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Agrément Certificate
05/4200
Product Sheet 1

CEFIL SINGLE PLY PVC ROOF WATERPROOFING MEMBRANE

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate of Confirmation relates to Cefil Single Ply PVC Roof Waterproofing Membrane for use in mechanically fastened, waterproofing on flat and pitched roofs with limited access and loose-laid and ballasted waterproofing on flat roofs with limited access.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the membrane and joints, when completely sealed and consolidated, will resist the passage of moisture to the interior of the building (see section 5).

Properties in relation to fire — tests indicate that the product will enable a roof to be unrestricted under Building Regulations (see section 6).

Resistance to wind uplift — the product will resist the effects of any wind suction likely to occur in practice (see section 7).

Resistance to foot traffic — the product will accept the limited foot traffic and loads associated with installation and maintenance of the system without damage (see section 8).

Durability — under normal service conditions the product will provide a durable waterproof covering with a service life of at least 20 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 4 August 2008

Original Certificate issued on 14 February 2005

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, Cefil Single Ply PVC Roof Waterproofing Membrane if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the product will enable a roof to be unrestricted under this Requirement. See sections 6.1 to 6.3 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Data for water resistance on the product, including joints, indicate that the system meets this Requirement. See section 5.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the product satisfies the requirements of this Regulation. See sections 9, 10 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.8	Spread from neighbouring building
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the product will be unrestricted by the requirements of clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 to 6.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Data examined for water resistance on the membrane, including joints, indicate that the use of the product can enable a roof to satisfy the requirements of clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ of this Standard. See section 5.1 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this product under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The product is acceptable. See section 9 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Data for water resistance on the membrane, including joints, indicate that the use of the product can enable a roof to satisfy the requirements of this Regulation. See section 5.1 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		Test data to BS 476-3 : 1958 indicate that on suitable non-combustible substructures the use of the product will be unrestricted by the requirements of this Regulation. See sections 6.1 to 6.3 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

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

See sections: 1 *Description* (1.2) and 2 *Delivery and site handling* (2.3).

Non-regulatory Information

NHBC Standards 2007

NHBC accepts the use of Cefil Single Ply PVC Roof Waterproofing Membrane, when installed and used in accordance with this Certificate, as meeting Technical Requirement R3 in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Cefil Single Ply PVC Roof Waterproofing Membrane, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4, *Superstructure*, Sub-section *Flat roofs*.

General

This Certificate is a Confirmation of a Dutch Agrément No CTG-565 issued by Intron Certificatie to Ceplastik S.L. and relates to Cefil Single Ply PVC Roof Waterproofing Membrane.

The membrane is manufactured by Vinilika (Ceplastik S.L.) and marketed in the United Kingdom by Cefil UK Ltd.

Technical Specification

1 Description

1.1 Cefil Single Ply PVC Roof Waterproofing Membrane is a polyester-reinforced PVC membrane, manufactured by calendaring.

1.2 The membrane has the nominal characteristics of:

thickness (mm)	1.2
width (m)	0.75–2.0
length (m)	20
roll weight (kg)	22.5–60.0
mass per unit area (kgm ⁻²)	50.

1.3 Ancillary items for use with the membrane include:

- steel sheet — galvanized steel laminated with Cefil PVC compound for use in forming edge and other details
- paving support pads — for use in loose-laid and ballasted specification
- THF welding fluid — Tetrahydrofuran (THF) for use in solvent welding of joints in membranes
- fasteners and fixing plates — fasteners and fixing plates used with the mechanically fastened systems are supplied by SFS Intec, Olympic or Iso-TAK. The Certificate holder's advice should be sought regarding approved fixing range
- separation layers — non-woven polyester scrim or glassfibre mat, for use when the membranes come into contact with incompatible materials
- vapour control layer — a polyethylene membrane for use as a vapour control layer where required
- Alpha Profile — triangular-shaped raised architectural range of sizes to suit roof penetrations
- Cefil Clip — lightning conductor clips made from Cefil membrane for compatible welding.

1.4 Quality control checks are carried out during production and on the final product. Checks on the final product include:

- dimensions
- tensile strength
- elongation at break
- tear strength
- dimensional stability.

2 Delivery and site handling

2.1 The membrane is delivered to site in rolls, individually wrapped in a PVC sleeve, on pallets. Labels on the rolls bear the marketing company's name, product name, dimensions, product code, batch number, date of manufacture and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls should be stored horizontally on a clean, dry, level surface and kept under cover.

2.3 THF is classified as 'highly flammable' and 'irritant' under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002* (CHIP3) and bears the appropriate hazard warnings. It should be stored in accordance with the Highly Flammable Liquids and Petroleum Gases Regulations 1997.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Cefil Single Ply PVC Roof Waterproofing Membrane.

Design Considerations

3 General

3.1 Cefil Single Ply PVC Roof Waterproofing Membrane is satisfactory for use as mechanically fixed waterproofing on flat and pitched roofs with limited access and loose-laid and ballasted waterproofing on flat roofs with limited access.

3.2 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged special precautions, such as additional protection to the membrane, must be taken.

3.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined as those having falls greater than 1:6.

3.4 Decks to which the products are to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards Chapter 7.1 Flat roofs and balconies* or the *Zurich Building Guarantee Technical Manual, Section 4, Superstructure, Sub-section Flat roofs* pages 268 to 270.

3.5 Insulation systems or materials used in conjunction with the product must be either:

- as described in the relevant clauses of BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

3.6 The membrane can be adversely affected by contact with bituminous or coal tar products, or polystyrene insulation boards, and a suitable separating layer must be used. When doubt arises, the advice of the Certificate holder should be sought.

4 Practicability of installation

Installation of Cefil Single Ply PVC Roof Waterproofing Membrane must be carried out only by installers trained and approved by the marketing company.

5 Weathertightness



5.1 Data confirm that the membrane and joints, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of the national Building Regulations (see section 15, Tables for *Physical properties — general* and *Membranes — general*):

England and Wales — Approved Document C, Requirement C2(b), Section 6

Scotland — Mandatory Standard 3.10, clauses 3.10.1⁽¹⁾⁽²⁾ and 3.10.7⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Regulation C4(b).

5.2 The membrane is impervious to water and when used as described will achieve a weathertight roof capable of accepting minor structural movement without damage.

6 Properties in relation to fire



6.1 When tested in accordance with BS 476-3 : 1958 a system comprising a profiled steel decking, layer of aluminium foil vapour control layer loose-laid, an aluminium foil-faced polyurethane insulation board mechanically fixed to deck, and a layer of Cefil 1.2 PVC membrane achieved a rating of EXT.F.AB.

6.2 When used in a loose-laid and ballasted specification including a minimum surface finish of 50 mm of aggregate, the membranes shall be deemed to satisfy BS 476-3 : 2004 designation EXT.F.AA.

6.3 The designation of other specifications (eg when used on combustible substrates) should be confirmed by:

England and Wales — Test or assessment in accordance with Approved Document B, Appendix A, Clause A1

Scotland — Test to conform Mandatory Standard 2.8, clauses 2.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Test or assessment carried out by a UKAS accredited laboratory or an independent consultant with appropriate experience.

7 Resistance to wind uplift

7.1 The resistance to wind uplift of a mechanically-fixed waterproofing layer is provided by the washer secured to the deck by approved fasteners passing through the membrane. The number and position of fixings will depend on many factors, including:

- wind uplift forces to be resisted
- pull-out strength of fasteners
- elastic limit of the membrane
- appropriate safety factors.

7.2 The number of fixings used should be established by reference to the wind uplift forces calculated in accordance with BS 6399-2 : 1997 on the basis of maximum permissible loads of 0.4 kN per fixing.

7.3 The precise ballast requirements for loose-laid systems should be calculated in accordance with the relevant parts of BS 6399-2 : 1997, but should be a minimum thickness of 50 mm. In areas of high-wind exposure, the gravel may be bonded at the edges for a distance of one metre. Alternatively, concrete slabs on suitable supports can be used.

8 Resistance to foot traffic

Data indicate that the membrane can accept, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Reasonable care should be taken, however, to avoid sharp objects or concentrated loads. Anywhere regular traffic is envisaged, ie maintenance of lift equipment, a walkway should be provided using concrete slabs supported on bearing pads. When under pavements a protective geotextile membrane must be laid between the waterproofing and ballast.

9 Maintenance



Roofs covered with the membrane should be the subject of annual inspections, as is good practice with single-layer waterproofing systems, to ensure continued security and performance, especially those roofs without ballast.

10 Durability



Accelerated weathering tests confirm that satisfactory retention of physical properties is achieved. Available evidence indicates that the membrane should have a life in excess of 20 years.

Installation

11 General

11.1 Installation of Cefil Single Ply PVC Roof Waterproofing Membrane must be carried out by trained and approved installers working in accordance with the relevant clauses of the Certificate holder's instructions and BS 8000-4 : 1989.

11.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections such as nail heads, concrete nibs. When used over a rough substrate, a suitable protection layer should be placed over the substrate.

11.3 Installation should not be carried out during wet weather (eg rain, fog, snow) nor when the temperature is below 5°C unless suitable precautions against surface condensation are taken.

11.4 All flashings should be formed in accordance with the Certificate holder's instructions.

11.5 When used over bitumen, bitumen-bound insulation products, coal tar, pitch or oil-based products a separation layer must be interposed between the substrate and the membrane. In case of doubt, the advice of the Certificate holder should be sought.

12 Procedure

Mechanically fastened

12.1 The membrane should be laid out flat onto the substrate without folds or ripples, with 100 mm overlaps, and secured against wind uplift prior to installation of fasteners by sandbags or other suitable means.

12.2 The membrane is fixed to the deck (through insulation boards, where appropriate) in the joint overlaps prior to welding of the joint. The fastener screw should be positioned 30 mm from edge of the membrane (10 mm from edge of plate). The fixings should be installed at centres calculated from the average wind force in that area.

Loose-laid and ballasted

12.3 The membrane should be laid out flat onto the substrate without folds or ripples, with 50 mm to 70 mm overlaps depending on the type of substrate used.

12.4 The membrane is mechanically fixed at perimeters and the laps welded together. Finally, the detailing work is carried out.

12.5 The membrane should be covered with a protective sheet prior to the application of a 50 mm minimum thick layer of washed, well-rounded gravel. In areas of high wind exposure, a heavier gravel may be used and/or the gravel may be bonded at the edges for a distance of one metre. Alternatively, concrete slabs on suitable supports can be used.

13 Jointing

Hot-air welding

13.1 The welding area should be dry and clean. If the membrane in the weld area has become contaminated, it must be cleaned in accordance with the Certificate holder's instructions.

13.2 Welding is carried out either by hand or automatic welding machine using equipment approved by the Certificate holder.

13.3 The welded width of the joint must be a minimum of 40 mm. Care should be taken that overheating of the membrane does not occur, as possible impairment of the membrane may result.

13.4 For hot-air welding, a firm substrate is required to achieve consistent welding. Some insulation materials may not have an adequate resistance to this pressure. In such cases, solvent welding may be a necessary alternative.

13.5 The seam should be tested with a suitable metal probe and any weakness repaired immediately.

14 Repair

In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch as described in the Certificate holder's instructions.

Technical Investigations

15 Tests

15.1 Data from tests conducted by BDA are summarised in Tables 1 and 2.

Table 1 Physical properties — directional

Test (units)	Mean results		Method ⁽¹⁾
	Longitudinal	Transverse	
Tensile strength (N per 50 mm)	865	795	MOAT 29 : 4.8.1 (200 mm min ⁻¹)
Elongation at break (%)	230	270	MOAT 29 : 4.8.1 (200 mm min ⁻¹)
Dimensional stability (%)	+0.40	-0.05	MOAT 27 : 5.1.6.1
Nail tear (N)			MOAT 27 : 5.4.1 (200 mm min ⁻¹)
-10°C	541	548	
20°C	499	578	
40°C	449	528	

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to the sections of the various documents.

Table 2 Membranes — general

Test (units)	Mean results	Method ⁽¹⁾
Low temperature flexibility (°C)		MOAT 27 : 5.4.2
control	≤-40	
heat aged ⁽²⁾	≤-40	
Static indentation		MOAT 27 : 5.1.9
rigid	L ₄	
compressive	L ₄	
Dynamic indentation		MOAT 27 : 5.1.10
Perlite	I ₃	
EPS	I ₃	
'T' peel (N per 50 mm)	185	MOAT 29 : 4.17.2
Wind uplift load per fixing (N)	1100	MOAT 55 : 4.2.2
Corrected load per fixing (N)	752	MOAT 55 : 5.1

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Heat aged 168 days at 80°C.

15.2 Testing was also carried out on the membrane to determine:

- thickness
- length
- width
- mass per unit area
- plasticiser content
- weldability (using THF)
- dehydrochlorination.

16 Investigations

16.1 Existing data on fire performance to BS 476-3 : 1958 of the reinforced and fleece-backed membranes were examined.

16.2 The manufacturing processes were examined, including methods of quality control. Details were also obtained of the quality and composition of the materials used.

Bibliography

- BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
- BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*
- BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
- MOAT No 29 : 1984 *Directives for the Assessment of Roofing Systems using PVC sheets without reinforcement, loose laid under heavy protection and not compatible with bitumen*
- MOAT No 55 : 1991 *UEAtc Supplementary guide for the assessment of mechanically fastened roof waterproofing*

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

17.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- remain covered by a valid Dutch Agrément; and
- are reviewed by the BBA as and when it considers appropriate.

17.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.