

GUIDELINES FOR INSTALLING HYDROPAVE PERMEABLE PAVING FOR DOMESTIC APPLICATIONS.

Product

All products should be carefully inspected for defects or damage upon delivery and prior to being laid or fitted.

Product Information

Within Tobermore, design and development of products is a continuing process, and product information is subject to change without notice. Accordingly, please check with Tobermore to ensure that the product information you have represents the most up-to-date product information.

Prior to Installation

It is good practice to sort products to ensure consistency of colour, texture and dimensional tolerance. Any defects must be reported without delay. If products are installed with any form of defect which was clearly apparent prior to installation the installer will be responsible for all costs incurred to rectify the issue.

Important: *Check the area to be paved for services such as gas or electric and if necessary, contact the provider for advice.*

Health & Safety

Always wear appropriate PPE (Personal Protective Equipment) during construction.

SUITABILITY OF HYDROPAVE PERMEABLE PAVING

Hydropave Permeable Paving can be used on driveways, patios and paths where the intent is to infiltrate water back into the ground. The paving should only be used to deal with water landing on it and not from other adjacent impermeable areas or roofs. In some regions of the UK and Ireland the ground conditions may not be suitable for the infiltration of water or it may have an adverse affect on the properties foundations, particularly with older properties. In these instances it is best to seek professional advice or contact your local Building Control office.

Hydropave permeable paving should only be used in areas where the sub-grade strength is greater than 5% or where there is an existing driveway which would demonstrate the sub-grade is greater than 5%.

The table below can be used as a guide to determine the strength of a sub-grade. If you are in any doubt please seek advice from an experienced paving contractor.

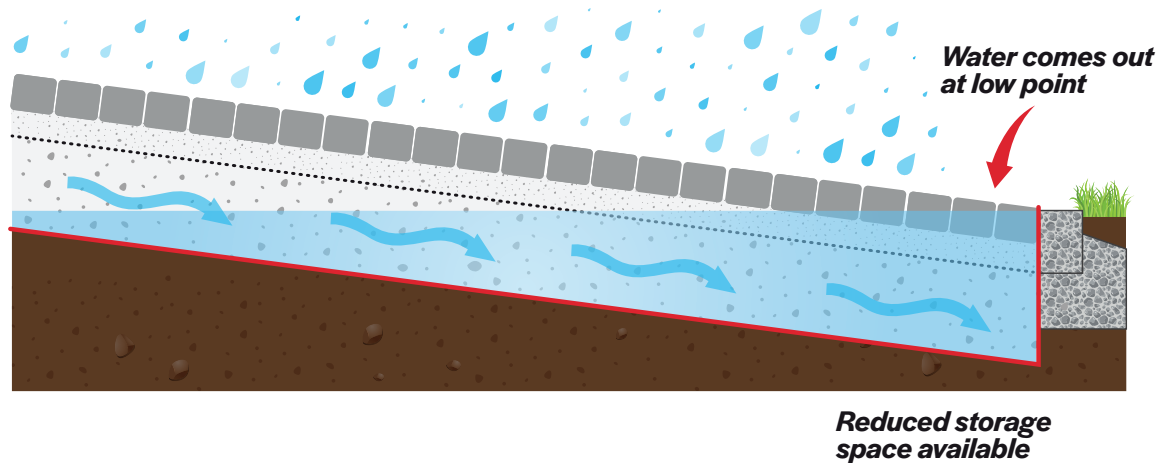
Soil Type	Condition	Simple Soil Test	CBR (strength of ground)
Rock	Hard	Requires digger to excavate	5% +
Sand / gravel	Compact	Resistance when driving a 50mm square peg into the ground	5% +
Clay Sandy Sandy Clay	Stiff	Very difficult to mould by hand	5% - 2%
Clay Sandy Clay	Firm	Very difficult to mould by hand. Spade required to excavate.	5% - 2%
Sand Silty Clay Clayey Sand	Loose	50mm square peg can be easily driven into the ground	2%
Silt Sandy Clay Silty Clay Clay	Soft	Easily moulded by fingers	< 2%
Silt	Very soft	Squeezes through fingers very easily	Seek advice

IMPORTANT: HYDROPAVE PERMEABLE PAVING ON SLOPES

On sloping sites, the water will run to the low end of the sub-base and therefore the volume available for storage will be greatly reduced, *see Figure 1*.

Also, if the slope is too steep water will flow over the surface and not infiltrate through the joints. It is very important therefore that slopes have a maximum gradient of 1 in 20 (5%). **Important:** Check dams, increasing the sub-base depth for extra storage or the use of geocellular storage (plastic boxes) at the lower end of the site to increase storage capacity may be required on slopes. Consulting with an engineer is advised.

On sites with slopes the installation of the paving should commence at the lowest point and work upwards.

Figure 1**Permeability of soil**

To enable infiltration of water back into the ground certain criteria needs to be met. This involves completing a test to determine the permeability of the soil.

Soil permeability test

A square test hole measuring 400mm x 400mm x 400mm should be dug for every 20-25m² of driveway. There should be at least two holes spaced evenly apart. Topsoil or the existing driveway should be removed first to expose the sub-grade material before digging the hole.

Fill the hole with water and allow it to drain away. Repeat this process 3 times. If the water completely drains away the soil will be suitable for permeable paving.

If the water does not drain then this indicates that the soil does not have sufficient permeability and you should not proceed using permeable paving.

Excavation

To calculate the depth of excavation required, add the depth of the sub-base, 50mm laying course and the depth of the block.

For example, 150mm (typical sub-base depth) + 50mm laying course + 60mm block = Total excavation of 260mm approximately.

Important:

The finished level of the paving must be a minimum 150mm below the damp proof course of the property.

Edge restraints

Kerb edge restraints must be installed prior to the sub-base material. The use of edge restraints will prevent any movement of the blocks.

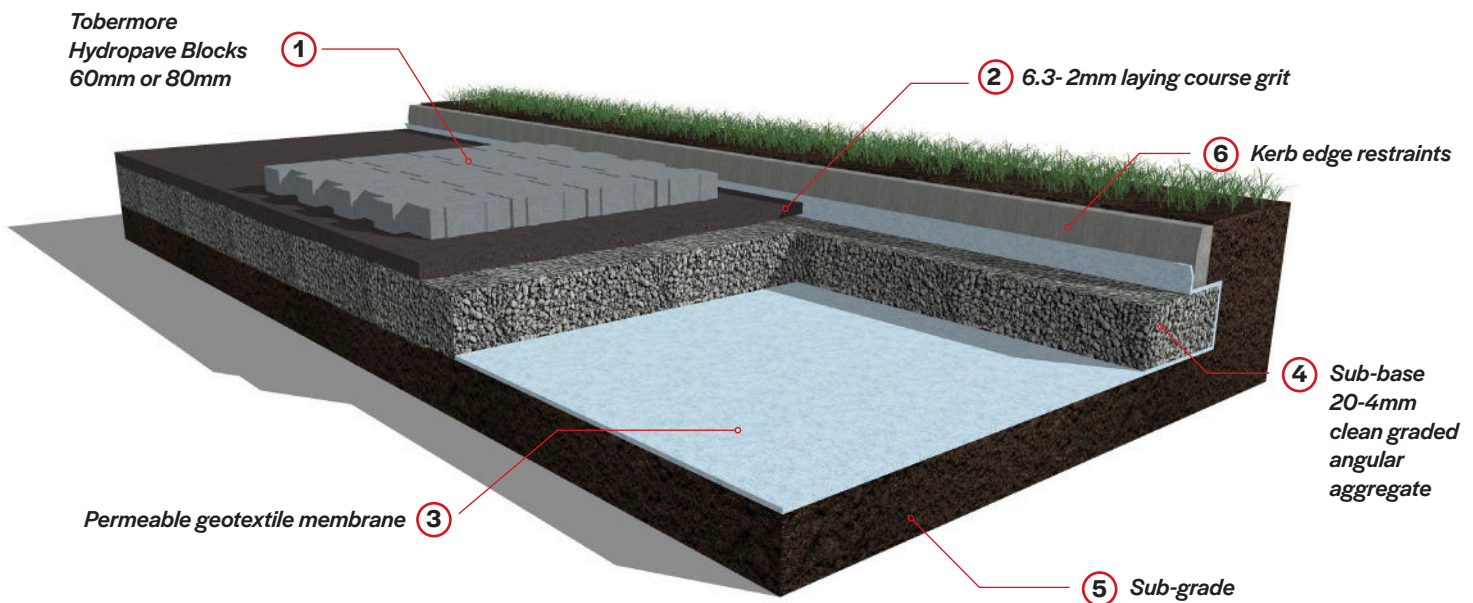
Sub-base depth and material

The depth of sub-base aggregate will be dependent on the existing ground conditions and the type and frequency of vehicles using the paving. As a general guide a depth of between 150mm and 250mm is usually sufficient for a domestic driveway and 100mm for a path or patio.

The sub-base aggregate must be 20 – 4mm clean graded angular aggregate. (MOT Type 1 must NOT be used) A permeable geotextile membrane should be placed on top of the sub-grade to separate the soil from the sub-base aggregate. See Figure 2.

Figure 2

Typical cross section of a Hydropave permeable driveway



The laying course should be 50mm in thickness. The material must be 6.3 – 2mm clean graded angular grit. (*Sharp sand must NOT be used.*)

Below is a table providing approximate quantities of sub-base and laying course aggregates for various sizes of driveways.

	10m ²	20m ²	30m ²	40m ²	50m ²	60m ²	70m ²	80m ²	90m ²	100m ²
20-4mm clean aggregate for sub-base in tonnes based on a sub-base of 200mm	4	8	12	16	20	24	28	32	36	40
6.3-2mm grit in tonnes based on a depth of 50mm	1	2	3	4	5	6	7	8	9	10

10kgs of 6.3-2mm jointing grit is required per m² of paving.

INSTALLATION

Geotextile

Place a suitable permeable geotextile membrane onto the sub-grade.

The geotextile can be overlapped by 300mm at joints if necessary. It should be brought up at the sides to just below the finished level of the paving and trimmed off. See Figure 2.

Sub-base

Install the 20 – 4mm clean graded angular aggregate in maximum layers of 75mm and compact it using a vibrating plate compactor. Take care to prevent any dirt or other contaminants from entering the sub-base aggregate as this could affect permeability.

Laying course

Spread out the 6.3 – 2mm clean graded angular grit over the sub-base. Screed the material to achieve a thickness of 50mm. The 6.3-2mm grit will not compact in the same way as sharp sand would, therefore it is important to try and achieve the target depth of 50mm during the screeding process. It is often helpful to carry out a trial area to determine the characteristics of the material when screeded and compacted.

Installing the Hydropave paving units

When the circumstances allow complete one area of paving by using products taken from the same batch. This is achieved by checking the batch code label displayed on the packs.

Always, thoroughly mix products from a minimum of three packs.

Where products are supplied in packs with vertical slices always take them “vertically slice by slice” this ensures that colours are distributed evenly.

When the circumstances do not allow the use of products from the same batch then it is extremely important to minimise possible colour banding / shading by always, thoroughly mixing products from a minimum of three packs concurrently with some overlap between deliveries / batches.

Install whole paving units first onto the laying course. Use string lines regularly to ensure joints are correctly aligned and to maintain the laying pattern. The permitted manufacturing tolerances of the units should be factored into the installation process.

Individual units should interlock with neighbouring units, however joint widths can be varied slightly to allow straight lines to be achieved or to maintain the laying pattern / bond.

Cutting in

Once all full-size units have been installed fill the remaining gaps with cut units. To prevent cut units becoming loose or breaking no unit should be cut to less than one quarter of its original size. In-board cutting should be used to avoid small cut pieces. Units should be measured and cut to maintain the permeable joint width in the range of 3-6mm. On curves the maximum joint width should be 6mm. Cutting may be carried out using a water and dust suppressed diamond tipped power saw or a block-splitting guillotine. It must however be noted that the aesthetic finish achieved will depend greatly upon the choice of cutting mechanism and the skill of the installer. Cutting should be carried out in an area away from the newly installed paving to prevent cutting dust staining the product.

Joint filling and compaction

Before jointing and compacting commences brush the area to ensure any dirt or debris is removed. Brush the 6.3 -2mm grit into the joints and sweep off any excess material which could scratch the surface of the paving during compaction. Compact the paving using a vibrating plate compactor with a protective rubber mat. Repeat this process 2-3 times or until all joints are completely filled to the top.

Any joints that are not filled can lead to movement of the paving during trafficking, which can also cause blocks to chip and become loose. We recommend that after a few weeks of use, any joints that are not full should be topped up. Joints should always be kept filled. Care must be taken to ensure that the permeable joints do not become contaminated as work continues. Particular care must be taken when planting or carrying out areas of soft landscaping to prevent soil from entering the joints.

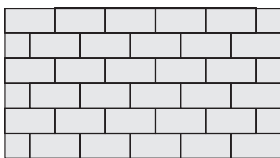
Laying patterns

45° and 90° degree stretcher bond pattern and herringbone patterns are suitable for driveways.

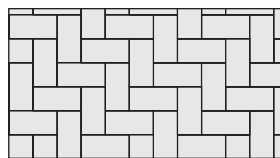
Basket weave pattern should not be used on driveways.

For paths and patios any laying pattern is suitable.

HYDROPAVE FUSION

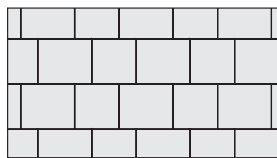


Stretcher bond
200x100mm



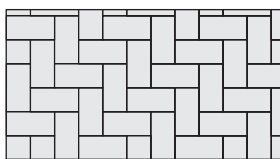
Herringbone 90°
200x100mm

HYDROPAVE FUSION DUO



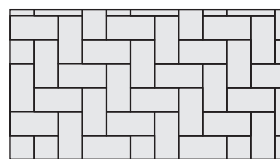
Stretcher bond
208x173mm, 173x173mm

HYDROPAVE 240



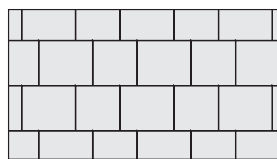
Herringbone 90°
240x120mm

HYDROPAVE TEGULA 240



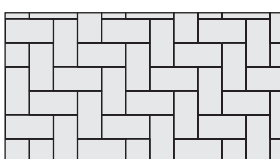
Herringbone 90°
240x120mm

HYDROPAVE TEGULA DUO



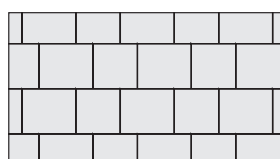
Stretcher bond
208x173mm, 173x173mm

HYDROPAVE PEDESTA



Herringbone 90°
200x100mm

HYDROPAVE SHANNON DUO



Stretcher bond
208x173mm, 173x173mm

Maintenance

Please refer to the table below for advice.

Schedule	Action	Frequency
Routine visual inspection	Visually inspect the paving for ponding during heavy rainfall or following heavy rainfall.	Once a year
Remedial maintenance for ponding	Brush / Vacuum joints Replace any lost jointing material	As required
Structural Maintenance	Replace damaged blocks Repair any rutting	As required
Maintenance for aesthetics of the joints	Brush / Vacuum joints Replace any lost jointing material	Recommended once a year
Maintenance for aesthetics of the paving blocks	Brush with soapy water Light pressure wash	As required
Weed Control	Treat with weedkiller	As required
Maintenance during the winter months	De-icing salts	As required during winter
WARNING!	Do not replace the jointing grit with kiln dried sand as this will block the joints and prevent infiltration. Do not store materials which may clog up the permeable joints such as soil and mulch on top of the paving.	

Instructions & Warnings

CORE TERMS (PAVING & WALLING)

Product

All products should be carefully inspected for defects or damage upon delivery and prior to being laid or fitted.

Product Information

Within Tobermore, design and development of products is a continuing process, and product information is subject to change without notice. Accordingly, please check with Tobermore to ensure that the product information you have represents the most up-to-date product information.

Prior to installation

It is good practice to sort products to ensure consistency of colour, texture and dimensional tolerance.

Installation

All products should be installed in accordance with the latest British Standard.

Colour & Texture

Tobermore produces paving and walling products with excellent density and durability. Products are manufactured using naturally occurring raw materials including aggregates, granite aggregates, pigments and sand. Although every effort is taken to ensure consistency, inevitably due to the presence of these naturally extracted raw materials variations in colour, shade and texture can occur. Therefore, colours and textures illustrated are representations and should not be expected to be an exact match.

Batch codes should be checked prior to installation to reduce the risk of product shading and ensure consistency of finish. When multiple packs are being installed in one area, please ensure you check that they are all from the same production batch. This can be done by checking the batch code label that is displayed on the packs. This is of particular importance when installing single colours such as Golden, Buff, Natural, Charcoal and Red. Tobermore therefore recommends that products are thoroughly mixed on site by drawing from a minimum of four pallets.

We would always recommend that when purchasing products, especially in larger quantities, that they are all ordered and manufactured in one batch to reduce the chances of colour / shade or texture variation.

Please note that the colour of new products will inevitably vary compared to those which have been installed for a period of time as weathering does take place.

All colour illustrations in Tobermore's brochures are as accurate as the printing process will allow. For a more accurate colour match please refer to actual product samples, which can be provided.

Staining

Some chemicals that are commonly used in gardens such as lawn feed containing Ferrus Sulphate can stain concrete products. Any chemicals that are spilt must be removed immediately by rinsing away with clean water. Please check the information on the instruction label of the container holding the chemical.

Moisture

Occasionally, after installation, some units may show variations in shade and have a patchy appearance. This is due to the varying amounts of moisture within the concrete and the ground. The drying out process of concrete continues in-situ after installation. Some units may also retain more moisture than neighbouring units and take longer to dry out. This is caused by the variations in density of the naturally extracted aggregates used in the manufacturing process. Given time and natural weathering, the capillaries within the surface of the concrete will gradually close and any patches or moisture retention will dissipate as the product matures. This does not affect long-term performance.

Efflorescence

Efflorescence is a white crystalline deposit that occurs naturally on the surface of concrete materials. Tobermore use market leading technology to significantly suppress the occurrence of efflorescence, however, if it occurs, it may mask the colour of the product for a period of time, but tends to be washed away gradually by rain. Tobermore do not replace products with efflorescence. Packs of products which have had packaging removed should always be re-covered with appropriate packaging to prevent the occurrence of secondary efflorescence.

Surface Scratches

Minor scuffs or bruises may occur during delivery, movement onsite, and installation (for example, during any plate vibrating process). In Tobermore's experience, these marks usually weather off through time. (EasyClean products are protected with a glue dot) To reduce the risk of surface scratches we strongly recommend the use of a vibrating plate with a rubber protective mat.

Ordering

Please ensure that your contractor accurately measures the area on site before ordering products. In Tobermore's experience, dimensions taken from a project plan can vary significantly from the final layout. Depending on the layout of the project, we recommend ordering an additional 2 - 5% of material to allow for cutting, detailing and wastage.

Manufacturing & Quality Systems

Tobermore is a BS EN ISO 9001, BS EN ISO 14001 and BES 6001 registered company. Tobermore uses an integrated management system to manage all health & safety and environmental issues.

Product Maintenance

Routine cleaning and maintenance is required to keep the overall appearance of products in pristine condition.

All concrete products can develop algae, lichen, and moss growths due to environmental conditions and may require cleaning. Areas adjacent to plant borders and trees may discolour from transfer of plant-life. Tobermore cannot accept responsibility for any of these conditions.

Laying multi-blend coloured paving blocks, flags and walling products

To achieve an even blend of colour when laying multi-blend paving blocks, flags and walling products, it is desirable to mix from 3 or 4 different pallets.

Queries & Complaints

Please contact one of Tobermore's Paving & Walling Centres or offices (contact details at www.tobermore.co.uk) with any queries or complaints. Any complaints must be notified to Tobermore without delay.

CORE TERMS (PAVING ONLY)

Product Maintenance

Light coloured paving blocks and flags emphasise tyre marks and oil spills on the driveway. Please note that these products will need more maintenance if overall appearance is to be maintained.

Initial Cleaning

When an area has just been paved, allow it to settle for a few days. After this, you may wish to lightly hose down the paving to remove any excess sand or dirt. The area should then be treated with a weed killer suppressant two - three times per year as required.

General Cleaning

Paving requires regular maintenance, including regular sweeping to prevent the build up of detritus. Tobermore recommends that paving is cleaned two - three times per year.

For general cleaning of dirt and algae, vigorous brushing with a stiff yard brush with plenty of hot detergent solution (washing up liquid or non-bio washing powder), thoroughly rinsed with clean water, should suffice. Repeated treatment may be required for paved areas sited beneath trees or in permanent/near permanent shade. A light power hose at medium pressure is generally all that is required to clean general dirt and grime. Any jointing material which is removed must be replaced. Do not use high pressure powerwashers as aggressive power-washing can damage the product surface. A trial area should be tested before large scale powerwashing takes place. (Important: EasyClean products should not be pressure washed. Please refer to specific EasyClean information)

Moss, Lichen and Algae

Thick growths of moss or lichen must be removed first by scraping out the joints and then treating the area with a moss killer such as anti-moss paving cleaner. Anti-moss is designed to remove moss, lichens and algae. It is best applied in dry weather. After being applied it will take a few days to be fully effective. Once the moss and lichens have been killed, they can easily be brushed off. Anti-moss also leaves a residue in the sand joint which will help reduce the likelihood of re-growth. The manufacturer's instructions should always be followed when using any cleaning agent.

Weeds

Large weeds should be removed by hand and then the area treated with a weed killer (available from any good garden centre). Smaller weeds can then be treated directly with weed killer and these weeds should start to die within days. The manufacturer's instructions should always be followed when using any weed killing agent.

Block Paving Sealer

It is possible to seal block paving with a resin material which combats staining and weed growth and which also enhances colour and appearance. The acrylic sealer is sprayed onto the block paving and forms a 'skin' on top of the paving and the jointing material giving an easily maintained finish. The manufacturer's instructions should always be followed when using any sealing agent. (Important: Do not use sealers on EasyClean products)

FOR HYDROPAVE PRODUCTS

Installation - Hydropave

Tobermore recommends that its Hydropave products be installed in conjunction with a BS EN 7533-13:2009 designed permeable paving system.

Note: A permeable paving design relies heavily on using the correct aggregates. Prior to installation, we would ask you to test both the 4/20mm coarse graded aggregate and also the 6.3-2mm bedding and jointing grit as per the relevant British Standard specification (BS EN 13242:2002). In particular, the material should be categorised as LA20 according to Table 9, SZ18 according to Table 10 and MDE15 according to Table 11 within this standard. The grit should be insoluble in dilute hydrochloric acid and should be naturally occurring material. In our experience, incorrect use of aggregates is one of the most common reasons for failure of a permeable paving system.

Joint Filling

All joints must be filled to the top with 6.3 - 2mm grit to prevent movement and spalling of the blocks. We recommend that after a few weeks use, any joints which have settled and are not full, are topped up with grit. Joints should be kept filled at all times. You will need approximately one tonne of grit for every 100m² of 80mm paving.

Note: Care should be taken that the permeable joints do not become contaminated as work on the scheme is completed. Special care needs to be taken when soft landscaping is carried out so that soil does not enter the joints. When this type of work is being carried out, the surface of the permeable paving should be protected by an appropriate cover to protect the joints from being contaminated.

Hydropave Maintenance

Please refer to Tobermore's detailed 'Permeable Paving Maintenance Guidelines' available on our website: www.tobermore.co.uk