

SCOPE OF AGRÉMENT

This Agrément relates to the CTF Therm® inverted roof insulation system (hereinafter the 'System') formed from expanded polystyrene (hereinafter 'EPS'), extruded polystyrene (hereinafter 'XPS') and cellular glass (hereinafter 'CG') insulation boards, in conjunction with a water flow reducing layer (hereinafter 'WFRL'). For use on flat roofs (with a pitch not greater than 10 ° to the horizontal) and zero fall roofs (with a slope which lies between 0 and a minimum fall of 1:80) including brown roofs, intensive and extensive green roofs, terraces and balconies. Such areas must be subject to pedestrian access only. A protective finish (hereinafter 'ballast') must be applied to the System. Types of ballast include:

- loose laid gravel (hereinafter 'gravel');
- cast stone or mineral slabs (hereinafter 'paving slabs');
- brown roofs;
- intensive and extensive green roofs.

The System is only to be used on roof decks when these areas have been pre-waterproofed with a membrane based watertight roof covering. Use of the System in conjunction with blue roof applications is permitted subject to verification by a blue roof System Designer in co-operation with the Agrément holder. Use of the System in designs for parking decks is not permitted.

SYSTEM DESCRIPTION

The System comprises combinations of flat or tapered EPS, flat or tapered CG and flat XPS insulation boards. Optional CTF-FS1 and CTF-FS2 (Fire Safe) boards can be incorporated into the System. A WFRL with lapped and taped joints is laid over the system components to prevent water ingress into the System. The ballast layer will serve to resist wind-uplift and as protection against pedestrian traffic.

SYSTEM ILLUSTRATION



THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

STATEMENT

It is the opinion of Kiwa Ltd., that the System is fit for its intended use, provided it is specified, installed and used in accordance with this Agrément.

Craig Devine
Operations Manager, Building Products



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Business Unit Manager, Building Products



SUMMARY OF AGREEMENT

This document provides independent information to specifiers, building control personnel, contractors, installers and other construction industry professionals considering the fitness for the intended use of the System. This Agreement covers the following:

- Conditions of use;
- Production Control, Quality Management System and the Annual Verification procedure;
- System components and ancillary items, points of attention for the Specifier and examples of details;
- Installation;
- Independently assessed System characteristics and other information;
- Compliance with national Building Regulations, other regulatory requirements and Third-Party acceptance, as appropriate;
- Sources.

MAJOR POINTS OF ASSESSMENT

Thermal Performance - the System can be designed to meet all required levels and provisions regarding U-values or thermal resistance (see section 2.2.9).

Moisture Control - the WFRL will prevent water ingress into the System (see section 2.2.10).

Strength - the System can transfer maintenance traffic loads and wind loads to the roof deck (see section 2.2.11).

Fire Performance - when covered with a brown roof, intensive or extensive green roof, gravel, paving slabs or any other non-combustible flat roof covering materials the System provides adequate resistance to the spread of fire over a roof, and from one building to another (see section 2.2.12).

Durability - given the material characteristics of the EPS, CG and XPS insulation boards, Fire Safe boards and the WFRL, the System components are deemed durable and will have a service life equivalent to that of the structure into which they are incorporated (see section 2.2.13).

UKCA and CE Marking - the product manufacturers have responsibility for conformity marking in accordance with all relevant British and European Product Standards. An asterisk (*) appearing in this Agreement indicates value included in the Declaration of Performance (DoP) (see section 2.2.14).

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CHAPTER 1 - GENERAL CONSIDERATIONS

1.1 - CONDITIONS OF USE

1.1.1 Design considerations

See section 2.2.

1.1.2 Application

The assessment of the System relates to its use in accordance with this Agrément and the Agrément holder's requirements.

1.1.3 Assessment

Kiwa Ltd. has assessed the System in combination with relevant test reports, technical literature, the Agrément holder's quality plan, DoPs and site visit as appropriate.

1.1.4 Installation supervision

The quality of installation and workmanship must be controlled by a competent person who must be an employee of the installation company.

The System must be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.

1.1.5 Geographical scope

The validity of this document is limited to England, Wales, Scotland and Northern Ireland, with due regard to chapter 3 of this Agrément (CDM, national Building Regulations and Third-Party Acceptance).

1.1.6 Validity

The purpose of this BDA Agrément® is to provide for well-founded confidence to apply the System within the Scope described. The validity of this Agrément is three years after the issue date, and as published on www.kiwa.co.uk/bda.

1.2 - PRODUCTION CONTROL AND QUALITY MANAGEMENT SYSTEM

Kiwa Ltd. has determined that the Agrément holder fulfils all obligations in relation to this Agrément, in respect of the System.

The initial audit demonstrated that the Agrément holder has a satisfactory Quality Management System (QMS) and is committed to continuously improving their quality plan. Document control and record keeping procedures were deemed satisfactory. A detailed Production Quality Specification (PQS) has been compiled to ensure traceability and compliance under the terms of this Agrément.

1.3 - ANNUAL VERIFICATION PROCEDURE - CONTINUOUS SURVEILLANCE

To demonstrate that the System is in conformity with the requirements of the technical specification described in this Agrément, an Annual Verification procedure has been agreed with the Agrément holder in respect of continuous surveillance and assessment, and auditing of the Agrément holder's QMS.

This Agrément does not constitute a design guide for the System. It is intended as an assessment of fitness for purpose only.

2.1 - SYSTEM COMPONENTS AND ANCILLARY ITEMS

2.1.1 System components included within the scope of this Agrément

The following components are integral to the use of the System:

Component		Description	Dimensions	
CTF-IV1		flat or tapered EPS 200E insulation boards manufactured in accordance with BS EN 13163. Alternative grades including EPS 300E are available; consult the Agrément holder for application	20 - 80 mm thick ^a ; fitted with square-edge profile	1,200 x 600 mm 30 - 32 kg/m ³ density
			120 mm, 150 mm, 190 mm and 200 - 350 mm thick ^a ; fitted with 15 mm shiplap rebated edge profile	1,200 x 590 mm 30 - 32 kg/m ³ density
CTF-IV2		flat XPS 300 insulation board manufactured in accordance with BS EN 13164	50 mm, 60 mm, 70 mm, 75 mm, 80 mm, 100 mm and 150 mm thick	1,200 x 600 mm 2,400 x 600 mm 34 kg/m ³ density
CTF-IV3		flat or tapered CG insulation boards manufactured in accordance with BS EN 13167	50 - 200 mm thick	1,200 x 600 mm 600 x 450 mm 95 kg/m ³ density
CTF-FS	CTF-FS1	fibre-cement flat sheet building board	6 mm thick	1,200 x 2,400 mm 1280 kg/m ³ density
			9 mm thick	
	CTF-FS2	MgO sulphate board, rigid magnesium oxide overlay	9 mm thick	1,200 x 2,400 mm 9.94 kg/m ² weight
			12 mm thick	1,200 x 2,400 mm 13.19 kg/m ² weight
CTF k-shield		vapour permeable membrane manufactured in accordance with BS EN 13859-1 for use as a WFRL in conjunction with CTF k tape	50 x 1,500 - 3,000 mm 125 g/m ² weight	
CTF k tape		single-sided reinforced tack solvent-free butyl rubber tape designed to form a moisture and watertight seal, specifically for use between overlaps and joints in waterproof laminated membranes	roll size: 75 mm x 50 m	

^a combinations of different board thicknesses may be required to achieve the design thickness required to meet the necessary U-value

2.1.2 Ancillary items falling outside the scope of this Agrément

Ancillary items detailed in this section may be used in conjunction with the System but fall outside the scope of this Agrément:

- timber, concrete and metal deck used as a supporting structure;
- roofing membrane - hot and cold melt, liquid applied, bituminous and PVC/EPDM membranes for waterproofing of the roof deck prior to installation of the System;
- ballast - gravel or paving slabs; brown roof, intensive or extensive green roof (including root barrier membrane, filter fleece and drainage/water retention layer to manufacturer's specification);
- blue roof - permitted subject to verification by a blue roof System Designer in co-operation with the Agrément holder.

2.2 - POINTS OF ATTENTION TO THE SPECIFIER

2.2.1 Design responsibility

A Specifier may undertake a project specific design in which case it is recommended that the Specifier co-operates closely with the Agrément holder. The Specifier or installing contractor is responsible for the final as-built design.

2.2.2 Applied building physics (heat, air, moisture)

The physical behaviour of the building incorporating the System shall be verified as suitable by a competent specialist, who can be either a qualified employee of the Agrément holder or a qualified consultant. The Specialist will check the physical behaviour of the building design and if necessary, can offer advice in respect of improvements to achieve the final specification. It is recommended that the Specialist co-operates closely with the Agrément holder.

2.2.3 General design considerations

Roofs incorporating the System must be designed in accordance with BS 6229 or BS EN 13956.

It is recommended that in respect of the design and application for flat roofs (with a pitch not greater than 10 ° to the horizontal) with continuously supported roof coverings, to ensure a minimum finished fall of 1:80 is achieved and roof drainage must be specified accordingly.

Falls for roof design shall be in strict accordance with BS 6229 clause 4.4.

Prior to installation of the System, the roof deck must be covered with a membrane based watertight roof covering, with a resistivity to water vapour transmission greater than that of the insulation boards.

Loads imposed during construction should be considered, along with the end use application and dead weight of the finish layer. Mechanical plant and machinery must not be used for the distribution and laying of paving slabs, gravel, or other elements.

The GRO Green Roof code contains aspects to consider when designing and specifying the waterproofing system of a brown roof, and intensive or extensive green roof.

The specification of the System for a brown roof, intensive or extensive green roof will require the use of a root barrier membrane to provide the necessary root resistance, approved by the Agrément holder.

The System shall be finished with ballast to resist wind-uplift, to protect the WFRL and insulation boards against pedestrian traffic; and to mitigate the spread of fire.

A project specific design shall address the wind-uplift resistance of gravel and/or paving slabs.

A gravel finish must have a depth of at least 50 mm or have a mass $\geq 80 \text{ kg/m}^2$ (minimum aggregate size 4 mm, maximum 32 mm).

When using paving slabs as a finish they must be:

- a minimum of 40 mm thick;
- installed supported by proprietary bearing spacers as per the manufacturer's instructions, to maintain a nominal air gap to assist the removal of water and help to reduce rocking;
- provided with a 150 mm wide edge strip filled with gravel (clean, rounded, minimum aggregate size 20 mm, maximum 40 mm) against parapets, upstands and around rooflights.

Examples of typical details of e.g. outlets, penetrations and upstands can be obtained from the Agrément holder. The project specific roof design must take into consideration all elements required in the finished roof.

The System is for use with one of the following waterproofing specifications for waterproofing the roof deck prior to installation of the System:

- built-up reinforced bitumen membrane to BS 8747, laid in accordance with BS 8217;
- hot and cold melt membranes.

Roof drainage should be designed in accordance with BS EN 12056-3.

Where there is a risk from plasticiser migration or other contaminants from the roof waterproofing (such as PVC single ply membranes) a suitable plastic fibre or similar isolating sheet must be interposed between the roof waterproofing and the insulation boards. For loose laid single layer roof waterproofing membranes, a cushion layer should be interposed.

2.2.4 Project specific design considerations

A pre-installation survey is required for the installation of the System (see section 2.4.3).

2.2.5 Permitted applications

Only applications designed according to the specifications given in this Agrément are permitted; in each case the Specifier will have to co-operate closely with the Agrément holder.

Application of the System is only allowed on continuous self-supporting decks, the material and shape of a deck shall support all relevant loads and transmit these to the deck supports.

2.2.6 Installer competence level

The System must be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.

Installation can be undertaken by competent persons experienced in this sort of work.

2.2.7 Delivery, storage and site handling

The System components are delivered to site in suitable packaging, that bears the System name, the Agrément holder's name and the BDA Agrément® logo incorporating the number of this Agrément.

Store the System components in accordance with the Agrément holder's requirements. Particular care must be taken to:

- avoid exposure to direct sunlight for extended periods of time;
- avoid exposure to high or low temperatures for extended periods of time;
- store in a well-ventilated covered area to protect from rain, frost and humidity;
- store away from possible ignition sources.

Rolls of CTF k-shield should be stored vertically on-end; packs of CTF-IV1, CTF-IV2, CTF-IV3, CTF-FS1 and CTF-FS2 should not be unwrapped until needed for use.

2.2.8 Maintenance and repair

Once installed, the System does not require regular maintenance. For 60-year durability a bespoke extended repair and maintenance protocol will apply. For advice in respect of repair, consult the Agrément holder.

In accordance with BS 6229 flat roofs incorporating the System must be inspected at least twice yearly:

- in autumn to ensure that rainwater outlets are not blocked, and the roof is draining freely;
- in spring to identify and rectify any damage due to weather actions.

It is good practice to adopt this programme for zero fall roofs in respect of the installation of the System.

Performance factors in relation to the Major Points of Assessment

2.2.9 Thermal Performance

The System can meet or contribute to meeting all required levels and provisions regarding U-values or thermal resistance.

Calculations of thermal transmittance (U-value) should be carried out by a competent person in accordance with BS EN ISO 6946 and BRE Report BR 443, using the thermal conductivities (λ)^{*} given in Section 2.5.4.

The drainage factor (f) of the System is 0.

Therefore, the correction ΔU_r for the calculated thermal transmittance of an inverted roof element (according to annex F.4 in BS EN ISO 6946) and the factor F_m (to calculate the design thermal conductivity because of moisture are):

- $\Delta U_r = 0$ (no water flowing between the insulation and the waterproofing membrane in an inverted roof);
- $F_m = 1$ for inverted roofs and balconies;
- $F_m = 1.13$ for a brown roof, intensive or extensive green roof. This is based on the moisture conversion coefficient according to BS EN ISO 10456 and the long-term water absorption by diffusion according to BS EN 12088.

2.2.10 Moisture Control

The WFRL will prevent water ingress into the System. Condensation that might accumulate due to ambient temperature fluctuations will naturally drain away in a short period of time without materially affecting the performance of the System.

2.2.11 Strength

The System has adequate strength and stiffness to transfer maintenance traffic loads and wind loads to the roof deck.

Wind actions should be calculated in accordance with BS EN 1991-1-4; due consideration should be given to higher pressure coefficients applicable to corners of the building; do not specify insulation boards less than 300 x 300 mm in corner zones (F) or in edge zones (G) of a roof.

The imposed and snow loads must be calculated in accordance with the recommendations of BS EN 1991-1-1 and BS EN 1991-1-3 respectively.

The System is capable of withstanding the impacts associated with normal handling, installation and service.

2.2.12 Fire Performance

When finished with paving slabs the System has an external fire performance Class of $B_{ROOF}(t_4)$ in accordance with BS EN 13501-5.

The roof is deemed to be of designation AA/Low Vulnerability when the System is finished with one of the following ballast layers:

- gravel with a thickness of at least 50 mm or a mass $\geq 80 \text{ kg/m}^2$ (minimum aggregate size 4 mm, maximum 32 mm);
- sand/cement screed to a thickness of at least 30 mm;
- paving slabs of at least 40 mm thickness, as defined in the national Building Regulations.

When used with the types of ballast defined above, the System is not subject to any restriction on building minimum boundary and therefore can be used at any distance from the boundary as specified in the national Building Regulations.

The fire rating of any roof containing the System will depend on the type of finish top deck and the nature of the roof waterproofing covering.

A flat or zero fall roof is not required to have any specific fire resistance, except when it forms part of a means of escape, when it performs the function of a floor, or where part of it is near a boundary.

When a flat or zero fall roof forms part of a means of escape, or performs the function of a floor, provisions for fire resistance apply; resistance to fire must also be considered in respect of the underside of the means of escape or floor.

2.2.13 Durability

The System will have a service life durability equivalent to that of the structure into which it is incorporated.

2.2.14 UKCA and CE Marking

The harmonised European standard for the EPS, CG and XPS components are BS EN 13163, BS EN 13167 and BS EN 13164 respectively.

2.3 - EXAMPLES OF TYPICAL DETAILS

Diagram 1 - Standard test rig for water flow test in accordance with ETAG 031

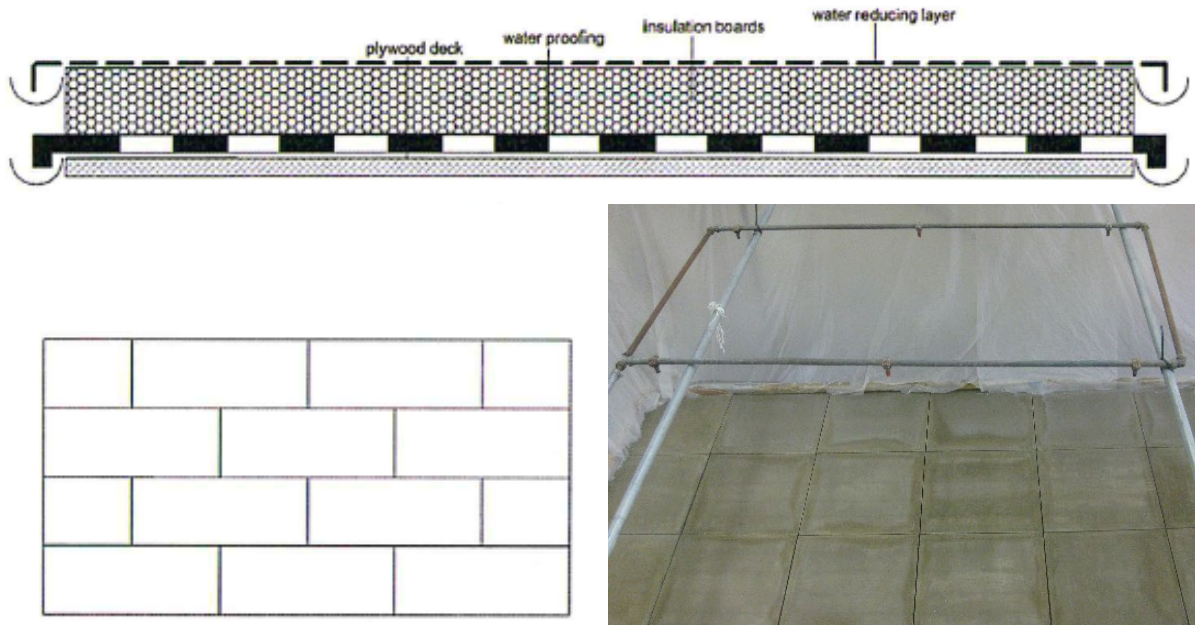


Diagram 2 - CTF modified test rig for water flow test in accordance with ETAG 031. Test report number 182937 (QT-50302/2/GMB)

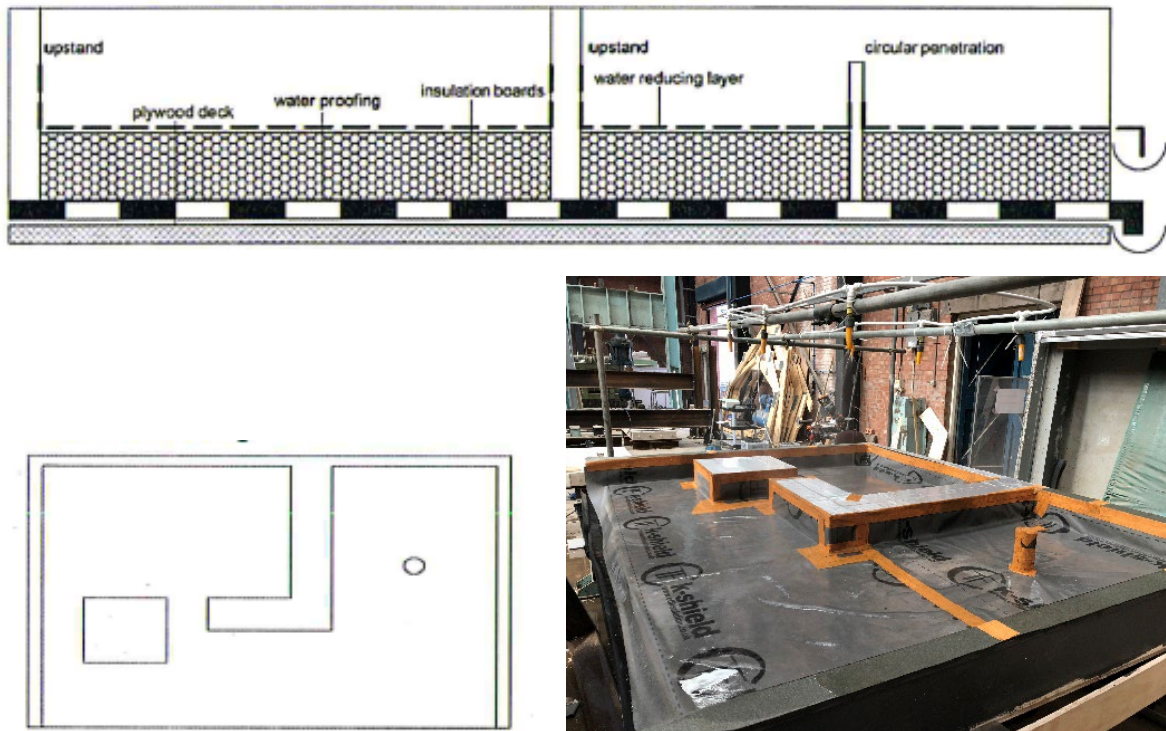


Diagram 3 - System components

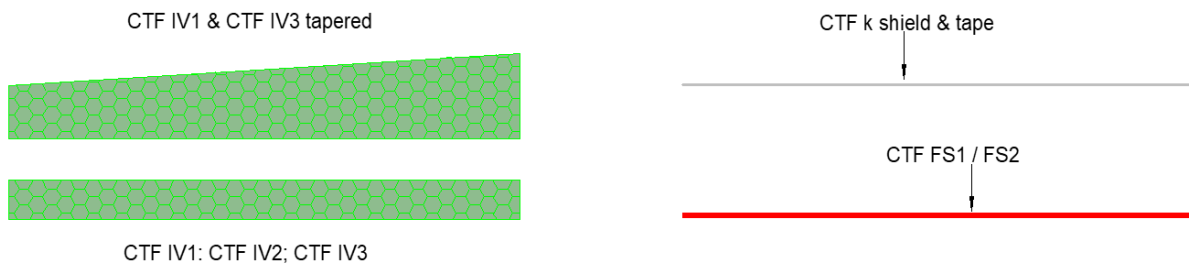


Diagram 4 - Typical combinations of the System components

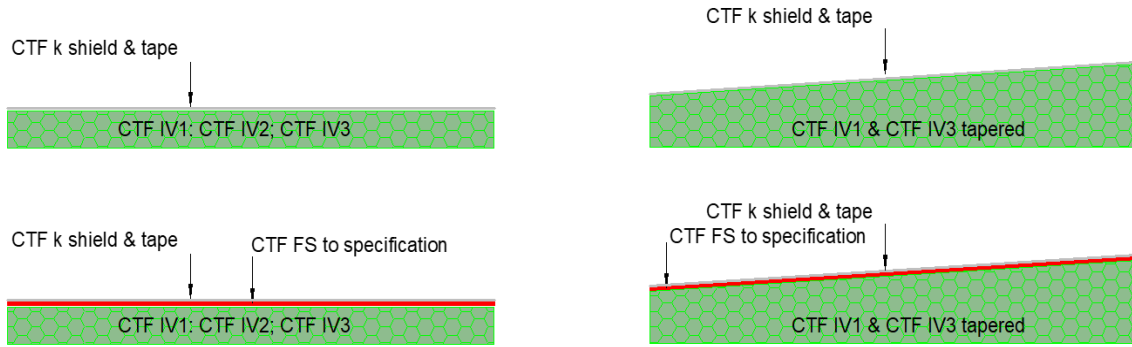


Diagram 5 - Typical System upstand

Key:

1. 20-40 mm rounded aggregate ballast with no fines installed to a minimum depth of 50 mm by others
2. CTF k-shield, all laps tape sealed
3. CTF insulation system to achieve design U-value
4. waterproofing detail membrane by others
5. render by others
6. CTF k tape
7. structural waterproofing system by others
8. primer by others
9. insulation board to CTF specification
10. FS1/ FS2 to CTF specification

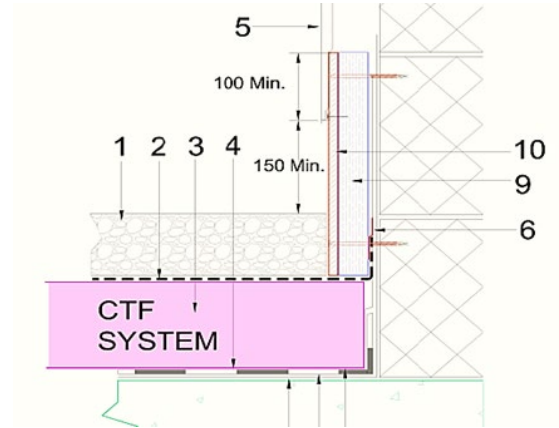
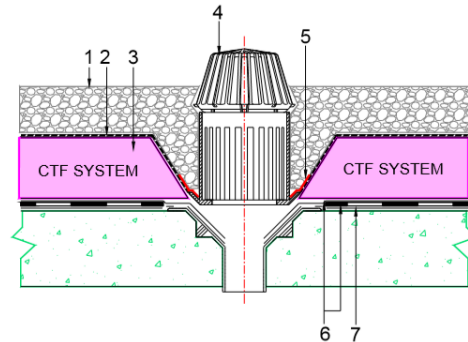


Diagram 6 - Typical roof outlet vent detail

Key:

1. 20-40 mm rounded aggregate ballast with no fines installed to a minimum depth of 50 mm by others
2. CTF k-shield, all laps tape sealed
3. CTF insulation system to achieve design U-value
4. rainwater outlet by others
5. CTF k tape
6. structural waterproofing system by others
7. primer by others



2.4 - INSTALLATION

The System must be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.

2.4.1 Installer competence level

See section 2.2.6.

2.4.2 Delivery, storage and site handling

See section 2.2.7.

2.4.3 Project specific installation considerations

The project specific design has been determined from a pre-installation survey.

2.4.4 Preparation

The following considerations apply prior to commencement of work:

- read the installation instructions carefully prior to installing the System;
- the structural deck and existing roof covering shall be true, even, dry, sound and free from dust, grease and other defects prior to installation of the membrane based watertight roof covering.

2.4.5 Outline installation procedure

Pre-cut tapered insulation boards are marked to the requirements of the project specific design.

Where there is a risk from plasticiser migration or other contaminants from the membrane based watertight roof covering (such as PVC single ply membranes) a suitable plastic fibre or similar isolating sheet must be interposed between the watertight roof covering and the insulation boards. For loose laid single layer roof waterproofing membranes, a cushion layer should be interposed.

The key sequence for typical installation is:

- loose lay insulation boards:
 - in parallel courses, with staggered longitudinal joints (i.e. broken bond), ensuring they are closely butted to avoid gaps;
 - sequentially in accordance with the position code on the detailed layout supplied. Laying of the main area should commence at the apex line(s) of the roof.
- if required by the project-specific design, overlay the insulation boards with CTF-FS1 or CTF-FS2;
- overlay the system components with CTF k-shield, complete with CTF k tape;
- to protect the system components from the effects of wind uplift and UV degradation a protective finish of ballast must be installed as work progresses.

2.4.6 Finishing

The following finishing is required upon completion of the installation:

- no additional finishing is required upon completion of the installation.

2.5 - INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.5.1 Moisture Control

Test	Test Standard	System Component	Result
Water vapour permeability	BS EN 13163	CTF-IV1 (EPS 200E)	0.006 to 0.015 Mg(Pa·h·m) ⁻¹
Water vapour resistivity		CTF-IV1 (EPS 200E)	514 MN·s·g ⁻¹ ·m ⁻¹
		CTF-IV1 (EPS 300E)	
Water impermeability	BS EN 12467	CTF-FS1	pass
Water vapour diffusion resistance factor μ	BS EN 12086	CTF-FS2	7
Water vapour diffusion resistance S_d			0.06 m
Water vapour diffusion resistance S_d	BS EN 13859-1	CTF k-shield	≤ 0.034 m
Resistance to water penetration			W1
Resistance to water penetration	ETAG 031 ⁱ	System	Sealed ⁱⁱ
Freeze thaw resistance by diffusion	BS EN 12091	CTF-IV2 (XPS 300)	FTCD1
Declared water vapour resistance factor	BS EN 12086	CTF-IV2 (XPS 300)	MU ₁₅₀

ⁱ ETAG 031 test method adapted to create a more onerous test condition

ⁱⁱ No leakage was recorded during 7 hours of testing

2.5.2 Strength

Test	Test Standard	System Component	Result	
Bending strength	BS EN 13163	CTF-IV1 (EPS 200E)	250 kPa	
		CTF-IV1 (EPS 300E)		
	BS EN 13167	CTF-IV3 (CG)	400 kPa	
Bending strength - MOR ⁱ	BS EN 12467	CTF-FS1	longitudinal transverse	14.69 MPa 8.88 MPa
Compressive strength at 10 % compression	BS EN 13163	CTF-IV1 (EPS 200E)	CS (10) 200	
		CTF-IV1 (EPS 300E)	CS (10) 300	
	BS EN 826	CTF-IV2 (XPS 300)	CS (10) 300	
		CTF-IV3 (CG)	500 kPa	
Compressive creep	BS EN 1606	CTF-IV2 (XPS 300)	CC(2/1.5/50)140	
		CTF-IV3 (CG)	CC(1.5/1/50)225	
Tensile strength	BS EN 13859-1	CTF k-shield	160 N/mm	
Tear resistance			180 N	

ⁱ Test carried out on 1,200 x 600 mm, 6 mm thick fibre-cement board

2.5.3 Fire Performance

Test	Test Standard	System Component	Result
Reaction to fire classification	BS EN 13501-1	CTF-IV1 (EPS 200E)	E
		CTF-IV1 (EPS 300E)	
		CTF-IV2 (XPS 300)	F
		CTF-IV3 (CG)	A1
		CTF-FS1	
		CTF-FS2	
Fire classification using data from external fire exposure to roofs	BS EN 13501-5 and BS EN 490	System	B _{ROOF} (t4)

2.5.4 Thermal Performance

Parameter	Test Standard	System Component	Result	
Declared thermal conductivity, λ_D^*	BS EN 12667	CTF-IV1 (EPS 200E)	0.033 ⁱ W/m·K	
		CTF-IV2 (XPS 300)	50 mm thick	0.034 W/m·K
			60 mm thick	
			70 mm thick	
			75 mm thick	
			80 mm thick	
			100 mm thick	
		150 mm thick	0.041 W/m·K	
		CTF-IV3 (CG)	0.036 W/m·K	
Coefficient of thermal conductivity, λ		CTF-FS1	0.23 W/m·K	
		CTF-FS2	0.19 W/m·K	

ⁱ λ_D without the addition of moisture correction for calculation of thermal transmittance (U-value) of an inverted roof construction

2.5.5 Other product characteristics

Test	Test Standard	System Component	Result
Dimensional stability	BS EN 1603	CTF-IV1	DS(N)2
	BS EN 1604	CTF-IV2 (XPS 300)	DS(23,90)
		CTF-IV3 (CG)	DS(70,90)

CHAPTER 3 - CDM, NATIONAL BUILDING REGULATIONS AND THIRD-PARTY ACCEPTANCE

3.1 - THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015 AND THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS (NORTHERN IRELAND) 2016

Information in this Agrément may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

3.2 - NATIONAL BUILDING REGULATIONS

In the opinion of Kiwa Ltd., the System, if installed and used in accordance with Chapter 2 of this Agrément, can satisfy or contribute to satisfying the relevant requirements of the following national Building Regulations.

3.2.1 - ENGLAND REQUIREMENTS: THE BUILDING REGULATIONS 2010 AND SUBSEQUENT AMENDMENTS

- A1(2) Loading - the System can transfer maintenance traffic loads, imposed and wind loads to the roof deck
- B4(2) External fire spread - the System can adequately resist the spread of fire over a roof and from one building to another, when covered with gravel or paving slabs
- C2(b) Resistance to moisture - the System can contribute to satisfying this Requirement
- L1(a)(i) Conservation of fuel and power - the System can contribute to satisfying this Requirement
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe and durable materials for its application and can be installed to give a satisfactory performance
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26A Fabric energy efficiency rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26C Target primary energy rates for new buildings - the System can contribute to satisfying the Regulation

3.2.2 - WALES REQUIREMENTS: THE BUILDING REGULATIONS 2010 AND SUBSEQUENT AMENDMENTS

- A1(2) Loading - the System can transfer maintenance traffic loads, imposed and wind loads to the roof deck
- B4(2) External fire spread - the System can adequately resist the spread of fire over a roof and from one building to another, when covered with gravel or paving slabs
- C2(b) Resistance to moisture - the System can contribute to satisfying this Requirement
- L1(a)(i) Conservation of fuel and power - the System can contribute to satisfying this Requirement
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe and durable materials for its application and can be installed to give a satisfactory performance
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26A Primary energy consumption rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying the Regulation

3.2.3 - SCOTLAND REQUIREMENTS: THE BUILDING (SCOTLAND) REGULATIONS 2004 AND SUBSEQUENT AMENDMENTS

3.2.3.1 Regulation 8 (1)(2) Durability, workmanship and fitness of materials

- the System is manufactured from acceptable materials and is adequately resistant to deterioration and wear under normal service conditions, provided it is installed in accordance with the requirements of this Agrément
- maintenance of repair work will not be necessary unless (a part of) the roof is damaged or is affected by structural modifications

3.2.3.2 Regulation 9 Building Standards - Construction

- 1.1(a) Structure - the System can transfer maintenance traffic loads, imposed and wind loads to the roof deck
- 2.8 Spread from neighbouring buildings - the System can inhibit the spread of fire in a building
- 3.10 Precipitation - the System can contribute to satisfying this Requirement
- 6.1(b) Carbon dioxide emissions - the System can contribute to satisfying the requirements
- 6.2 Building insulation envelope - the System can contribute to satisfying the requirements
- 7.1(a)(b) Statement of sustainability - the System can contribute to satisfying the relevant Requirements of Regulation 9, Standards 1 to 6, and therefore can contribute to a construction meeting a bronze level of sustainability as defined in this Standard; in addition, the System can contribute to a construction meeting a higher level of sustainability as defined in this Standards

3.2.3.3 Regulation 12 Building Standards - Conversions

- all comments given under Regulation 9 also apply to this Regulation, with reference to Schedule 6 of the Building (Scotland) Regulations 2004 and subsequent amendments, clause 0.12 of the Technical Handbook (Domestic) and clause 0.12 of the Technical Handbook (Non-Domestic)

3.2.4 - NORTHERN IRELAND

REQUIREMENTS: THE BUILDING REGULATIONS (NORTHERN IRELAND) 2012 AND SUBSEQUENT AMENDMENTS

- 23(1)(a)(i)(iii)(b) Fitness of materials and workmanship - the System is manufactured from materials which are suitably safe and acceptable for use as thermal insulation
- 28(b) Resistance to moisture and weather - the System can contribute to satisfying this Requirement
- 30(a)(b) Stability - the System can transfer maintenance traffic loads, imposed and wind loads to the roof deck
- 36 External fire spread - the System can adequately resist the spread of fire over a roof and from one building to another, when covered with gravel or paving slabs
- 39(a)(i) Conservation measures - the System can contribute to satisfying the requirements
- 40(2) Target carbon dioxide emission rates - a roof incorporating the System can be designed and constructed as not to exceed its target CO₂ emission rate

3.3 - THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

CHAPTER 4 - SOURCES

- BS EN ISO 6946:2017 Building components and building elements - Thermal resistance and thermal transmittance - Calculation method
- BS EN ISO 10456:2007 Building materials and products. Hygrothermal properties. Tabulated design values and procedures for determining declared and design thermal values
- BS EN 490:2011+A1:2017 Concrete roofing tiles and fittings for roof covering and wall cladding. Product specifications
- BS EN 826:2013 Thermal insulating products for building applications. Determination of compression behaviour
- BS EN 1603:2013 Thermal insulating products for building applications. Determination of dimensional stability under constant normal laboratory conditions (23 °C/50 % relative humidity)
- BS EN 1604:2013 Thermal insulating products for building applications. Determination of dimensional stability under specified temperature and humidity conditions
- BS EN 1606:2013 Thermal insulating products for building applications. Determination of compressive creep
- BS EN 1607:2013 Thermal insulating products for building applications. Determination of tensile strength perpendicular to faces
- BS EN 1991-1-1:2002 Eurocode 1 Actions on structures. General actions. Densities, self-weight, imposed loads for buildings
- BS EN 1991-1-3:2003+A1:2015 Eurocode 1 Actions on structures. General actions. Densities, self-weight, imposed loads for buildings
- BS EN 1991-1-4:2005+A1:2010 Eurocode 1 Actions on structures. General actions
- NA to BS EN 1991-1-4:2005+A1:2010 UK National Annex to Eurocode 1 - Actions on structures. General actions
- BS EN 12056-3:2000 Gravity drainage systems inside buildings - Roof drainage, layout and calculation
- BS EN 12086:2013 Thermal insulating products for building applications. Determination of water vapour transmission properties
- BS EN 12088:2013 Thermal insulating products for building applications. Determination of long-term water absorption by diffusion
- BS EN 12091:2013 Thermal insulating products for building applications. Determination of freeze-thaw resistance
- BS EN 12667:2001 Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance
- BS EN 13163:2012+A2:2016 Thermal insulation products for buildings. Factory made products of expanded polystyrene (EPS) - Specification
- BS EN 13164:2012+A1:2015 Thermal insulation products for buildings. Factory made extruded polystyrene foam (XPS) products. Specification
- BS EN 13165:2012+A2:2016 Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products
- BS EN 13167:2012+A1:2015 Thermal insulation products for buildings. Factory made cellular glass (CG) products. Specification
- BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using test data from reaction to fire tests
- BS EN 13501-5:2016 Fire classification of construction products and building elements. Classification using data from external fire exposure to roofs tests
- BS EN 13859-1:2014 Flexible sheets for waterproofing. Definitions and characteristics of underlays. Underlays for discontinuous roofing
- BS EN 13956:2012 Flexible sheets for waterproofing. Plastic and rubber sheets for roof waterproofing. Definitions and characteristics
- BS 6229:2018 Flat roofs with continuously supported coverings - Code of practice
- BS 8217:2017 Reinforced bitumen membranes for roofing - Code of practice
- BS 8218:1998 Code of practice for mastic asphalt roofing
- BS 8747:2007 Reinforced bitumen membranes (RBMs) for roofing - Guide to selection and specification
- ETAG 031-1:2010 Guideline for European Technical Approval of Inverted Roof Insulation Kits
- BRE Report BR 443:2006 Conventions for U-value calculations

Remark: apart from these sources, technical information and confidential reports have been assessed; any relevant documents are in the possession of Kiwa Ltd. and kept in the Technical Assessment File of this Agrément. The Installation Manual for the System may be subject to change, the Agrément holder should be contacted for clarification of revision.

CHAPTER 5 - AMENDMENT HISTORY

Revision	Amendment Description	Amended By	Approved By	Date
-	First Issue	C Vurley	C Forshaw	June 2020
A	Correction to Table 2.1.1	C Vurley	C Forshaw	July 2020
B	Updated address and additional insulation options	A Chapman	C Devine	October 2022
C	Addition of Fire Safe board options	A Chapman	C Devine	April 2024