type of roadbase (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 PermaPave 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.

# Hy-Tex Hy-Pave™ Permeable Paving and Grass Reinforcement Tiles

## Hy-Pave™ Installation

### Reduced Dig Method

### Installation of Hy-Pave™ Permeable Paving Solution in combination with a grass or gravel surface

This method is suitable for installation of Hy-Pave™ for pedestrian and light vehicle applications where firm ground conditions exist.

After confirming that the ground conditions are suitable for this type of 'reduced dig' application, the following method of installation should be followed.

#### FOR GRASSED SURFACES

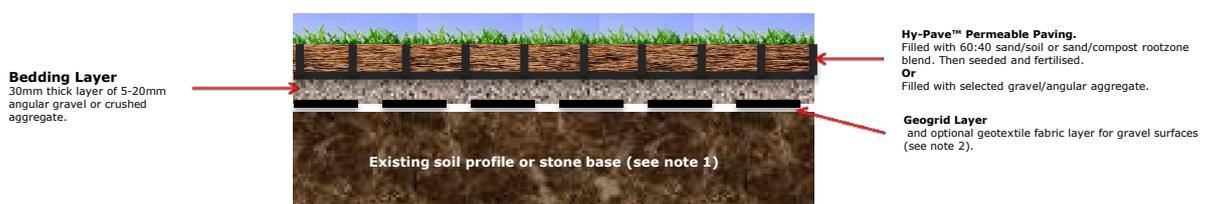
1. Cut the grass closely to the surface or where necessary remove the turf and topsoil to a depth of <70mm and dispose of all debris. Level the formation layer and lightly consolidate.
2. Install edge retaining boards or kerbs if required.
3. Place a layer of geogrid on the formation layer and ensure that it is flat to the surface by pinning as required. Advice on the specification for a geogrid layer is available on request.
4. Place a 30mm thick layer of 5-20mm diameter gravel / angular aggregate evenly over the geogrid. The geogrid must not be allowed to become exposed above the gravel / aggregate layer.
5. Place the Hy-Pave™ pavers onto the screeded gravel / aggregate layer. Connect the pavers using the interference connectors progressing over the area in rows. Use protective gloves to avoid abrasions.
6. Pavers can be cut using a hand or power saw to 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 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.
8. 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.
9. 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
10. The surface may be trafficked immediately, but it is preferable to allow the grass to fully establish prior to use.

#### FOR RETAINED GRAVEL SURFACES

1. Follow steps 1-6 as for grassed surfaces. *Note: an optional geotextile fabric layer can be placed onto the formation layer prior the geogrid installation (step 3) to prevent migration & contamination (see note 2). Please contact Hy-Tex (UK) Ltd for further advice.*
2. Fill the pavers with the specified gravel or angular aggregate. Preferably a clean, well graded angular material within the range of 5 -14mm diameter. Fully rounded 'pea gravel' is not recommended.
3. Consolidate the surface using a light vibratory whacker plate if required.
4. Refill any localised low areas with gravel and repeat consolidation until satisfied with final compacted finish.
5. The surface can be trafficked immediately.

**Note 1:** Determination of the requirement for placement of an imported sub-base for the application, and the required thickness of that sub-base material shall be determined by the strength and condition of the existing soils, the extent of allowable excavation and also in consideration of the traffic loadings to be applied. Standard sub-base design thicknesses for access routes may then apply. Certain ground conditions may require placement of a drainage system within the design.

**Note 2:** Geogrid and geotextile may not be required where the construction is to be placed onto an existing stone base. Further advice is available on request.



# Hy-Tex Hy-Pave™ Permeable Paving and Grass Reinforcement Tiles

## Hy-Pave™ Installation



- 1) The area to be reinforced should be marked out and excavated to the appropriate depth (see note 1). Geotextile 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. If using B-Gard™ install these between steps 4 and 5.



- 3) Compact the sub-base using a plate compactor. Fill the excavated area with 30mm of free draining gravel or crushed stone. 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) If using B-Gard™ to edge the area, install it at this stage. 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 60:40 or 70:30 rootzone mixture. 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.