



Llywodraeth Cymru
Welsh Government

Building Regulations Wales

Circular

Circular number:	WGC 015/2017	Date issued:	07 / 09M / 2017
Status:	For information		
Title:	Wind-loading calculation for cladding.		
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Addressed to:	Please forward to:		
Local Authority Chief Executives Welsh Local Government Association Association of Corporate Approved Inspectors Construction Industry Council Competent Persons Forum	Local Authority Building Control Officers Assembly Members		
Summary:	The purpose of this Circular Letter is to draw attention to the need to properly assess design calculations for cladding systems, particularly for high rise buildings and buildings in exposed locations.		
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WIND-LOADING CALCULATION FOR CLADDING

The purpose of this Circular Letter is to draw attention to the need to properly assess design calculations for cladding systems, particularly for high rise buildings and buildings in exposed locations.

This Circular does not give advice on the technical requirements in the Building Regulations, as these are matters covered by Approved Documents.

Scope of this Circular Letter

The guidance in this Circular Letter applies to buildings and building work in Wales, it does not apply to *excepted energy buildings* in Wales.¹

Introduction

Requirement A1 of Part A of the Building Regulations requires that buildings shall be constructed to safely transfer loads, including wind loads, to the ground. Section 3 of Approved Document A (Structure) provides guidance on wall cladding.

The relevant design standards for wind loading calculation are given in paragraph 3.3 of Approved Document A as BS EN 1991-4 2005 with the relevant UK National Annex.

Paragraphs 3.7 and 3.8 provide guidance on the design of fixings.

Wind-loading calculations, and structural design of cladding systems.

Subsequent to our previous circular letter of 19 July on considerations when designing re-cladding for tall buildings, this circular highlights key aspects in calculation and assessment of structural design calculations for building cladding systems. Inadequate calculations can result in cladding systems failing due to high wind loads, potentially resulting in parts of the cladding system falling from the building.

On high rise buildings in particular, this can give rise to life safety risks.

It is therefore important that Building Control Bodies and competent person scheme operators consider carefully how the necessary wind loadings have been factored into the structural design of cladding systems. The following can be important factors in the assessment of structural design by those responsible for designing and installing the system. That:

- The design system is demonstrated to be capable of resisting the calculated wind loading.
- Insulation to render bond strength is adequately considered in render systems.
- Design pull-through values are considered and used appropriately.
- Fixing numbers / pattern are correctly specified and defined.
- Design pull out value is correctly calculated at all levels of the building.
- The correct safety factors are applied as set out in relation to the specific system being used.
- The methodology for installation and design is clearly expressed.
- Sufficient detail of the building and its site context is available.

¹ Excepted energy buildings are defined in the schedule to the Welsh Ministers (Transfer of Functions) (No.2) Order 2009 (S.I. 2009/3019)

- Sufficient data is available to enable a detailed assessment to be carried out.
- Consideration is given to the need for a detailed site survey to be undertaken including specific pull out and / or adhesion tests.
- Wind pressures zones on the building are adequately described.
- Care is taken to avoid calculation errors resulting in over engineering of the system (which can cause failure e.g. where pull out zones overlap).

Failure to properly take into account these factors can mean that the safety factors used during calculation and design to meet anticipated wind loads can be significantly eroded or, in some cases, reduced to zero. Where safety factors are marginalised, only a perfectly installed system will be likely to resist predictable peak wind loads.

This leads to an increased risk of render systems (or any type of cladding) delaminating or falling from the building. Debris falling from height could pose a substantial risk to life. Buildings over 15 storeys, and over 6 storeys in areas of high exposure, are likely to be particularly vulnerable if design calculations are inadequate.

It is therefore particularly important that:

1. Design calculations are undertaken by a competent designer in accordance with the guidance in Section 3 of Approved Document A (Structure).
2. The structural design of cladding systems is rigorously checked by a suitably qualified person.
3. The specific site conditions and nature of the building are fully understood and factored into calculations.
4. Where necessary, site tests are undertaken to assess design pull out and adhesion strength underpinning design assumptions.
5. There is adequate site inspection to ensure that the system is installed in line with the system design.

Enquiries

Any enquiries on this Circular Letter should be addressed to enquiries.brconstruction@wales.gsi.gov.uk

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Francois Samuel', written in a cursive style.

Francois Samuel
Head of Building Regulations