

*Conservation in Tendring*

Listed Buildings

# Bricks and Brickwork

*Tendring*  
District Council





This advice is provided to guide those preparing applications for planning permission and/or Listed Building Consent or considering repairs. More general advice on both Listed Buildings and buildings in Conservation Areas can be found in the two advisory booklets which are related to this series of publications.



## 1 Introduction

Bricks were first introduced into Britain by the Romans but they were not used for domestic buildings until c14th. Even then most brickwork carried out was to large public buildings and houses of high status. It was not until about the C16th that bricks became more widely used for smaller houses. Then they were poorly made locally, were of inconsistent size and sold by number so they were often undersized.

However, in 1568 the “statute brick” was defined but despite this bricks still varied greatly because of the way they were produced. In the late C17th Gauged brickwork was introduced and also during this period elaborate brick patterns became fashionable.

In the early c18th designers began to favour bricks ranging in colour from light yellow to dull brown rather than the warm red bricks used by their predecessors.

The size of a brick has always been based on the size of a man’s hand, within this scope exact sizes have varied up until the mid 19th Century. As a general rule earlier bricks were had made and tended to be long and thin, though irregular in shape.

Early brickwork, in a period when no standardisation of bricks existed, will probably have had thick mortar beds in order to compensate for the irregularity in brick sizes. However, by the mid 1800’s various efforts were made to standardise brick sizes.

A standard size of  $9 \times 4\frac{1}{2} \times 3\frac{1}{2}$  inches was widely adopted from 1840 and was subsequently replaced by the metric brick in 1970.



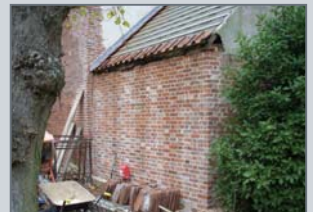
*Victorian industrial brickwork detail*



*Boundary wall in Harwich with a mix of brick types and colours*

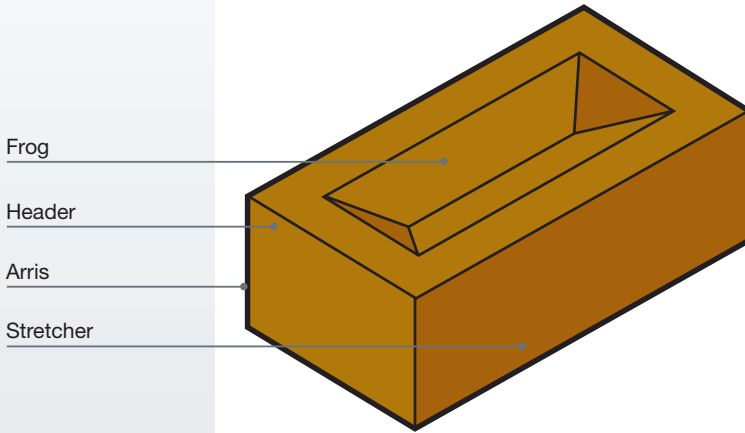


*Gault brick facade of Listed Building in Manningtree*



*Rebuilt extension to Listed Building*

## 2 Anatomy of a brick



## 3 Bonding



*Re-built historic wall (Flemish Bond)*

Bonds are the horizontal patterns in which bricks are laid. There are five main types of bond used in old buildings. The bricks in very old buildings (those earlier than 1700) were not always laid in any recognisable bond. The thickness of the lime mortar between the bricks varies by as much as 15 - 25mm ( $1/2$  - 1in) and sometimes the bricks themselves differ in size. This historic effect, is almost impossible to reproduce, so only rebuild very old brickwork if all other attempts to repair it in situ have failed. If you do have to rebuild a section of very old wall, record as much visual detail as possible, but don't attempt to rebuild it in a slavishly accurate fashion.

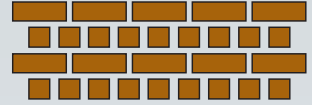


*Unattractive cement patch repairs on important historic wall forming curtilage to a Listed Building*

A brick can be laid with either its long side (stretcher) showing, or its short (header) end showing. Some bonds are made from bricks laid with just one side showing, while others use a combination of both stretchers and headers. The more headers you have showing the greater the number of bricks you will use, but the greater the inherent strength of the wall.

## English bond

This is the oldest pattern, and was commonly used until the end of the 17th century. A course of stretchers alternates with a course of headers.

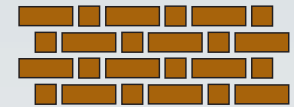


*English bond*

## Flemish bond

From the beginning of the 18th century, the Flemish bond superseded the English bond. This style has stretchers and headers alternating within each course.

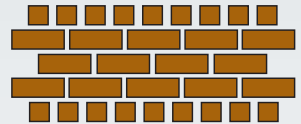
English Bond is considered stronger than Flemish bond, so continues to be used for civil engineering projects, such as bridges, viaducts and embankments. Laying the bricks in alternative courses, however, gives the impression of stripes, which is considered less pleasing than the appearance of Flemish bond. As a result, Flemish bond, although inherently weaker, is widely used for house and small projects.



*Flemish bond*

## English garden wall bond

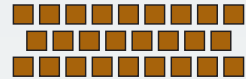
A variation on English bond, this pattern has one row of headers followed by 3 - 7 rows of stretchers. As laying stretchers uses up fewer bricks than laying headers, this style is cheaper to produce than English bond. However, it is also less strong hence its use in traditional walled gardens and other modest structures.



*English garden wall bond*

## Header bond

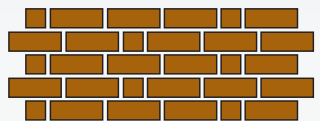
Popular during the 18th century Header bond often employed contrasting brick colours to give a decorative effect. This bond produces a fine, tight wall, but uses so many bricks that it is usually reserved for very high-quality buildings. It's also used for curved brickwork, as the short faces are easier to build into undulating shapes.



*Header bond*

## Flemish garden wall bond

Also known as Sussex bond, this is a version of Flemish bond that served the same function as English garden wall bond. It is made by using one header brick every three stretcher bricks.



*Flemish garden wall bond*



Local example of diaper patterned brickwork



Window arch detail in terracotta



Victorian industrial brickwork detail



Heavily eroded soft red brick wall in need of extensive repair

## 4 Decorative Brickwork

From the early 16th century onwards the Flemish influence was not only significant for the promotion of the use of brick for structural reasons, but also encouraged its use for its decorative possibilities. Traditional Flemish brick designs were imported from the continent and their influences particularly noticeable in the number of decorative brick parapeted gables which exist on buildings throughout the Tendring District.

The use of brick for decorative effects continued to grow in popularity during the 18th and 19th centuries. It was a comparatively cheap way of embellishing buildings through the creation of service patterns using different coloured bricks, and modelling, using moulded, cut and shaped bricks. Terracotta was also used for decorative purposes, especially in the 19th and early 20th centuries.

## 5 Maintenance and Repair of Brickwork

The main causes of failure and the need for repairs in brickwork are **weathering** and **movement**, other causes include salt, frost and plant damage. (See section 10 for more detail on brick failure).

Weathering of both joints and brickwork occurs more quickly on those parts of the wall which are more exposed – chimney stacks, cornices etc. and where they are vulnerable to run off, i.e. string courses, aprons under windows and parapets.

Movement can cause cracking in the brickwork or cause it to bulge. This can be due to differential settlement and changes in the load bearing soil, or the application of excessive external forces, such as wind and structural failure. Elsewhere in the building e.g. failure of a timber lintel expressing a sudden change of load on to the brickwork.

If it becomes necessary to replace bricks great care is needed not to cause damage to existing, undamaged brick in the process. The minimum amount of work necessary must be undertaken to help preserve the integrity of the wall. The choice of repair method will depend on how easily the damage bricks can be re-used, which in turn depends on bond type and the strength of mortar used.

Replacement bricks should match the existing as closely as possible. This can sometimes prove difficult as some historic bricks are often of irregular size and shape. Mismatched bricks can appear unattractive and cause problems to fit into existing bond. There are a number of brick specialists who produce hand-made bricks to measure (see under “Further Information”).



Important brick wall forming curtilage of Listed Building where pointing has failed

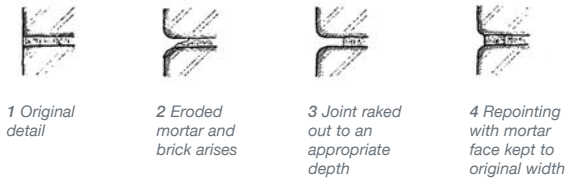
## 6 Pointing and Re-pointing

Traditionally brickwork joints were bedded and finished as the wall went up in one process. Modern bricklaying is a two stage operation, the wall erected then pointed, filling the joints to weather proof the work.

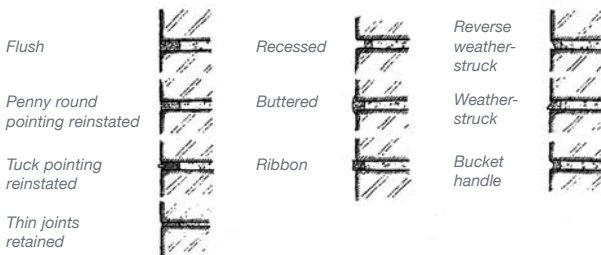
The term “pointing” is generally used to describe the exposed face of a joint, whether or not it is the original mortar face, original pointing or a later re-pointing. In all cases the appearance of the original pointing should be the guide for later work and every effort should be made to match existing work.



Tuck-pointed brick frontage



### Types of Pointing



Brickwork detail of walls at Old Lifeboat House building, Harwich

## 7 Mortar Mixes and the use of Lime

Any re-pointing should be carried out with an appropriate mortar. As a general rule any building pre-1850 will need a lime based mortar in a ratio of 1:3 lime to sand. The odd damaged brick can be replaced by raking out the old mortar



*Yellow Gault brick with stone dressing  
former Great Eastern Hotel, Harwich*

and turning the brick around. This is only possible with lime mortar, as hard cement mortar is very difficult to remove.

Lime mortar consists of lime, sand and water. The exact proportions of the mix, the colour and character of its ingredients and very thorough mixing are all extremely important.

The mortar used for repairs should never be harder or less porous than either the bricks or the mortar which it replaces. Whilst there are many mixes of lime mortars which can be used for re-pointing historic brickwork if possible try to match the original mortar used.



*Impressive flank wall of the former Three  
Cups Inn, Harwich*

Colour matching and sizes are also important factors in the final appearance of re-pointing. The colour and grading of aggregate will determine the colour and texture of the mortar. Pigments can be used but can weaken mortar if used excessively and they also leach out quickly. Naturally coloured sands and brick dust are always to be preferred when re-pointing.

## 8 Painting Brickwork / Rendering Brickwork



*Rear of Pier Hotel, Walton (unlisted)*

Painting or rendering over facing brickwork may seem an attractive proposition because of its relative cheapness. However, it is actually likely to cause more problems in the long term than it solves in the short term, especially as it tends to trap excessive moisture within the wall preventing it from evaporating away naturally. The application of pebbledash and other types of coating should also not be undertaken for the same reason. The facing brickwork, which often has decorative elements, is much more attractive anyway.

Furthermore, painted, rendered, pebbledashed and similarly altered buildings which were originally designed with facing brickwork, invariably harm the appearance of the street and more often than not are worth less than those which retain their original appearance.

Listed Building Consent will be required for painting over or rendering facing brickwork on a Listed Building. In some circumstances it may be required for repointing or replacing bricks.



## 9 Cleaning Brickwork or Removing Paint or Render

When considering cleaning historic brickwork it is important to be gentle. Over-abrasive forms of cleaning, such as sand blasting or high pressure water jets, can damage the valuable surface of the brick, leaving it open to further problems. This principle also applies to Chemical Cleaners, which are just too strong for old brickwork. Any Chemical applications are best undertaken by a specialist conservation contractor, who will have all the appropriate safety equipment and correct dilutions for historic brickwork.

Brickwork that is in good condition does not need painting, rendering or any other form of weatherproofing. However, unfortunately there are many examples of buildings which once had attraction, historic brickwork but is now hidden beneath layers of paint. The paint is expensive to remove but in all cases it is recommended that a reliable professional company be employed to chemically strip the old paint from the brickwork. Once the old paint has been successfully removed to prevent moisture permeating the wall it should be re-pointed and/or repaired by replacing cracked and spalled bricks.

See also booklet in this series on **Plaster Work and Render**.

## 10 Reasons for Brick Failure

- ♦ **The original bricks were too soft.** This could be because they were badly made or underfired, causing them to crumble over time.
- ♦ **The bricks have become saturated with water** (often as a result of a leaky gutter or drainpipe). During a frosty spell, the trapped water expands, causing the bricks to shatter.
- ♦ **Water saturation** can also cause the mortar to erode, affecting the structural strength of the wall.
- ♦ **Brick clay often contains soluble salts.** Even after firing, some of these salts remain in the brick. If a brick gets repeatedly wet, the salts can travel to just below the surface of the brick, causing the surface to crumble and flake off. This is called 'cryptoflorescence', and often occurs in poorly fired bricks sitting in damp area, such as cellars.



*Naval House, Harwich*

- ◆ **Acid rain damages brick.** The pollution not only eats away at the lime mortar between the bricks, but can also lead to actual damage on the face of the brickwork.
- ◆ **Metal wall ties and other reinforcements** in brickwork can rust, expand and cause damage to the surrounding material.
- ◆ **Inappropriate mortar repairs will damage brickwork.** Old bricks expand and need the surrounding mortar to be soft enough to accommodate this movement. Modern Portland cement-based mortars are too hard for most historic bricks. Use a soft, lime-based mortar on any brickwork that pre-dates 1850.



*Attractive red brick frontage of historic and modern building side by side. Ground floor of historic building rendered.*

- ◆ **Sandblasting old brickwork exposes it to harm.** Bricks have an outer surface called a 'fireskin', which protects the softer, more permeable inner brick from water penetration. Very abrasive cleaning methods, such as sandblasting and gritblasting, remove this precious outer skin and leave the bricks vulnerable to water damage and decay.
- ◆ **Modern paints and water-repellent coatings** are not advisable for historic brickwork. The often lack breathability and will trap moisture within a wall, causing long-term damage.
- ◆ **Bad pointing.** Certain types of modern pointing, such as ribbon pointing, which stands proud of the brick, encourage water to collect on and penetrate the surface of the brickwork. This type of pointing also looks unsightly and is historically inaccurate.



*Important boundary wall to Listed Building in Harwich with repaired section*

- ◆ **Rampant vegetation.** Ivy can penetrate joints and cracks in brickwork or crumbling lime mortar. If you don't want to remove your ivy, make sure it is kept in check with regular pruning and doesn't start to invade gutters and downpipes (it will block them and cause them to leak). If you do want to get rid of any ivy, be extremely careful, as yanking it can pull the mortar out too. Consult a conservation expert, who will be able to assess whether it's better to leave the ivy in place rather than attempt to remove it.
- ◆ **Structural problems.** Subsidence, structural failures, tree roots, vibration, failure of lintels or joists - all these problems can have serious consequences for brickwork. Always consult a structural engineer if you suspect your building might be unstable, and don't attempt any repairs until the underlying problem is solved.

## 11 Listed Buildings - Applications for Consent

Applications for Listed Building Consent do not attract a fee which is a recognition that there is a cost incurred in preparing the necessary quality of Plans required to accompany such applications. The Council strongly advises the owners of Listed Buildings to engage properly qualified and experienced professionals to prepare such applications.

Such professionals can also provide advice on methods of repair. Wherever possible the Council expects owners of Listed Buildings to explore repair of historic fabric rather than seek to replace it with modern materials.

This advice in this series of booklets draws on a variety of specialist publications prepared by other organisations including Essex County Council, English Heritage, S.P.A.B. Links to these publications and/or the organisations' websites are given at the end of each booklet.

## 12 Further information

Planning Policy Guidance Note 15 Annex C

English Heritage: The Pointing of Brickwork 1994  
Conservation Principles Policies and Guidance 2008

Essex County Council Leaflets:

Conservation in Practice: repointing  
Advice on the maintenance, repair and conservation of old brickwork in traditional houses and service buildings.1998

"Conserve": Typical Details for Historic Buildings and Conservation Areas 2009

Pointing with Lime Mortars 2000

Conservation Practice: Plastering/Lime wash 1986

The Georgian Group Guides No.2 Georgian Brickwork: A brief Guide to the types and Repair of Georgian Brickwork

There are a number of firms specialising in the manufacture of traditional, handmade bricks. The nearest supplier being Bulmer Brick and Tile Company Ltd.

## Other useful sources of information?

There are various national organisations providing design advice and guidance in relation to Bricks and Brickwork. These include the following:

### **English Heritage**

[www.english-heritage.org.uk](http://www.english-heritage.org.uk)

### **Historic Environment Local Management - HELM**

[www.helm.org.uk](http://www.helm.org.uk)

### **Society for the Protection of Ancient Buildings - SPAB**

[www.spab.org.uk](http://www.spab.org.uk)

### **The Victorian Society**

[www.victorian-society.org.uk](http://www.victorian-society.org.uk)

### **The Georgian Group**

[www.georgiangroup.org.uk](http://www.georgiangroup.org.uk)

### **The Twentieth Century Society**

[www.c20society.demon.co.uk](http://www.c20society.demon.co.uk)

### **Institute of Historic Building Conservation**

[www.ihbc.org.uk](http://www.ihbc.org.uk)

### **Historic Towns Forum**

[www.historictownsforum.org.uk](http://www.historictownsforum.org.uk)

### **Essex County Council**

[www.essex.gov.uk](http://www.essex.gov.uk)

### **Communities and Local Government**

[www.communities.gov.uk](http://www.communities.gov.uk)

Note; Tendring District Council is not responsible for the content of any external websites.

# Bricks and Brickwork

**For more information write to:**

**Planning Services**

Tendring District Council  
Council Offices  
Weeley  
Clacton-On-Sea  
Essex CO16 9AJ

