GAPS AROUND EXTERNAL WINDOWS AND DOOR FRAMES, SEALANTS AND FINISHING TRIMS

Introduction

This technical document provides additional guidance relating to how the Functional Requirements in the Technical Manual may be satisfied when installing windows and doors – in respect of allowable gaps around external windows and doors, and information required in relation to correct use of sealants for the purpose of weather tightness.

Fitting tolerances around window and door frames, trims, and sealants

Gaps around windows and door frames are primarily provided to give a fitting tolerance which allows placement of the frame. However, these tolerances or 'gaps' also allow for thermal movement such as expansion of the frame material which will vary depending on the material of the frame and the opening size.

These 'gaps' are then packed with a backing material to facilitate the application of sealant to the perimeter gap around the frames to create a weather tight junction with the surrounding building fabric. In some instances, additional trimming sections are also incorporated into the installation to help effective closure and sealing.

What are the Warranty providers concerns?

The gaps created around the frames are often found to be either:

- Too small and do not allow for thermal expansion, which results in stress in the frame (e.g. buckling, bending) and impedes locking mechanisms, cracks frame joints, creates stress transfer to glazing that causes cracking.
- Or where gaps created around windows are too large, the sealant lines around the perimeters need are increased beyond acceptable limits to cover the backing material or trimming sections are introduced alongside sealant which are not part of the window design, and can impact on effective weather tightness, air tightness and thermal performance.

Image: This photograph relates to an instance of excessive sealant lines picked up during a final inspection of a new Home. As depicted, this perimeter gap dimension was measured at 20-30mm. ►

Warranty stance

Failure to provide appropriate finishing detailing to external windows and door frame installations that fully considers movement, weather tightness and thermal performance is considered to compromise the ability of the wall and frame junction in meeting with the Functional Requirements and Performance Standards stipulated by the Technical Manual, notably those relating to durability, moisture ingress, the avoidance of condensation and those relating to achieving thermal performance, and avoiding the effects of thermal bridging.

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What Developers should action after reading this document?

Developers should ensure that their design teams and buyers are aware of the requirements of Warranty in relation to specification and testing of the materials installed.

A full set of design drawings and specifications shall be made available to the Warranty provider and all other interested parties prior to the associated works starting on site. This may include, but is not limited to:

- Evidence that the external windows and doors are suitable for the site exposure e.g. a manufacturer's declaration of performance for the site.
- Evidence of certification for the window assembly, confirming weather-tightness rating as detailed within BS 6375 'Performance of windows and doors - Classification for weathertightness and guidance on selection and specification'.
- Evidence of UKCA marking in accordance with UK Construction Production Regulation.
- Details of external window and door fixing methodology.
- Details of sealing methodology and materials being around the frame.

Where timber windows are specified, timber and other wood-based materials need to comply with the relevant requirements of BS EN 942 'Timber in joinery. General requirements'.

For proof and demonstration of performance and adequacy, the documentation required is typically a valid UKAS (or European equivalent) 3rd Party Accreditation.

Developers should ensure that the suppliers and installers of their chosen window and door frame products are aware that these gaps around windows need to be carefully considered. The manufacturer's installation requirements and the requirements and guidance of the 'External Windows and Doors' section of the Technical Manual should be referenced and followed, notably in relation to:

Perimeter gap dimensions

Material	Recommended gap per side for width of structural openings (mm)		
	Less than 1.5m	**1.5m – 3.0m**	**3.0 – 4.5m**
Upvc – white	5	5	7.5
Upvc - non-white	7.5	7.5	11
Timber	5	5	5
Steel	4	5	6
Aluminium	5	5	7.5

The maximum gap permitted for openings less than 3m should be 10mm. For openings more than 3m, the maximum gap permitted should be 15mm. Please refer to the manufacturer's guidance for further clarification.

For all gaps greater than 5mm, a backing strip should be provided behind the sealant and the sealant should have a minimum depth of 6mm.

Please note, for timber framed and LGSF superstructures, gaps underneath window and door openings will also need to be provided to cater for differential movement between the timber frame/LGSF and the external brickwork. For further guidance on such requirements please refer to the 'External Walls' sections covering Timber frame or LGSF within the Technical Manual.

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Sealing

Durable and thermally insulating filling or backing materials should be applied to the perimeter gap around the frames (such as PU foam, or impregnated tapes). Perimeter joints need to be continuously sealed on both the outside and the inside of the frames. Sealants should be appropriate to:

- The frame surface.
- The substrate material.
- Joint size and configuration.
- Anticipated joint movement.
- Anticipated weather exposure conditions.

Wet sealants (e.g. silicones) should be tested and classified in accordance with BS EN ISO 11600 'Building construction - Jointing products - Classification and requirements for sealants'.

When using impregnated tapes, over-capping with a wet sealant is generally not required – manufacturer's instructions should be referred to and explicitly followed.

In situations where the sealant will rely on atmospheric moisture to begin curing then deep filling should be avoided.

When applying sealant:

- Apply against a firm backing, forcing it against the sides of the joint.
- It should not be applied to the backing as this restricts lateral movement of the joint.
- Any gaps greater than 6mm require a closed-cell oversized polyethylene (PE) foam backing rod be included.
- A width to depth ratio of between 1:1 and 2:1 should be observed.
- When applying a fillet joint a minimum 6mm contact to non-porous, and 10mm to porous substrates should be achieved.
- Seal should be provided between any sill and frame, with a barrier created at ends of the sill.

Finishing trims

The use of proprietary surface fixed finishing trims e.g. D-moulds, should be undertaken only as part of a designed junction between window and door framing and the surrounding opening.

For this purpose, surface finishing trims:

- Must be compatible with the materials used within the frame.
- Must be robust in their attachment.
- Must not be detrimental to the performance of the junction e.g. create thermal bridging.
- Must not impede the function or operation of the window or any attached fitments e.g. obstructing trickle vents, framing drainage holes.

The inclusion of finishing trims should not be considered as a means to:

- Achieve weather tightness, unless they are included within appropriate weather and water tightness testing conducted on the window and door system.
- Extend frame dimensions where windows are undersized for the opening. Only recognised sections that form part of the window system can be used for this purpose e.g. proprietary or manufactured interlocking sections ('knock-ons'), or manufacturer led alterations using fixed sections (adhesively bonded planted sections).