

Flat Roofing Specification Guide



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Introduction

Introducing three advanced Flat Roofing solutions featuring cutting-edge thinness and thermal performance with our new unique product, suitable for single ply bonded applications.

Our relationship with the UK's installer and distribution communities has equipped us with unique insights, feedback and testing opportunities. Developed and rigorously tested over eighteen months, our new Flat Roofing products have had to meet demanding standards of integrity and performance.

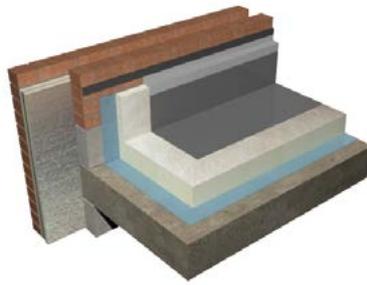
So this isn't just a generic Flat Roofing product from a well-known brand. It's different and better because it is made by Celotex.

Our package of digital specification tools, services and aftercare is unique in the industry. Sales and technical. Face to face and digital.

Flat Roofing by Celotex means working with Celotex – an insulation business like no other.

Our new Flat Roofing products have had to meet demanding standards of integrity and performance.

Product Properties



Celotex Crown-Bond

Celotex Crown-Bond features composite facers suitable for bonded single ply concrete, metal and timber deck applications and a low lambda performance of 0.022 W/mK delivering cutting edge thinness and high thermal performance.

Dimensions: 600mm x 1200mm

Thickness: 50-140mm

Compressive Strength: ≥ 150 kPa
BS EN 826:1996 (Thermal insulating products for building applications – determination of compressive behaviour).

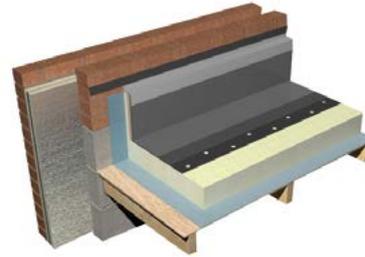
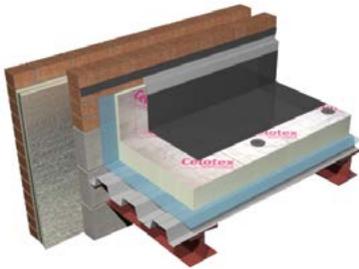
Dimensional: DS (70, 90)3, DS (-20,-)1
BS EN 1604:2013 (Thermal insulating products for building applications – determination of dimensional stability under specified temperature and humidity conditions).

Thermal Performance: Celotex Crown-Bond has a declared thermal conductivity (λ -value) of 0.022 W/mK in accordance with BS EN 13165:2008 (Thermal insulation for products – factory made rigid polyurethane foam (PUR) products).

Flat Roofing Insulation

Celotex Crown-Bond Technical Data

Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
50	2.25	2.77
100	4.50	4.69
120	5.45	5.46
140	6.35	6.23



Celotex Crown-Fix

Celotex Crown-Fix features low emissivity aluminium facers on both sides suitable for mechanically fixed single ply concrete, metal and timber deck applications and a low lambda performance of 0.022 W/mK delivering cutting edge thinness and high thermal performance.

Dimensions: 1200mm x 2400mm

Thickness: 50-140mm

Compressive Strength: ≥ 150 kPa
BS EN 826:1996 (Thermal insulating products for building applications – determination of compressive behaviour).

Dimensional: DS (70, 90)3, DS (-20,-)1
BS EN 1604:2013 (Thermal insulating products for building applications – determination of dimensional stability under specified temperature and humidity conditions).

Thermal Performance: Celotex Crown-Fix has a declared thermal conductivity (λ -value) of 0.022 W/mK in accordance with BS EN 13165:2008 (Thermal insulation for products – factory made rigid polyurethane foam (PUR) products).

Celotex Crown-Up

Celotex Crown-Up features coated glass tissue facers suitable for built-up concrete, metal and timber deck applications and a low lambda performance of ranging between 0.025 – 0.027 W/mK delivering high thermal performance.

Dimensions: 600mm x 1200mm

Thickness: 100-150mm

Compressive Strength: ≥ 150 kPa
BS EN 826:1996 (Thermal insulating products for building applications – determination of compressive behaviour)

Dimensional: DS (70, 90)3, DS (-20,-)1
BS EN 1604:2013 (Thermal insulating products for building applications – determination of dimensional stability under specified temperature and humidity conditions)

Thermal Performance: Celotex Crown-Up has a declared thermal conductivity (λ -value) of 0.025 – 0.027W/mK in accordance with BS EN 13165:2008 (Thermal insulation for products – factory made rigid polyurethane foam (PUR) products).

Flat Roofing Insulation

Celotex Crown-Fix Technical Data

Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
50	2.25	2.16
100	4.50	4.08
110	5.00	4.47
120	5.45	4.85
140	6.35	5.62

Flat Roofing Insulation

Celotex Crown-Up Technical Data

Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
100	3.80	4.29
120	4.80	5.06
150	6.00	6.22

Certification

Third party approvals play a key role in distinguishing product performance between different manufacturers. To eradicate the perception that all PIR is the same, we recognise the importance of approvals and certifications from a number of leading organisations, including BBA, BRE and ISO. These approvals include independent validation of thermal, fire and other product standards.

Product Code	Application	BBA No.	ISO 9001	ISO 14001
Celotex Crown-Bond	Bonded single ply membranes	Pending 2016	✓	✓
Celotex Crown-Fix	Mechanically fixed single ply membranes	Pending 2016	✓	✓
Celotex Crown-Up	Built-up systems	Pending 2016	✓	✓



Sustainability

Suitable for use within a number of applications within the building fabric, the specification of Celotex products will significantly contribute to improving the energy efficiency of the UK's building stock. Celotex is also able to independently certify the environmental impact for a selection of its product ranges. This includes Flat Roofing ...by Celotex.

Measured by its BRE Ecopoint score, Celotex achieve the lowest environmental impact of any PIR manufacturer and from its most recent recertification, has improved this score by over 5% since 2010. Moreover, when compared to the generic PIR Ecopoint value, Celotex' impact is over 20% better than that of non-certified PIR manufacturers.

Through its BRE Approved Environmental Profile, Celotex was the first PIR manufacturer to achieve an A+ Green Guide rating. This rating has been maintained through ongoing recertification and now includes even more Celotex products as part of the profile.

Celotex products are all manufactured in accordance with environmental management system ISO 14001. As well as this, the suppliers of the principal raw materials used in the manufacture of Celotex products also possess this standard allowing a credit to be achieved within the Materials category of BREEAM assessments.

For further information please see Celotex' Sustainability Guide available at celotex.co.uk

“Celotex manufacture solutions that start saving energy as soon as they are installed. Over its useful life, PIR insulation saves over 100 times more energy than was used in its manufacture”



Bonded single ply membranes, mechanically fixed single ply membranes and built-up systems

Name of Insulation Material	Celotex Crown-Bond, Crown-Fix and Crown-Up	✓
Manufacturer	Celotex	✓
Unfoamed, Foamed or Installed using Propellants	Foamed	✓
Global Warming Potential (GWP)	Less than 5	✓
Blowing Agent	Pentane	✓
Element Number	815320017*	✓
Environmental Management System (EMS) - Key Process	ISO 14001	✓
Environmental Management System (EMS) - Supply Chain Process	ISO 14001	✓

*Element number for Celotex Crown-Bond & Crown-Fix only

Specification Support

NBS Plus

NBS
BIM



Celotex
Energy Assessments

Specification Clause

Celotex Crown-Bond

The flat roofing insulation suitable for bonded single ply applications shall be Celotex Crown-Bond _____mm thick, comprising a polyisocyanurate (PIR) rigid foam insulation core and innovative composite facers on both sides. Crown-Bond is CFC/HCFC free with low GWP and zero ODP and CE marking compliance to BSEN13165. Crown-Bond has a low lambda value of 0.022 W/mK offering high thermal performance and an excellent compressive strength, giving increased dimensional stability and added robustness. Crown-Bond is manufactured in accordance with quality management systems ISO 9001 and environmental management system ISO 14001. All products must be installed in accordance with instructions issued by Celotex.

Celotex Crown-Fix

The flat roofing insulation suitable for mechanically fixed single ply applications shall be Celotex Crown-Fix _____mm thick, comprising a polyisocyanurate (PIR) rigid foam insulation core and low emissivity textured aluminium foil facings on both sides. Crown-Fix has low GWP and zero ODP and CE marking compliance to BSEN13165. Crown-Fix has a low lambda value of 0.022 W/mK offering high thermal performance and an excellent compressive strength, giving increased dimensional stability and added robustness. Crown-Fix is manufactured in accordance with quality management systems ISO 9001 and environmental management system ISO 14001. All products must be installed in accordance with instructions issued by Celotex.

Celotex Crown-Up

The flat roofing insulation suitable for built-up flat roofing applications shall be Celotex Crown-Up _____mm thick, comprising a polyisocyanurate (PIR) rigid foam insulation core and coated glass tissue facings on both sides. Crown-Up is CFC/HCFC free with low GWP and zero ODP and CE marking compliance to BSEN13165. Crown-Up has a low lambda value of 0.025 – 0.027 W/mK offering high thermal performance and an excellent compressive strength, giving increased dimensional stability and added robustness. Celotex Crown-Up is manufactured in accordance

with quality management systems ISO 9001 and environmental management system ISO 14001. All products must be installed in accordance with instructions issued by Celotex.

Building Information Modelling (BIM)

Flat Roofing ...by Celotex is available for BIM in the following software formats:

- ▶ Autodesk Revit
- ▶ Industry Foundation Classes (IFC)

Celotex products are available for BIM through both celotex.co.uk/bim and the NBS National BIM Library.

NBS Specifications

Flat Roofing ...by Celotex is referenced in the following NBS clauses:

- ▶ J42, 10, 420, 430 - Celotex Crown-Bond and Crown-Fix
- ▶ J21, 10, 420, 430 - Celotex Crown-Up
- ▶ J41, 10, 420, 430 - Celotex Crown-Up

Technical Services

Celotex provide outstanding levels of technical expertise and personal assistance through two industry leading services:

Celotex Technical Centre

When it comes to finding easy-to-understand, quick and helpful advice regarding PIR insulation, the Celotex Technical Centre (CTC) is where you will discover high levels of support and guidance on finding the most appropriate solutions to meet your requirements.

This includes provision of:

- ▶ U-value calculations
- ▶ Condensation risk analysis
- ▶ Application and installation advice
- ▶ Guidance on compliance to Building Regulations
- ▶ Information on our product and environmental credentials

Call the Celotex Technical Centre on **01473 820850** to speak to one of our advisors, or alternatively email technical@celotex.co.uk

Thermal Bridging

Celotex offers a wide range of junction details and these can be downloaded via the Celotex members area. When designed in to a building they offer a significant contribution to the improvement of the fabric energy efficiency. Due to the way whole-building energy calculations work, having better junction details can benefit the designer.

As insulation levels increase, the risk of condensation occurring around junctions also increases. Using construction details such as Celotex Thermal Bridging models helps to address the issue. By improving the performance of the junction, the amount of insulation required in the walls is optimised. Celotex Thermal Bridging models have low psi values and can prevent condensation from forming ensuring that mould growth does not occur. Find out more at celotex.co.uk

Celotex Energy Assessments

Offering energy calculations including SAP, SBEM and bespoke thermal modelling as well as additional services for pre-tender planning and sustainability assessments for BREEAM.

For more information on Celotex Energy Assessments (CEA) please take a look at the CEA brochure on celotex.co.uk with a full breakdown of the services we can provide for your project requirements. For more information please phone **0333 733 0850** or email info@celotexea.co.uk

For more information on how to download Flat Roofing ...by Celotex for BIM, visit celotex.co.uk/bim

Customers should be aware that Celotex and Darren Evans Assessments are separate legal entities and Celotex makes no warranty as to the quality of the services that DEA provides and assumes no responsibility in connection with those services. Customers should also be aware that, as an Assured Partner of Celotex, Darren Evans Assessments operate under a commercial agreement with Celotex for services provided by Darren Evans Assessments under the Celotex Energy Assessment Service.



Building Regulations

England Part L 2013

Part L is an Approved Document within the Building Regulations for England dealing with the Conservation of Fuel and Power. It ensures that the design and construction of new buildings, as well as work done on existing buildings, meets targets designed to limit the associated CO₂ emissions from the building following its construction or modification. Below is a guidance table of U-values to help comply with Part L 2013 Building Regulations.

	New Build		Existing Buildings	
	Domestic Notional Value/Backstop	Non-Domestic Notional value/Backstop	New Thermal Element e.g. Extensions	Existing Thermal Element e.g. Garage Conversions
Walls	0.18 / 0.30	0.26 / 0.35	0.28	0.30
Floors	0.13 / 0.25	0.22 / 0.25	0.22	0.25
Pitched Roofs	0.13 / 0.20	0.18 / 0.25	0.18	0.18
Flat Roofs	0.13 / 0.20	0.18 / 0.25	0.18	0.18

Scotland Section 6 2015

Section 6 of the Scottish Building Regulations is the Technical Handbook that deals with Energy within the built environment. Section 6 supports the Climate Change (Scotland) Act 2009 as it seeks to meet the target of an 80% reduction in carbon emissions by 2050 by ensuring that effective measures for the conservation of fuel and power are taken with constructing new or modifying existing buildings. Below is a guidance table of U-values to help comply with Section 6 2015 Building Regulations.

	New Build			Existing Buildings	
	Domestic Notional Value/Backstop	Non-Domestic Notional Value/Backstop <i>Zone Heated & Naturally Ventilated</i>	Non-Domestic Notional Value/Backstop <i>Zone Heated & Mechanically Ventilated/Cooled</i>	Domestic New Thermal Element e.g. Extensions	Domestic Existing Thermal Element e.g. Garage Conversions
Walls	0.17 / 0.22	0.23 / 0.27	0.20 / 0.27	0.17 / 0.22*	0.30
Floors	0.15 / 0.18	0.22 / 0.22	0.20 / 0.22	0.15 / 0.18*	0.25
Pitched Roofs	0.11 / 0.15	0.18 / 0.20	0.16 / 0.20	0.13 / 0.18*	0.25
Flat Roofs	0.11 / 0.15	0.18 / 0.20	0.16 / 0.20	0.13 / 0.18*	0.25

*Value required for extensions when houses have a reasonable standard of insulation

Wales Part L 2014

Historically, Part L, the Approved Document for the Conservation of Fuel and Power, applied to Wales and England. In 2014 this changed and the Welsh Government has issued their own version of Part L for use in Wales which came into force on 31st July 2014. Part L ensures that the design and construction of new buildings, as well as work done on existing buildings, meets targets designed to limit the associated CO₂ emissions from the building following its construction or modification.

	New Build				Existing Buildings		
	Domestic Notional Value/Backstop	Non-Domestic Notional value/Backstop	New Thermal Element	Retained Thermal Element	New Thermal Elements Domestic in Character	New Thermal Elements Other Domestic buildings	Retained Thermal Elements
Walls	0.18 / 0.21	0.26 / 0.35	0.21	0.30	0.21	0.26	0.30
Floors	0.13 / 0.18	0.22 / 0.25	0.18	0.25	0.18	0.22	0.25
Roofs	0.13 / 0.15	0.18 / 0.25	0.15	0.18	0.15	0.18	0.18
Ceiling	-	-	-	0.16	0.15	0.15	0.16

U-value Tables

U-value calculations: bonded single ply flat roofing with Celotex Crown-Bond

Product Code (mm)	Concrete Deck*	Metal Deck**	Timber Deck***
Crown-Bond 100	0.21	0.20	0.20
Crown-Bond 120	0.17	0.17	0.17
Crown-Bond 140	0.15	0.15	0.14

U-value calculations: mechanically fixed single ply flat roofing using thermally broken fixings with Celotex Crown-Fix

Product Code (mm)	Concrete Deck*	Metal Deck**	Timber Deck***
Crown-Fix 100	0.21	0.20	0.20
Crown-Fix 110	0.19	0.19	0.18
Crown-Fix 120	0.17	0.17	0.17
Crown-Fix 140	0.15	0.15	0.14

U-value calculations: mechanically fixed single ply flat roofing using metal fixings with Celotex Crown-Fix

Product Code (mm)	Concrete Deck*	Metal Deck**	Timber Deck***
Crown-Fix 100	0.22	0.22	0.21
Crown-Fix 110	0.20	0.20	0.19
Crown-Fix 120	0.19	0.18	0.18
Crown-Fix 140	0.16	0.16	0.15

U-value calculations: built-up flat roofing with Celotex Crown-Up

Product Code (mm)	Concrete Deck*	Metal Deck**	Timber Deck***
Crown-Up 100	0.24	0.23	0.22
Crown-Up 120	0.19	0.19	0.18
Crown-Up 150	0.16	0.15	0.15

Celotex Crown-Up calculations are based on 12mm built-up roofing felt

*Unsealed suspended ceiling/Concrete 250mm/VCL/Celotex insulation/SPM

**Plasterboard/25mm battens/metal deck/VCL/Celotex insulation/SPM

***Plasterboard/150mm joists/plywood/VCL/Celotex insulation/SPM

Design Considerations and Installation Guidelines

Design Considerations for Flat Roofing

A flat roof, for the purposes of this guide, is any roof that has a continuously supported roof covering. As defined in BS6229:2003 (Flat roofs with continuously support coverings – Code of Practice), a flat roof is one with a pitch of not more than 10° to the horizontal, however, some roofs greater in pitch will meet the definition for example where you have got a continuous waterproof roof membrane and therefore design considerations are similar. Celotex flat roofing insulation can be installed in a number of ways within a flat roof construction and these are separated out into two basic types:

Warm Roof

This guide covers the use of Celotex flat roofing insulation in warm roofs. This is where the insulation is placed entirely above the roof structure so that the roof deck remains close to the internal temperature of the building.

Cold Roof

In this build up the insulation is principally placed between the roof structure and so the roof deck remains colder than the internal temperature of the building. This system requires a path of ventilation between the insulation and roof deck above.

The details below aim to provide some guidance as to the most important areas to consider when designing the insulation requirements.

Materials and Components

Roof Coverings

Celotex flat roofing insulation is directly compatible with bonded and mechanically fixed single ply membranes, mastic asphalt, built up bituminous roofing and metal roofing (such as zinc, stainless steel, lead or copper).

Structural deck

Celotex flat roofing insulation is suitable to be used with a variety of deck types, particle boards or plywood, profiled steel and concrete slabs. It can also be used over existing roof coverings to improve thermal performance.

Structural Design

Loadings

Dead and imposed loads should be calculated with the recommendations of BS EN 1991-1-1:2002, and BS EN 1991-1-7:2006+A1:2014.

In general our insulation boards are strong enough to resist the dead, imposed and point loads associated with installation and maintenance. Specific attention should be given when:

- They are used as part of a balcony or terrace build up. We suggest that the insulation should be sandwiched between two layers of 18mm plywood or covered with a screed whichever is appropriate. However, the loading of the roof should always be considered in each case.
- The boards are used as part of a green roof build up. This should be of an 'extensive' type rather than 'intensive'. As always, it is recommended that an assessment is carried out, but for example, roofs using sedum trays would generally be considered suitable as part of a designed green roof system.
- Plant equipment such as solar panels and air conditioning units should be secured over the insulation. Each case should be considered by a structural engineer to ensure suitability.

Fixings

A variety of different fixings can be used to secure the components used in flat roofing. For securing Celotex insulation to the deck we recommend using thermally broken fasteners. The guidance of the BRUFMA document ID/1/2009 should be followed.

A fixing manufacturer should always be consulted to ensure that the wind and structural loading of the roof is resisted. The type and number of fixings used is specific to each roof and the requirements of BS EN 1991-1-4:2005+A1:2010 should be followed.

In general, for the purpose of securing the insulation only, the guidance of the relevant BRUFMA document (mechanical fixings for rigid polyisocyanurate (pir) and polyurethane (pur) roofboards beneath single-ply waterproofing membranes id/1/2009) should be considered when using mechanical fixings. The guidance of the fixing manufacturer should be followed in all cases to ensure that the specific loading requirements of the roof will be resisted by the design of the fixing whether they are mechanical or adhesive.

Structural Movement

Differential movement between the roof covering and substrate should be taken into account in the general design of the roof. More specifically, in warm roofs the differential movements or stresses in the roof covering are more severe. This is because the insulation layer isolates the roof covering from the internal heating source and so is subject to greater fluctuations of the external environmental conditions.

Celotex flat roofing insulation can be installed in a number of ways within a flat roof construction

Falls and Drainage

Where a fall is required the minimum finished fall of the roof should be designed to be in line with the table shown in BS6229:2003. Tapered beams under the roof deck or screed laid to falls under Celotex flat roofing insulation can be used to create the desired slope.

In an area of a roof that will have significant foot traffic or heavy loadings for example a roof terrace or garden roof, screed can be used over the insulation to form part of a fall. Please note that a separating membrane should be used between Celotex Crown-Fix and screed.

Celotex tapered roofing

Celotex provide a service for a tapered roofing solution. It takes into account drainage options, roof fall, thermal calculations (including condensation risk analysis) to provide a wholly bespoke tapered roof design.

Thermal Performance

U-values

Thermal insulation should be provided in all roofs, except those in unheated buildings, for thermal comfort and energy conservation. The amount of insulation to use is governed by the various energy conservation documents that form part of the Building Regulations for England, Wales, Scotland and Northern Ireland.

The tables on page 11 demonstrate the various requirements of flat roofs across the UK Building Regulations and how our range of flat roofing products can be used to contribute to meeting the energy conservation requirements. (see page 10)

Linear Thermal Bridging

Building Regulations require building designers to consider heat loss through junctions within the construction. This requirement varies in England, Scotland and Wales, however, more emphasis than ever before is being placed, not just on the CO₂ emissions of buildings, but also the energy efficiency. This means a step change to U-values and junction details. Heat loss through junctions can account for 15% of the total loss, and so by utilising better junction details a new range of possibilities opens up to the designer.

Celotex Thermal Bridging Models

As insulation levels increase the risk of condensation occurring around junctions such as a parapet upstand also increases. Using Celotex Thermal Bridging models helps to address this issue. Firstly, by improving the thermal performance of the junction the amount of insulation required in the flat roof is optimised. Secondly, as Celotex junction details have low psi values and high temperature factors they can prevent condensation from forming around the edges of the internal ceiling to ensure that mould growth does not occur.

Parapets

Insulation should be continuous between the flat roof and parapet upstand to avoid a cold bridge. Thinner boards from the Celotex Crown-Bond and Celotex Crown-Fix range can be used for this purpose. The roofing membrane is fixed directly to the insulation. Where Celotex Crown-Up is used for hot works, a thinner foil faced Celotex board can be used against the parapet wall with plywood to form a suitable substrate for the roof covering.

Gutters

If bridging or local variations of thermal performance exist within certain roof designs then account should be made for this within the overall thermal design of the roof. For example, a gutter detail where a thinner insulation is required to form the gutter will mean an increased u-value is achieved at that point. Within the scope of the R regulatory documents an area-weighted calculation can be made to take account of this locally reduced area.

Condensation

The roof should be designed to control the effect of interstitial condensation and surface condensation. The recommendations of BS5250:2011 (Code of Practice for control of condensation in buildings) Annex H and BS6229:2003 Annex A should be followed.

Surface condensation can form if warm humid air comes into contact with a cold surface. The general guidance given in the various Regulatory documents of the UK Building Regulations state that a roof will meet the requirement to resist surface condensation and mould growth if it is designed and constructed so that

the thermal transmittance (u-value) does not exceed 0.35W/m²K at any point and the junctions are designed to Accredited Construction Details.

In warm flat roofs interstitial condensation should be controlled by using a vapour control layer and insulation of appropriate vapour resistance to avoid or minimise the occurrence of interstitial condensation.

Vapour Control Layers

The type of vapour control layer can vary depending on the installation. They generally fall in to these categories: Bitumen-based to be used with torch-on, mastic asphalt or pour and roll systems; loose-laid polyethylene, sometimes reinforced with aluminium foil to be used in mechanically fixed or bonded single ply membrane systems.

It can also vary depending on the type of roof and the roof covering used. However, the general guidance in BS5250:2011 warm flat roofs H.8 is that the VCL should at least match the vapour resistance of the waterproof covering.

The Celotex Technical Centre is available to assist in the design of roofs in terms of condensation and can carry out a condensation risk analysis. This tool can be used to make comparative judgements between different roof types, however, you should always bear in mind that these calculations are for indication only and should not be used to demonstrate that a particular design is free from risk. In general the principles of the BS5250 document should be the overriding factor.

Installation Guidelines for Flat Roofing

The three different warm flat roof solutions offered in our range will all be installed in slightly different ways. Below is a description for each board and an overview of the ways in which it can be installed as part of a flat roofing system:

In general

- The boards should be laid break-bonded when installed onto a fully supporting substrate such as concrete or plywood. When installed on to a metal deck the long edges of the boards should be laid at right angles to the corrugations.

- The boards should be installed with closely butted joints. The board can be cut to size to fit around perimeters and other openings using a sharp knife and straight edge to ensure an accurate butt edge.

Celotex Crown-Bond

This product is used exclusively for roofs using a Single Ply Membrane (SPM) waterproofing membrane that is to be adhered.

- A suitable vapour control layer, usually part of the SPM system, will be mechanically fixed or adhered to the deck using adhesive. SPM manufacturers will give specific guidance on the correct adhesive and installation method of these products.
- Celotex Crown-Bond is bonded to the vapour control layer, usually with a PU adhesive as specified by the manufacturer. Particular attention should be paid to using the correct pattern and amount of adhesive to ensure that adhesion to the roof deck will resist the calculated wind load.
- The SPM is then bonded to the top side of the insulation. For full details and to ensure a safe installation this must be carried out to the SPM manufacturer's installation guidelines.
- Care should be taken not to use adhesive products that contain chemicals likely to attack the insulating foam such as Ketonic solvents. The SPM Manufacturer should have a list of adhesives tested for compatibility, but the suitability of a specific product should always be confirmed.

Celotex Crown-Fix

This is used exclusively for roofs using a Single Ply Membrane waterproof covering that is to be mechanically fixed.

- Lay the board on to a deck along with a suitable vapour control layer as specified by the single ply membrane manufacturer. The deck must be structurally sound, dry, clean and if necessary primed.
- The boards should be secured to the deck using a mechanical fixing appropriate for the substrate

- When insulation is fixed to the deck, as a minimum, the number of fixings used should be in line with the BRUFMA document ID/1/2009. That is, 6 fixings for a 2400mm x 1200mm board size. For further information please consult the document available to download from brufma.co.uk.
- When fixing the membrane to the insulation, the exact number of fixings used should be determined by the calculation method in BS EN 1991-1-4:2005+A1:2010. Celotex recommends discussing exact requirements with a fixing manufacturer.
- The membrane is laid over the insulation. To ensure a successful and safe installation the roofing membrane should be installed in line with the guidance given by the manufacturer.

Celotex Crown-Up

This product is designed to be used in built up flat roofing applications such as hot-applied pour and roll systems or mastic asphalt roofing systems.

- A compatible vapour control layer should be fixed or bonded to the roof deck.
- The vapour control layer will be determined by the roof covering, for example, a felt vapour control layer is used with pour and roll three layer felt systems and is partially bonded to the deck using hot bitumen.
- The boards should be laid with the perforated side uppermost to take the weathering system.
- Different types of weathering systems will require different installation instructions and guidelines. For full details and to ensure the safe installation of these systems, advice should always be sought from the manufacturer of the system.

Installing over existing flat roofs

In all cases the existing roof membrane

- Should be clean and in good repair with no protrusions so as it provides a smooth and even substrate for the Celotex Crown-Bond and Celotex Crown-Fix flat roofing boards.

- It can act as a vapour control layer provided it is not torn or degraded with gaps.

Celotex Crown-Bond can be bonded to the existing roof membrane or a new vapour control layer with an adhesive recommended by the membrane manufacturer. If a new vapour control layer is used it should be compatible with a fully bonded system as recommended by the membrane manufacturer.

Celotex Crown-Fix can be mechanically secured to the existing roof membrane or a new vapour control layer using fixings. Please reference Celotex Crown-Fix installation method for guidance on the fixing type, number and pattern to be used. If a new vapour control layer is used it should be loose-laid.

Two layer systems

Celotex Crown-Bond and Celotex Crown-Up can be installed as part of a two layer system. They must be mechanically fixed to the substrate. Guidance on the fixing type, number of fixings and the pattern is given for Crown-Fix installation method.

The two layers of insulation should be staggered or horizontally offset against each other to prevent one vertical joint.

For more information please contact the Celotex Technical Centre on **01473 820850** or email **technical@celotex.co.uk**

General Information

Storage

Celotex insulation boards should be stored dry, flat and clear of the ground. Only as much material as can be installed during a single working period should be removed from storage at any one time. If boards are stored under tarpaulins, care should be taken to prevent rope damage to boards.

Installation

Always install Celotex insulation boards in accordance with the instructions supplied by Celotex.

Celotex insulation boards should not be installed when the temperature is at or below 4°C and falling.

Where possible, cut the product using the Celotex Insulation Saw to minimise dust creation.

When cutting Celotex insulation, dust extraction equipment, eye protection and face masks should be provided. Dust or particles in the eyes should be washed out with liberal quantities of water. If skin is sensitive to fibre irritation, apply a barrier cream to exposed areas before handling.

Handling

Care should also be taken to ensure that packs are not dropped on to corners or edges.

Aluminium foil edges may be sharp. Avoid sliding bare hands along board edges.



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**Celotex, Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
T: 01473 820850 E: technical@celotex.co.uk**