



## **THE EMPIRE BRICK SYSTEM**

### **Installation Manual**

First published April 1996

This update – April 2007

This document is not designed to be an installation manual for every situation, as the “Empire Brick System” can be applied in so many different places that they cannot all be covered in a document such as this. There are many circumstances where a number of possible solutions are applicable and the installer has to use his or her own judgement.

We attempt in this manual to set out possible circumstances and solutions as best we can, but a manual such as this cannot cover all possibilities or the interaction with every possible other building component.

This manual is related, generally, to the installation of the Empire Brick System when renovating a timber framed dwelling, but most of the circumstances apply to, or can be adapted to, installation of the Empire Brick System on new timber or steel framed homes.

Whilst there are certain fundamentals that apply to installing the Empire Brick System anywhere, for specific installation questions, please contact your nearest Empire Distributor. and remember..

**There is no substitute for common sense**



## What are the “Empire Brick” Components?

### The EMPIRE Top Rail

Specially designed rail section that fits inside the BRIKrail to ‘finish off’ at the top of a section of brickwork

### THE EMPIRE Steel Course Rail

3.6 metres long x 86mm high  
Hi-tensile 0.42mm Steel.  
Coating : Zincalume - aka Galvanium

### THE EMPIRE BRICK Facing

230mm long x 76mm high BRIKfacing  
25mm thick. (nominal sizing).

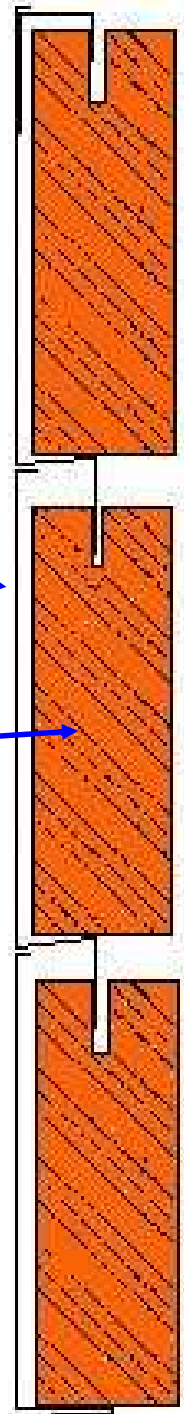
AND.. (not shown here)

### THE EMPIRE BRICK 90° Corner Piece

25mm thick "L" shaped corner pieces.

### THE EMPIRE Starter Rail

Specially designed rail section  
that provides a flush finish at the  
base of the section of brickwork



THE MAIN ADVANTAGE OF USING THE “EMPIRE BRICK SYSTEM” IS THAT YOU DO NOT NECESSARILY NEED THE SKILLS OF A SPECIALIST BRICKLAYER. ANY TRADE BASED PERSON OR EXPERIENCED HANDYMAN WITH AN UNDERSTANDING AND APPRECIATION OF STANDARD BUILDING PRACTICE CAN INSTALL THIS SYSTEM EASILY..

**REAL BRICKS.. MADE REAL EASY !**

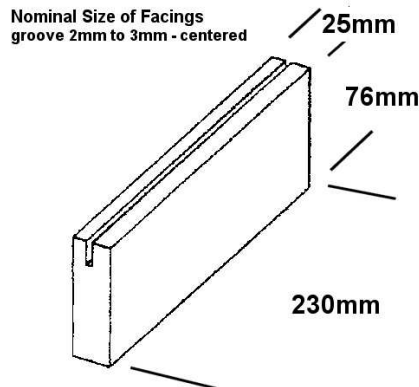
## SPECIFICATIONS

### EMPIRE BRICK Facings

Length 230mm, height 76mm, thickness 25mm

Tolerance of standard DW bricks as per Australian Standard:

Length  $\pm 60$ mm over 20 bricks. Height  $\pm 40$ mm over 20 bricks



Some brick types are intentionally manufactured to be very rustic and uneven. In such cases the Australian Standard specifies a tolerance in length of  $\pm 90$ mm over 20 bricks.

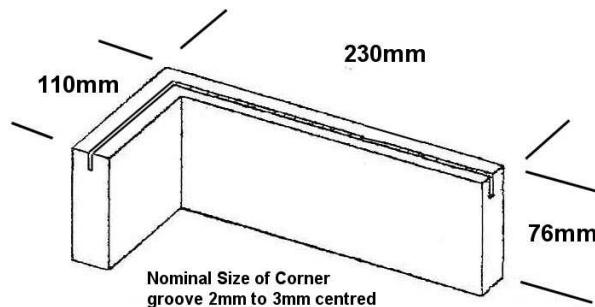
On standard bricks, our manufacturing tolerance is  $\pm 2$ mm in thickness.

Rustic or very uneven bricks may vary by up to 5mm in thickness.

Facings are grooved one side only as this is all that is usually required, but can be 'double grooved' to order.

### EMPIRE BRICK Corner Pieces

For use at external corners and can also be used as reveals on the vertical sides of windows and doors. They are normally grooved on one side only and supplied as 50% left hand / 50% right hand to reduce costs, but can be supplied double grooved if required.



#### Corner Brick

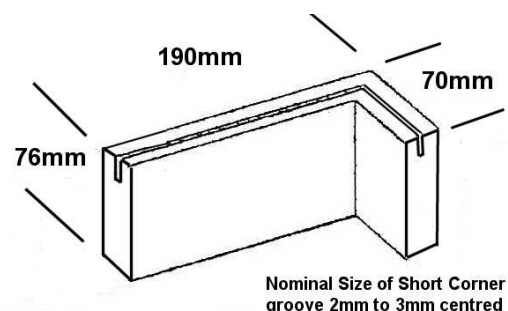
Length 230mm, height 76mm, return 110mm, thickness 25mm.

These are cut from an Australian standard size brick.

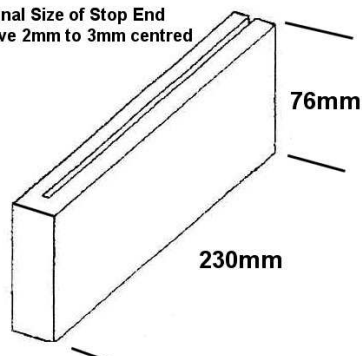
#### Short Corner

Length 190mm, height 76mm, return 70mm, thickness 25mm.

Some bricks are made only as 70mm types, therefore we have no option but to supply corners of this size.



Nominal Size of Stop End groove 2mm to 3mm centred



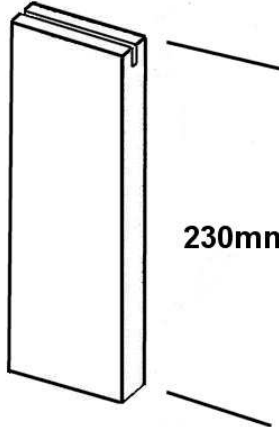
#### Stop End Facing

There are many situations where you can get away with not using a corner piece, in fact, many large builders in Japan do not use corners at all, they simply insert stop ends at all building external corners and other openings. This can save considerable money on materials.

## Sill Brick

Width 76mm, height 230mm and thickness 25mm.

Nominal size of Sill Brick  
groove 2mm to 3mm - centred



Installed vertically and grooved one end only.  
Can be installed above or below openings.

The Sill Brick will almost always need to be cut to length, so the single groove at the top will engage the course rail above the window (as a soldier course above the opening) with the cut end engaging into the window frame or a starter rail piece.

When used below the opening (as a soldier course) the sill brick is cut to length and can be installed by engaging the cut end in the window frame and then on some inverted top rail.



The “Empire Brick System” is purely a non-structural cladding mainly used in Australia to renovate older homes where claddings like timber or fibro have degraded or need continual maintenance.

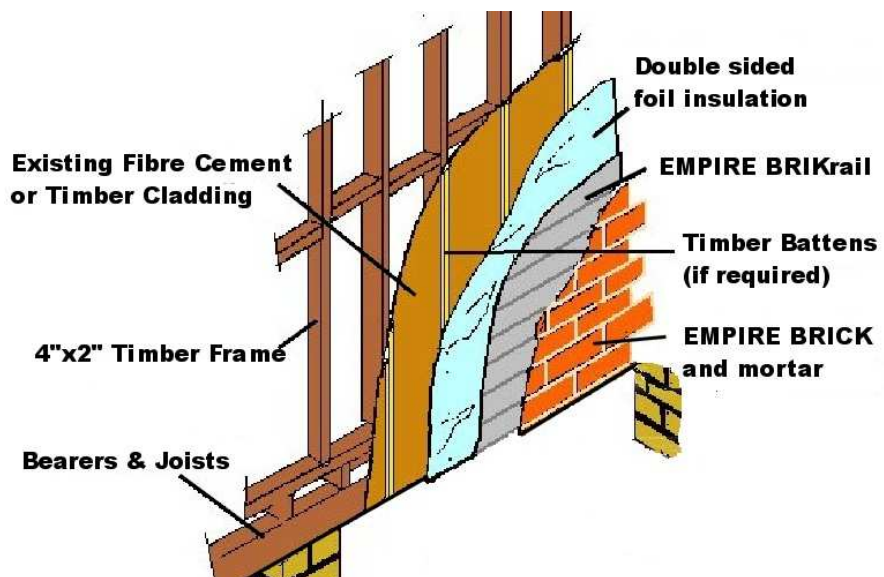
It is also used to match lower floor brickwork on 2<sup>nd</sup> Storey additions and other areas where conventional brickwork is either difficult or impossible.

Other areas include transportable buildings, commercial exteriors, internal feature walls and new dwellings of all descriptions.

This “external skin” provides older homes with a REAL brick finish that will last for generations and also allows for a brick finish on new projects that would normally be too difficult to attempt.

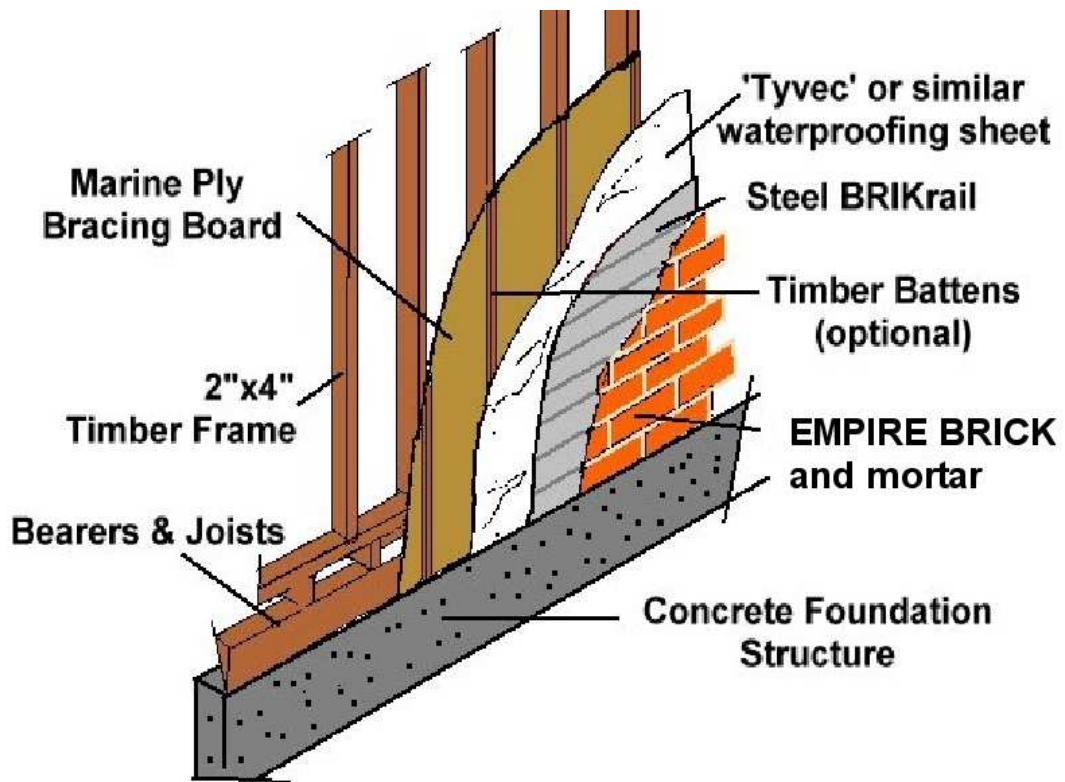
We do not claim that Empire Brick will look exactly like conventional 110mm brickwork. If you want conventional brickwork, use it.. If you want a solution where conventional 110mm brickwork has difficulty.. then use Empire Brick!

The drawing below shows how it is typically used.  
It is a simple product to use if you PLAN CAREFULLY before you start.



In Japan, New Zealand, Sth Pacific Islands, Middle East and the many other countries where The “Empire Brick Walling System” is exported to, it is mainly used on NEW buildings to provide a high quality, waterproof, brick veneer exterior that is resistant to the extreme structural loads caused by earthquakes and cyclones (typhoons). The “Empire Brick Walling System” is also ideal to use in areas with unstable soil conditions or highly sloping building sites.

The drawing below shows the “Empire Brick Walling System” as it is used in Japan, applied over 2x4 or Post & Beam construction methods using either timber or steel studs.



**EMPIRE BRICK in typical use - a 2"x 4" timber framed home in Japan.**



# Tools for renovating a Timber Framed Building

## Preparation

Here is a typical list of tools you may need for timber framed buildings. In addition to the normal kit of tools that a carpenter would carry, please make sure you have:

- **COMPRESSOR**  
(for nail gun with 30-50 metres hose)
- **NAIL GUN** (taking Nails suitable for use with Galvanised steel - 38mm x 2.5mm shank)
- **ELECTRIC SAW** (with metal blade for steel rail and a diamond or fibre blade for brick)
- **ANGLE GRINDER** (with metal and masonry blades)
- **TIMBER SAW**
- **ELECTRIC EXTENSION LEADS**  
(to suit above)
- **WATER LEVEL** (clear plastic hose) or **LASER LEVEL**
- **LONG SPIRIT LEVEL**
- **8m TAPE MEASURE**
- **PENCILS & STRING LINE**
- **HAMMER & CLOUT NAILS** (75 & 100mm)
- **WOOD CHISELS & TIN SNIPS**
- **50mm PLASTIC TAPE**
- **COLD GALVANISING PAINT** (small can) & **PAINT BRUSH** (25mm)
- **PLASTIC SHEET & STIFF BRUSH** (like a scrubbing brush - for brushing down)
- **WHEEL BARROW & PLASTIC BUCKETS**
- **SAND** (A good mix of sharp and medium particles – brickies mix)
- **BAGGED LIME & CEMENT** (off-white or grey, whatever is specified for colour)
- **A BRICKLAYER'S LARRY** (a hand tool for mixing sand/cement)
- **DISHWASHING DETERGENT & SILICONE SEALANT + APPLICATOR GUN**
- **APPROVED LADDERS & PLANK SYSTEMS**
- **SCAFFOLDING** (for work above 1.8 metres above ground level)



[If applying to steel framed buildings..](#)  
you may need to substitute some items

e.g.

COMPRESSOR (for screw gun with 30-50 metres hose)  
AIR SCREW GUN (taking self drilling tek screws with the flattest heads possible)  
ELECTRIC DRILL DRIVERS (reversible)  
SCREWDRIVERS, METAL CHISEL AND HAMMER

[In addition to this list of tools, you will need..](#)

to check the delivery of the materials and familiarise yourself with the components..

***And.. make sure you still have..  
some patience and common sense.***

**Now - LOOK AT THE BUILDING or AREA YOU ARE ABOUT TO COVER !**

**Check it** - for structural adequacy.

**Check it** - with a string line for alignment at the top, bottom and centre.

**If there are any problems or variations with the walls, fix them now !**

**THESE WALLS ARE THE “FOUNDATIONS” OF THE EMPIRE BRICK SYSTEM**

**Install a Batten system**

- in line with the wall studs if necessary. This is a basic carpentry / DIY skill, where you must plumb the battens as you go, to provide a true surface.

**Installing Window Flashings**

- In both new and renovated buildings it is a common practice to install new windows at the same time as installing an EMPIRE BRICK veneer or other exterior cladding. Your window manufacturer should supply full specifications of flashings needed, but we have always found it worthwhile to recommend that all windows, doors, openings of any description be flashed off fully over the top, both sides and the bottom with a high quality flashing material to ensure no water can penetrate anywhere.

All buildings are different and, again, common sense and trade training will apply but generally windows are installed to accommodate the EMPIRE BRICK system as the ones in this example are.

The flashing is usually installed starting at the bottom of a window and works its way up overlapping as it goes. You will see that the flashing is silicone sealed at the very top.. then engaged into the fin on the top of the window.. the sides flashings are tucked UNDER the top and the bottom flashing is tucked UNDER the sides..



This forces any water that penetrates to flow completely around the window opening. Take your time in this area and do it properly. A leaking window is a difficult problem to fix later.

The “Sisalation” or wall wrap will go over this window flashing

### Installing "SISALATION" (or other approved double-sided insulation)

- Install "Sisalation", preferably using staples, horizontally starting at the bottom of the frame and overlap at the joins of two levels at least 100mm. Use waterproof tapes around the window sashes depending on how window sashes are supplied by window manufacturers.

### Installing the EMPIRE BRICK System Rail

#### **OK.. Let's get into it..**

The dimensions you must plan & set out with are:

- From the back of the rail to the face of the brick is 24-26mm dependant on brick type.. check yours now!
- THE SET OUT of the course rails is 86-87mm gauge.
- Check where you want a full brick to be BEFORE you do any nailing, etc.  
This is your set out point & it can be at either...

THE EAVE LINE

THE HEADS OF THE WINDOWS

or.. THE BASE LINE

**YOU HAVE TO MAKE THIS DECISION.. EACH PROJECT IS DIFFERENT!**

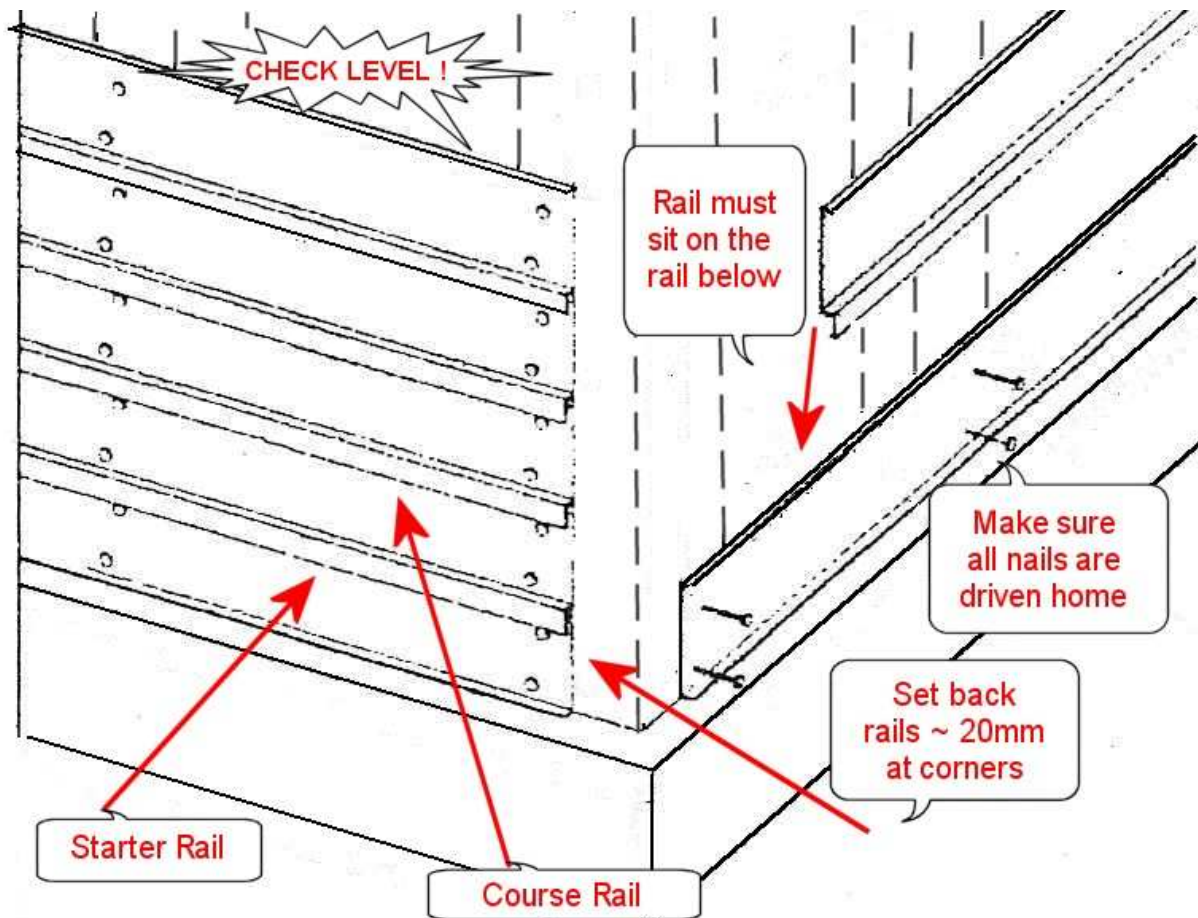
It is called the DATUM POINT

**This is where all levels and measurements must be calculated.**



- The steel rail can be installed from top to bottom but is easier when installed from the bottom up.
- Rail installation must always be level.
- Join adjacent lengths of rail at different studs so that the joins are not in a vertical line. This maximises the bracing effect of the steel rail.
- It is critical that the rail each side of the comers is aligned.
- It is important to make sure the profile of the rail is not distorted by nailing.
- Think about the position of the nail so that the pressure of the nail gun will not distort the rail profile.
- Use two nails at each stud on each rail, offset horizontally and vertically.
- Standard nail specifications 50nm galvanised or zinc coated - minimum length of 32mm (without battens) or 38nm (with battens) is required.
- At a horizontal join of two rails at a stud, the two pieces of rail should be butted up to each other and should not overlap.

- All nails & screws must be "driven home" otherwise they will cause the brick facing to stick out. It is recommended to use a compressed air powered nail gun to instal the rails make sure that the nail gun can fire suitable nails and that the pressure is set correctly for the framing material you are using.
- It only takes a second to grab your spirit level and double check your work as you go... It takes HOURS to fix an initial mistake at this early point... so **CHECK!!!**  
This is the most common place for errors.. It seems so simple.. you do not even realise that you are 'creeping' the rail by 2mm or 3mm every time you nail..  
so **CHECK!!**



From here on it is simple... just keep nailing the rail one course above the next, by resting the rail on top of the one below

... **BUT REMEMBER THESE TIPS!!**



- Don't lean on the rail when fixing or you'll cause "bows" between the battens or studs. (This is a common problem).
- Set the rail back about 15~20mm from a corner.. this makes installation of a corner brick easier.

- At the corners, **CHECK** that your rail 'lines up' with the rail on the adjoining wall.. remember that 1mm variation per rail multiplied by 10 rails means that you will be a complete mortar joint out in under 1 metre!!
- The tip is to use a corner brick or slide a facing into the rail and use this to check the level..
- Make sure the nails / screws are driven home **FULLY**...
- This is **VERY** important when fixing the bricks into the rail.. if the nail heads are sticking out it will make the bricks uneven.
- When you need to cut the rail for any reason, it is recommended to paint the cut area with a protective 'cold gal' paint before installation.
- Installation of the Top Rail is easy.. simply nail it in place over the top of the last BRiKrail at the top of your wall and use a BRiKit facing to check for the height needed.
- **CHECK YOUR LEVELS...CHECK YOUR ADJOINING WALLS**
- It's easier to do any brick cuts at the bottom of a wall rather than cutting bricks at the eave line! You can "open out" the rail slightly but it is difficult to "close up" without cutting bricks.
- When fixing the rail to an outside corner, come back about 10-15mm from the corner to allow the corner brick to sit in easily. **BUT.. MAKE SURE** that the rails line up **EXACTLY** at the corners before nailing. The easiest way is to 'slide' the rail you're about to nail past the corner and sight it. If OK, slide back & nail it.. if not **FIX IT NOW**.

## **Installing the EMPIRE BRICK System Bricks**

There is **NO** book that shows the ideal way to set out brickwork, it is a practical thing gained by experience.. but it is also common sense.. Go and look at some conventional brickwork somewhere.. you will start to see how easy it is.. but there are certain things about bricks & brickwork which are worth noting before you start.

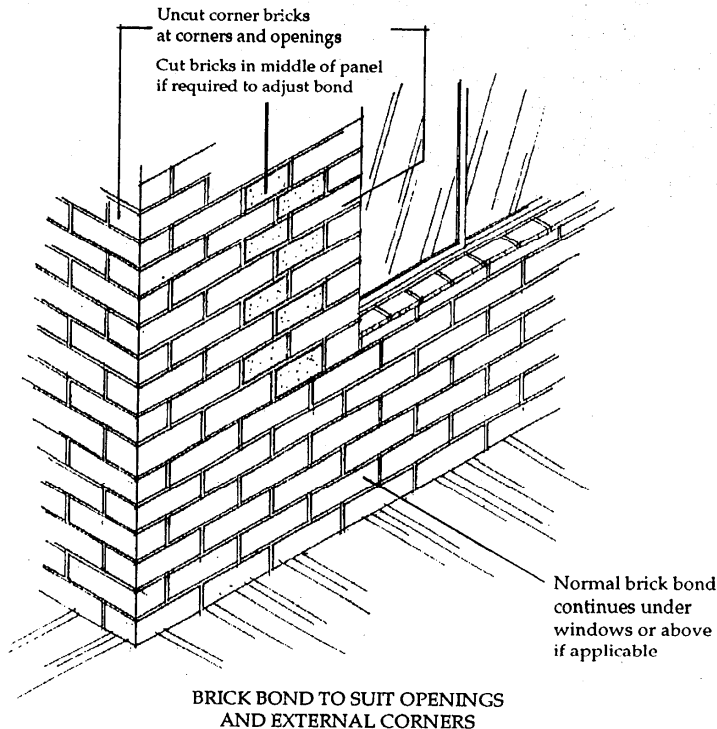
- Bricks are not totally uniform in length so don't try to gauge the facings accurately with a 10mm joint measure.
- Unless absolutely necessary in a very tight area, you should not use facings that are cut to less than a half facing (110mm) and wherever possible cut facings should be at least 170mm in length.
- Anywhere a cut brick is required it should not be, unless unavoidable, too close to a corner unless absolutely necessary you should never cut a corner.

- Down the sides of windows should be halves and full facings.
- Whilst it is best to try to keep perpendicular mortar joints (perps) as close to vertically aligned as possible, it should not be seen as the most important issue.
- It is always best to install two courses of brickwork around the entire building first.  
The two courses should be at a level which will run through all, or the majority of, the openings. A little time spent working on these two courses can save hours later.
- Corners should be installed first, before the facings in the bulk of the wall.
- Remember that comers can be installed facing either direction.  
A lot of cutting can often be avoided by turning a comer at one end or the other of a section of wall, or perhaps by turning them both.
- Install the brick facings between the comers and the openings, checking how the brick spacing works.
- The object is a balanced look with minimal cutting.
- If necessary, it is quite appropriate to tighten up the perp joint in a section of the wall, or indeed, to spread the facings a little to take up a gap in the brickwork.
- Consider vertical areas between openings and vertical areas beneath and below openings as sections of brickwork independent of other areas.  
If a cut facing (or "3/4" facing) is required to work the facings between two openings, the same size % facing should be used above and below the same area, even though the openings aren't a constraint in that area. This might not be the case where openings on the first and second storeys of a two storey building are not positioned to work bricks, but generally this approach provides for the most balanced look, and is superior to what can be achieved in full brick masonry.
- Once the layout around openings has been determined, install the brick facings in line with the first two courses, starting immediately above and below these first two courses.

Laying the Empire facings is an extremely fast and simple task if you follow these guidelines:

- Lay the corner bricks **FIRST!!**
- Always lay the facings from the bottom of the wall up. It is easier to 'line up' correctly.

- Make sure you have the 'perps' (perpendicular or vertical joints) lined up as you go. Moving a wall of facings later is not easy!!
- Check the wall as you go. Any bricks 'sticking out' or not sitting properly for any reason, **FIX NOW...** Once those bricks are mortared into position, you **WILL NOT MOVE THEM!!**



The way we recommend to set out is:

Starting with a corner, set out 2 courses by "sitting" them on the rail.

Sometimes the wall will "work brickwork" perfectly, other times you need to reverse the corner bricks, spread the "perps" (perpendicular joints) a little, or cut a brick. Once you've set out 2 courses and you're happy with them, you're ready to install the bricks.

**BUT BEFORE YOU DO!!!**

Walk along the wall and look up to see where the windows or openings line up, sometimes a minor change at this time can minimise cutting later.

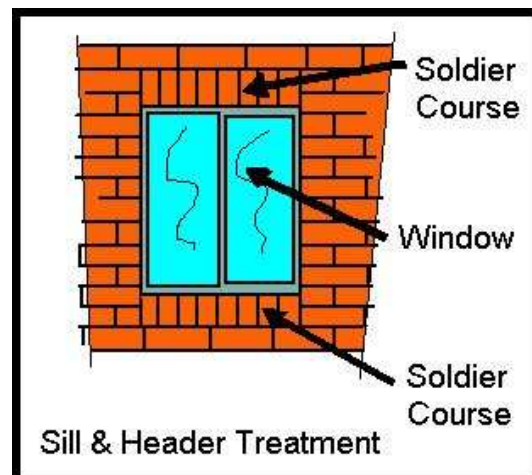
You'll find areas that don't work brickwork, particularly between windows, **so STOP & THINK!!**

Try a number of combinations if necessary but, **AVOID CUTTING THE CORNER BRICKS.** You are better to cut a little off a few bricks rather than cut a small 20-30mm piece of brick to "fill in".

## Window, Door & Opening Treatments

The easiest method of treating these areas is to 'butt finish' the brickwork to the architrave of the window/door, above & below an opening can be a vertical 'soldier' course.

You can also use windows that are specifically designed for cladding applications and have an inbuilt architrave section that is approx. 30mm wide and the 25mm Empire facings then simply 'slip in'.



Check with your local window supplier or we can refer you to manufacturers that supply this type of window.

### Sills

The simplest method is to take some facings and stand them up to form a 'soldier course' sill that engages into the normal brick coursing.

If you want a sill to protrude beyond the face of the brickwork you can use an EMPIRE BRICK facing cut down to suit and glued in position or a quarry tile installed in the same way.

You can also use corner bricks in this area, but this can be a costly option.

## MORTARING THE JOINTS



A general on-site mix is:  
 4 Sand (mixed particle sizes) : 1 Cement  
 : 1 Lime  
 plus some 'DYNEX' Admixture.  
**'DYNEX' IS NOT A STANDARD  
 BRICKIES AIR ENTRAINING  
 ADMIXTURE.. DO NOT USE BYCOL OR  
 SIMILAR  
 AND DEFINITELY AVOID THE USE OF  
 PVA BONDING AGENTS SUCH AS  
 BONDCRETE!**

Mortar can be inserted with a plastic bag shaped like a cone, or a mortar gun or pumped.

The easiest method of mortaring Empire Brick Walling is:

- Place approx 40kg of your chosen mix in a standard wheelbarrow & add any colouring oxide, if required.
- Add water, as required, & also add the Dynex admixture, then mix to a consistency similar to "yoghurt".
- The water addition rate is sensitive to the climate, so until you get used to the mixing it is better to add water slowly & mix thoroughly. The best test to see if your mortar is "right" is to get a mortar bag & fill it over the barrow...
  - if the mortar "runs out" - it's too wet.
  - if the mortar "dribbles out" - it's OK.
  - if the mortar stays in the bag - it's too dry!



**IF IT STILL DOESN'T FLOW.. GET SOME WASHING UP DETERGENT & PUT SOME IN THE MIX. THIS CREATES AIR BUBBLES TO HELP IT MOVE.**

Put down some dropsheets around the job and with the mix now ready simply fill the joints as cleanly as you can.

There is no "right" way to do this, it's just a matter of perseverance & keeping the wall as clean as you can. The idea is to 'over-fill' the joint slightly. Always fill the 'perps' (vertical joints) from the bottom up and ensure the mix gets right into the top of the joint.



Mortars are not good for your hands, use gloves & eye protection. (& don't let the mix get inside the gloves while you're working).

Once you've got the 1st mix in, the walls should be ready for tooling, but keep your eye on this as you go.

Grinding out mortar joints because you let it go off before tooling is very difficult and costly!

Rather than use conventional steel brickies tooling equipment, experience has shown us that a simple piece of round timber (similar to a broom handle) will give the standard "ironed joint" finish and is excellent at forcing the mix into the joint.

#### **IMPORTANT NOTE:**

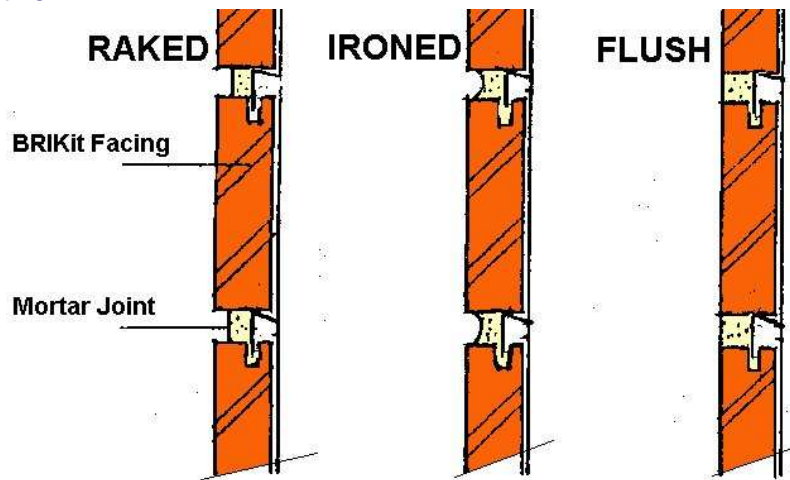
When mortaring a brick into place, look at the bricks as you go. If one is "sticking out" too much or not straight for some reason.. **ADJUST IT NOW** - whilst the mortar is still wet.

It is pointless coming along after the mortar has gone off and trying to fix anything then.

### **JOINT DESIGNS**

**IRONED JOINTS:** are best for the BRiKit system, they compact the mortar & push it into the joint. An ironing tool is easy to use.

**FLUSH JOINTS:** are also easy, but make sure the mix fully fills the joint because there is no compression when doing it this way.



**BRICKWORK JOINTS**

**RAKED JOINTS:** are more difficult. Use the raking tool carefully and don't go too deep or you'll expose the lugs on the rail.



Once you've done the tooling in an area let it go off a little more & then brush it down. If you brush it immediately after tooling you will smear the moist edges of the mortar all over the bricks.

## **IMPORTANT NOTE**

**You CANNOT clean bricks the same way you do tiles!!!**

Tiles are glazed and the mortar does not stick to them

**EMPIRE BRICK is made from brick materials and the mortar will stick to them!!**

**So.. DO NOT SMEAR MORTAR OVER THE FACE OF THE BRICKS!**

A light wash down of all the walls is advised to remove all of the dust and dirt from the bricks and clean any mortar smears.

If you have installed the mortar correctly,  
you **SHOULD NOT NEED TO ACID WASH.**

If you do need acid,  
make sure it is the right one,  
diluted properly and  
wet the bricks down before applying ANY acid solutions.

If you have any specific installation questions..  
Contact us:



# **EMPIRE**

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