



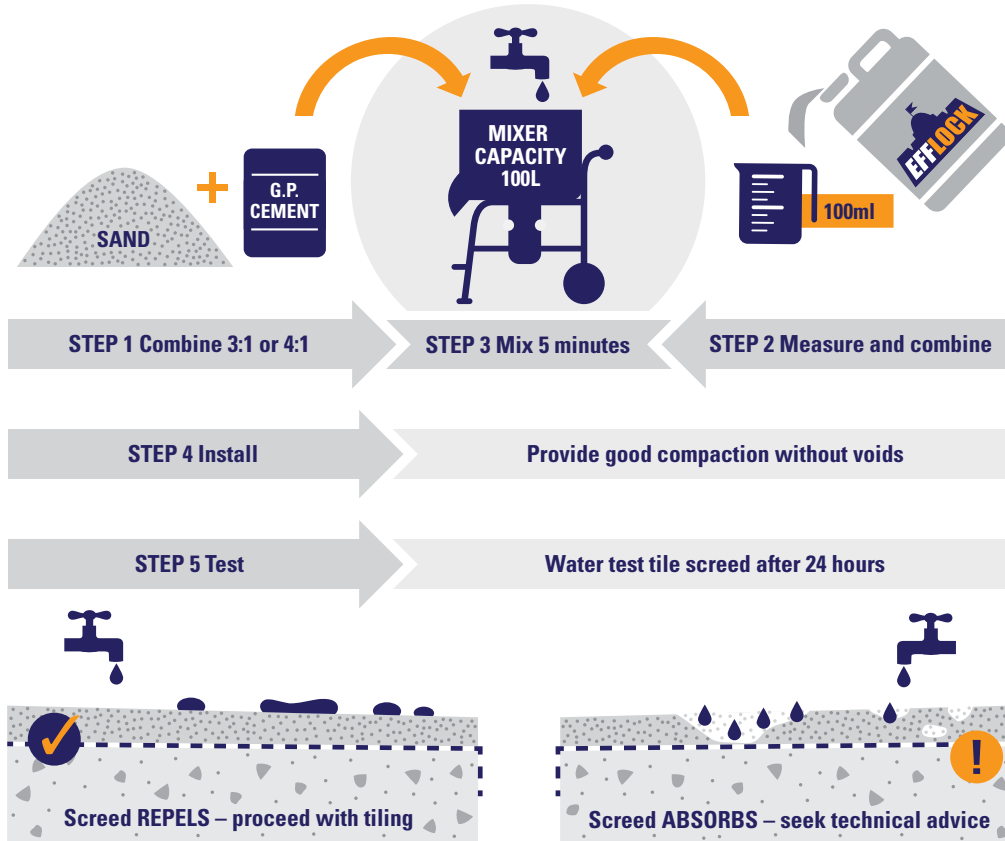
TECHNICAL DATA SHEET

18 NOVEMBER 2016

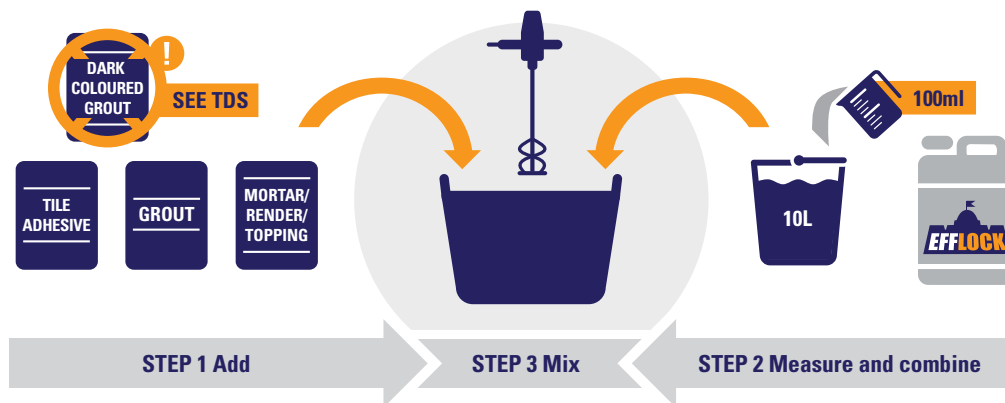
QUICK REFERENCE INSTRUCTION SHEET

Mixing tile screed

Sand from the building yard has unknown moisture content. To not exceed 1:100 dilution, add Efflock neat, and water to desired consistency as per this guide:

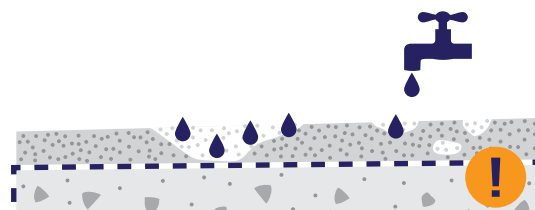
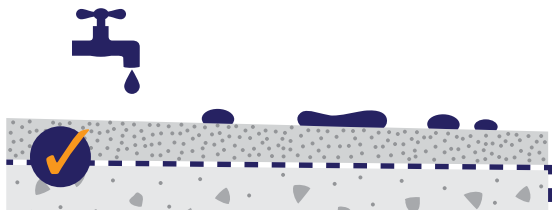


Mixing adhesive, grout & other bagged products



Efflock is a high performance, water based, VOC free, liquid additive designed for the bulk impregnation of cement based building materials to protect against efflorescence and damp.

By controlling water absorption, efflorescence is locked and the potential for waterproofing failure is dramatically reduced.



The hydrophobic effect of Efflock:

- Prevents capillary action that can lead to waterproofing failure.
- Repels waterborne contaminants like dirt and salt, resulting in a cleaner appearance with excellent resistance to salt attack, and concrete cancer.
- Provides fast evaporative function to inhibit moss and mould growth.
- Provides unique protection against picture framing and/or crypto florescence.

Efflock can also be used as a high performance impregnating water repellent sealer for concrete, brick and sandstone (see *Hydrophobic Sealer for Masonry*, page 10).

The Efflock Technology

The Efflock additive creates a hydrophobic molecular structure within the pores of cured concrete without filling the pores of the material. The product dramatically reduces water absorption whilst remaining permeable to allow the controlled release of any moisture. Efflock provides bulk impregnation to protect concrete throughout the entire mass, so that performance is not affected by traffic wear or movement cracks.

WHERE TO USE EFFLOCK?

- Bathroom tiling
- Balconies, patios and stairs tiling
- Stone and concrete paving
- Stonemasonry
- Brickwork
- Pool surrounds
- Render
- Off-form concrete
- Construction in saline soils
- Protection against freeze / thaw damage
- Concrete pavers and blocks manufacturing
- Post tension concrete reinforcement pockets
- Impregnating sealer for concrete, brick and sandstone

WHY USE EFFLOCK?

- Excellent additional barrier to a waterproofing system to promote drier, healthier wet areas.
- Complete efflorescence protection for a tiling system – compatible with tile beds, tile adhesive and grout.
- Negates the practice of installing a secondary membrane, saving around 80% cost and faster construction.
- Protects against picture framing and crypto florescence in stone, brick and concrete.
- Water based, environmentally friendly, VOC free.
- Concentrated formula dilutes 100 times for convenience, minimal plastic waste and minimal transport impacts.
- Prevents absorption of damp, salt attack and frost attack.
- Invisible bulk impregnation of the entire concrete mass.
- No detrimental effect towards adhesion of paint, adhesives and other finishes.
- Good workability.
- Improves curing.
- Permeable to vapour and UV stable.

TILING

Always observe applicable tiling, waterproofing and building standards.

Before tiling, consider all potential sources of efflorescence. In addition to tile screed, tile adhesive and grout, this could include (and may not be limited to) adjacent bricks, blocks, render, structural concrete, and the tiles or pavers themselves. Problems can be avoided with careful design and selection of materials.

Substrate

Concrete substrates should be sufficiently cured and aged to mitigate shrinkage. Falls for wet areas should be provided within the substrate wherever possible to provide fall for the primary waterproofing membrane and/or to maintain a more even tile screed thickness. Any negative fall or ponding areas on structural concrete should be rectified with a bonded screed prior to waterproofing. If a screed is to be bonded to a concrete slab, then a traditional cement slurry should be used. Both the bonded screed and slurry layer can be mixed with Efflock to repel potential rainwater absorption during the construction process.



Timber frame and cement sheet structures should be constructed to fall. Tile screed should be reinforced and un-bonded with a separation layer. Tile screed may be able to be omitted altogether by expressing sheet joints throughout the tiles with caulked expansion joints or by bridging lateral movement cracks with a decoupling system (subject to manufacturers' recommendations).

Waterproofing membrane(s)

The overall design, number and position of waterproofing membranes can vary across regions and with individual preference. Waterproofing membranes should be installed according to relevant standards and manufacturers' instructions. A membrane should be selected with consideration towards function, durability, flexibility and bonding compatibility. Materials containing Efflock are suitable for the normal adhesion of membranes.

Secondary membranes for the purpose of efflorescence control above a screed are not required when a screed has been installed correctly using Efflock (which can save around 80% cost). However, if a primary or secondary membrane is to be installed above a screed, Efflock provides a major advantage by repelling rainwater during construction. This can be a major time saver in reduced weather delays, and eliminates potential problems associated with trapping moisture in a screed beneath a waterproof membrane.

Screed

The sand to cement ratio for screed should be either 3:1 or 4:1 in compliance with tiling standards. Always use Type GP cement, washed sharp sand and clean fresh water. Be aware that sand from the building yard already contains a variable amount of water that will further dilute the Efflock additive. For this reason, we recommend the use of a screed mixer wherever possible. Efflock should be added neat to each batch, measured in proportion to the volume of your screed mixer (refer to our info graphic instructions on page 1). Additional water can then be introduced to reach desired consistency. This method ensures enough Efflock in each batch regardless of moisture variance.

If mixing screed by hand, Efflock should be pre-gauged with water in a bucket to assist with achieving uniform dispersion. However, an estimate needs to be made to increase the ratio of Efflock in proportion to water, to compensate for water already in the sand. (i.e, 1:80 or 1:50 dilution may be required). Thorough mixing to ensure uniform dispersion is essential for both mechanical and manual methods.

Efflock will produce a lubricating effect in tile screed that will feel different to a usual mix. It also

has a water reducing effect and can have a slight accelerant effect. If a tile screed mix is sticking to tools, or is dragging and difficult to work, try reducing the usual amount of gauging water.

If a substrate has been exposed to atmospheric salt, thoroughly rinse the substrate prior to laying screed.

When placing the screed, thorough compaction without voids and a quality wood float finish is essential. An external screed should not be attempted if any rain is likely before the initial set, and if heavy rain is likely in the first 24 hours. Tile screed should be protected from early drying out, particularly in sunny conditions using shade, and damp hessian or polythene sheeting. As with all concrete, screed should be damp cured for 7 days, and allowed to dry and stabilise for 2 weeks prior to tiling. A thorough curing process will help to mitigate the potential for curling. Any shrinkage cracks that appear in a screed during the drying process should be filled using tile adhesive mixed with Efflock, and pressed firmly into the cracks with a trowel.

Supervisors should sprinkle water over a screed to 'water test' prior to tiling to ensure Efflock has been used correctly in every batch. A screed containing Efflock will exhibit strong water repellency.

Cement slurry

If a cement slurry is to be used to wet bed tiles or stone, or to bond a screed to a substrate, ensure the slurry is also mixed using Efflock in the gauging water. Latex additives may be required to promote adhesion for certain materials such as porcelain tiles. Latex will delay the hydrophobic function of Efflock for approximately 6 days, other than that, the products are compatible. Slurry coats should provide a thin bonding layer incorporated with the screed.

Tile adhesive

If a substrate has been exposed to atmospheric salt, thoroughly rinse the substrate prior to laying tiles.

Cement based tile adhesives do contribute to efflorescence in tiling, and should be mixed with Efflock. At the time of publication, Efflock has been approved for use with Novatex Products and Davco tiling products (contact us for the latest information on testing).



Efflock should be premixed with water at a ratio of 1 part Efflock to 100 parts water to use as the gauging water for tile adhesive. The design rate of water should be observed as recommended by the manufacturer. Efflock can have a water reducing effect, so less gauging water may be needed than usual in order to maintain desired workability.

Tiles should be installed with minimum voids in the adhesive layer (i.e. >90% coverage as per tiling standards).

Rain exposure to a tiling installation prior to grouting and caulking of joints should be avoided. The latex content of tile adhesives can delay the hydrophobic effect of Efflock by approximately 6 days, meaning that efflorescence can potentially migrate from the adhesive during that period. If rain does get into the adhesive notches beneath the tiles, it should be extracted with a vacuum cleaner and allowed to thoroughly evaporate prior to grouting and caulking.

Tile grout

Proprietary grout and site-made grout can both produce efflorescence, so each should be mixed with Efflock at 1:100 dilution. The hydrophobic effect helps to keep water above the tiles rather than easily absorbing into grout joints. The design rate of gauging water should be observed as recommended by the manufacturer. Efflock can have a water reducing effect, so less gauging water may be needed than usual in order to maintain desired workability. Grout should be protected from early moisture loss as with any concrete. Grout joints should be filled without voids and finished flush with the surface of the tiles whilst being careful to avoid laitance by over sponging.

Dark colours in proprietary grouts are known to have problems with patchy appearance and long-term colour retention. Efflock does not prevent or contribute to the problems of colour consistency and colour retention in dark grouts, but it still provides improved hydrophobic effect and protection from secondary efflorescence.

Expansion joints and penetrations

Any expansion joints or balustrade penetrations should be completely dry and clean of dust, debris, non-compressible adhesive or grout and sealed to prevent water entry into the tiling system. The caulking of the expansion joint should be formed with a polyethylene backing rod to achieve optimum design thickness of the sealant to allow stretch and compression without losing adhesion to either side of the joint to allow water entry. For best flexibility, adhesion and all round performance, MS Polymer sealants are highly recommended. Specific primers or surface activators may be required for certain materials as recommended by the manufacturer.

Drop-down cover plates and doorsills often conceal typical water entry points that need to be sealed. Expansion joints should be located at each perimeter and at no greater than 4.5m centres. Materials subject to extreme thermal expansion or mechanical disturbance such as metal edge trims should also be caulked with flexible sealant rather than rigid grout.

Coverage

1 litre of Efflock is sufficient for approximately 16m² of tiling, comprising 40mm thick tile screed, tile adhesive and tile grout based on a 300 x 300 x 10mm floor tile.



BRICKWORK AND STONEMASONRY

Efflock can be used in mortar to prevent efflorescence, crypto-florescence and other water related problems. The hydrophobic effect repels dirt and moss growth to keep mortar joints cleaner. The long-term appearance of face brickwork is dramatically improved and passively maintained – this is especially an advantage when using off white cement mortar. The suitability of Efflock in the mortar with any type of face brick or stone installation should be tested on site (with particular consideration to acid cleaning – see further below), before proceeding with a large project.

Efflock provides an effective Damp Proof Course (DPC) at each mortar joint, preventing rising damp and destructive salt attack of the masonry in saline soils. In combination with salt resistant bricks or stone, Efflock provides the most durable specification available against rising damp and salt attack.

Using Efflock in the mortar can have advantages where a conventional DPC is impractical, such as in irregular stonework, or to maintain a mortar bond to avoid the slip-joint effect of a standard DPC.

Bricklaying sands can vary in their composition from region to region. Many modern sands supplied for bricklaying contain sediment or clay to make them sticky and fatty for bricklaying (sometimes known as 'bush sand'). Sands that already contain clay should not have extra plasticisers added. If sand is deficient in clay content, then either lime or builders clay (fire clay) is added to make them workable. Lime, clay and coloured oxides are hygroscopic. To a point, their inclusion helps the strength of the bond by retaining water to prolong the hydration of the cement at the mortar and brick interface. Yet at the same time, because they are hygroscopic, plasticisers start to create problems with mortar shrinkage and start to work against the durability of mortar and against the performance of the Efflock additive. For this reason, they should be used sparingly.

Because lime will set and clay does not, lime is recommended over the use of clay in building standards. However, it should be noted that bricklayers have reported an accelerant effect when



using Efflock in mortar that is compiled with washed sand (without clay) and hydrated lime as a plasticiser. It was found that the accelerant effect can be avoided by substituting lime with clay, but the use of clay should be signed off by a structural engineer and/or tested under the relevant standard (i.e. AS 3700) to confirm satisfactory performance.

Efflock will produce a lubricating effect in mortar, so the need for air-entraining admixtures may be able to be reduced or avoided. If they are needed, they should also be used sparingly.

Mortar with Efflock should not be exposed to any rain prior to the initial set, and exposure to heavy rain should be avoided in the first 12-24 hours. Brickwork should be protected from rain feeding into partly constructed walls, particularly core holes in extruded bricks. Walls that are finished to height should have the frogs or core holes in bricks filled flush with mortar to deflect water ingress.

Face brickwork should be laid with care to minimise mortar smears and splashes on the face. Cleaning should begin with mechanical removal of larger droppings, followed by normal methods using hydrochloric acid. It should be noted that the hydrophobic effect of Efflock in the mortar will repel water during the cleaning process, but it will not repel acid. Therefore the usual acid to water dilution ratio may need to be strengthened.

Other forms of efflorescence can appear from salts within clay bricks themselves, although it is usually less extensive than calcium carbonate that comes from cement. Nevertheless, good design should prevent lateral damp being able to migrate from behind the wall to dissolve and transport salts to the face. Lateral damp absorbed into bricks caused

by rain wetting the exterior face of a wall can be addressed with a surface application of Hydrophobic Sealer for Masonry to the finished wall (see page 10).

For detailed information on using Efflock with natural stone, see under Cautions and Limitations on page 9.

CLASS 1 (OFF FORM FINISH) CONCRETE

Efflock provides an excellent hydrophobic function for concrete. Long term durability is achieved by repelling contaminants such as chloride ions that are normally absorbed into the concrete with the ingress of water. The same water repellency provides excellent protection against freeze / thaw damage in cold climates.

With Efflock, a clean appearance is passively maintained by repelling dirt absorption, and fast evaporation of the surface after rain ensures moss growth is suppressed. Unlike crystalline additives, Efflock is inert and will not discolour, craze or grow crystals from the finished surface of the concrete.

Structural concrete can either be protected with Efflock as an additive or by the method of surface application (see Hydrophobic Sealer for Masonry, page 10).



PREPARATION AND MIXING

Please refer to specific recommendations for each type of application. The user must determine the suitability of this product for any intended purpose. Efflock is intended for use by qualified professionals. Installation must comply with applicable building standards.

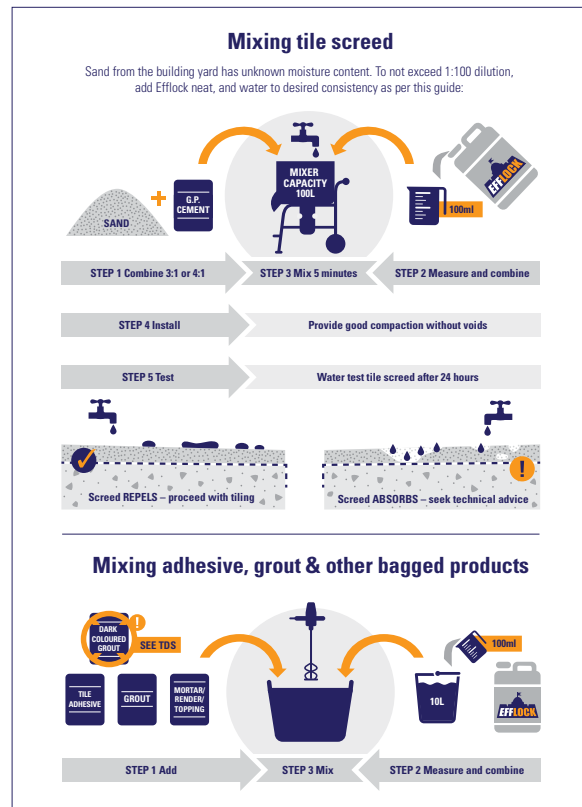
General notes

Ensure all containers are clean and free of solvents or tin containing materials.

We strongly recommend the use of a measuring jug to ensure accurate batching for performance and optimal economy. Efflock is designed for dilution with 100 parts water. In many cases, gauging water can be prepared with Efflock before combining the water with dry ingredients. However, this method is not recommended for a 'dry mix' such as tile screed, when the sand to be used already contains moisture. Instead, a mechanical screed mixer should be employed and Efflock should be added neat to the mix at a rate of 0.001% of the mixer capacity, i.e. 100mls of Efflock to 100 litres of screed (or 1 litre per cubic metre). Additional clean water can then be added to reach desired consistency (as illustrated in our full sized info graphic instructions on page one). Thorough mechanical mixing must always be provided to ensure even dispersion of the additive.

General instructions – when all aggregates are dry

1. Always use Type GP cement.
2. Shake container well.
3. Prepare the required amount of gauging water in a clean bucket at a ratio of
1 part Efflock : 100 parts clean tap water.
4. Add pre-mixed gauging water to dry concrete ingredients and proceed as usual.
5. Any additional water added to the mix must also contain Efflock.
6. During installation and curing the air temperature should not drop below 4°C or exceed 35°C.



7. Concrete should be protected from direct sun and damp cured to prevent premature drying. Avoid exposure to rain for 24 hours.
8. Clean tools normally with water.
9. Project supervisors should conduct a water test after 24 hours. Mortar and concrete that has been satisfactorily impregnated with Efflock will exhibit a strong beading effect.

CAUTIONS AND LIMITATIONS

Always use Type GP cement

We recommend the use of General Purpose Cement (Type GP) wherever efflorescence is a risk. Both grey and off white cement is available as Type GP cement. "Builders Cement" is classed as General Blend Cement (Type GB) and should be avoided when using hydrophobic additives generally. The increased proportion of fly ash and/ or blast furnace slag contained in Builders Cement contributes to efflorescence.

Other additives

Please refer to the recommendations for each type of mix listed in this document.

Weather

The ideal temperature for concrete to cure is 23°C. Protect concrete from premature moisture loss with shade and damp curing. Efflock should have up to 24 hours to cure with concrete before exposure to rain.

Workability

The workability of mortar can be altered with the addition of Efflock in a mix. Please refer to the recommendations for each type of mix listed in this document

Natural Stone

Suitability for purpose when selecting stone is important, but is often overlooked with most attention given to aesthetics. The potential problems and limitations of a particular stone for its intended purpose should be thoroughly understood, and impartial advice should be sought from a professional stone consultant. With approximately 13,000 types of stone sold throughout the world, there is enormous variance in porosity and mineral composition. For this reason, on-site testing of stone samples is recommended with all intended installation materials to confirm a satisfactory outcome. Pull-off testing to confirm satisfactory adhesion to pre-sealed stone may be available from your tile adhesive manufacturer. Completed installation test samples should be observed after materials have cured and dried out, and observed again after re-wetting. Ensure the same installation methods used in a successful test sample are followed for the main project.

Picture framing and crypto florescence is a common problem observed in stone paving, often occurring in stone of low porosity such as granite and basalt. It is caused by the absorption of moisture into the pores around the perimeter of the stone that causes a visual darkening effect. The hydrophobic effect of the Efflock additive in the grout and bedding material will minimise the saturation of those materials that ordinarily cause picture framing.

When using stone, it is also possible that Efflock can migrate from wet screed, adhesive or grout to be absorbed by the stone. This can occur because Efflock has a second function as a high performance water repellent sealer (see *Hydrophobic Sealer for Masonry* page 10). Depending on the colour and the porosity of the stone, the additive can cause a visible dry spot when the stone gets wet (cases have occurred with G684 basalt and sandstone). This can be avoided by pre-sealing, and /or by treating the entire surface of stone with equal consistency, i.e. grouting the entire stone surface - not just the joints.

Caution when using sealers

Because stone is usually selected upon aesthetics, sealers are often used to try and impart better durability. They might be used to limit the absorption of stains, or to increase the resistance of porous stone against salt attack by repelling water absorption. However, sealers should always be used with caution because they can potentially cause accelerated decay if they are used incorrectly. Adhesion failure can occur from 6 sided sealing if the stone has low porosity, caused by a film of active ingredient from the sealer sitting on the surface of the stone. Stone of low porosity should not be sealed on the face which is to be bedded.

Six sided sealing can have its place for stone of greater porosity. Delamination of the sealed layer is a common problem caused by topical application of a sealer on to very porous stone. Like timber, stone will expand with the absorption of water. Delamination can occur when the unsealed portion of stone absorbs water, and the sealed layer does not, causing a shear line. It can also be caused by an accumulation of salts from rising damp, which expands when they crystallise in the pores of the stone beneath the sealed layer. Submerging stone into a bath of

sealer encourages deep penetration to all six sides to promote uniform stability and resistance to salt damp. Designed for dilution with nine parts tap water, Hydrophobic Sealer for Masonry is particularly cost effective for this purpose (see below).

Dark coloured tile grout

Dark coloured cement based tile grout is known to be problematic towards colour stability. From when it first sets, dark grout can often look patchy, and the colour generally fades in a short space of time (i.e. black fades to grey). Efflock still makes dark grouts hydrophobic to protect against secondary efflorescence, but it does not assist with colour stability.

According to tilers, certain brands of dark coloured grout perform better than others. Epoxy grout may also be a suitable alternative to avoid colour problems.

Submersion

Efflock does not fill the pores of concrete, and therefore is not intended to resist head pressure under water. It can be used in render, adhesive and grout at the waterline of a swimming pool to control rising damp, salt attack and efflorescence.

HYDROPHOBIC SEALER FOR MASONRY

Efflock's sister product is called Hydrophobic Sealer for Masonry. This sealer is the same chemical as Efflock, but is diluted differently at **1 part Efflock : 9 parts water** for use as a water repellent impregnating sealer. By diluting 9 times, this sealer reduces the usual packaging waste by 90% and is very cost effective.

It is suitable for use as a surface applied sealer for porous masonry such as sandstone, concrete and brick, or any masonry with a minimum of 1.8% water absorption rate. The treated surface will help prevent efflorescence, reduce dirt, reduce moss growth and protect against salt attack by repelling water absorption. It lasts up to 10 years on pavements and 15 years on walls. The unique dilution makes it cost effective for dip sealing masonry prior to fixing. For existing efflorescence problems in tiling, the product can be applied to grout lines (not on tiles) with an eye dropper to limit water ingress to reduce efflorescence.

As the pore structure of materials can vary substantially (particularly with stone), suitability for use on any material should always be tested across a few samples in a small area first. The sealer should be observed for any potential problems once the test samples have dried before proceeding with a large area.



General instructions

1. Surfaces must be clean and dry.
2. Shake container well.
3. Prepare the required amount of sealer in a clean bucket at a ratio of
1 part Efflock : 9 parts clean tap water.
4. **Surface Application:** Apply using a bucket and soft bristle broom for horizontal surfaces. Use a manual air pressure sprayer for walls, beginning from the bottom, working upwards in a horizontal motion. The product needs to be applied 'wet on wet' or 'flood coated' to promote deep absorption.
5. Coverage for ordinary concrete is 5m² per litre of diluted sealer. Coverage for ordinary render and porous brickwork is 3m² per litre of diluted sealer.

6. **Dip sealing:** Dip masonry units into a bath or tray for pre-sealing.
7. Re disperse any excess puddles with a brush or rag before the sealer dries on the surface.
7. Allow to dry for a minimum of 4 hours, prior to rain. The air temperature must be between 4°C and 35°C.

Limitation: Not effective against oil based stains.

HANDLING AND STORAGE

- Efflock and Hydrophobic Sealer for Masonry is available in 1 litre, 5 litre and 20 litre jerry cans. Larger drums available on request.
- **Please refer to the Material Safety Data Sheet (MSDS) for safe handling instructions. (Available at www.efflock.com.au/pages/faqs)**
- Not classified as dangerous goods.
- Safe for postage, and air freight.
- For shelf life, please refer to the best before date located on the container. Efflock can be stored in tightly sealed original containers for at least 24

months if kept dry and at moderate temperatures out of direct sunlight. Temperature extremes below 0°C and above 45°C may cause irreparable damage. In the case of suspected frost or heat damage, the usability of the product has to be checked before use. Efflock already diluted with tap water can be stored for a short time for future use. Algae and contaminants within tap water may begin to visibly affect diluted mixture within a couple of weeks.

- Dispose of any waste chemicals at an authorised chemical disposal facility.

GLOSSARY

Crypto-florescence – is a visible darkening defect that occurs around the perimeter of a masonry unit (i.e. stone paving, bricks, pre-cast concrete paving and blocks), which is caused by the migration of salts from mortar, adhesive and grout.

Gauging water – is a trade term referring to water that is put into a concrete mix.

Hydrophobic – meaning water repellent.

Hygroscopic – meaning moisture absorbent.

VOC – Volatile Organic Compounds are environmentally unfriendly, toxic and dangerous chemicals that have a high vapor pressure at ordinary room temperature. Their high vapour pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublime from the liquid or solid form of the compound and enter the surrounding air.

CONTACT DETAILS

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Eco Liquids Pty Ltd reserves the right to update product literature without notice as required. It is the responsibility of the user to ensure the latest product literature is in their possession.



Foreground: A sample of 4:1 tile screed with EFFLOCK showing amazing water repellency.
Background: the exact same mix without EFFLOCK reaches total saturation due to capillary action in only 3 minutes.

MAKE YOUR BATHROOM BULLET-PROOF

Add EFFLOCK to render, tile beds, tile adhesive and tile grout. With only 1% Efflock added to water at the time of mixing, the results are amazing.



A CAT AMONG THE PIGEONS

Concentrate dilutes 9 times with tap water. Superior technology at less than half the cost of other sealers.

Photo courtesy: www.flickr.com/mark_robinson