

Glass & Glazing Options

Glass Types - single glazing

Broad glass became widely used around the 12th century. The method involves forming a balloon of molten glass & then swinging it to elongate it. The ends are removed to form a cylinder, sheared along the length and flattened on a smooth surface to form a sheet. The glass was of poor quality and not particularly clear or flat.

Crown glass was developed in the 14th century and widely used up until the mid-19th century. Molten glass is gathered on the end of a blowpipe and a 'balloon' shape blown. The blowpipe is removed and a rod (known as a punty) attached. The glass is spun rapidly until a disc is formed. The outer glass is cut into small panes and the central section of the spun glass becomes the bulls-eye or bullion. Crown glass can be identified by concentric ripples & air bubbles.



Cylinder glass is a more developed method of broad glass and formed by blowing molten glass into elongated balloon shapes whilst swinging the cylinder in a trench to stretch it. The ends of the cylinder are cut off & the glass is allowed to cool before cutting down its length. The glass is re-heated in an oven; annealed and the cylinder unfolds into a flat sheet. The glass is distinctive by its faint parallel ripples.

Polished Plate is formed by casting glass onto a table and then grinding and polishing to a clear flat surface.

Drawn flat sheet glass was produced in the early 20th century. The process involved drawing molten glass through a die into a flat continuous sheet.

Float glass, was developed in the 1950's. It is manufactured by floating molten glass in a bed of molten metal (typically tin). This gives the sheet a flat, uniform thickness and reflective surface. This picture shows the comparison between the reflective façade of float glass used in the top pane & the 'distorted' appearance of cylinder glass used in the lower section.



For repairs & replacement windows in historic (Listed) buildings ideally the glass should be preserved and reused. New float glass may not be acceptable due to its uniform, flat, reflective surface.

It is possible to imitate historical crown & cylinder glass although both are expensive. Depending on how sensitive the replacement needs to be to the original (and its location) a lower cost could be to suggest 3mm 'period style' glass or horticultural glass. This glass has a wavy reflection however it does not have the same quality as hand blown glass.

Glazing method (single glass)

Single glass is typically putty glazed by bedding in the rebate. There are various types of putty and choice depends upon the frame material, design and performance demands. The use of putty with green oak frames is generally not advised.

Putty types include Linseed Oil putty, Multipurpose putty, Metal casement putty, Rapid set putty, Colourglaze (plastic glazing compound), Butyl glazing compound.

Prior to glazing, remove all dust, grease & loose material from the rebate. Any moisture should be wiped off to give a dry surface. Moisture content should be ~17%.

The rebate should have an appropriate full surface protection applied prior to glazing. Putty is applied to the rebate and setting blocks inserted. The glass pane is then centralised and pressed into the putty to give a bedding of 1-2mm throughout and then secured mechanically with metal sprigs or clips.

Further fronting putty is applied and knifed at an angle finishing approx. 2mm below the sightline. The putty is then brushed with a soft brush to seal the glass. Knife off back bedding, sloping away from the glass.

Overpainting is essential once the skin is formed on the putty. This typically takes a few days to cure but can take several weeks depending on temperature and humidity. If decoration is applied too soon then this will lead to a 'wrinkled' appearance. If left too late then the putty will dry out and shrink back.

The coating should seal between the glass and the top of the putty. Vapour permeable coatings (micro-porous, water based) are not recommended for linseed oil, multipurpose, metal casement, rapid set or butyl putty glazing as they may reduce service life. Check the manufacturer's instructions and information before applying. These will typically be solvent borne alkyd undercoat & gloss. Avoid strong solvents such as Xylene as these can lead to surface defect problems such as wrinkling of the putty.

Glazing beads may be suitable for single glazing. As with the above method, rebates should be coated and the glass fully bedded with an appropriate sealant before pinning beads into place. Mitred ends of beads should be end grain sealed prior to fixing. Pin heads should be punched, filled & coated.

Refer to BS8000:Part 7 1990 – Code of Practice for Glazing and BS6262: 2005 - Glazing for Buildings.

Glass Types – Double Glazing

Slim/Narrow Cavity Units allow thinner timber profiles and bead details to be used and (subject to approval) may be permitted in listed buildings or conservation areas where they provide a compromise between energy-efficiency and authenticity.

However, Narrow Cavity Units are expensive in comparison to 'standard' cavity units, can be difficult to glaze and may have a reduced service life.

Before purchasing it is important to check that they have the correct test evidence in place to ensure performance of the unit. Units should be CE marked, supported by a Declaration of Performance (DoP) and meet the requirements given in BS EN 1279 series of standards.

Warranties vary between manufacturer (5-10 years) and details of the cover need to be checked carefully. For instance, one manufacturer states that they will not guarantee against units becoming misted at any time!

Care needs to be taken when specifying large units with 4mm cavity otherwise the glass could touch in the centre under load.

It is imperative that the correct glazing method as recommended by the manufacturer using appropriate and compatible materials is followed. Linseed oil putty should be avoided as this will prematurely break down a double glazed unit; putty substitutes such as Dry Seal MP, Kawo Elastokitt and Hodgson Heritage Putty are available.

The BWF has published a fact sheet and recommendations when placing orders for Narrow Cavity Units and this is available for download from

<http://www.bwf.org.uk/assets/bwf-igu-advice.pdf>

'Standard' (24mm) double-glazed units can be used in windows & doors in conservation areas that do not have a restriction on permitted development. They are more energy efficient and have a longer service life than Narrow Cavity Units. Ideally units should be factory fitted to fully coated frames using a drained and vented method. All units should be CE marked.

Glazing bars

Early glazing bars were relatively wide (38 to 40mm), typically made from oak (or similar hardwood) and helped to support and protect the fragile glass.

As cheaper timbers became available (e.g. deal) and due to the development of crown glass, bars became narrower (typically ~16mm but some as narrow as 13mm) and glass panes larger. Glazing bar width was typically ~19mm by the late 19th century.

In the late 20th century double-glazed units became widely available. To support the glass (and cover the sealant), glazing rebates increased in depth to accommodate these units and glazing bars increased in width, which created a stocky appearance. This was unsuitable for conservation areas and applied bars were developed.

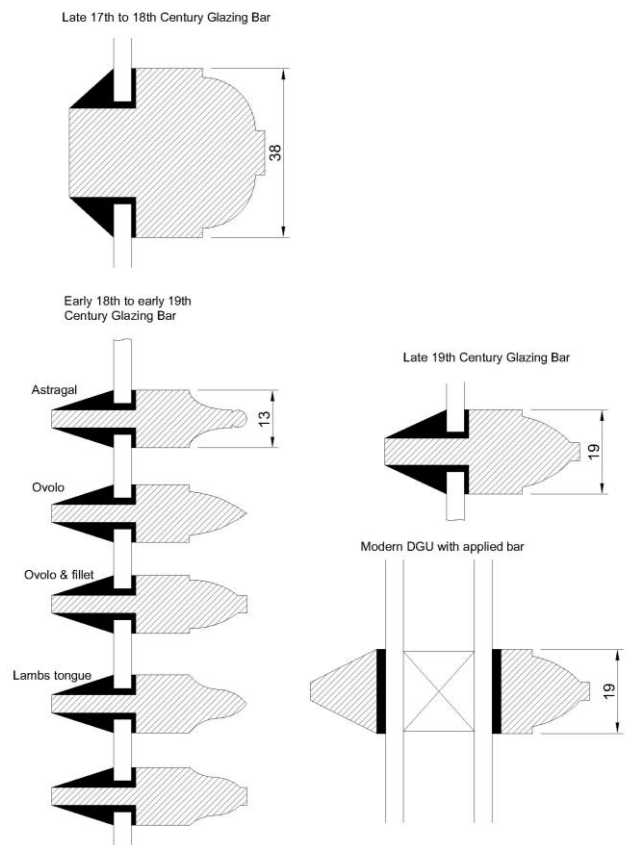
Applied glazing bars with dummy spacer bars within the double-glazed unit can be used in conservation areas without

compromising on moulding & glazing bar thickness and maintain the façade and character of the property.



Modern tapes & adhesives securely bond the bars to both faces of the glass. The depth of the unit is only visible when viewed up close.

TYPICAL GLAZING BAR DETAILS



Further information is available via the Heritage section of the BWF website (www.bwf.org.uk) or via the BWF Technical Team on 0844 209 2610 or via bwf@bwf.org.uk

If you are having a conservation, planning or building regulations issue related to Heritage or Conservation work, please do not hesitate to get in touch.

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