



# WHY CHOOSE CLAY BRICK?





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“The brick is one of the most widely used building materials in the UK. Its use dates back to 7000 BC, making it one of the oldest known man-made materials. It is long-lasting, durable, weathers well and, when used in the right context, beautiful. It characterises some of our most treasured historic architecture and contributes to creating a built environment that is perceived as both permanent and safe.”

Fran Williams, Architects' Journal



# INTRODUCTION

When choosing building materials, the most common criteria are aesthetics, durability, installation, performance, maintenance and cost. However, with the Future Homes Standard scheduled to come into effect in England in 2025, and the UK's binding target across the economy to reach net zero greenhouse gas emissions by 2050, building materials will quite rightly come under increasing scrutiny with regard to not only their performance as part of a finished building, but at each stage of their lifecycle.

It would be natural to assume that a building material that has been around for thousands of years might not be up to the job, but there are many reasons why clay brick remains the building material of choice for architects, developers, builders and planners across the UK, and why it will continue to be so as we move to ever more sustainable methods of construction.

In this document, we explore the history of clay brick in the UK; how the wide range of colours, textures, shapes and sizes of clay brick have shaped our built landscape and continue to contribute to building aesthetics today; the documented productivity benefits of building with clay brick; and, finally, how clay brick contributes to a sustainable construction industry both now, and into the future.



# HERITAGE

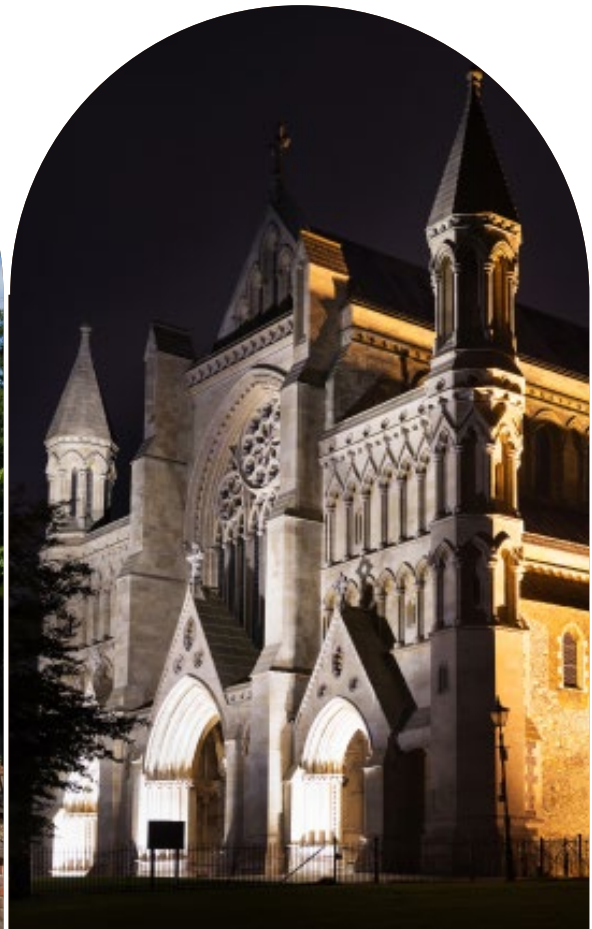
Britain is a country built on clay brick. Rich seams of clay in a wealth of different colours run through it. Towns and villages vary in hue depending upon which clay is dominant in the local area.

It was the Romans who introduced the first bricks into Britain. Ever resourceful, they used the widespread, easily accessible and workable soft surface clays to mould into a variety of shapes and sizes before firing. After the departure of the Romans, it would be several hundred years before clay bricks were made again. The Normans and the Saxons were early recyclers and re-used Roman bricks to build, for example, Colchester's oldest standing building, the Holy Trinity Church. The re-used Roman bricks can still be seen in its walls. Similarly, St Alban's Cathedral is a Norman church built from bricks and tiles saved from the ruins of the Roman town Verulamium.

"Both of these buildings have been standing for a thousand years, using bricks from buildings built a thousand years before them, and are testament to the durability, longevity and inherent sustainability of clay brick."



Pictured above: Holy Trinity Church



Pictured above: St Alban's Cathedral



## Clay brickmaking in the UK began again in the 12th century, but it wasn't until Tudor times that it became fashionable as a building material.

However, it was the 17th century when the benefit of building with clay brick over other materials was recognised. After the Great Fire of London in 1666, when fire swept through the city's timber buildings in a matter of hours, timber was banned as a building material, leading to a significant increase in the use of clay brick. Clay brick's inherent fire resistance continues to be an important benefit today.

In the second half of the 19th century the brick industry, like many other industries, became increasingly mechanised. In 1859, the Hoffman continuous kiln, which is still used today in the production of the iconic London Brick, was introduced. The kiln improved efficiency in fuel consumption and increased the rate of production, doubling brick production between 1850 and 1900.

“The popularity of clay brick during the Victorian period, and earlier, is evident throughout Britain today.”

In an article in *Architects' Journal*<sup>1</sup>, Fran Williams states that brick “characterises some of our most treasured historic architecture and contributes to creating a built environment that is perceived as both permanent and safe.”

With so much of Britain's built landscape constructed in clay brick, it is small wonder that planners will stipulate brick to ensure continuity and harmony with the local vernacular. The proposed National Model Design Code, should it come into effect, will likely strengthen this stance through its recommendation of “the need to lay great weight on harmonising with local vernaculars”<sup>2</sup>. Since most UK clay brick manufacturers still, by and large, manufacture bricks from clay extracted either on site or nearby, demand for regional colours and textures of brick can be readily supported, as we explore in the next section.



Pictured above: Battersea Power Station

# AESTHETICS

Clay brick is available in a wealth of colours, textures, shapes and sizes. Whether building new or renovating, maintaining or improving an existing building, modern production techniques alongside the continuation of centuries-old hand working skills means there is an abundance of options to ensure that older bricks can be matched, and aesthetic and planning preferences accommodated.

## Colours

Clay brick is available in a vast range of colour variations within seven dominant colour groups: red, yellow, buff, blue, grey, brown and black. Different colours dominate in different parts of the country owing to the prevalence of certain types of clay. For example, in Cambridgeshire, the gault clays of the area produce bricks in a light creamy-buff shade. In the north of England where carboniferous shale clays are found, bricks are dense and smooth, and typically dark red in colour, while in Sussex and Kent, the red of the bricks is a result of the iron oxide bearing weald-clay of the area.



Prior to the second world war, these regional colour variations were very evident as the majority of bricks were used within a 30 mile radius of where they were made. Nowadays, while planning might still require a certain shade and texture of brick, particularly in conservation areas, these regional variations have been diluted, although can still be identified in the names of many of the bricks available from the UK's brickmakers.

## Finishes and textures

The variety of bricks available is enhanced by different surface finishes, which are typically a result of the brickmaking process. Very often, the look and feel of existing, legacy brickwork will be an important consideration in brick selection. The most common clay brick textures available today are:



### Smooth and sandfaced

Smooth bricks are wirecut bricks with a consistent and uniform character. Sandfaced bricks are created by applying a sanded coating to an extruded column of clay prior to firing; the adhered sand adds a light texture to the brick face.



### Textured

A wirecut brick with a uniform texture created using a variety of rollers or blades. These can vary from dragfaced, small indentations and irregular prints, through to heavy distress rustications. Once the texture has been applied the column of clay is wirecut.



### Tumbled

Tumbled bricks are distressed and irregular in shape. Wirecut after the texture has been applied, they offer a cost effective way of achieving the old world charm and aesthetics associated with reclaimed bricks.



### Stock pressed, stock thrown and waterstruck

Manufactured using soft mud (clay containing a high percentage of water) that is pressed or thrown into sanded mould boxes. Stock pressed bricks have a smooth sandfaced finish while stock thrown is a more traditional looking brick, slightly irregular in shape with a creased texture that replicates the appearance of handmade bricks. Waterstruck is a relatively smooth, sand free textured brick in which water rather than sand is used to release the brick from its mould.

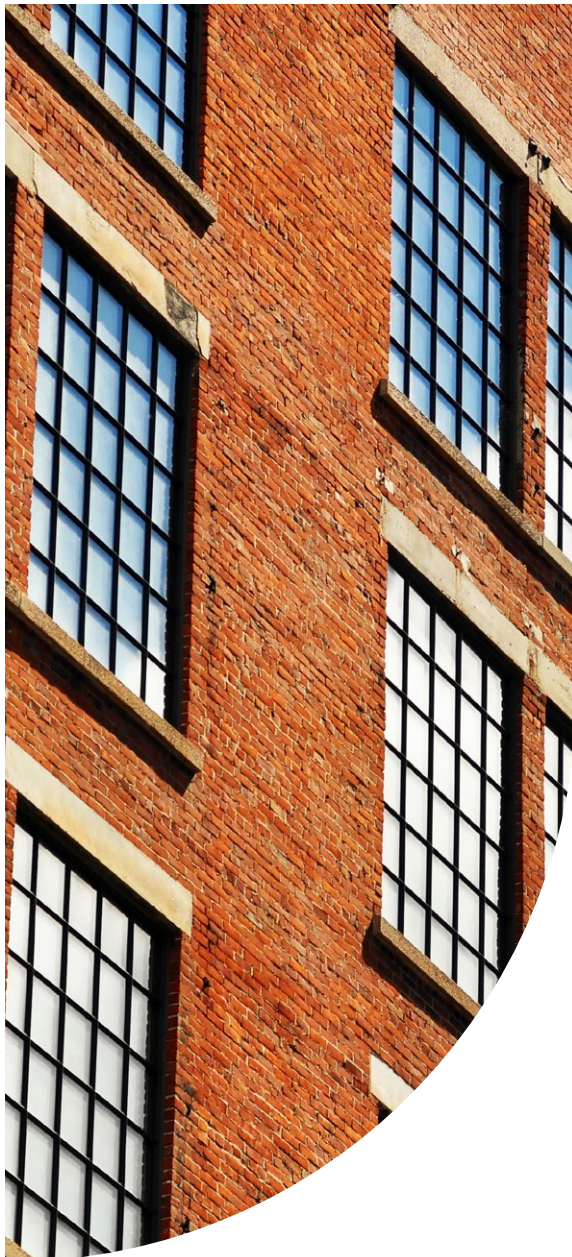


### Size and shape

Most clay bricks in the UK are made to a British Standard size of 215mm long, 102.5mm wide and 65mm high. The length of the brick is equal to twice its width plus 10mm allowance for the mortar joint, and three times its height plus allowance for two 10mm mortar joints. This consistency in sizing has played an important role in improving construction efficiency.

Prior to standardisation, there were regional and even factory variations in brick sizes, which can be seen in many older buildings standing today. This can make matching bricks for renovation, maintenance and improvement purposes challenging.

Fortunately, many of the UK's brick manufacturers offer non-standard and special shaped brickmaking services, which can produce bricks in a large variety of sizes and shapes in runs of as little as one brick up to 100,000 or more.



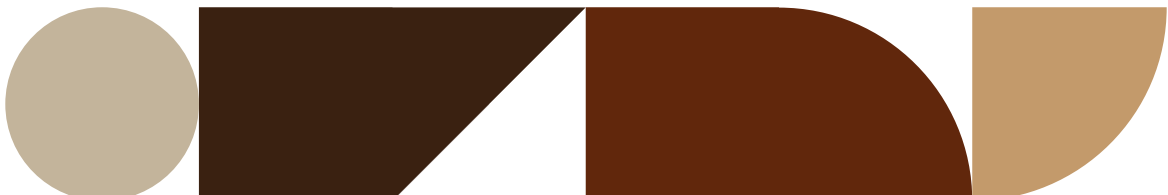




Pictured above: The Interlock

While mass-produced clay bricks dominate, look at most clay brick buildings and you will see much more than rectangular clay bricks. Clay's extraordinary versatility means it can be worked and moulded to create unique brickwork features and detailing for restoration projects, or to add a finishing touch to a new build of any architectural style. It is this versatility that makes clay brick a popular choice for architects. The award-winning Interlock building in London is an example of the transformative effect of clay brick. Designed and produced by Cradley, UK brickmaker Forterra's special shaped brick facility, the complex construction of this clay brick façade brought together 5,000 bespoke Etruria clay blue bricks which were expertly laid using course by course drawings to form the three-dimensional, interlocking pattern.

The Interlock may be an extreme example of how clay bricks can transform a building, however, there are many other more commonly used examples that add important finishing touches to our buildings, such as bat and swift boxes, cill bricks, copings, cut and bond bricks, large format pier caps, personalised and date bricks, as well as slips and spacing bricks.



# PRODUCTIVITY

Clay brick has long been the bricklayer's choice of building material. Compared to other similar products, such as bricks made from concrete, clay bricks are light, easy to lay, handle and require a relatively low number of constructional safeguards, thereby contributing to greater productivity rates and a reduction in health and safety risk.

Based on trials carried out in 2019, building with clay brick can be 30% quicker than building with a concrete-based equivalent. The reason for this significant difference is different water absorption, density and cutting time.<sup>3</sup>

## Water absorption

The majority of clay facing bricks have an initial rate of water absorption that is conducive to high productivity brickwork. In other words, the combination of clay brick and mortar is optimised to firm up quickly so more bricks can be laid within a given period of time.

## Density and cutting time

The density of clay bricks varies from high density engineering bricks, commonly used in industrial buildings, through to lower density facing bricks, typically used for housebuilding. Clay bricks of lower density are relatively easy to handle and work, requiring only hand tools to cut, which can help speed up the building process compared to higher density bricks that require mechanical power saws to cut.

## Constructional safeguards

Compared to other building materials, clay brick requires relatively few constructional safeguards. For example, walling built from clay brick typically requires movement joints only every 12 metres compared to every six metres for concrete bricks. Similarly, clay brick walling does not generally require stainless steel reinforcement. These are all factors that also contribute to increased productivity rates.

## WHAT BUILDERS AND ARCHITECTS THINK

A survey\* of Professional Builder Magazine readers revealed that clay brick remains a favourite of builders and architects for a variety of reasons.



### BEST TO WORK WITH FOR SPEED

Clay brick **82%**  
Concrete brick **18%**



### BEST FOR SUSTAINABILITY

Clay brick **88%**  
Concrete brick **12%**



### BEST FOR AESTHETICS

Clay brick **99%**  
Concrete brick **1%**



### BEST FOR CREATIVITY POSSIBILITIES

Clay brick **92%**  
Concrete brick **8%**



### BEST FOR RMI\*\* WORK

Clay brick **87%**  
Concrete brick **13%**



### BEST TO WORK WITH OVERALL

Clay brick **91%**  
Concrete brick **9%**

\*Based on the responses of 95 participants in a survey of Professional Builder Magazine e-newsletter recipients

\*\*Repair, maintenance and improvement





# SUSTAINABILITY

In use, clay brick is an inherently sustainable building material. It is durable, requires little to no maintenance and can be recycled, reclaimed and re-used. Clay brick can also contribute to thermal mass, resulting in buildings that need less energy for heating and cooling.

The firing of clay bricks is an energy intense process; however, the industry has made great strides in reducing energy consumption by switching from high carbon fuels, such as coal, to natural gas. With the aim to reduce carbon emissions further still, the industry has set out a decarbonisation and energy efficiency roadmap<sup>4</sup> and is exploring other low-carbon fuels such as hydrogen and electric-firing.

Another important factor to consider when choosing building materials is cost of transportation from factory to construction site in terms of both economic and environmental costs.



### Transportation

Clay brick, like many other building materials, is a heavy product that requires transportation on a heavy goods vehicle (HGV) from point of manufacture to point of use. On average, this is a distance of fewer than 68 miles with a typical payload of 11,000 units, compared to just 10,000 for higher density concrete bricks.

This relatively short distance of travel, combined with payload quantity, helps to minimise the emissions associated with the transportation of clay bricks.

In 2018, road transport accounted for 91% of UK domestic transport emissions, and HGV traffic accounted for 17%. Greenhouse gas emissions (GHG) from HGV traffic increased by 14% between 2012 and 2018. In 2018, the government agreed a voluntary, industry-supported commitment to reduce GHG emissions from HGVs by 15% by 2025, from 2015 levels.<sup>5</sup>

To support this aim, some clay brick manufacturers are investing in upgrading their fleet to Euro 6 vehicles and looking to increase payload through updated vehicle body design, which will see vehicle movements and emissions reduce still further.

### Longevity

Buildings constructed using clay brick have long lifespans, which may require only minimal upkeep and can be adapted to meet ever-changing demands. You don't need to look very far in the UK to see clay brick buildings that are centuries old.

A 150-year-old brick building will look at least as good as when the bricks were first laid. This is compared to the generally accepted expectation that a new building will last for at least 60 years.

The longevity of clay brick contributes to its sustainability as a building material, and even if a building is demolished, the clay bricks can be refurbished, re-used and recycled.

### Refurbish, re-use, recycle

As we explored briefly on page 4, the durability and recyclability of clay brick is well documented. When a building reaches the end of its current use, arguments about repurposing a building rather than demolishing it are gaining strength. Clay brick buildings in particular lend themselves to being refurbished and retrofitted in line with changing needs and purposes. If this is not an option, clay brick walls can be dismantled and mortar removed before being used to create new building facades, or clay brick can be recycled for use as hardcore, reducing the amount of virgin material required.





# CONCLUSION

The benefits of choosing clay brick are clear. Aesthetically, it is an intrinsic component of our built landscape, its wealth of colours reflecting the ground from which it was excavated, rooting our buildings within their environment. Its versatility, durability and longevity are second to none – factors which also contribute to its inherent sustainability as a building material.

As the construction industry looks for ways to be ever more sustainable, architects, developers, builders and planners want reassurance that the building materials they use perform at every level, from cradle to grave. The clay brick industry recognises this and is working to improve sustainability at every stage of the product's lifecycle, from the extraction of raw materials through to methods of manufacture and delivery. With its ability to contribute to the creation of long-lasting, efficient and low impact buildings in little doubt, it is quite possible that clay brick will continue to be the building material of choice for another thousand years.



Pictured above: York House

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## Other reading

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- Campbell, James W.P and Pryce, Will, Brick – a world history, Thames & Hudson, 2003

**For advice or information about Forterra's brick ranges,  
contact us on 0330 123 1017 or visit our website at [forterra.co.uk](https://forterra.co.uk)**