



MUDRAK & SONS
The Surface Specialists

LARGE FORMAT SLABS

INSTALLATION GUIDE

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Delivery

The delivery vehicle will be a 14 or 18 tonne commercial 'curtainsider' or a 26 tonne 'Hiab' crane lorry. Due to the weight, the delivery lorry is not able to enter driveways or proceed off the public highway.

You are advised to contact our After Sales department with regards to the following:

- To request an estimated time of arrival on the day of delivery.
 - To arrange a time specific (AM or PM) delivery. (Additional charges may apply.)
 - To reschedule the delivery date please give at least 24 hours notice by way of email (Excluding Saturday, Sunday and public holidays).
 - To change or amend the delivery address or site contact number prior to the delivery date.
 - To inform us of any road restrictions or any special requirements prior to the delivery date.
- Note deliveries are made using a 14 or 18 tonne vehicle and that the road surface needs to be suitable for such a vehicle. In the case of EPAL Euro pallets, there needs to be a flat tarmac surface (or similar) in order for the pallet truck to function correctly. Pallet deliveries will be made to the kerbside only.
- To report a failed delivery.



Large format slabs will be delivered on an 18 tonne 'curtainsider' truck



Please inform us of any road or parking restrictions or any special requirements prior to the delivery date.

'A' frames

Deliveries of large format tiles (which includes formats with dimensions 1500 x 1500 mm and above) are made using wooden 'A frame' racks. These 'A Frames' are extremely heavy and have dimensions of 312 x 74 x 191 (H) cm. A maximum of 50 slabs (25 each side) can be delivered on each frame. With the wooden frame itself weighing 220 kg and each individual porcelain slab weighing up to 60 kg, a single 'A frame' might weigh over 3000 kg.



'A frame' dimensions 312 x 74 x 191 (H) cm



Supporting up to 25 slabs per side

The 'A frame' will be off-loaded from the truck and placed at the kerbside for unloading. We highly recommend that tiles are taken directly to the area of installation and that a specialist tile handling frame is used.

Please note that typically the wooden 'A frames' are for transport only and, unless prior approval has been given, will not be left on-site.

Slabs should be removed from the 'A Frame' individually using the handling frame. Carefully wipe the surface of the tile to remove any dust or moisture. Move the handling frame into position and attach the handling frame using the suction pads to the surface of the tile. Ensure that the suction pumps are at suitable pressure and the frame is securely fixed before attempting to lift the tile.

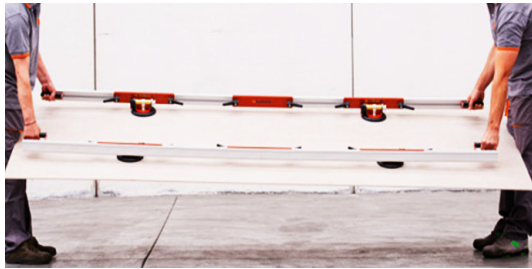


Porcelain slabs are extremely heavy and may have sharp edges. It is therefore necessary to wear protective gloves at all times.

Handling Large Format Slabs

Large format porcelain slabs are extremely heavy and may have sharp edges. It is therefore necessary to wear protective gloves at all times. For safe handling of large format slabs on-site we highly recommend the use of a specialist tile handling frame with suction cups, such as the Raimondi Easy-Move. These frames help to maintain the integrity of the tile and ensure that operators' safety is not compromised.

Carefully wipe the surface of the tile to remove any dust or moisture, position the suction cups on the face of the tile and make sure that they adhere to the surface properly. For larger formats the full frame with four suction cups is suitable, use two double suction cups with smaller formats.



Four suction cups



Two double suction cups



Always use handling frame to manoeuvre slabs

To remove the handling frame from the tile surface, first ensure the tile is stable, then support the weight of the handling frame and press all the suction release valves in turn.



Suction cups attach to the face of tile and not the rear. Always follow the manufacturer's instructions.

Preparation

Health and Safety

We recommend that a risk assessment is undertaken prior to all works involving large format tiles. This assessment should include evaluating the number of trades-persons required to both transport and install the tiles. It should also include an assessment of the correct equipment required to lift and carry large format tiles whilst on-site and during transportation to the site. It should also consider the correct use of Personal Protective Equipment when cutting and fixing the tiles.

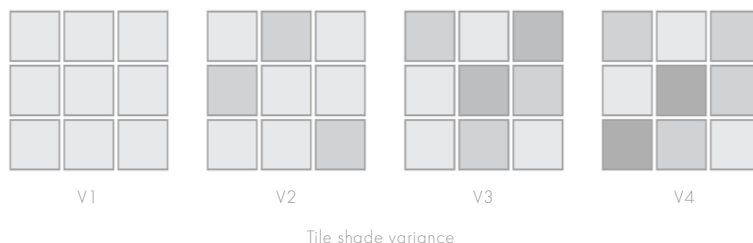
Design Considerations

The amount of cutting required and wastage caused by a particular tile layout should be considered during the planning stage. Careful planning can mitigate these issues and keep wastage and cutting to a minimum.

In addition, for projects requiring the fitting of sanitary ware or other permanent fixtures, consideration should be given to whether the tiles should be fixed first in order to reduce wastage and the requirement for cutting.

The surface flatness of the finished tiling should be true such that, when checked with a 2m straight-edge with 3mm thick feet the straight-edge should not be obstructed by the tiles and no gap should be greater than 6mm.

Take time to consider how the tiles can best be laid out to maximise aesthetic appeal and/or minimise cutting. The tiles should be well shuffled by drawing tiles from all the boxes. If possible dry-lay an area in suitable light as a final check before installation. Tiles should be arranged to obtain the best aesthetic result, especially if using a tile with a shade variation over V2.



Subfloor

Porcelain tiles are suitable for use with underfloor heating as well as floating, insulated and acoustic separating floors. Your subfloor must be level, in good condition and of appropriate thickness. It should be rigid, non-flexing and capable of supporting the expected load with minimal deflection. It must be stable, well supported, ventilated underneath and level. A level subfloor is extremely important in order to keep tiles from cracking. Use a levelling compound on low spots or sand high spots. Finally ensure your subfloor is dry and clean.

Floor Substrates

The installation of a suitable substrate is essential. Your substrate must be prepared in accordance with the British Standards and Codes of Practice BS 5385 Parts 1 and 3 and BS 8000 Part 11. It must be totally flat and free from contamination including wax and oils and other impurities that might prevent adhesion. Holes and leaks in the substrate should be sealed. Floor drains etc. should be protected. Sub-floors should be laid to a minimum of Surface Regularity SR1. If the surface does not meet these criteria, this must be communicated to the appropriate parties and made suitable before tiling. The installation of movement joints will generally be required according to British Standard BS 5385: Part 3. Substrates that are considered suitable for large format tiles include floor screed (sand/cement), concrete or specialist tile backer board. Timber is no longer considered a suitable substrate for large format porcelain tiles.

Wall Substrates

Substrates that are considered suitable for large format tiles and panels are listed in the table below. Existing tiling or paint should not be considered suitable for fixing large format tiles and panels. For following figures are only a guide as some boards may be capable of greater weights. You are encouraged to consult with the manufacturer for confirmation. Wall substrates should be in accordance with the requirements of British Standard BS 5385 Part 1.

WALL SUBSTRATES	MAXIMUM WEIGHT OF TILING PER M ²
Gypsum plaster	20 kg
Gypsum plasterboard (12.5mm thickness)	32 kg
Gypsum fibreboards	40 kg
Glass reinforced cement-based boards	50 kg
Lightweight foam-cored tile backer boards	60 kg
Cement/sand rendering	Typically no restriction



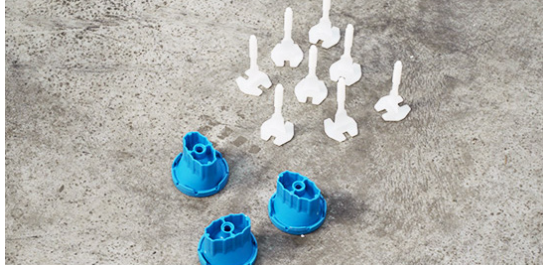
Please note that timber is not considered a suitable substrate for large format porcelain tiles.

Avoiding Lippage

Lippage is the difference in height between adjacent tiles. There are permissible manufacturing tolerances for porcelain tiles as defined in BS EN 14411, therefore laying tiles in a staggered pattern should be carefully considered due to any slight curvature of large format tiles, which, although within manufacturing tolerances, may result in lippage.

We recommend that any deviation between adjacent tile surfaces, should be no greater than 1 mm for joints less than 6 mm wide, and no greater than 2 mm for joints wider than 6 mm.

The contributing factors to what causes tile lippage are how much warpage the tile has, the width of the grout, how flat the substrate is, and the expertise of the tile installer. In order to ensure a uniform surface and produce a surface with acceptable lippage, make use a levelling system and frequently check that your tiles are even using a suitable box level. Levelling systems are available with 1 mm, 2 mm and 3 mm tile spacers. (It should be acknowledged that levelling systems may reduce the solidity of the tile bed.)



Tile levelling system

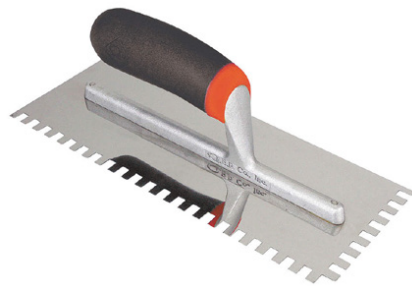


If installing over underfloor heating, ensure the heating system remains off while the tiles are fixed and until the adhesive and grout have fully cured.

Fixing

Correct preparation of the subfloor or laying surface is crucial. The laying surface should be rigid, non-flexing and capable of supporting the expected load with minimal or no deflection. A level subfloor is extremely important in order to keep tiles from cracking. Sanding high spots and the use of a levelling compound on low spots is essential. It is also important that your tiles are clean and dry, if necessary wash them with clean water and dry them thoroughly before fixing.

Whatever your specific requirements, selecting the appropriate cement-based, fibre-reinforced or ready-mixed adhesive is vital to ensuring the success of your project. Adhesive must conform to British Standards EN 12004.



10 mm square toothed trowel

Once your subfloor is clean and dry, spread the adhesive on the surface to be covered with a 10 x 10 mm square toothed trowel, covering an area 5 – 10 cm more than the size of the tile. Always apply the adhesive in stripes running parallel with the short edge to remove air pockets and bubbles. By using this method, full coverage of the tile with adhesive is ensured.



Apply adhesive in stripes running parallel with the short edge

Back-buttering

Large format porcelain slabs always require back-buttering. Back-buttering describes the process of applying a layer of adhesive to the back of the tiles using a trowel.

Using a specialist wheeled transport cart, fix the large format slab in a vertical position on the handling frame with the use of suction cups. Use a 10 x 10 mm square toothed trowel for applying your adhesive to the wall or floor and when back-buttering use a 3 x 3 mm square toothed trowel for the back of the tile. The sum of the two trowels notch sizes should equal or be greater than 13 mm (3 mm + 10 mm = 13 mm).



Wheeled transport cart



Back-buttering on transport cart

Using the handling frame with suction cups, bring the slab into a vertical positional and slowly lower it to horizontal. The tile should be firmly pressed into the adhesive along a straight edge, collapsing all adhesive ridges. Use a levelling system to avoid lippage and frequently check that your tiles are even using a suitable box level. Levelling systems are available with 1 mm, 2 mm and 3 mm tile spacers.

Periodically check the tiles backs to make sure there is full contact between the adhesive and tile. If not apply additional adhesive to the tile or use a troll with larger notches in your adhesive. As you are working wipe off excess mortar with a wet sponge.



Please note that under no circumstances should the 'dot and dab' technique be used with porcelain tiles.

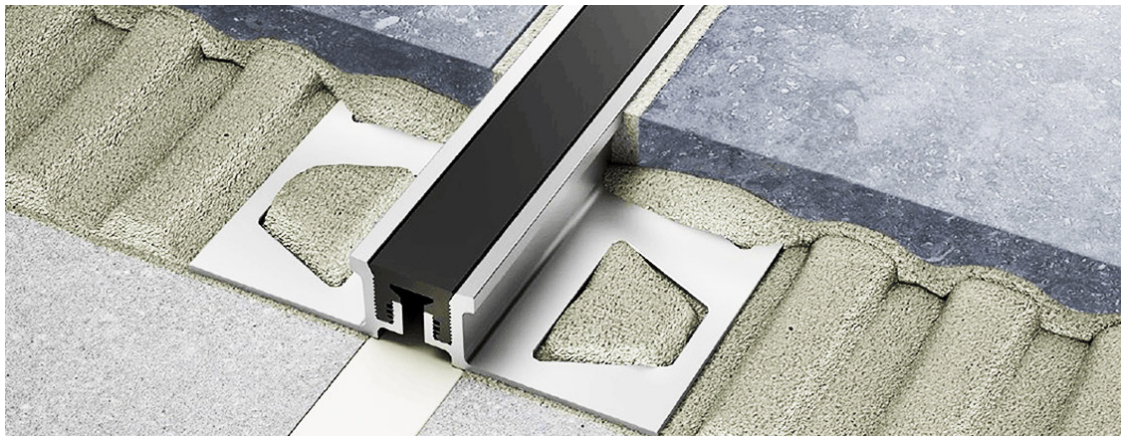
Movement Joints

All tiles will expand and contract due to changes in temperature and moisture, and almost all substrates will move differently to their coverings. Referred to as a movement joint, expansion joints are used when tiling large areas to break up the tile bed in to separate sections. Using an expansion joint allows each block or section to move independently from the others.

The provision of movement joints should be considered during the design stage of all projects involving large format tiles. Background movement due to factors such as thermal changes, moisture and drying shrinkage can cause loss of adhesion or cracking, but can be mitigated by the correct provision of movement joints.

Construction materials, bedding systems, anticipated temperature and humidity conditions should all be taken into consideration when planning movement joints. Movement joints should be installed at the perimeters of rooms, thresholds and where the tile bed meets other constructions. They should also be installed at changes in background construction and to divide up large expanses of tiles as recommended in BS 5385 Part 3. Sealants should be used for movement joints in flooring applications according to BS EN 15651 Part 4.

For wall tiling applications, movement joints should be installed where the tile bed meets other materials, or is continuous across junctions of different background materials. They should also be installed over any existing structural movement joints. Movement joints should also be installed at internal vertical corners and where stresses are likely to be concentrated. Refer to BS 5385 Part 1.



Movement, expansion or stress relieving joint

Cutting

Porcelain tiles require high quality diamond blades for cutting; if hiring cutting equipment please ensure this is provided with the appropriate blades. Always cut and fabricate with wet diamond tools and take appropriate measures to provide efficient ventilation in the work area. Always wear approved eye, boot & hand protection when fabricating porcelain.

Linear cuts

For most cuts we recommend the use of a wet saw machine. These are available for cutting lengths of 100 mm up to 2200 mm. The Raimondi Bolt range of bridge wet saw machines are available in various lengths.



Wet saw machine

For linear cuts of 1500 - 3000 mm we recommend the use of a cutting guide with cutting carriage. Always use a handling frame with suction cups where necessary. The Raimondi FREE-CUT Cutting System is available for lengths up to 4000 mm.



Cutting guide



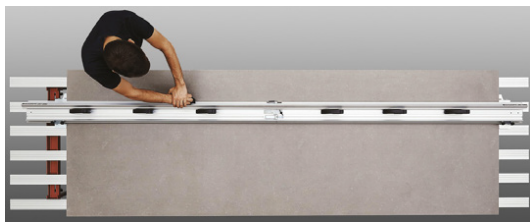
Cutting carriage



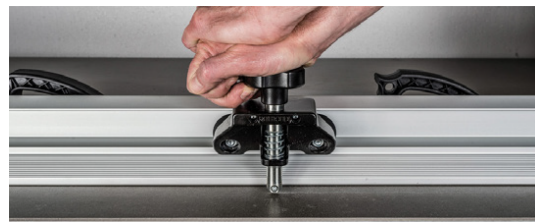
Always wear approved eye, boot & hand protection when fabricating porcelain tiles.

Using a cutting guide with cutting carriage

Mark the portion to be removed at the ends of the tile with a pencil. Position the cutting guide with cutting carriage so that the references on the guide coincide with the lines marked on the panel. Lock the cutting guide with the cutting carriage in place using the suction cups. To guarantee correct scoring, the pressure and movement of the cutting carriage must be constant along the whole length of the cut. Score one end of the panel by 15cm pushing the cutting carriage towards the edge of the panel. Complete the scoring up to the opposite end of the panel.



Cutting guide



Cutting carriage

Using the cutting guide, move the panel until scoring line protrudes 5-10 cm from work surface. Release the cutting guide from suction cups and move towards the middle of the panel. Start cutting off process by positioning cutting-off pliers in line with the line scored on the panel. Exert progressive pressure until you notice that cutting off process has begun. Go to the opposite end and position cutting-off pliers in line with line scored on the panel. Exert progressive pressure until you notice the cutting off process has begun. To complete the cutting off process, one or more operators must grip the portion to be removed and exert progressive pressure.

Sharp or rough edges should be smoothed and finished with a diamond buffer or sanding pad.



Cutting-off pliers



Diamond buffer



Always follow the manufacturers instructions of the particular cutting system you are using.

L-shaped cuts or cut-outs

It is necessary to process the tiles on a flat work surface, at least 5 cm longer than the tile from each side. For L-shaped cuts (holes for electrical boxes, internal corners) you must round off the internal angle by making a hole first with a suitable wet diamond core drill bit. Mark the portion to be removed on the panel. To limit the possibility of breaking, please ensure you drill a pilot hole in line with the point where the two lines marked on the panel meet.

Rectangular holes

Mark the area on the panel to be removed. Make 0.7 mm holes in the 4 corners using a water cooled drill with a diamond core drill bit. Using an angle grinder equipped with a diamond blade join the 4 holes. Run the diamond cutting blade along the marked surface cutting the tile. Sharp or rough edges should be smoothed and finished with a diamond buffer or sanding pad.

Drilling Holes

Due to their inherent strength drilling holes in porcelain tiles can be a difficult task without the correct equipment. It is recommended to process the slabs on a flat work surface, at least 5 cm longer than the slab from each side or double suction cup. One operator is sufficient for cutting the holes. Normal masonry or tile bits will not work.

We highly recommend the using a water-cooled drill with a diamond core drill bit. For drilling smaller holes we advise using a drill guide to prevent the drill bit from wandering. Support the tiles over the entire surface, preferably on a wooden base. Always use a support tool to help fix the drill, for example a drill support with suction pads. Small diameters must be drilled at a high speed, larger diameters at lower speeds. Do not use a rotary hammer, roto-drill, hammering drill or any other rotary drill with hammering action.

Grouting

A suitable cement based grout according to BS EN 13888 should be used in normal situations. High-performance products are available for all applications, from domestic bathrooms through to commercial swimming pools. Most cement based options come in powder form, but epoxide or acrylic resin based pre-mixed grouts are also available. Whichever option you choose follow the manufacturer's instructions on how to mix or prepare the grout. Specialist products are available for specific applications requirements including interior, exterior, floor, wall, assorted joint widths, wet areas and swimming pools and can also be specified in an assortment of complimentary and contrasting colours.

Epoxy or Epoxide based grout provides a hygienic, chemically resistant joint and offers greater bond strength than cement based grout. It does not require sealing and is easier to maintain and clean. However please note that using an epoxy based grout requires a different installation process than using regular cement based grout, from mixing to application to cleaning, and that improper application can cause serious problems. Please ensure that your tiling professional has experience with this type of product.

Prior to applying grout allow the tile adhesive to cure according to manufacturers instructions. Ensure that the grout joints are clean, dry and free from adhesive, dirt and other loose debris. It is advisable to grout and clean a small test area prior to grouting the whole floor. This will give you the opportunity to check that you are happy with your chosen grout colour.

The instructions provided by the manufacturers of grouting materials for polished or honed surfaces must be carefully followed and installation times and above all cleaning instructions must be abided by. Grout the tiles with a suitable grout in accordance with the manufacturer's instructions.

Take care to fully compress the grout into the full depth of the grout joints so that no air pockets exist and the joints are fully filled. After applying the grout, leave for approximately 20 minutes or until it has hardened, before cleaning the excess grout with a wet sponge and haze remover. Work in manageable areas and clean off any residues when the grout has begun to firm up in the joints, but before it sets on the tile face. After grouting do not walk on the floor for at least 24 hours.



To allow for expansion and contraction during normal heating and cooling cycles, perimeter joints must be finished with silicone sealer, not with grout.

Sealing

Porcelain tiles are UV, scratch, stain and thermal-shock resistant and 100% non-porous and therefore do not require sealing products. But while porcelain tiles are non-absorbent and stain resistant, the grout that surrounds the tile may not be. Cement based grout is a porous product that can absorb water and stain. We therefore advise that all cement based grout joints are protected using a dedicated grout sealer.

Spray the sealer directly onto the clean and dry surface at a distance of roughly 10-15 cm away from the application point. Rub into the grouting with a sponge to improve penetration. Fully remove any residues within 5 minutes, either manually using a clean cloth or absorbent paper towel. Treat a small area at a time (1m²). The floor can be walked on after 8 hours. Any remaining residues on the surface can be removed with a mild cleaning solution.

For most grouts, sealers will not affect its appearance, but we recommend testing the sealer on an inconspicuous area 24 hours before you do the rest of the grout to check for colour fastness. Carefully apply the sealer onto the grout following the manufacturers instructions.

Take care to only saturate the grout with the sealer, not the porcelain tiles. If some sealer does get on the porcelain, wipe it away immediately with a soft cloth. If this is the first time you have sealed the grout, apply a second coat of sealer at this time. Once the second coat has penetrated, wipe away the excess grout with a lint-free cloth. Continue buffing the grout and the tiles until they feel dry and not tacky to the touch. The sealer will be fully effective after 48 hours, protect the surface against water, oil, etc. during this time.

We recommend grout sealing products from Fila Solutions and Lithofin.



Porcelain tiles are UV, scratch, stain and thermal-shock resistant and 100% non-porous and therefore do not require sealing products.

Cleaning

Porcelain tiles are manufactured from extremely pure clays and minerals that are fired at very high temperatures. They are harder, stronger and more durable than any natural stone and have superior chip resistance and an extremely low level of water absorption. A comprehensive cleaning routine will help to keep your tiles in tip-top condition and ensure their continued beauty for years to come.

Post-laying cleaning is critical after on-site works. Inadequate or delayed removal of the grouting used on the joints can leave marks that are difficult to remove and creates a cement film that can absorb all types of dirt, giving the impression that the tile surface has become dirty.

To remove cement based grouts, wash the floor with specialist cleaning detergent which is aimed at removing excess grout residue, post-application deposits and building grime. Always follow the manufacturers instructions. For stubborn stains or advice on specific detergents contact our After Sales department.

General cleaning of porcelain tiles is a relatively simple process. Regular cleaning (once or twice weekly) is the best way of preventing a build-up of dirt and unsightly stains. This can be accomplished with a simple sweep and vacuum to remove debris, followed by mopping sparingly with warm water. Dry with a microfibre cloth and if your surface is polished, buff to restore the brilliant finish.

Before using any new cleaning product or method, make sure to test it on a small, inconspicuous area of tiling first. Avoid using excessively acidic or basic products, and do not use abrasive sponges. We do not recommend the use of polishing machines or waxes.

Although porcelain tiles are stain resistant, care must be taken to immediately clean any stain, especially on polished bench tops. The best way to ensure stubborn marks do not occur is to wash away stains such as red wine, food and drinks, using warm water and a soft cloth. For stubborn stains use a non-abrasive cleaning product, sugar soap or normal house cleaning products. Do not use cleaners that have strong alkaline pH levels and thoroughly rinse the surface with clean water to remove residue. It is also important to note that hydrofluoric acid (HF) and its derivatives can irreparably damage porcelain stoneware.

We strongly advise against the use of waxes, oily soaps and impregnating products as their application is unnecessary. Please note that some off-the-shelf detergents contain waxes and additives which can deposit a shiny coating on the surface, affecting the slip resistance properties of the tile.

We recommend cleaning products from Fila Solutions and Lithofin.



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