HEBDEN X GRID
Permeable Paving

5 reasons why you should choose Hebden X Grid cellular paving

- Avoids rainwater run off and reduces flooding.
- Can be finished with grass or gravel.
- Extremely strong and flexible.
- More economic, aesthetically pleasing and faster to lay than asphalt or block paving
- Ultra low carbon footprint as made from recycled and recyclable waste
- Does not fade and is totally impervious to water and algae

The British-made Hebden X Grid cellular paving system can be filled with grass or gravel, then driven over, parked on and walked on whilst allowing rainwater to filter back to the water table, reducing the risk of flooding and making it perfect for incorporating into SuDS strategies.

Applications

- Green parking
- Emergency vehicle access
- Temporary and permanent roadways
- Quick fit shed bases
- Road protection
- Embankments
- Green roofs
- Driveways
- Tree beds
- Golf walkways
- Caravan parking
- Equine hard standing

Hebden X Grid is a highly durable, environmentally-friendly alternative surface for permanent and overspill car parks, private driveways, pathways, verge stabilisation, emergency vehicle access lanes, golf buggy paths, helicopter pads, cycle routes and many other uses.

The Hebden X Grid blends unobtrusively into parks, rural areas or heritage sites, unlike asphalt or block paving.
Its lightweight modular grid system makes it easy and quick to fit and allows substantial cost savings during installation.

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British Recycled Plastic is a trading name of Low Carbon Products Ltd
Company 06903105 VAT 976 4519 73

BRITISH RECYCLED PLASTIC

Technical Specifications

The permeable paving solution

Dimensions	33cm x 33cm x 4cm
Wall Thickness, Wall Height	3mm, 40mm
Weight per Tile	0.57 kg
Weight per m2	5.13kg
Material	100% Recycled Plastic (UK Sourced)
Connection method	Slot & Peg Quick snap connection
Cell Profile	Cylinders 55mm Nominal ID 63mm OD 93% Open Structure
Capacity : Natural Stability	Up to 350 tonnes/ m2
Environment Compatibility	Temperature range -50°C up to 90°C
Solubility	Environmentally neutral in accordance with DIN 38412 Resistant against acid and leaching, alcohol, oil and petrol (strewing salt, ammonia, acid rain etc.)
Surface Finishes	Gravel up to 20mm Angular in accordance with NBS Section Q23 Grass Seeding / Turfing in accordance with NBS Section Q30
Expected Life Sub	25 years with 10 years Manufacturer Guarantee*
Base Preparation	In accordance with BS7533-
DDA Compliance	3 Part M Building

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Technical Specifications Continued

The permeable paving solution

Car Parking Areas	Surfaces for Car Parking areas DIN EN ISO 124B
Carry Load	125 up to 16tonne axle load
Maximum Gradient	1072 12%
Maximum Vehicle Speed	15 Mph
Installation	100 m2 per person per hour

100% Recycled Plastic Colour Black	100% Recycled Plastic Colour Green *	100% Recycled Plastic Colour Natural/ white *

X-Grid® is manufactured from 100% recycled Plastic and provides a lightweight ground reinforcement system for grass and gravel stabilisation.

This type of surface helps to reduce the risk of potholes, rutting or grass damage. X-Grid® has been designed to support healthy grass growth providing a minimum of 3.2cm of available height to allow the grass sufficient height in which to grow.

The system design provides a lightweight strong structure making it easy and quick to install and suitable for a wide range of applications including paths, driveways, car parking areas and access routes.

Correctly installed X-Grid® has been demonstrated to withstand up to 350 tonnes per square metre.

X-Grid® offers unimpeded flow to surface water reducing the rate of run off and potentially saving the costs of drainage installation.

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Sub grade Assessment

The permeable paving solution

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 BS 1377-4:1990+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.

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.

	Indicator			Strength	
Consistency	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 5070 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 1025mm	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 subbase 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 subbase layer.
- 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 soakaway. 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.
- X-GRID® complies with BS8300:2001

- 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 screed using a mechanical device.
- It is necessary to include a substantial edge restraint when constructing X-Grid® See Ancillary Items:

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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 levelling layer
For all grid types = 25kg of sharp sand (grass or gravel finish) or fine chippings (gravel finish only) per m²

Topsoil required for a grass surface (per m2)
For 40mm grid = 65kg of topsoil

Aggregate required for a gravelled area (per m2)
For 40mm grid = 70kg of gravel

X-Grid® 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

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.

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

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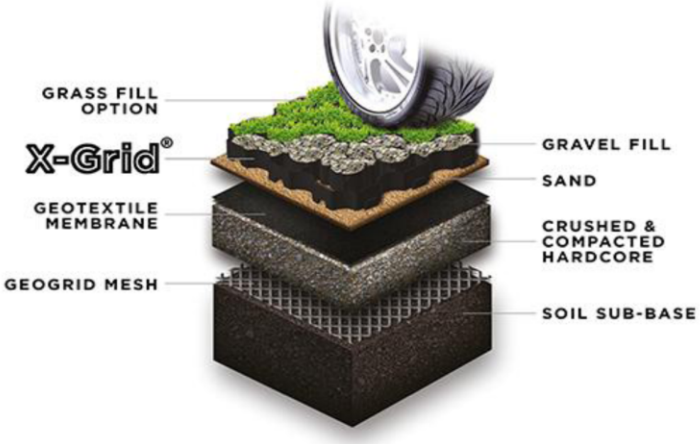

Gravel Fill Option

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 restraint.
3. Place a layer of GeoGrid 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 GeoGrid installation to prevent migration & contamination.
4. Place a 5-10mm thick layer of sharp sand blinding the area to level out and even the GeoGrid. The GeoGrid must not be allowed to become exposed above the gravel / aggregate layer.
5. Place the X-Grid® ground reinforcement grids onto the sharp sand layer. Connect the X-Grid® panels using the slot and peg snap connection.
6. X-Grid® 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. X-Grid® can be firmed in place using a light vibrating whacker plate if required.
7. Fill X-Grid® with the specified gravel or aggregate. Preferably a clean, well graded angular material within the range of 5-20mm 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 Fill Option.

1. Follow steps 1-3 as for gravel. Note: It is not necessary to install the optional Geotextile fabric layer as stated in Step 3(gravel).
2. Place a 35mm thick layer of compacted RootZone layer evenly over the geogrid. The geogrid must not be allowed to become exposed above the gravel / aggregate layer
3. Fill X-Grid® pavers with the specified propriety Rootzone. A light vibrating plate can be used to consolidate the pavers and to settle the Rootzone infill if required.
4. 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.
5. 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.
6. The surface may be trafficked immediately, but it is preferable to allow the grass to fully establish prior to use.

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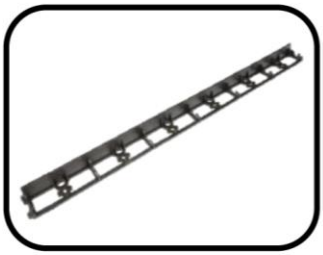
Ancillary Items

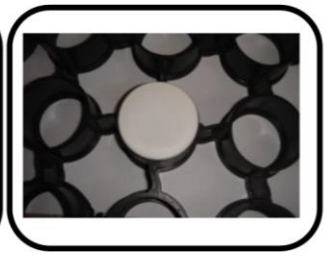
It is necessary to include a substantial edge system when installing X-Grid® Ground Reinforcement Grids with grass or gravel finishes. GeoBorder recycled plastic edging system is a suitable edge restraints system for most applications. Made from Recycled plastic Geoborder is a restraint system which is sufficiently robust to withstand thermal expansion, vehicular movement, and prevent loss of laying course material. Other alternatives could include kerbs, channels, existing structures, and rigid abutments such as securely fitter paving blocks.

GeoBorder is a recycled plastic edging system which provides suitable edging restraint in areas where alternative support is missing. Geoborder is made from recycled plastic and can be used for straight edges, curves and bends.



Parking Delineators

X-Grid® laid for car parking surface may require the car parking bays be marked out. X-Grid® Delineators are a white plastic cap which quickly and easily insert into the cylinders visibly denoting the car parking areas.



Typical car parking bays are 2.4m x 4.8m. We recommend that 5 Delineators are evenly spaced down the length of the car parking bay line to create a clear denotation between parking bays.

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