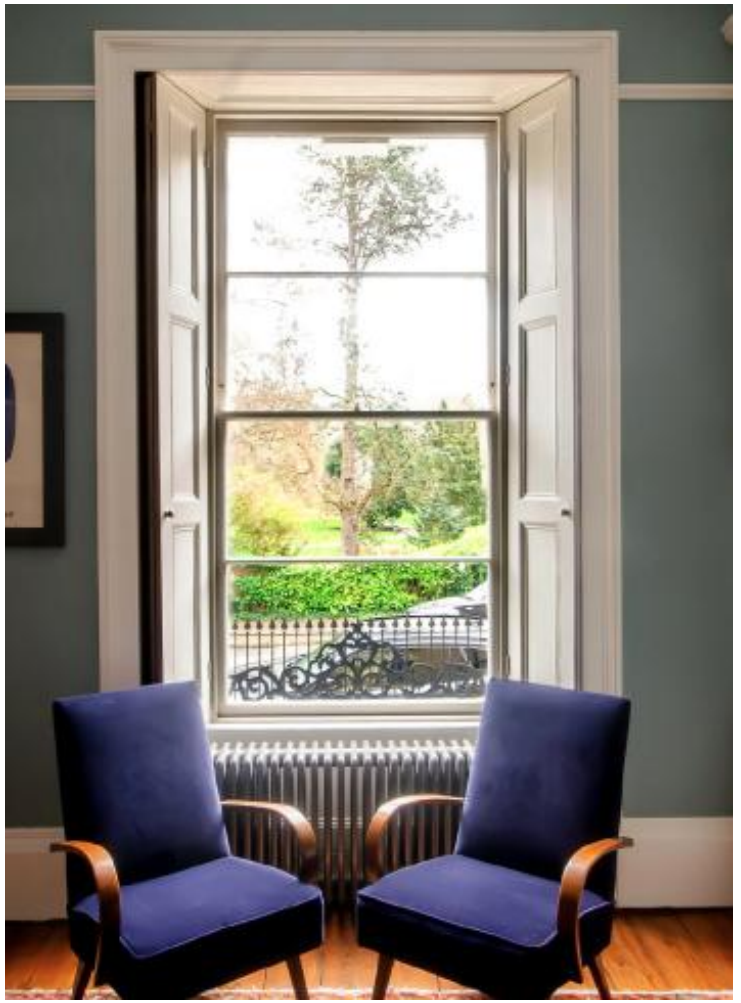
NEWMANS
JOINERY

Improving the energy efficiency of historic sliding sash windows



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- Brief history of the sash window
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- Methods to improve energy efficiency

The importance of the sash window

- Over 5,000 listed buildings in Bath most with sash windows
- Sash windows are central to Georgian architecture
- Help understand when a building was constructed or altered
- Inappropriate replacement or refurbishment work can ruin the appearance

Brief history of the sash window

- Introduced towards the end of the 17th century
- Crown glass could only be manufactured in small panes
- Glazing bars allowed a number of panes in a single sash
- During the 1700's the glazing bar detail evolved into a finer, more intricate design
- Plate glass introduced in the 1830's
- Larger panes of glass so, no need for glazing bars.
- Plate glass still had imperfections but considered an improvement on Crown glass.
- Decorative horn was added to provide additional strength
- A 6/6 sash with horns is a common sight, but incorrect and irritating detail

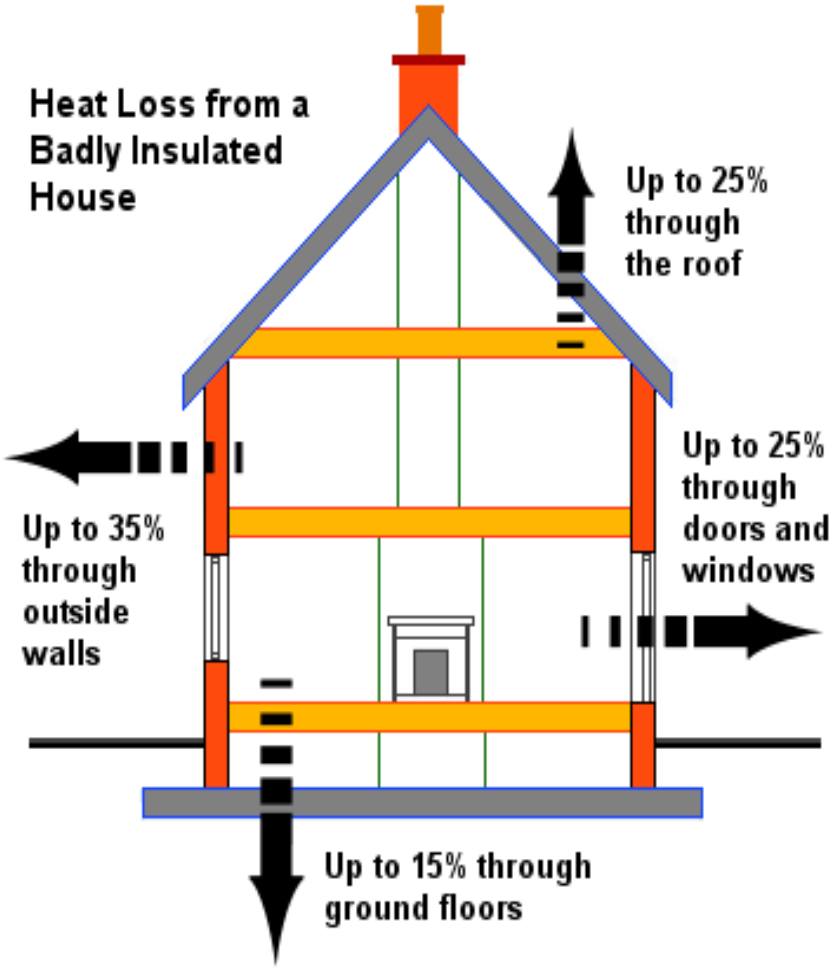
Problems with sash windows

Common problems as I am sure most of you are aware

- Distorting of the sash box over time
- Fit very poorly, be hard to open and close, draughty and rattle
- Condensation
- Single glazed they have a very poor U-value, approximately 5.5 W/m^2K

(Note: The lower the U-value the better)

Heat loss


Heat Loss from a Badly Insulated House
Up to 25% through the roof
Up to 25% through doors and windows
Up to 35% through outside walls
Up to 15% through ground floors

Heat loss through windows

- U-values are measured in Watts per square meter per Kelvin and measures the rate of heat flow through a building component
- Up to 25% of heat loss is through windows
- Significant heat lost through air leakage or draughts
- **Conduction** - heat is conducted through the glass
- **Convection** - warm air contacts the cooler window surface, loses heat and circulates back into the room
- **Radiation** - glass radiates heat outwards to the colder environment

Methods of improving thermal efficiency

- Shutters
- Curtains/drapes/roller blinds
- Draught proofing
- Secondary glazing
- Double glazing

Shutters

- Listed Building Consent may be required if being replaced
- Originally designed to control light, privacy and security, not necessarily energy efficiency
- Some firms do advertise draught proofing of shutters but far easier to draught proof the windows
- I have yet to see historic shutters that are in a good enough condition to draught proof
- Shutters are expensive to make and not always practical

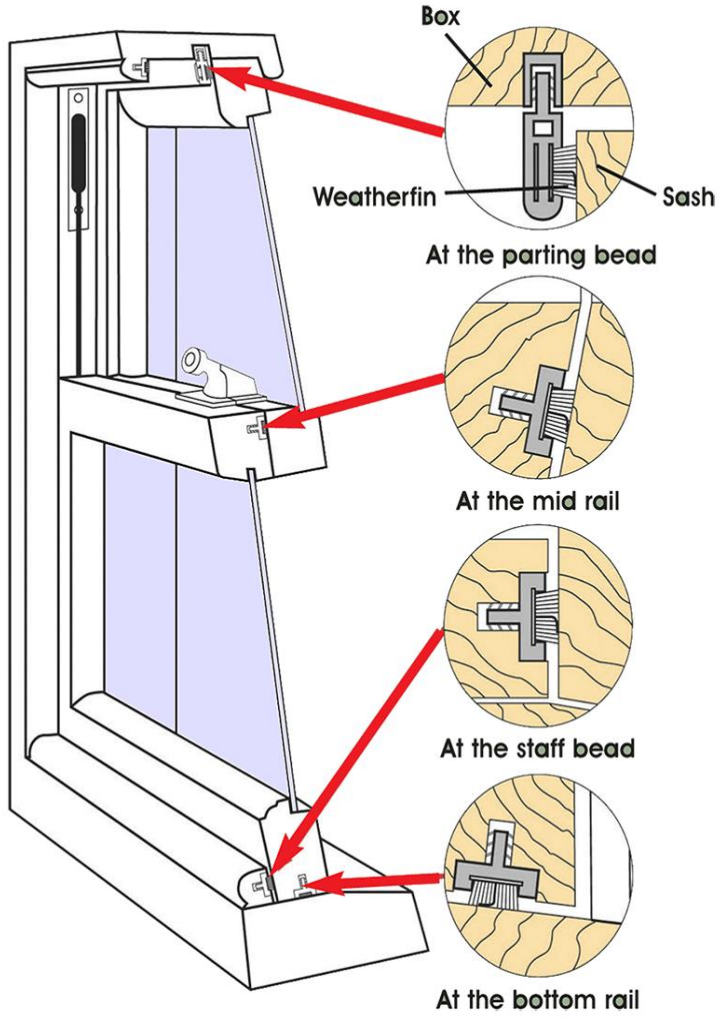
Curtains/drapes/roller blinds

- Listed Building Consent not required
- Can reduce heat loss by up to 40%
- Curtains are generally better than blinds although there are specialist thermal blinds that can be effective
- Curtains and drapes may not be practical
- Shutters and curtains only feasible at night

Draught proofing

- Listed Building Consent not usually required
- Relatively inexpensive and effective option
- Staff and parting beads are replaced
- Draught strip fitted into the meeting rail and top rail
- Seal gaps and prevent rattling it also helps the sashes open and close smoothly

Draught proofing



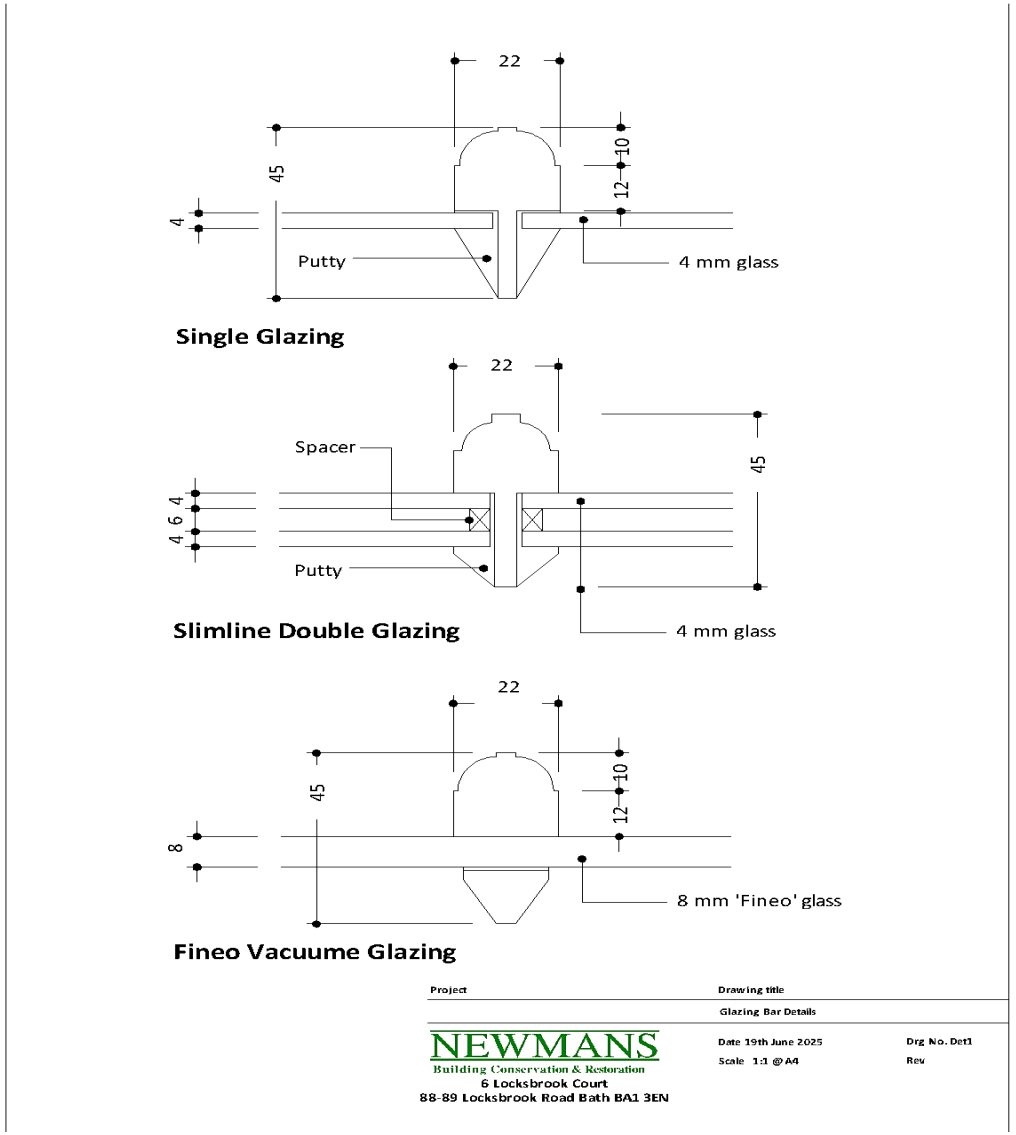
Secondary glazing

- Listed Building Consent may be required
- Can be effective, can improve the U-value to approximately 2.7W/m^2K
- Various methods for secondary glazing
- DIY application of plastic film applied with the help of a hair dryer
- Various bespoke solutions using plexiglass etc
- Gecko glazing can improve U value approximately 2.9W/m^2K.
- Not advisable to draught proof windows prior to fitting some secondary glazing

Double glazing

- Listed Building Consent will be required
- Each case considered
- Possibly fitted into existing sashes
- New lead weights
- May have to replace the historic sash wheels
- Slimline double glazing or vacuum glazing.
- Replicate existing mouldings and use timber beads
- No double glazing > 8mm cavity or duplex bars

Retrofitting double glazing



Limitations

- Fineo
- Sash minimum thickness 36 mm
- 13 mm sightline
- Meeting rail minimum 25 mm
- Stile rebate13 mm left to right & 18 mm inside to out
- Any width glazing bar
- 4-6-4 slimline
- Sash minimum thickness 40 mm
- 6.5 mm sightline
- Meeting rail minimum 25 mm
- Stile rebate 9 mm left to right & 25 mm inside to out
- Minimum thickness glazing bar 22 mm

Slimline double glazing

- 4-6-4 krypton filled double glazed units
- U value of 1.5 K/m^2W
- 5-year guarantee
- Individual glass units in a multi pane sash
- Retro fit lose 9 mm from the glazing bar
- Sash windows minimum of 40 mm thick

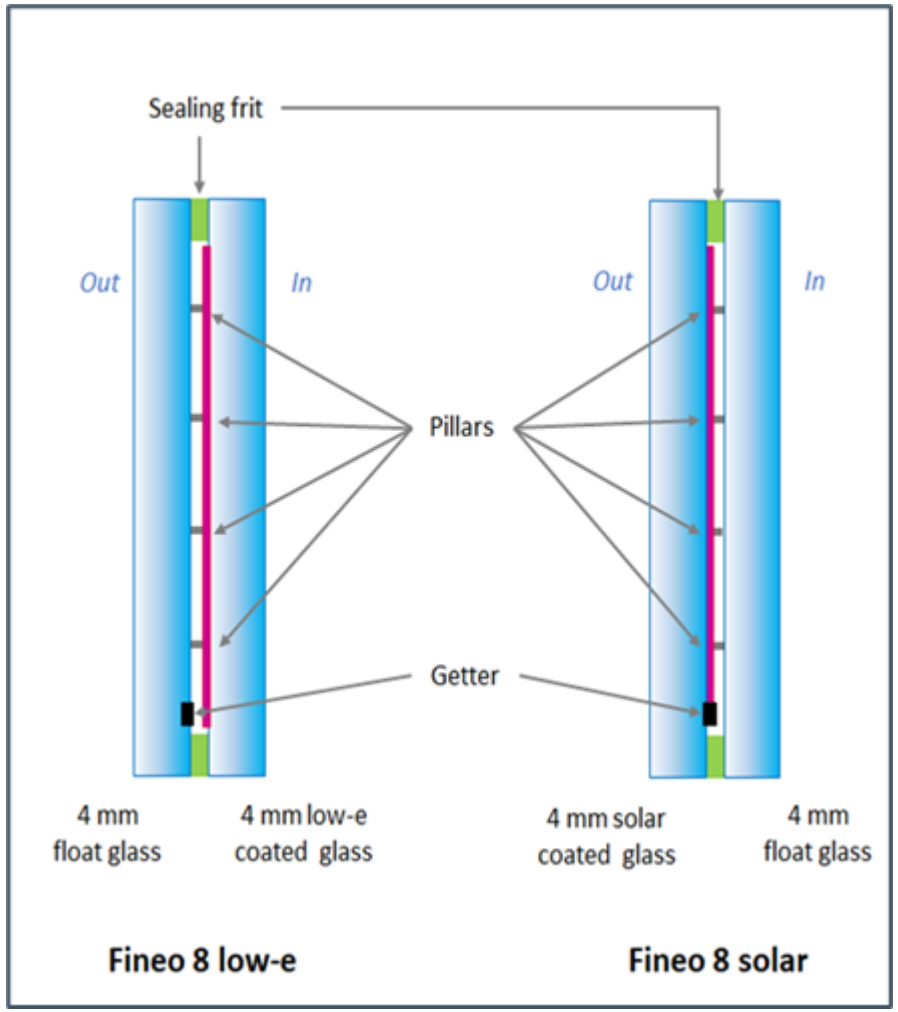
Vacuum glazing (Fineo)

- U value of 0.7 W/m^2K
- Acoustic performance of 6 dB
- Guarantee of 15 years
- 100 % recyclable
- Single glass unit in a multi pane sash
- Window traditionally constructed but with external beads planted on
- Retro fit lose 5mm from the glazing bar
- Sash windows minimum of 36 mm thick

What is vacuum glazing

Two panes of float glass

- separated by a vacuum gap (~0.1mm)
- micro-pillars on a 20mm grid
- vacuum seal
  (ceramic technology)
- getter (gas catcher)
- no evacuation port
- low-e or solar control coating



Fineo sash windows

Fineo sash windows

Various

- Ventilation
- Hard to accommodate in existing sash windows and boxes
- Potentially leave the draught strip on the top sash out
- New sash box can be fitted with discreet trickle vent