



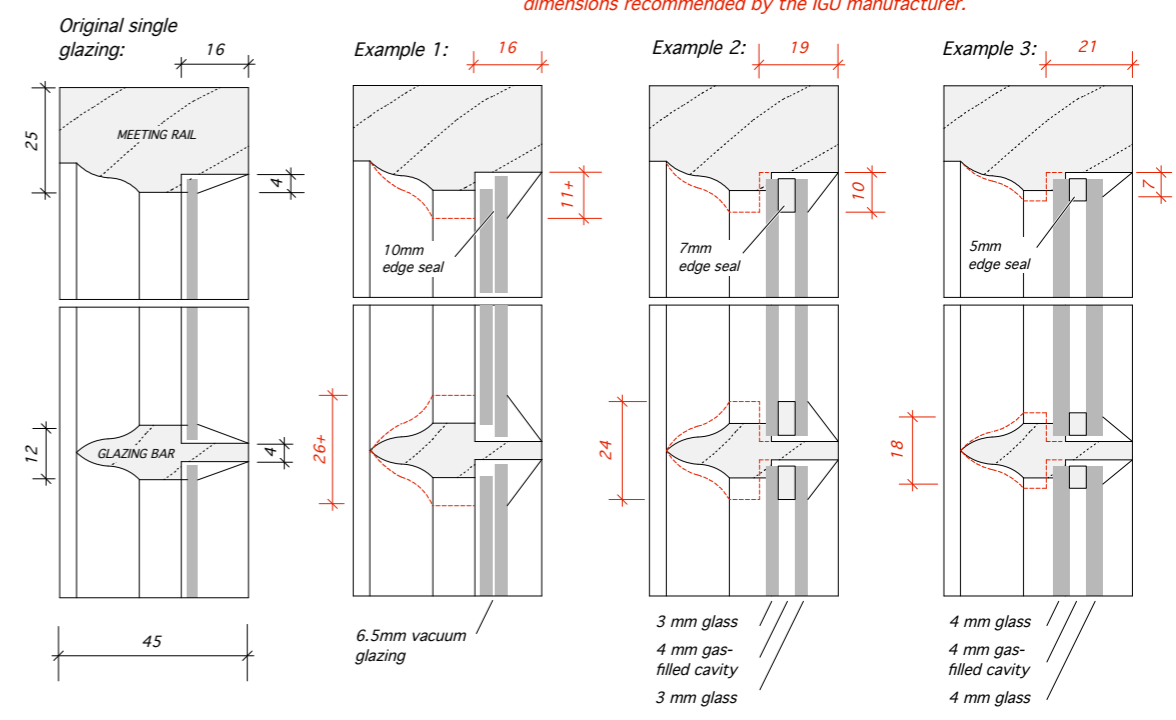
Double glazing in listed buildings

Illustration taken from 'Traditional Windows: their care, repair and upgrading', Historic England 2017, showing how historic frames and glazing bars need to be altered to accommodate the deeper rebate required for slim profile double glazing

TYPICAL SASH WINDOW PROFILES (e.g. 18th - mid 19th century)

SLIM PROFILE INSULATED GLAZED UNITS (IGU)

Dimensions in red show the minimum rebate and glazing bar dimensions recommended by the IGU manufacturer.



The tension between energy conservation and heritage conservation is familiar territory for many listed building owners, not least when it comes to installing double glazing. In this article I explain some of the myths surrounding double glazing as well as some of the pitfalls and alternative approaches which might be appropriate where new double-glazed windows are not an option. I explain national policy and guidance which underpins decision making on alterations to historic windows and why it is not always as straight forward as one might expect.

Windows are an essential part of a building's history and architectural appeal. Perhaps more than any other feature of an elevation they bear witness to the architectural tastes and technical advances of their time. They are often the single element which most serves to establish the character or date of a listed building.

However, pressure to reduce heat loss and increase thermal efficiency; to increase security and to 'update' our homes is considerable. So much so that many fine historic windows have been lost or compromised as a result of well-meaning but harmful alterations. We can all bring to mind the ill-conceived or aesthetically damaging replacement windows which mar a favorite elevation or historic street.

THE BASIS FOR DECISION MAKING: GOVERNMENT POLICY AND GUIDANCE

Most proposals for adding double glazing to a listed building are alterations which affect architectural or historic character so they require listed building consent. In times past some authorities took the view that secondary double glazing had little impact and were sometimes prepared to accept that consent was not required but few are so accommodating today.

All such applications for listed building consent are determined by the local planning authority who are required by statute 'to have special regard to the desirability of preserving the listed building or any features of special interest which it possesses'. It follows that there is a presumption towards preserving windows which are 'features of special

interest'. The presumption does not extend to windows which have no special interest.

Policy (in England) is contained in the National Planning Policy Framework which states that when considering the impact of a proposed alteration to a listed building great weight should be given to the building's conservation. The more important the asset, the greater the weight should be.

HISTORIC ENGLAND GUIDANCE

Historic England has recently updated its helpful guidance entitled 'Traditional Windows: their care, repair and upgrading' (2017) which specifically addresses the subject of thermal upgrading of windows and double glazing. It describes that assessing the significance of a window and understanding the contribution it makes to the significance of the building is the key first step in deciding the correct approach to any alterations or upgrading. Where historic fenestration survives, Historic England explains that it is often an irreplaceable resource that should be conserved and repaired wherever possible. It describes how to determine the architectural and historic significance of windows so that decisions about altering them can be made in an informed way.

Thermal upgrading of windows is considered in some detail. Historic England refers to recent research which has shown that by using secondary glazing with low emissivity coating, heat loss can be reduced by over 60%. It does not rule out the use of double-glazed windows in listed buildings but explains that conventional double-glazed units which are between 22 and 28mm thick, or slim profile double-glazed units which are between 10 and 16mm thick, differ from traditional glass which is normally between 2 and 3mm thick.

Consequently, double-glazed units are many times heavier and many times thicker than the original glass. In practical terms, it is often impossible to replace existing glass in multi-paned historic windows even using slim profile double-glazed units without having to alter the frames and glazing bars to accommodate the increased thickness and weight of the glazing. For this reason it is likely to cause serious harm. However, there are circumstances in which Historic England considers that the addition of double-glazed units to existing windows may be considered acceptable, including the following:

- Where a historic window retains no significant glass, has sufficiently deep

glazing rebates and is robust enough to accommodate the increased thickness and weight of double-glazed units without significant alteration (for example late Victorian or Edwardian 'one-over-one' sash windows or a simple casement).

- Where an existing replacement window of sympathetic design is to be retained and is capable of accommodating double-glazed units.
- Steel windows that are able to accommodate slim double-glazed units.

The guidance goes on to describe situations in which the significance of a listed building has already been harmed by the installation of poor windows of non-historic design. In these situations Historic England says that consideration may be given to the installation of new slim-profile double-glazed replacement windows where:

- The new windows are of a more sympathetic design and the net impact on significance will be neutral or positive.
- No incidental damage to the building fabric will result from the removal of the existing windows.

In the situations where double-glazed units are not considered appropriate, adding secondary glazing is often an acceptable alternative. Secondary glazing is a fully independent window system installed to the room side of the existing windows. The original windows remain unaltered so secondary glazing is often considered the most appropriate type of double glazing where the windows are historically significant.

Historic England are the government's advisers on heritage conservation – consequently their published guidance carries considerable weight in determining applications for listed building consent.

If you are applying for listed building consent for any type of double glazing it is well worth familiarizing yourself with the Historic England guidance documents (listed at the end of the article). At the very least, it will help you to understand how conservation principles are applied to historic windows and how best to make the case if you are applying for listed building consent. If your proposals for double glazing fall squarely within the guidance, you may well want to quote it in support of your application.

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Left: In this example slender glazing bars have been stuck onto the face of a large double-glazed sealed unit to give the appearance of traditional glazing bars. This solution has been widely used in the past on extensions to listed buildings but is not normally considered acceptable in place of traditional or historic windows



Right: This slim profile double-glazed unit consists of 3mm outer glazing, 4mm cavity and 4mm Low-E inner glazing. Total thickness 11mm



LISTED BUILDING CONSENT AND DOUBLE GLAZING

It is your local planning authority which will determine any application to alter windows in a listed building. Some councils have prepared their own helpful design guidance on double glazing in listed buildings and all will have published planning policies aimed at safeguarding significant architectural features on listed buildings and in conservation areas. However, when it comes to determining listed building consent applications for double glazing there is no consistent approach across the country. Some seem to have little regard to the Historic England guidance and take the view that double-glazed units should be refused and only secondary double glazing is ever acceptable in a listed building. In considering such decisions at appeal the Secretary of State (represented by the Planning Inspectorate) takes a more considered view and will inevitably attach weight to Historic England's published guidance.

Historic Environment Scotland offer the following advice for those altering or upgrading windows:

'The local authority determines the need for consent. Minor works such as draught proofing will rarely require consent. The installation of secondary glazing may sometimes require consent, often according to its design. More intensive works, e.g. retrofitting double glazing, are almost always likely to require consent, as will replacement. Where listed building consent is required, an application is made to the local authority. This should include accurate scale drawings showing both the existing windows and the proposed works in context. It is normally helpful to provide detailed technical

information and photographs. A brief description of the interest of the windows and an explanation of the impact of the alterations are always helpful in assessing change. Where an application proposes the replacement of a window or windows in poor condition, a condition survey by an appropriately skilled tradesman is often useful.'

UNDERSTANDING HEAT LOSS

Heating accounts for most of the energy use in our homes. In traditionally constructed buildings, typically 60% of heat loss is through walls and roof (35% and 25% respectively); 15% is due to draughts and only 10% is through windows (some sources say 10 to 20% depending on the size, type and condition of the windows). Windows in traditional buildings tend to be relatively small which means that the effect of double glazing on reducing heat loss is also correspondingly small. It follows that it is important to understand that there is little point in tackling heat loss through windows (the 10%) if you have not first dealt with heat loss through the roof and drafts (40%).

SOME RECENT TECHNOLOGICAL ADVANCES

There is not space here to describe all the alternative approaches to retro fitting double glazing traditional windows. However, there is one innovation which deserves particular mention. In recent years the development and marketing of slim profile double-glazed units (also referred to as 'slimline' or 'slim cavity', as well as several other trade names) has prompted a lot of interest. Slim profile double-glazed units are between 16 and 18mm thick as opposed to conventional double glazing which is between 20 and 25mm thick and single glazing which is between 3 and 6mm thick. Because it is

relatively thin it can be substituted for single glazing in certain situations without the need to deepen the glazing rebate or change the design of the window. It still achieves the same thermal efficiency as conventional double glazing by the use of inert gas, such as krypton or xenon, within the cavity. Historic Scotland has carried out tests and published a technical paper which confirms its thermal efficiency, although not its durability or longevity. Some professionals are openly concerned about the short life expectancy of slim profile units which are puttied into the glazing rebate in the conventional way. Historic Scotland has generally been more receptive to the use of slim profile double-glazed units in listed buildings than have other parts of the UK.

SOME POINTS TO BEAR IN MIND

- The reflective quality and the irregularities of old glass contribute to the character of a historic window. Original crown, cylinder or early plate glass is an increasingly rare asset which should be cherished and preserved wherever possible. By comparison, modern float glass is flat, blemish-free and characterless.
- Double glazing has a different appearance to single glazing in its reflective qualities.
- Maintenance and timely repair is the best means of safeguarding the historic character of most windows. Many timber windows are capable of repair even when the window salesman says they are not.
- The installation of replacement double-glazed windows is rarely economical unless the existing window frames are so badly damaged or rotten that they are really beyond repair.



Secondary glazing does not have to be visually obtrusive. In this example by CosyHome Company the frameless secondary pane is held in place by magnetic strips and only becomes visible on close inspection

- The cost recovery time (sometimes referred to as the payback period) for double-glazed units can be as high as 50 years which exceeds the lifespan of most units; between 15 and 25 years.
- The cost recovery time for draught proofing can be as low as 1 year for DIY and 5 years if fitted professionally.
- Most traditional windows can be effectively draught proofed, reducing air infiltration to match that of modern windows.
- Simple repairs, draught proofing and secondary glazing reduces heat loss of a window by a massive 75% (and even more if combined with shutters, curtains or blinds) making such measures comparable even with some of the more advanced modern double-glazed window.
- Secondary double glazing is more effective than primary double-glazed units in reducing traffic noise. The Building Research Establishment states that the minimum air space between the inner and outer panes of glass needs to be at least 150mm to achieve good noise reduction.
- Listed building consent will be required for any alteration which affects the character of a listed building. Most types of double glazing will fall into this category although some planning authorities accept secondary glazing without a formal application. Always check before proceeding.
- In contrast to modern houses, the installation of double glazing is unlikely to add to the value of your listed building. A listed building is normally valued for its authenticity, historic character and period features. Some window replacements are so badly executed that they detract from the value of the house.
- The additional weight of double-glazed units may be difficult (or impossible) to counter balance in sash windows and can cause additional stress to hinges in casement windows.
- Traditional windows can be very durable, often surviving up to 250 years. Modern windows on the other hand commonly only last 20 years. Traditional glass also lasts centuries whereas double-glazed units rarely last 25 years.



EXEMPTION FROM THE BUILDING REGULATIONS

Listed buildings, whatever their grade, are expressly exempted from the need to comply with the energy efficiency requirements of the building regulations where compliance would unacceptably alter their character and appearance. It is always advisable to speak with the building inspector before proceeding with replacement windows to ensure that the exemption applies in your particular case.

WHAT DOES THE FUTURE HOLD?

Buildings account for 46% of the UK's carbon emissions so it goes without saying that we all need to look carefully at the way we live and the buildings we live in. Listed buildings can often be easily adapted to modern technologies, such as energy efficient boilers, low energy lamps and low carbon energy sources. However, changing the historic fabric of the building can be more difficult, particularly when it directly affects elements such as windows which give buildings so much of their distinct character.

The emphasis on reducing heat loss and making our homes more energy efficient is likely to increase in years to come. However, in historic buildings there will always need to be a balance struck so that thermal improvements are not made at the expense of the building's architectural and historic significance. There is likely to be more emphasis placed on the need to change behavior, to use energy efficient controls and equipment, and to manage the performance of buildings.

With increasing emphasis on carbon reduction, government policy may change, but for the time being you are likely to have an uphill struggle if you want to install double-glazed units in architecturally or historically significant windows. Today's presumption in favour of retaining single glazing in significant windows is likely to continue, but hopefully Historic England's more pragmatic approach to double glazing in less significant windows will become more universal. ☺

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Further reading:

- Traditional Windows: their care, repair and upgrading*, Historic England, 2017 www.historicengland.org.uk
- Energy Efficiency and Historic Buildings: Application of part L of the Building Regulations to historic and traditionally constructed buildings*, English Heritage, 2010 www.communities.gov.uk
- Research Report: Thermal Performance of Traditional Windows: Timber Sash Windows*, English Heritage, 2009 www.historicengland.org.uk
- National Planning Policy Framework, Department for Communities and Local Government, 2012 www.communities.gov.uk
- Managing Change in the Historic Environment: Windows* www.historicenvironment.scot
- Historic Scotland: Technical Paper 9, Slim-profile double glazing: Thermal Performance and Embodied Energy*, 2010 www.historicenvironment.scot
- Building Regulations, Approved Document L1B: Conservation of fuel and power in existing dwellings*, 2016 www.planningportal.co.uk
- www.climatechangeandyourhome.org.uk
- www.energysavingtrust.org.uk
- www.historicengland.org.uk/advice/your-home/saving-energy/