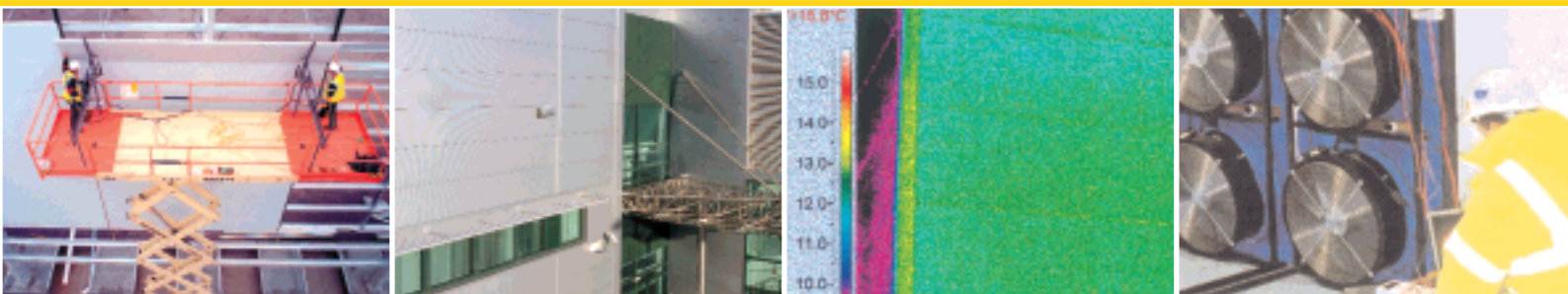


Insulated panels for external roof and wall cladding



Amendments to Building Regulations Part L2 (England and Wales) and Part J (Scotland)

Guide to requirements and compliance

12 Technical Standards – Part J: 6th Amendment Scotland

12.1 Introduction

The Scottish Executive has agreed to work in partnership with the UK Government in achieving a goal of a 20% reduction in UK carbon dioxide emissions by 2010. This goal is significantly beyond and so more challenging than the UK's international target to reduce greenhouse gas emissions by 12.5% in the first commitment period (2008-2012).

Technical Standards - changes

The construction industry has a major role to play in the conservation of fuel and power. Energy use in buildings is a major source of carbon dioxide emissions which contribute to climate change.

The intention of the changes in Part J is to ensure that effective measures for the conservation of fuel and power are incorporated in a building. It contains energy conservation provisions for the building fabric and the building services.

The amendments are based on the principle that tighter building regulations are the best option for delivering improved energy efficiency in new building works, as they ensure that action is taken for the benefit of both the individual, investor and occupiers and to support the national carbon reduction targets. Building regulations ensure that the Government sets standards, and that private agents are able to achieve these standards in the most cost-effective way they can find, stimulating efficiency and innovation.

Improvements in energy efficiency have also been demonstrated to be one of the most efficient ways of reducing carbon emissions.

The primary benefit of the new regulations will be to contribute towards the achievement of the UK Government's international commitments on carbon emissions. These commitments contribute to the international efforts to reduce the impacts of climate change.

12.2 Part J Amendments

The Scottish Executive Part J amendments were effective from 4th March 2002 on approved building warrants.

A building in purpose groups 2 to 7 must have provision for conservation of fuel and power in accordance with one of the three following methods:

- i) the Elemental Method (see 12.3)
- ii) the Heat Loss Method (refer to Standards)
- iii) the Carbon Emissions Calculation Method (refer to Standards)

In addition to requirements for insulation of the fabric there are requirements for building services, air conditioning, mechanical ventilation and artificial lighting.

12.3 Elemental Method

Part J contains a guide to the use of all three compliance methods. However metal clad industrial and commercial buildings are generally constructed with insulated roof and wall systems, which are calculated according to the Elemental Method.

To comply with Part J following the Elemental Method, the building envelope has to provide certain minimum levels of insulation. The requirements will be met if the thermal performances of the construction elements are no worse than those illustrated in Figure 11 and detailed in Table 9.

Notes

- Windows, personnel doors and rooflights (area weighted average for the whole building), glazing in wood or PVC frames.
- Windows, personnel doors and rooflights (area weighted average for the whole building), glazing in metal frames.
- For pre-melt gutter specifications obtain building control approval at design stage
- Rooflights may be permitted up to 12% of roof area at 3.0W/m²K by using the 'Whole building' or 'Carbon emission' method of calculation, however, there is a significant risk of condensation.

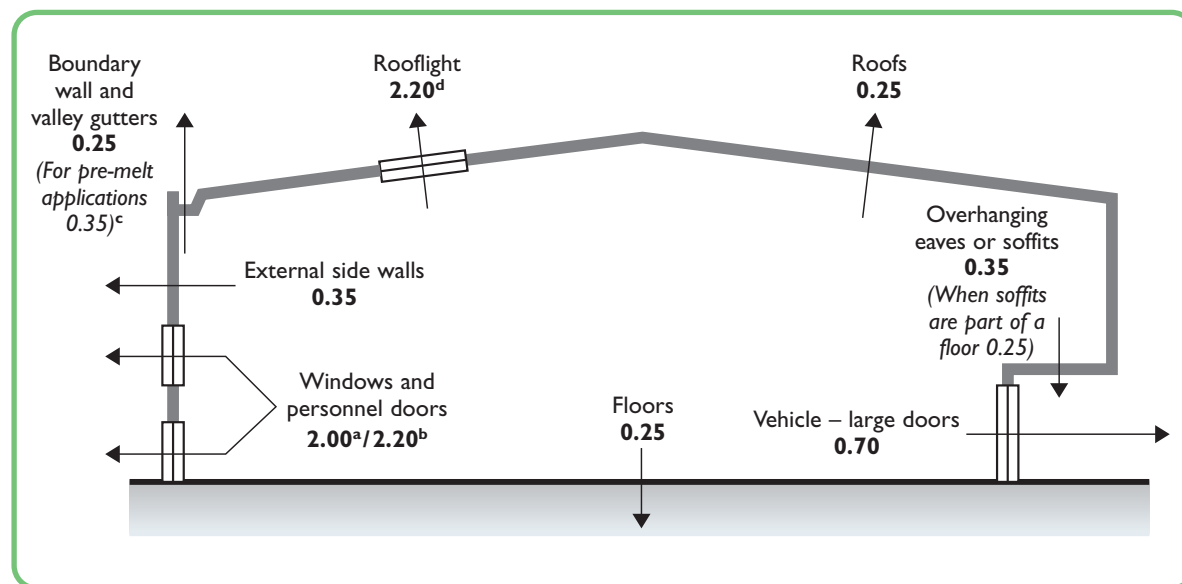


Figure 11. Standard 'U' values for insulated metal roof and wall cladding systems – Part J Elemental Method

Table 9. Standard U-values of construction elements – Part J – Scotland

Construction element	U-value W/m ² K
Roof	
Pitched roof with insulation between rafters	0.20
Pitched roof with insulation between joists	0.16
Flat roof (see note opposite)	0.25
External Walls – excl. windows/doors ⁽¹⁾	0.30
Floors	0.25
Windows, rooflights & personnel doors – glazing in metal frames ⁽²⁾	2.2
Windows, rooflights & personnel doors – glazing in wood/pvc frames ⁽²⁾	2.0
Rooflights	2.2
Vehicle access and similar large doors ⁽³⁾	0.7

⁽¹⁾ Solid area only i.e. excluding windows, doors etc

⁽²⁾ Area weighted average for the whole building

⁽³⁾ No requirement where doors have to be kept open when building is in use

Interpretation of the Technical Standard is the responsibility of Local Authority Building Control.

Buildings Regulations Note 1: 2002 issued by the Scottish Office clarifies that the intention behind the regulations was that flat roofs and roofs with integral insulation are required to meet 0.25 W/m²K. Sandwich panels come under this category. The required value of 0.25W/m²K applies irrespective of roof slope.

Buildings Regulations Notes can be viewed on www.scotland.gov.uk/development/bc/brns

12.4 Rooflights etc

The specified building elements must have areas of windows, doors and rooflights not more than those prescribed in Table 10. The rooflight area of 20% assumes a U-value of 2.2 W/m²K.

Rooflights up to 12% of the roof area may be permitted with a U-value of 3.0W/m²K by applying the 'whole building' or carbon emission methods of calculation.

However, the internal temperature of double skin rooflights will be significantly lower, which can cause condensation risk.

Table 10. Maximum area of openings – Part J (Scotland)

Purpose Group	Windows and doors as a % of the area of exposed wall	Rooflights as % of roof area
2	30%	20%
3,4,5	40%	20%
6,7	15%	20%

12.5 Limiting thermal bridging at junctions and around openings

The building's fabric must be constructed to minimise thermal bridges and gaps in the insulation layer(s):

- within the various building elements
- at the junctions between building elements
- at the edges of building elements (e.g. around window and door openings)

Compliance

The requirements with regard to minimising thermal bridges and gaps in the insulation, will be met by:

- constructing the building in accordance with Building Research Establishment (BRE) Report, BRE 262: "Thermal insulation, Avoiding risks", Second Edition, 1994 or
- demonstrating by calculation that equivalent performance to a) has been achieved.

12.6 Limiting air leakage

Air leakage into or out of a building through extraneous air paths must be limited as far as is reasonably practical.

Compliance

The requirements as regards minimising extraneous air leakage paths in the buildings fabric will be met by constructing the building in accordance with BRE Report BRE 262: Thermal insulation, Avoiding risks, Second Edition, 1994, including,

- sealing the gaps between dry linings and masonry walls at the edges of window, door and roof space openings, and at the junctions between walls, floors and ceilings
- sealing vapour control membranes in timber framed and other framed panel constructions; and
- sealing at service penetrations of the fabric or around boxing for services; and
- fitting draught seals to the openable parts of windows, doors and rooflights; and
- sealing around joist ends built into the inner leaf of external cavity walls

12.7 Building Services

The 6th Amendment states that the heating system of a building must be designed and installed to make efficient use of energy for the conservation of fuel and power.

There are specific requirements governing space heating controls; artificial lighting; and on the commissioning of building services.

Air conditioning and mechanical ventilation

Guidance and recommendations for air conditioning and mechanical ventilation directly concern the building fabric and building envelope and are as follows:

A building incorporating air conditioning or mechanical ventilation must be designed and constructed so that:

- the form and fabric of the building do not result in a requirement for excessive installed capacity of the cooling equipment; and
- fans, pumps, refrigeration equipment and other coolants are reasonably efficient and appropriately sized to have no more capacity for demand and standby than is necessary; and
- there are appropriate means of managing, controlling and monitoring the operation of equipment and systems.

Given the above conditions the requirements for energy efficiency of air conditioning and mechanical ventilation equipment will be met. Designers are referred to the Technical Standard for further details.

12.8 Refurbishment and repairs

The 6th amendments to the Technical Standards, including Part J apply to 'New Build'.

Refurbishment and repair work are derived from these requirements and come under Local Authority Building Control. No specific guidance on material alterations or refurbishment is given in the Technical Standard.

It is the intention of the Technical Standard that:

- replacements should be 'as good as the element being replaced'.
- alterations should meet the current standard
- for fixtures (part A) that do not require a warrant, replacement in whole or in part should be by a material of the same general type

Note: in many cases this is interpreted as 'like for like'.

It would appear that replacement of an element, say removal of a slate or asbestos roof, is interpreted as an **alteration** and is therefore required to meet the revised standard and U-value levels.

Appendix: Material alterations England & Wales

Insulated Panels have been used extensively for over 20 years for the upgrading and renovation of industrial and commercial buildings, particularly where there was a requirement for improved thermal efficiency of the roof/wall element.

The energy crises of the 1980's and 1990's together with the introduction of Part L of the Building Regulations further accelerated the use of panels due to the benefit of having insulation performance effectively 'built-in' in the factory.

The introduction of AD-L2 brings material alterations and material changes of use under the scope of the Amendment through a requirement to refurbish and upgrade such buildings to the new regulatory standards.

Material alterations – definition

"An alteration is material for the purposes of these Regulations (AD-L2) if the work, or any part of it, would at any stage result-

- in a building or controlled service or fitting not complying with relevant requirement where previously it did: or
- in a building or controlled service or fitting which before the work commenced did not comply with a relevant requirement, being more unsatisfactory in relation to such a requirement."

Compliance with AD-L2

For those elements or services associated with insulated panels, compliance would be met providing the following conditions are satisfied:

Element or activity	Compliance
Roof insulation When substantially replacing any of the major elements of a roof structure	by providing insulation to achieve the U-value for new buildings
Wall insulation When substantially replacing complete exposed walls or their external renderings or cladding or internal surface finishes, or the internal surfaces of separating walls to unheated spaces	by providing a reasonable thickness of insulation (to achieve the U-value for new building)
Sealing measures When carrying out any of the above work...	by including reasonable sealing measures to improve airtightness
Controlled services and fittings When replacing controlled services and fittings...	by following the guidance in Part L2



The pictures illustrate before and after refurbishment with insulated panels

Air tightness testing

AD-L2 makes no reference to air tightness in the case of a material alteration to a roof or wall element. Pressure testing would not be required in these circumstances, for example if a roof or wall is replaced as part of a refurbishment programme.

There is however a requirement to carry out reasonable sealing measures, e.g. at associated details etc., to improve airtightness. Compliance therefore would be satisfied by the use of robust approved details in conjunction with the refurbished element.

Infra-red testing

There is no mandatory requirement for infra-red testing but this technique can be used to illustrate compliance for continuous insulation throughout the new element.

Note: Additional advice on the interpretation of AD-L2 can be obtained from www.odpm.gsi.gov.uk

EPIC was set up in 1991 to promote quality roofing and cladding systems through the use of factory-engineered panels. Insulated panels maximise thermal efficiency whilst reducing the risk and effects of condensation and significant energy loss through air leakage.

The new building regulations and today's cost competitive and quality conscious environment require that industrial and commercial buildings are high performance designs working with maximum efficiency and minimum running costs. Rigid urethane insulated panels allow designers to achieve these goals with confidence and minimum risk.

Contact EPIC 29 High Street, Ewell, Surrey KT17 1SB Telephone: 020 8786 3619 Fax: 020 8786 8887 www.epic.uk.com

Download information from the EPIC website

This guide to requirements and compliance for insulated external roof and wall panels following the amendments to Building Regulations Part L2 and Technical Standard Part J can be readily downloaded from the website at www.epic.uk.com

EPIC have published a series of other guides including the Fire Safety, Specification and Installation of external insulated panels that are available in hard copy form and through the website.

Information on CD Rom

EPIC have produced two CD Roms which provide comprehensive information on the design and performance of insulated panels used as the roofs and walls of buildings:

Guide to the performance of insulated cladding systems

The CD covers cladding problems and solutions: thermal design and performance: and design detailing.

Insulated cladding systems – performance in fire

The CD provides essential data about the fire performance of external cladding panels based on extensive fire research programmes.

THE EPIC MEMBERS ARE:

Advanced Thermal Composites Limited

Hangar 1A, Wrights Lane
Burtonwood, Cheshire WA5 4DB
Telephone: 01925 711157 Fax: 01925 711158
sales@thermal-composites.co.uk
www.thermal-composites.co.uk

A. Steadman & Son Ltd

Warnell, Welton,
Carlisle CA5 7HH
Tel: 0169 74 78277 Fax: 0169 74 78530
info@steadmans.co.uk
www.steadmans.co.uk

Corus Building Systems

Llandybie, Ammanford,
Carmarthenshire SA18 3JG
Telephone: 01269 850691 Fax: 01269 851081
www.corusgroup.com

Ward Building Components Limited

Sherburn, Malton,
North Yorkshire YO17 8PQ
Telephone: 01944 710591 Fax: 01944 711140
wbc@wards.co.uk
www.wards.co.uk

Kingspan (Insulated Panels) Limited

Greenfield Business Park No 2, Greenfield,
Holywell, Flintshire CH8 7HU
Telephone: 01352 716100 Fax: 01352 710161
info@kingspanpanels.com
www.kingspanpanels.com

ASSOCIATE MEMBER:

Huntsman Polyurethanes

Hitchen Lane, Shepton Mallet, Somerset BA4 5TZ
Telephone: 01749 335333
www.huntsmanpolyurethanes.com

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Building Sciences Ltd

The Forge, Home Farm, Ardington,
Wantage, Oxon OX12 8PN