

GUIDANCE FOR THE CONSTRUCTION OF DOMESTIC STEPS

First impressions count and an appealing set of steps at the entrance to a property creates a great first impression. Steps not only need to look great they also serve a very important role for their users and therefore they need to be correctly designed and constructed.

When steps and surrounding paving is being installed generally the steps are constructed first. This ensures the concrete used in constructing the steps has set sufficiently to withstand the vibrating plate compactor when it's used on the main paving area during the final compaction process.

Steps should be centred on the doorway, so they look balanced when being viewed face on.

Most customers choose either Kerbstones, step risers, kerb large or Tegula kerb large to construct the risers for their steps as they match or contrast with the surrounding paving in both scale and colour. Normally a riser of a contrasting colour is used, as this gives an extra visual warning of the presence of a step, thereby reducing the chance of tripping.



Rise and Tread Dimensions

The preferred dimensions for the rise of a step at a domestic property is 150mm. The rise should not be less than 100mm as this would be more of a trip hazard. The treads should be between 280mm – 425mm to safely accommodate people's feet.

Types of Steps



Single Semi-circular step with block paving infill



Multiple Semi-circular steps with block paving infill



Single Rectangular Step with block paving infill



Multiple Rectangular Steps with block paving infill



Multiple Steps with flag infill

Step Construction

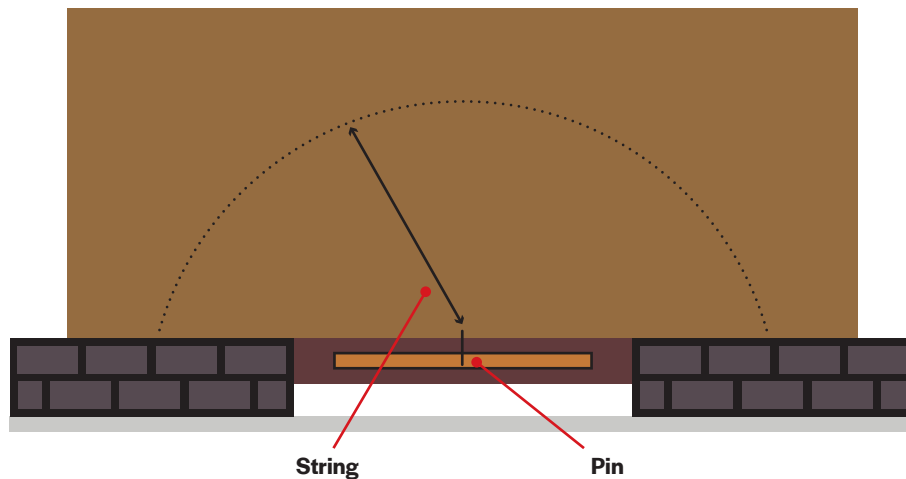
Step 1: Setting out

Semi-circular Steps

Figure 1. To set out semi-circular steps fix a pin at the centre point of the door and use a length of string with another pin to mark an arc in the ground.

Once you have made the mark it is a good idea to set out the risers using the mark as a guide to ensure they will fit correctly to your chosen radius before bedding them into the mortar. If you are going to be mortar jointing them, ensure you leave a joint between each unit. The mark on the ground can also be used as a guide for the placement of the bedding concrete.

Figure 1



Setting Out

Rectangular Steps

When constructing rectangular steps, Kerbstones or Step Risers are the most straightforward products to use for the risers as they do not require special corner units. (Image 1) 90 degree corners can be created easily by placing the units at right angles. You can also minimise cutting by setting the length and width of the risers to fit the size of the blocks or flags being used for the tread. This will reduce the number of cuts needed.



Image 1

Special external corner units can be purchased for use with Kerb Large and Tegula Kerb Large.



Step 2: Installing the risers

Spread 75-100mm of bedding concrete using a 4:1 mix of coarse sand and cement where the risers are to be placed, for semi-circular steps use the mark previously made in the ground. Figure 1.

Place the risers into the concrete and tap into position with a rubber mallet.

If you are using a mortar joint (Image 2), leave a joint of approximately 10mm between each unit. For mortar joints each unit is 'battered' with mortar and offered into position against the previous unit. It should be gently pressed against the previous unit to squeeze out the excess mortar. Trim the excess mortar off with a trowel. Use a jointing iron to smooth off the mortar. Use a spirit level to check the alignment and level as you go. For semi-circular steps use the string and pin again as a guide to ensure the units are placed in the correct position.

For rectangular steps, it is a good idea to set out the risers to ensure they fit correctly to your chosen measurements prior to setting them into the mortar bed. Install the risers at the sides first, using an equal number of units. Ensure the sides are perpendicular to the building. Once you are happy with the sides place the units at the front of the step.

Step 3: Jointing options

Mortar jointing (Image 2) gives the risers a more professional look but requires a higher skill level. Care should also be taken to avoid staining the risers with mortar. For DIYers it is easier to install the risers "close" jointed (Image 3) with a 1-2mm gap without the use of mortar.



Image 2



Image 3

Step 4: Haunching

A concrete haunch should be placed behind the risers. Haunching is where concrete is placed at the back of the riser to hold them in place. Image 4. It should be placed to a height behind the riser which provides sufficient space to accommodate the laying course and paving to be used on the tread. Allow the concrete to sufficiently harden before commencing paving on the tread to avoid displacing the risers.



Image 4

Step 5: Base and laying course

Once the risers have been placed and allowed to harden you can build up the base level behind the step using either Type 1 sub-base aggregate (40mm to dust crushed aggregate) or lean-mix concrete. Make sure it is thoroughly compacted with a pummel.

Important: If using aggregate for the base make sure to leave the level of the base low enough to accommodate the depth (Figure 2) of the tread paving and 30mm of sharp bedding sand. If using the lean-mix concrete allow enough for the tread paving to be accommodated.

Aggregate base

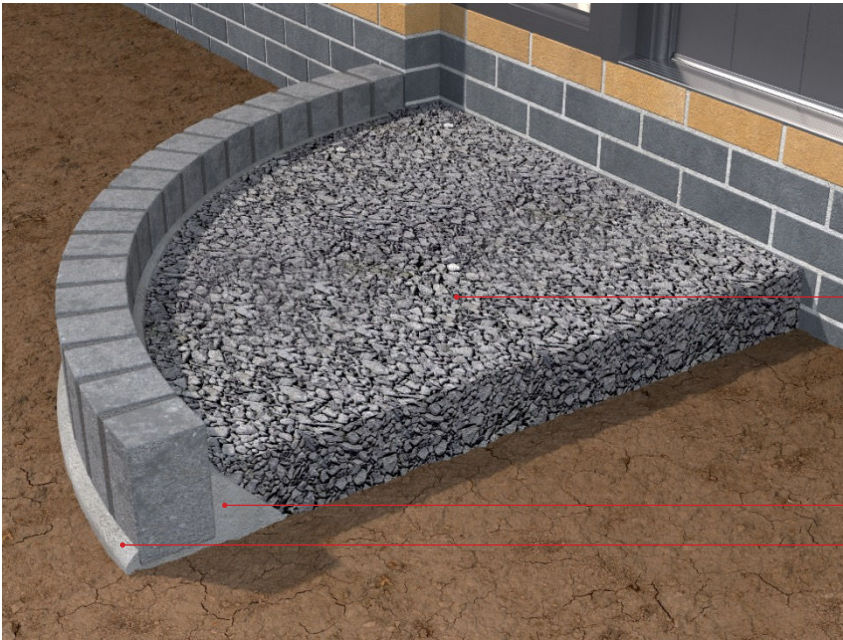
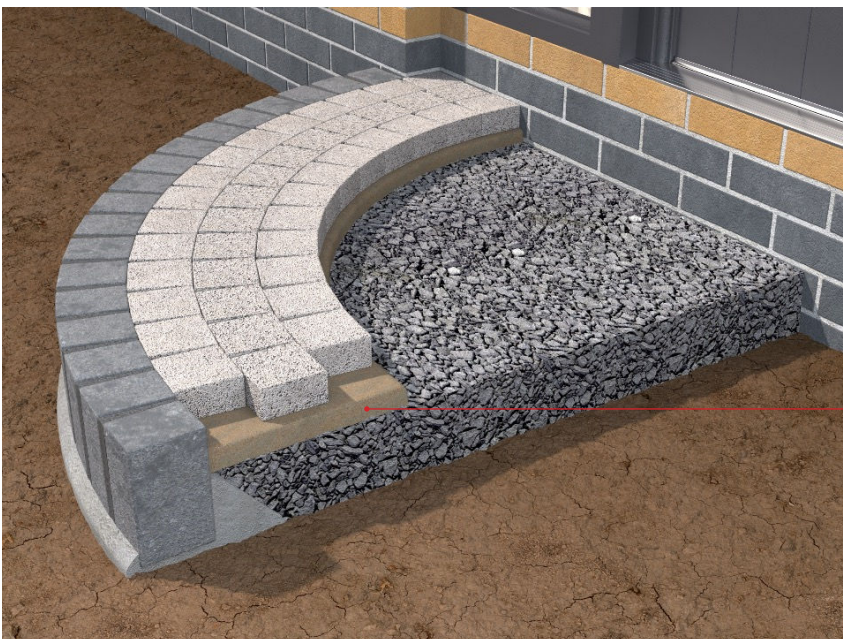
Once the aggregate base layer is placed and compacted you can spread 30mm of sharp sand over the base material and smooth it off. Figure 3.

Lean-mix concrete base

If using lean-mix concrete for the base the tread paving can be placed directly on top and tapped into position.

Step 6: Tread

The paving units for the tread can now be installed. Take a little bit of time at this stage to set out the tread units so they will be centred on the door opening and any cuts required will look balanced on either side of the step. Install full units first using a rubber mallet to compact them into position. Once all full units have been installed you can make any cuts necessary. Try to avoid very small cut pieces as they can break and become loose. See figure 3.

**Aggregate Base****Concrete Hanch****Concrete Bed****Figure 2****Laying Course Sand****Figure 3**

Multiple Steps

When constructing multiple steps careful planning and setting out is required. With multiple steps, construction should always start with the lowest riser and work should proceed upwards, so that the lower, completed work is able to support the higher, freshly constructed work. Complete the lower step before starting the upper step. See figure 4.

Constructing the upper step utilizes the same process that was used for the lower step. Bed the risers, point them, haunch them, place the base layer, sand laying course and tread paving. Figures 4,5 and 6.

Step 7: Jointing the tread units

Once the tread units have all been installed spread kiln dried sand over the top and brush into the joints ensuring they are full. Top up, if necessary, after a few weeks. Figure 7.



Figure 4



Figure 5

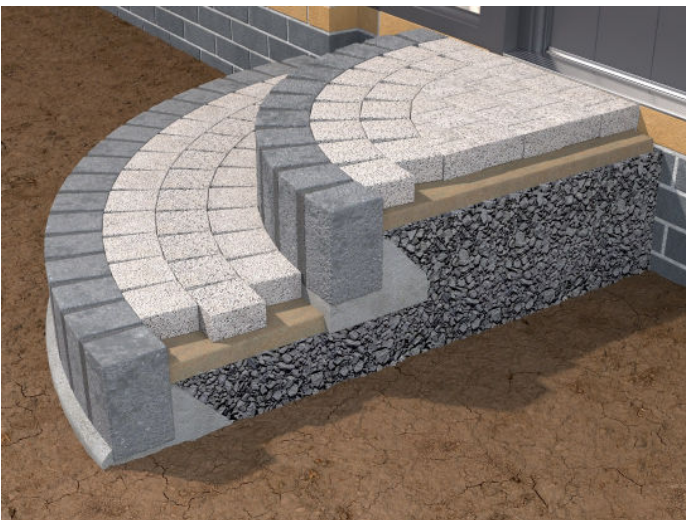


Figure 6



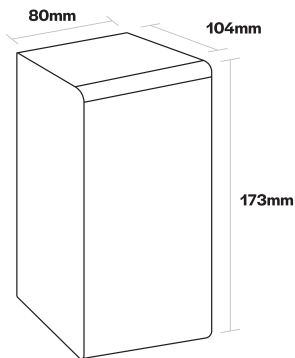
Figure 7

Example of Semi-circular Step (Figure 8)

The step illustrated in figure 8 below has been drawn to scale and represents a step with a radius of 825mm. This means the step is 1650mm wide against the wall and the tread is 825mm. This size of step is perfect and provides a safe and comfortable platform for all users. Rectangular steps can have treads as shallow as 450mm, but we find that a comfortable minimum would be around 600mm.

This step requires the following materials

35 – 104 x 173 x 80mm step risers or 104 x 173 x 80mm kerbstones and 1.2m² of infill paving.



Important: Always check measurements on site prior to ordering.

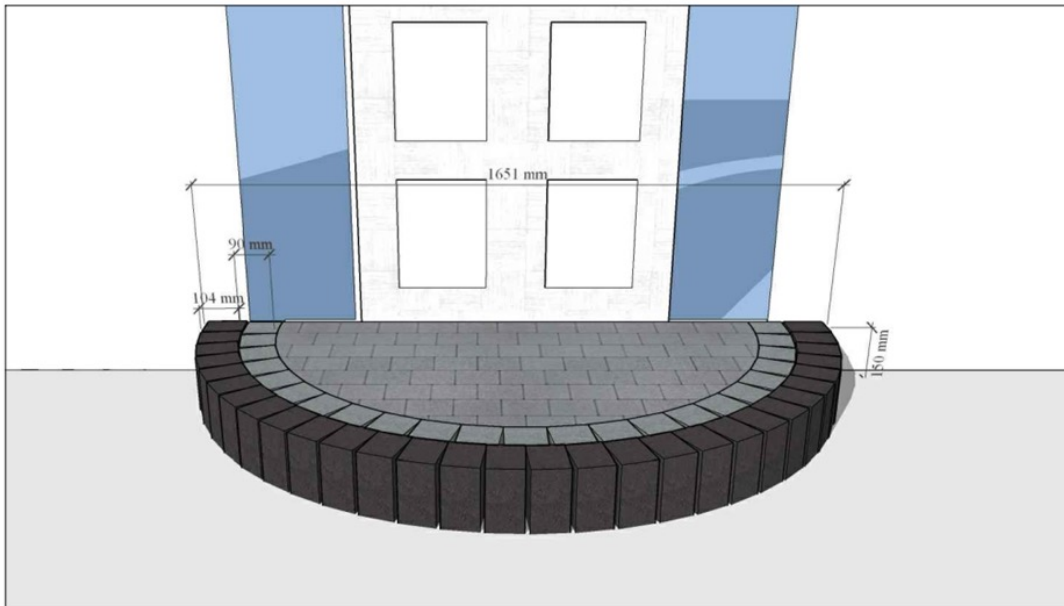


Figure 8

Any technical information provided by Tobermore in relation to any product (whether before or after order) is provided by way of GUIDANCE ONLY and, to the fullest extent permitted by law, without liability on the part of Tobermore for any loss or damage suffered as a result of relying upon it. Such technical information should not be relied upon in substitution for obtaining independent expert advice prior to using any product from both a suitably qualified engineer and building contractor, in particular, as to the suitability of the product for use at the intended site for the intended scheme.

Instructions & Warnings

As referred to in Tobermore's Conditions of Sale

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

Prior to opening the packs check that all the batch code labels match. The batch code labels can be found on the outer packaging. For example, O4D22N.

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.

Installation

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

Colour/Shade & Texture

Tobermore produces paving and walling products with excellent density and durability. All products are manufactured in batches using naturally extracted raw materials including aggregates, pigments and cement etc. Products such as Braemar, Sienna, Fusion, Mayfair Flags, Manhattan, City Pave and Fusion Kerbs are manufactured using premium naturally occurring granite aggregates. To achieve their final appearance some products undergo secondary processes, this involves shot blasting or grinding the surface of the product.

Whilst we have several factory procedures in place to help control shade, colour and texture within and between batches we cannot guarantee consistency. This is due to the natural materials and secondary processes. Therefore, slight variations in the finished products is normal between and within batches. These variations actually enhance the character and natural beauty of the products.

To achieve the best possible finish we recommend the following advice is followed to evenly distribute any slight variations in shade, colour and texture over a large area.

When the circumstances allow complete one area of paving, one retaining wall or one house / building 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.

Where products from different batches are being installed in the same area of paving, wall or building it is the installers responsibility to carry out a colour match check by comparing colours from each batch. If a noticeable variance in colour / shade or texture is visible, do not proceed with the installation and contact your supplier for further guidance.

Mixing thoroughly from a minimum of three packs is of particular importance when installing single colours such as Golden, Buff, Natural, Charcoal, Graphite, Silver, Mid-Grey, Sandstone, Alto Silver, Aaron Stone, Jura Grey and Innis Black.

During installation the installer must make regular visual checks to ensure the blending of colours is consistent.

We would always recommend that when purchasing products, especially in larger quantities, that they are all ordered at the same time.

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

All colour illustrations 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.

Colours and textures illustrated are representations and therefore should not be expected to be an exact match.

The overall visual appearance of a completed installation should only be assessed from the normal viewing distance. Variations in colour/shade and texture are technically harmless, do not affect the products performance and are not deemed to be a product defect.

We will not be held liable for any discolouration or staining caused to product which has been stored incorrectly.

Note: Whilst we strive to ensure consistency, complimentary products such as Kerb Specials, Step Flags, Facing Brick Specials, Historic Circles etc. may not be an exact colour / texture or shade match to the standard version of the product as they will have been manufactured at varying times using different processes.

Tegula

Tegula is manufactured using a secondary process that distresses the edges and corners of the blocks to give the desired aged antique appearance. The process randomly distresses the blocks, therefore some blocks will be more distressed than others will, this is completely normal and does not affect the product performance.

Staining

Some chemicals that are commonly used in gardens such as lawn feed containing Ferrous 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 crystalline deposit that occurs naturally on the surface of concrete materials. It usually appears as a white deposit but can also be brown or yellow in appearance. 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.

To reduce the risk of surface scratches we strongly recommend the use of a vibrating plate with a rubber protective mat.

Ordering

To avoid waste, 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.

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)

Paving installed unbound should have a close joint width of 2-5mm to allow for the dimensional tolerances of products and to create a gap to allow the brushing in of kiln dried jointing sand. The straightness of lines will be dependent on workmanship and product tolerances. String lines must be used to help achieve straight lines.

Tobermore do not recommend Butt jointing as this will make achieving straight lines more difficult.

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 2-3 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 2-3 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.

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.

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

FOR EASYCLEAN PRODUCTS

Handling & Installation

During installation, the surface should be protected at all times from scratching and abrasion. Once the protective glue dot has been removed do not stack flags directly on top of each other. Use a plate vibrator with a rubber mat. Do not scratch the surface with tools. (Spade, trowel etc.)

User advice

Do not drag garden furniture across the surface of the flags.
Do not pressure wash.
Do not use chemical cleaning products (e.g. solvents/acids).

FOR FACING BRICK & COUNTRY STONE PRODUCTS

Important Note:

If the circumstances allow, it is beneficial to complete one building / structure using bricks taken from one batch and mixed on site from a minimum of 3 packs to avoid colour banding / shading. If the circumstances do not allow for this then it is important to minimise the possibility of banding / shading by always mixing bricks from 3 packs concurrently with some overlap between deliveries.

Where the site conditions allow, it will also be beneficial to take receipt of as many bricks as possible at an early stage to maximise colour consistency throughout the site.

Installation – Facing Bricks

Please refer to Tobermore's detailed 'Guide to the use of Tobermore Concrete Bricks' available on our website: www.tobermore.co.uk

Installation – Country Stone

Tobermore's Country Stone products are designed to recreate traditional stone sizes and to co-ordinate with standard cavity wall construction. When used in housing projects, a clear cavity must be retained.

All work must be protected during construction and must be designed and built in accordance with accepted industry standards and practice. Builders familiar with conventional brickwork will find that similar installation principles apply.

Joints can be finished flush or tooled depending on the overall effect required. Raked joints are not recommended. It is vital that all horizontal and vertical joints between Country Stone blocks must be compacted and free from voids. Shell bedding should not be used.

Good Practice during Construction - Facing Bricks & Country Stone

- If mortar dries on the surface of the bricks it will stain the product and may not be removed.
- Mortar extruding from joints should be removed when the mortar is wet and during the process of laying.
- Any mortar smears on the brick surface should be removed by dry or wet brushing.
- Scaffolding should be installed as per regulatory instructions. Please note that mortar can drop and hit the scaffolding and then also go onto the wall. You should inspect the work area at all times to ensure the brick surface remains mortar free.
- When it rains be careful that any wet mortar on the scaffolding does not get 'splashed' onto the wall.
- When work stops or is interrupted by inclement weather conditions, brickwork should be protected immediately with polythene sheeting that is held in place with a suitable fixing. If

new brickwork is not protected efflorescence, patchy mortar colour, patchy brickwork and staining can occur.

- Bricks should always be covered with polythene sheets to avoid getting damp or dirty when not being used.

General Cleaning Advice - Facing Bricks & Country Stone

- It is always important to keep bricks as clean as possible while laying and tooling. See Good Practice above.
- If mortar has been allowed to dry on the surface of the bricks the options you have to clean it off are as follows; Each process should be tested first and should ensure the facing bricks are not damaged - Dry brushing b. Wet brushing c. Using a 'like coloured' brick to rub the stained brick d. Pressure washing - should only be used as a last resort as it will damage the surface and the mortar joint if not completed correctly (this method cannot be attempted until the area has been allowed to set for a minimum of 7 days).
- Acid cleaning should be avoided.

Movement Joints and Mortar Guidance - Facing Bricks & Country Stone

1. NHBC recommends that walls constructed of concrete masonry units should have vertical movement joints included every 6m to allow for drying/shrinkage, see PD6697:2019, maximum ratio for brickwork panels is to be 3:1 length : height. PD6697:2019 gives advice on joint positions, the benefit of brickwork reinforcement at window openings is also covered in the same document. Movement joints should be planned prior to commencing any construction to enable them to be concealed behind down pipes etc. and ensure the aesthetics of buildings are maintained.
2. It is important to ensure that the mortar specified for the construction is suitable for the contract, see table 15 of PD6697:2019 - class M4 is the maximum recommended for normal external masonry walls. This should not be exceeded when using Tobermore Concrete facing bricks and Country Stone Walling.
3. We would recommend that you discuss this guidance with all parties involved in the design, construction and installation of the scheme. We also recommend that you refer to BS EN 1996-1-1 and PD6697:2019.
4. Specific professional advice should be obtained at all times before commencing building work.

Important Guidance Information: Tobermore Concrete Facing and Country Stone Walling

1. Professional advice, specific to the project, should be sought before commencement of the building work.
2. Tobermore Facing Bricks have different properties to clay bricks especially in relation to moisture movement. Please refer to 'Guide to the Use of Tobermore Concrete Facing Bricks', which is available on request or at www.tobermore.co.uk
3. Tobermore recommends that vertical movement joints be spaced at no more than 6m apart. Panels of brickwork where the length: height ratio exceeds 3 are particularly vulnerable to cracking; if they cannot be avoided, they should include movement joints at closer centres.
4. Movement joints should be planned prior to any construction so that they can be concealed behind drainpipes etc. Further guidance on moisture movement is available in the 'Guide to the Use of Tobermore Concrete Facing Bricks' and BSI documents BSEN 1996 (Eurocode 6) and PD 6697 (Recommendations for Design).
5. It is important to ensure that the mortar specified is suitable for the construction, see Table 15 of PD 6697. Mortar of strength class M4 will generally be suitable. Please refer to 'Guide to the use of Tobermore concrete facing bricks', which is available on request.
6. When building with dissimilar materials allowances should be made for differential movement. Design guidance from a structural engineer should be sought when combining dissimilar materials such as clay and concrete facing bricks. Examples of using dissimilar materials would be where a clay brick is used to build up to the dpc level and then Tobermore concrete facing bricks are used above the dpc. In some circumstances the dpc acts as a slip plane to separate the two materials which helps to dissipate tensile stress. However expert guidance should always be sought as to ensure structural stability as further slip planes or bed reinforcement may need to be incorporated into the design.
7. It is recommended that this guidance is discussed with all persons involved in the design and construction of the building work.

FOR SECURA PRODUCTS

Installation - Secura

All Secura products should be installed in accordance with British Standard BS8002. When constructing a retaining wall, ensure that you follow the design provided by the scheme engineer.