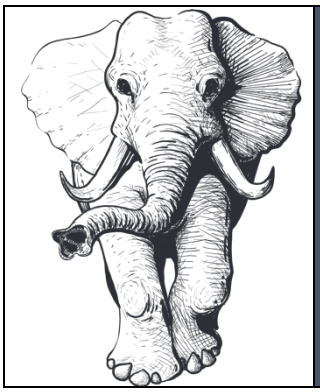

Technical specifications, good brickwork, brick care and brick maintenance

BRICK TECH SPECS

Usage: Facing clay masonry unit for internal or external use, load bearing or non-load bearing masonry structures.

Dimensional Tolerance: +/- 5mm (1 sigma standard deviation from the mean as measured across 20 randomly chosen bricks.).

Compressional Strength: > 10.5 MPa
Exceeds Australian standard for unconfined compressive strength as per AS/NZS 4455 along with European Standard BS EN771-1:2011.

Durability: General Purpose Brick

Active Soluble Salt Classification: S2
(Limited Soluble Salt) As per BS EN771-1:2011 (Note: No Australian standard exists for soluble salt content of clay masonry units).

Freeze-Thaw Durability: F2
(Suitable for Freeze-Thaw Climates) As per BS EN771-1:2011 (Note: No Australian standard exists for Freeze-Thaw durability for clay masonry units.)

Reaction to Fire: A1
(No contribution to a fire) As per EN 13501-1 (Note: No Australian standard exists for reaction to fire for individual clay masonry units.)

LAYING PATTERNS

The way in which a brick is laid, the brickwork bond, strongly influences the appearance of the facade. A well thought out brickwork bond gives projects extra style and character.

BRICK BLENDING

The composition of the raw materials, as well as the firing process of the brick will result in colour and dimensional variations from brick to brick and from pallet to pallet. This variation is inherent in the process of handmade bricks and is a key component to the appeal of handmade bricks.

To ensure that colour and dimensional variations are dealt with correctly, we advise that the bricks are blended during laying. The best method to do this is to select bricks from numerous open packs (e.g. 4 to 6 but the more the better). This will ensure a beautiful finished product. With all our bricks, there are four usable faces – two headers and two stretchers. Further blending can be achieved by careful selection of which face to use.

THE BRICKIE

Nothing is more important to good brick work than a good brickie. It's a common stereotype that brickies are unskilled labourers, however this is not the case at all, brick layers are highly skilled tradespeople, but like any industry, there are good ones and also some not as skilled. No matter how nice the bricks are, an unskilled brickie (this is rare) or a brickie doing the brickwork in a hurry (way too common) can ruin the final outcome of the project. **Choosing the cheapest brickie (this virtually guarantees a rushed job) is rarely the best approach**. Choose your brickie carefully, make sure your brickie has lots of experience laying face bricks. In many cases a brickie who normally lays bricks intended to be rendered may not be the best brickie for laying face bricks.

It's important to remember many parts of a house can be easily modified or replaced at a future time.....internal paint colours can be refreshed, furniture and fittings can also be changed/modernised comparatively easily over time. However, your external facade can not be easily changed, so getting it right at the start is important. Money spent on your bricks and your brickie is a long term investment in your home.

MORTAR CHOICE

Choosing a mortar colour is really important. Broadly mortar colours can be divided into four broad types: dark grey/black, grey, yellow (buttery) and white (creamy).

Yellow/Buttery Mortar

Yellow or a buttery colour is the most common colour used and is produced by using a yellow brick sand combined with an off white cement, this will produce a buttery coloured mortar, the addition of hydrated lime will lighten this colour further.

Creamy White

For a creamy white mortar you use a white brick sand with a white cement.

Grey

This is the most simplest mortar colour to achieve and is just a simple mix of grey cement and yellow brick sand. Standard grey mortar can also be purchased premixed in most hardware stores.

Dark Grey to Black

For dark grey to black mortars a black oxide must be added to the standard grey cement. Black oxides can be purchased readily at most hardware stores.

Both sand, cements and coloured oxides are readily available from hardware stores. To stress the point, yellow and white mortar can not be produced with the standard grey cement and for a true white mortar you must

use a pure white cement and white brick sand. Links to examples of these products can be found below:

- White Cement
- Off White Cement
- Hydrated Lime

We are happy to supply the correct cement for you.....just ask.

If you want a very traditional white mortar you can also use hydraulic lime (not to be confused with hydrated lime), it is unlikely that you will find hydraulic lime in a normal hardware store but we are happy to supply it for you....just ask.

Mixing Mortar

Mortar should be batched, this means volumes of sand, cement, lime, oxide and water should be carefully measured, generally using buckets of a consistent volume. Estimating the mix ratio of the mortar based on shovels is a clear sign of poor skills and/or workmanship and will result in inconsistent mortar colour and strength.

IMPORTANT

* As with all building work, advice should be sought from qualified professionals if you are unsure of any aspect of brick laying, cladding or paving.

DEBUNKING A MYTH: EFFLORESCENCE

Efflorescence describes crystalline salt deposits on brick, concrete, and other masonry surfaces. When we say salt we do not mean table salt (NaCl) but rather calcium sulfates and calcium hydroxides. It most often appears initially as a white rim around the brick during laying. Despite brickies constantly telling people the salt is coming from the brick, the truth is that the source of efflorescence is not from the brick but from the mortar. You can test this yourself, get a new dry brick from the pallet, soak it in water and let it dry, we guarantee you will never see efflorescence coming from the brick under these circumstances.

The cause and source of efflorescence is the sand, cement and lime in the mortar. During laying, the wet mortar which contains the soluble salts is absorbed by the dry brick, this water evaporates at the brick surface leaving behind a residue of the soluble salts.

While efflorescence can be unsightly it is harmless and will go away naturally over time. This process can be speed up by washing with a hose, but wait until the brick work is completely dry so that the evaporation process that carries the salts from the mortar into the brick is complete. Limiting efflorescence is the best approach and can be achieved by the use of several techniques including:

- Making sure the mortar is not made too wet;
- Making sure mortar is batched appropriately and ensuring the correct amount of cement and lime is used, excess cement and lime will promote efflorescence;
- The use of efflorescence blocking additives such as Efflock.

BRICK CLEANING & BRICK CARE

In most cases cleaning of brick work can be achieved using standard techniques. **Brick cleaning is no substitute to clean brick work done by a professional bricklayer competent in laying face bricks. Cleaning as you go is the best method for ensuring good brickwork. Mortar dag and smears are best cleaned when fresh (within 1-2 days). Cleaning of brick work should never be left to the last thing to do on a build. The appearance of brickwork can be spoilt by bad cleaning techniques or by the use of the wrong cleaning agent or technique.**

These recommendations are made in accordance with the Think Brick Australia Brick Cleaning Manual.

Guidelines for high pressure cleaning:

- **Allow the mortar to harden for at least 3 days**, but not longer than 3 weeks.
- Remove large mortar dags with appropriate hand tools.
- **Protect adjacent materials** (e.g. window frames etc.)
- Saturate brickwork with clean water and **never let the wall dry out during cleaning**.
- **Test a small unseen section prior to full-scale cleaning.**
- Keep pressure low - **maximum 7000kPa (approximately 1000psi)**.
- Use a wide fan spray nozzle.
- Keep the nozzle 0.5m from the wall, and **never closer than 0.3m**.
- **Keep the nozzle moving constantly** to avoid surface abrasion in one spot.

- **Do not use a turbo jet head or concentrated stream of high pressure water, as damage to the brick surface and mortar is likely to occur, only use a diffuse spray.**
- As with all building work, advice should be sought from qualified professionals if you are unsure of any aspect of brick cleaning.

ACID WASHING

Experience shows that acid-washing brickwork can cause various types of damage. **All efforts should be taken to ensure that building is performed clean enough not to need acid washing (in the past, brickwork was never acid washed!).** With acid washing, various forms of damage can arise, such as greyish mortar bloom on the bricks as a result of premature acid washing, degradation of the joint surfaces and changes in the colour of bricks and joints through staining. Mortar residues are not always an eyesore (especially on light coloured brickwork) and will often wash off with time.

<u>Guidelines for acid washing if absolutely required:</u>

Important: Hydrochloric acid is a hazardous material. All guidelines by the manufacturer must be adhered to. If this method is used incorrectly, it can result in unsightly staining that is more difficult to remove. In particular, care should be taken to treat any vanadium stains prior to cleaning. Acid washing is best done by trained professionals.

- **Test a small unseen section prior to full-scale cleaning.**
- All mortar dags should be removed using either a metal or wooden scraper.
- **Protect adjacent materials** (e.g. window frames etc.)
- Saturate the area of brickwork to be cleaned and all adjacent areas below with water.
- Use the correct ratio of hydrochloric acid and water - 1 part hydrochloric acid to 20 parts water.
- Always begin at the highest point and work down the wall.
- **Only clean small areas at a time** - e.g. one square metre - so as to allow adequate time to wash off the cleaning solution.
- Allow solution to remain on wall for 3-6 minutes before scrubbing. **Be sure not to scrub the joints.**

- **Rinse thoroughly**, making sure all cleaning solution has been removed.
- All light coloured brickwork & internal exposed brickwork washed with acid should be neutralised.
- As with all building work, advice should be sought from qualified professionals if you are unsure of any aspect of brick cleaning.

Citric Acid Cleaning

If a clean as you go approach has been used, with mortar dags being removed during laying, citric acid based cleaning is an ideal method, the advantages over hydrochloric acid cleaning include:

- Low VOC & biodegradable;
- Will not surface burn like other acid-based cleaning processes;
- Pleasant citrus odour;
- Effective in removing efflorescence and rust;

Special Cleaning Requirements for Reclamation Styles

Our reclamation styles, which can be identified by the white scumming on the brick surface (and the use of the term reclamation in their name), **should not be wet sponged, acid washed or high pressure cleaned**. During laying, the excess mortar should be cut off with a trowel and the brickwork should be constantly dry brushed. The bricks from the pallets are left intentionally dusty, this allows mortar dags and smears on the work face to be removed easily by dry brushing.

Do not sponge the joints of the brickwork, otherwise it may create permanent stains.

We also advise that with our reclamation styles, the mortar colour is matched closely to the colour of the white scumming (i.e. white to off white mortar).

With our reclamation styles we strongly recommend the use of efflorescence blocking additives such as Efflock.

If these instructions are followed the result will be a beautiful reclamation finish.

Special Cleaning Requirements for Non-Through Colour Grey Bricks

During laying, the excess mortar should be cut off with a trowel and dry brushed. Once this process is complete, chips can be recoloured using our supplied brick pigment.

Experience shows that acid-washing brickwork can cause various types of

damage. All efforts should be taken to ensure that building is performed clean enough not to need acid washing. If non-through colour grey bricks are to be acid washed this should be done using oxalic acid followed by dilute hydrochloric acid (1:20 dilution) but should not be high pressure cleaned, excess/residual acid should be removed by spraying clean water onto the brick work at low pressures and neutralised.

* High pressure cleaning can be used if a really pale grey exterior is desired. High pressure cleaning will allow more of the underlying ivory clays to show through.

Special Note on Light Coloured and Grey Bricks - Vanadium Staining

The clays used to make light coloured bricks (e.g. ivory bricks, off white bricks, cream bricks, grey bricks) always contain Vanadium. On occasion yellow/green/brown staining may appear on light coloured clay bricks. This is known as vanadium staining. This staining is a natural by-product of clay products and is not harmful. Typically the stain will appear if excessive acid is used in the cleaning process or if the bricks get excessively wet. Over time they will disappear through natural means if exposed to the elements.

These stains can be removed by using a solution of oxalic acid and water and must be followed by a neutralising wash, such as a sodium bicarbonate solution, to avoid serious secondary staining. It is important to always follow the safety instructions and warnings on any labels of chemicals used.

It is important to accept that vanadium staining is a natural process of clay products and is most obvious in light coloured bricks, if you are concerned about this process we would advise against the use of light coloured bricks.

Special Note on Sandstock Bricks

Sandstock bricks when taken straight from the pallets are covered by a loose sandy veneer. This is an intentional feature as it allows mortar dags to be easily brushed off during laying and helps to limit the need for aggressive brick cleaning techniques. Once washed this loose sandy veneer is removed.

CARE AND CLEANING OF NON-THROUGH COLOUR GREY BRICKS

Non-through colour grey bricks refers to those bricks in which the surface grey colour

is different to the interior colour of the brick. As chipping of bricks during transport and construction is unavoidable, non-through colour grey bricks will reveal the pale colour of the underlying natural fired clay colour. We supply concentrated brick pigment which allows for those areas of the brick work that have suffered chipping or other types of construction or cleaning damage to be recoloured.

During laying, the excess mortar should be cut off with a trowel and dry brushed. Once this process is complete, chips can be recoloured using our supplied brick pigment. Experience shows that acid-washing brickwork can cause various types of damage. All efforts should be taken to ensure that building is performed clean enough not to need acid washing. If non-through colour grey bricks are to be acid washed this should be done using oxalic acid followed by dilute hydrochloric acid (1:20 dilution) but should not be high pressure cleaned, excess/residual acid should be removed by spraying clean water onto the brick work at low pressures.

EXPOSURE TO THE ELEMENTS

All bricks can be affected by exposure to the elements over time which can affect their appearance.

- Bricks in urban areas can darken due to local pollution;
- Bricks experiencing excessive wetting can stain over time;
- Ground water, especially from sprinklers can also cause staining;
- Long term UV exposure can cause bricks to fade.

These are all natural processes and can not be avoided but specific cleaning techniques can be used to rejuvenate brickwork. Furthermore, building design should be best practise to minimise exposure to the elements, specifically, Think Brick Australia advises that Stormwater should be shed so as to clear the masonry immediately below. Copings and sills should project at least 10 mm beyond the wall face at the underside of the sill or coping. Sills should be angled to properly shed water. Where downpipes have not been installed water from the guttering should be diverted away from brickwork. The standards require damp-proof courses and flashings to be provided/designed to prevent moisture from moving upward or downward through the

masonry. The materials for damp-proof courses, copings, flashings and weatherings must comply with AS/NZS 2904.