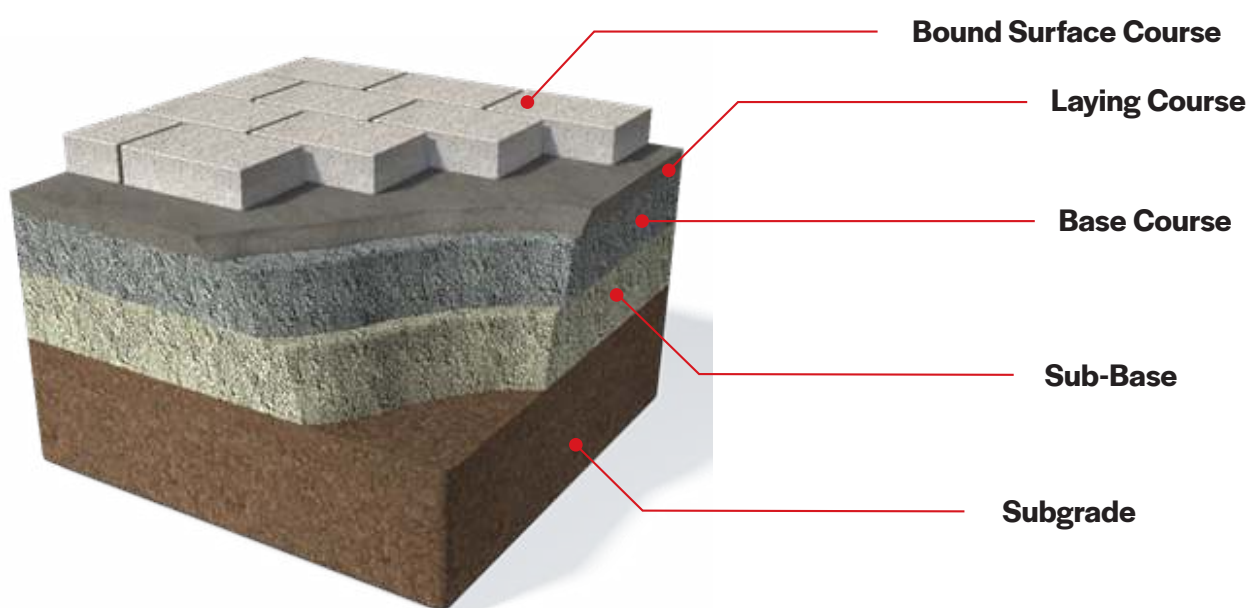


GUIDANCE FOR THE DESIGN AND INSTALLATION OF “BOUND” CONCRETE BLOCK PAVING

The following information is an overview of the comprehensive detail contained in BS 7533:101:2021 and therefore should be considered guidance for the design and installation of concrete block pavements. We strongly advise that this overview is read in conjunction with the relevant parts of the BS 7533 series of standards and a full in-depth detailed design is carried out by a qualified professional.

The longevity, durability and performance of a paved surface is not only about the quality and characteristics of the chosen surfacing material it also relies on the bedding, jointing and sub-base materials being specified and installed correctly.

Bound installation which was previously known as rigid installation refers to concrete block pavements where the paving units are laid on and jointed with cementitious mortar irrespective of the base material, which may be bound or unbound.



BS 7533 Part 101:2021 refers to two methods of bound installation.

Bound system A

Refers to a bound surface course installed over a conventional hydraulically bound material (HBM), a bituminous bound asphalt concrete base (AC) or an unbound base layer (Type 1), to which the bedding mortar is not adhered.

Bound system B

Refers to a bound surface course bonded to a “concrete” base whereby a tensile adhesion bond of not less than 2 MPa exists between all layers connecting the surface unit with the base. To enable the best possible adhesion bond between paving units and mortar, paving units should be thoroughly cleaned prior to installation.

Design

Step 1

Subgrade assessment

The design California Bearing Ratio (CBR) should be assessed to determine the subgrade strength in accordance with BS 1377-4. If the CBR of the subgrade is below 2% it should be improved or replaced prior to construction. This guidance deals with CBR's of 3% or better.

Step 2

Select the relevant traffic category from **Table 1**.

Table 1

Traffic category	Standard axles per day	Typical applications
1	0	Pedestrian-only areas, including domestic applications.
2	0	Pedestrian and cycle areas, domestic driveways. ^{B)}
3	0	Small car parks subject to car, light van and motorcycle access.
4	1	Urban footways with no planned vehicular overrun. ^{A)} Pedestrian areas used by light commercial vehicles, emergency vehicles and maintenance vehicles.
5	≤7	Pedestrian areas subjected to occasional overrun of commercial vehicles. Car parks receiving occasional commercial vehicular traffic.
6	≤70	Adopted highways and commercial/ industrial developments used by a moderate number of commercial vehicles. Pedestrian areas subjected to regular overrun of commercial vehicles. Industrial premises. Petrol station forecourts.
7	≤350	Adopted highways and commercial/ industrial developments used by a high number of commercial vehicles.
8*	≤1 400	As above
9*	≤4 000	As above

^{A)} Where a pavement is to be used for occasional events or heavy goods vehicle loading, the pavement should be designed for that loading.

^{B)} For bound construction, domestic driveways should be designed according to traffic category 3.

* Contact technical@tobermore.co.uk for further details

NOTE: Refer to BS7533:101:2021 for additional factors which may need to be factored into the selection of traffic category

Step 3

Select the relevant sub-base depth, base type / depth and block thickness from **Table 2**. Note: Table 2 does not take construction traffic into consideration. Refer to BS 7533:101:2021 for comprehensive guidance.

Table 2

		Minimum base thickness in mm (Select either Unbound base, AC or concrete)				
Traffic Category	Sub-base thickness in mm (depth based on a 3% CBR. Increase depth for lower CBRs)	Unbound Base	AC	Concrete	Laying course in mm	Minimum concrete block thickness in mm
1	150	75	60 ⁽¹⁾	100 ⁽¹⁾	40	50
2	150	100	80 ⁽¹⁾	100 ⁽¹⁾	40	50
3	150	⁽⁴⁾	150 ⁽²⁾	100 ⁽³⁾	40	50
4	150	⁽⁴⁾	150 ⁽²⁾	100 ⁽³⁾	40	60
5	150	⁽⁴⁾	200 ⁽²⁾	150 ⁽³⁾	40	60
6	150	⁽⁴⁾	200 ⁽²⁾	150 ⁽³⁾	40	60
7	150	⁽⁴⁾	200 ⁽²⁾	150 ⁽³⁾	40	80

⁽¹⁾ Surface construction Bound system A.

⁽²⁾ Bituminous base is only acceptable with Bound System A.

⁽³⁾ Surface construction Bound system B.

⁽⁴⁾ A bound base is necessary for a bound surface course.

Concrete paving blocks should be manufactured in accordance with BS EN 1338

Step 4

Ensure the correct laying pattern is specified from **Table 3** for the chosen traffic category.

Recommended maximum traffic categories for typical laying patterns

Table 3

Laying Pattern	Traffic category Bound surface course
45 degree herringbone	7
90 degree herringbone	7
45 degree stretcher bond	7
90 degree stretcher bond	7
Basket weave	5
Stack bond	5

Materials

Sub-Base Materials

Type 1 unbound granular material in accordance with clause 803 of the Specification for Highway Works

Base Materials

One of the following base materials should be used.

Unbound base material should be Type 1 unbound granular material to clause 803 of the Specification for Highway Works.

The following bituminous bases are suitable.

1. AC 20 dense bin 40/60 des conforming to BS EN 13108-1;
2. AC 32 HDM base 40/60 des conforming to BS EN 13108-1;
3. AC 20 dense bin 100/150 rec conforming to BS EN 13108-1 traffic category 5 and below;
4. AC 20 open bin 100/150 rec conforming to BS EN 13108-1 traffic category 5 and below;
5. AC 32 dense base 100/150 rec conforming to BS EN 13108-1 traffic category 5 and below.
6. A cement bound granular material (CBGM) base should conform to BS EN 14227-1:2013, strength class 8/10.
7. Concrete bases should be pavement quality concrete conforming to BS EN 13877-1:2013 with a minimum compressive strength class C32/40 for traffic categories 5 and above, and a minimum compressive strength class of C20/25 for traffic categories 4 and below.

Laying Course Materials for Bound Surface Construction

Proprietary bedding mortar

Proprietary bedding mortar should be produced in accordance with the characteristics in Table 2. This material may be assumed to be non-frost susceptible.

Table 2

Characteristics	Performance	Performance
	Type 25 bedding mortar	Type 35 bedding mortar
Compressive strength ^{A)}	≥25 MPa	≥35 MPa
Flexural strength ^{A)}	≥3.5 MPa	≥4.5 MPa
Modulus of elasticity ^{B)}	(15 000 ±3 500) MPa	(18 000 ±3 500) MPa
Shrinkage ^{C)}	≤0.09%	≤0.09%
Permeability ^{D)}	≥5 × 10 ⁻⁵ m/s	≥5 × 10 ⁻⁵ m/s

^{A)} Measured in accordance with BS EN 13892-2 after 28 days.

^{B)} Measured in accordance with BS EN 13412 after 28 days.

^{C)} Measured in accordance with BS EN 12617-4:2002, Clause 6 after 56 days with curing in accordance with BS EN 12617-4:2002, A.1.2.

^{D)} Measured in accordance with BS EN 12697-19.

NOTE: In all situations, Type 25 mortar may be replaced with Type 35 mortar.

NOTE: Tests in BS EN 13892-2 for compressive and flexural strength and BS EN 13412 for modulus of elasticity need to be made concurrently in the same testing facility, which has UKAS accreditation or equivalent for one or more of the tests.

NOTE: Factory production control testing may be carried out in the producer's own laboratory.

Site-batched non-proprietary bedding mortar

For traffic categories 1 to 4, site-batched non-proprietary mortars can also be used.

NOTE: Typically a mortar comprising 1:4 Portland cement-aggregate (proportions by volume) is used.

Bonding mortar for bound surface construction

Bonding mortar is necessary in Bound system B. It is a mix of cementitious binder and fine aggregate; it should not contain chemical admixtures which could reduce the water permeability of the cured bonding layer.

It should be applied as a liquid slurry with a thick creamy consistency to the underside of the blocks to provide better adhesion with the bedding mortar.

A site batched bedding mortar can be substituted for Bound system A in traffic categories 4 and below.

Jointing Materials for Bound Surface Construction

Proprietary jointing mortar

The maximum aggregate particle size should be not greater than 40% of the joint width. The material used for jointing should be a cementitious slurry grout conforming to **Table 3**.

Table 3

Jointing mortar characteristics

Characteristics	Performance	Performance
	Type 25 jointing mortar	Type 40 jointing mortar
Compressive strength ^{A)}	≥25 MPa	≥40 MPa
Flexural strength ^{A)}	≥3.5 MPa	≥6 MPa
Modulus of elasticity ^{B)}	(18 000 ±4 000) MPa	(20 000 ±4 000) MPa
Shrinkage ^{C)}	≤0.15%	≤0.15%
Adhesive strength ^{D)}	≥1.0 MPa	≥1.5 MPa
Frost/salt resistance class ^{E)}	≤1 500g/m ²	≤1 500g/m ²

^{A)} Measured in accordance with BS EN 13892-2 after 28 days.

^{B)} Measured in accordance with BS EN 13412 after 28 days.

^{C)} Measured in accordance with BS EN 12617-4:2002, Clause 6 after 56 days with curing in accordance with BS EN 12617-4:2002, A.1.2.

^{D)} Measured in accordance with BS EN 13892-8 after 28 days

^{E)} Measured in accordance with CEN/TS 12390-9 after 28 cycles (CDF Test)

NOTE: Factory production control testing may be carried out in the producer's own laboratory.

Site-batched non-proprietary bedding mortar

For traffic categories 4 and below, site-batched non-proprietary jointing mortar can also be used.

NOTE: Typically, a mortar comprising 1:3 Portland cement-aggregate mortar (proportions by volume), using fine aggregate conforming to BS EN 12620, GF85 0/1 (MP) is used.

Suitable types of jointing mortar for different traffic categories

A Type 25 jointing mortar may be used for traffic category 3 and below.

A type 40 jointing mortar should be used in traffic categories 4 to 7 and may also be used in traffic categories 1 to 3.

Proprietary bedding, priming and jointing mortars.

Proprietary bedding and jointing mortars are now used frequently. There are numerous manufacturers of these products which meet the requirements of BS 7533.

Always follow the instructions provided by the mortar manufacturer.

Joint width

For bound surface construction, joint widths should be between 6 mm and 10 mm.

Management of moisture in the pavement structure

Where the base layer is impermeable or has low permeability, a drainage system should be included to prevent the accumulation of water within the laying course which can lead to pavement failure and frost damage.

NOTE: The use of 50 mm diameter holes on a 2 m grid and at low points can be used to provide secondary drainage through bound base layers. Weepholes within edge restraints and linear drainage systems may also be considered to allow water to escape from the laying course.

Abrasion resistance

In areas subject to normal pedestrian and vehicle use (e.g. public footpaths and roads) the minimum abrasion resistance should be Class 3 in accordance with BS EN 1339:2003, Table 6.

In areas subject to light pedestrian and vehicular use (e.g. gardens, drives) the minimum abrasion resistance should be Class 1 in accordance with BS EN 1339:2003, Table 6.

Movement joints

Changes in temperature and moisture content can cause stresses on the pavement. To dissipate these stresses movement joints should be incorporated into bound pavements.

Movement joints in the base course should be aligned with movement joints in the surface course to ensure that all layers can move together and be unconstrained by adjacent areas of pavement.

Expansion joints

Expansion joints should be included within the base and surface course layers at spacings of up to 80m where construction is undertaken during winter months and up to 160 m where construction is undertaken at other times.

Consideration should also be given to the inclusion of expansion joints at changes in gradient where an accumulation of stresses could cause buckling.

Expansion joints should be in accordance with BS 7533:101:2021.

Isolation joints

Isolation joints should be provided between rigid bound pavements and adjacent features (e.g. buildings and drainage channels) to prevent load transfer.

Installation

Installation should be in accordance with BS 7533 Part 7.

The guidance below is a basic version of the comprehensive information contained in BS 7533:7:2010 and therefore should be considered guidance for the bound installation of concrete block pavements.

Bound installation is best carried out by an experienced paving installer who is familiar with this process.

Laying course

The laying course material should be uniform in thickness. It should not be used as a regulating course or to achieve falls. The laying course thickness after compaction should be 40 mm.



Installing The Blocks

For Bound system B, the underside of the blocks should be cleaned and then coated with bonding mortar prior to installation.



Blocks should be placed by hand onto the prepared laying course and tapped into place using a paviours maul.



The laying course material should rise upwards into the joint. Minor adjustments necessary to maintain the laying pattern should now be made. A laying method which maintains an open laying face, should be used.

String lines should be used regularly to check alignment and level of paving units.

The surface of the paving unit should be cleaned regularly to remove any excess material that may stain by entering the surface texture.

Joint filling

For bound installation joint filling usually occurs 12-24 hours after the blocks have been laid.

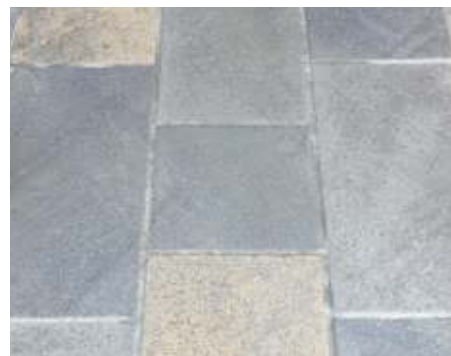
Slurry Mortar Jointing



Joints should finish 3 mm below the pavement surface. Completely soak the entire area to be jointed with clean water and spread the mortar slurry over the area.



Use a squeegee to move the slurry over the surface and ensure that all open joints are adequately filled.



As much of the excess slurry should be removed from the surface and the joints should then be given time to firm up.



Once the joints have begun to firm up any jointing slurry remaining on the surface of the flags must be washed off carefully taking care not to wash material from the joints. For best results use a sponge grout roller machine.



Alternatively a pressure washer can be used with care.



Important: Slurry jointing mortars begin to set quite quickly allowing the paving to be cleaned shortly after jointing is complete. Determining the optimum time to allow the joints to start to set whilst still being able to remove the excess material is crucial. If left too long it will become much more difficult to clean off and there is a risk of staining the blocks permanently. Temperature and humidity will also affect the setting time. On very hot days, it may be best to leave jointing until late afternoon.

We would strongly advise the construction of a trial panel to determine the optimal time to leave the mortar before removing.

Disclaimer

This guidance has been produced in good faith, however no warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by Tobermore Concrete Products Ltd in relation to the adequacy, accuracy, completeness or reasonableness of this guidance.

All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This guidance is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use.

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

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.

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.

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.

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 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:

Where 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 dry's 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 facing bricks should have vertical movement joints included every 6m to allow for drying/shrinkage, see PD6697:2010 section 6.2.6.3.4, maximum ratio for brickwork panels is to be 3:1 length : height. PD6697:2010 section 6.2.6.4 gives advice on joint positions, the benefit of brickwork reinforcement at window openings is covered in section 6.2.6.7 of 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 aesthetic of the building is maintained.
2. It is important to ensure that the mortar specified for the construction is suitable for the contract, see table 15 of PD6697:2010 - class M4 is the maximum recommended for normal external facing brick walls. This should not be exceeded when using Tobermore Concrete facing bricks.
3. We would recommend that you discuss this guidance with all parties involved in the design, construction and installation of this scheme. We also recommend that you refer to BS EN 1996-1-1 and PD6697:2010.
4. Specific professional advice should be obtained at all times before commencing building work.

Important Guidance Information: Tobermore Concrete Facing

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 BS EN 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.