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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
98/3491
Product Sheet 1

RHENOFOL PVC ROOF COVERING SYSTEMS

RHENOFOL CV, CG and CGv

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Rhenofol CV, CG and CGv, a range of PVC roof waterproofing membranes reinforced with either a glass or polyester mat.

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 systems will resist the passage of moisture into the building (see section 5).

Properties in relation to fire — the use of the systems can enable a roof to be unrestricted under the current Building Regulations (see the Regulations section and section 6).

Resistance to wind uplift — the systems will resist the effects of any likely wind suction acting on the roof (see section 7).

Resistance to foot traffic — the systems will accept the limited foot traffic and loads associated with the installation and maintenance of the system and the effects of thermal or other minor movement likely to occur in practice without damage (see section 8).

Durability — under normal service conditions the systems should provide a durable waterproof covering with a service life of at least 35 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Fifth issue: 12 October 2010
Originally certificated on 27 April 1998

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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, Rhenofol CV, CG and CGv, 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 2010 (England and Wales)

Requirement:	B4(2)	External fire spread
Comment:		Test data to BS 476-3 : 1958 and 2004 indicate that on suitable substructures the use of the systems will enable a roof to be unrestricted under this Requirement. See sections 6.1 to 6.6 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Tests for water resistance on the membranes, including joints, indicate that the systems meet this Requirement. See sections 5.1 and 5.2 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The systems comprise acceptable materials. See section 10.1 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The systems can contribute to a construction meeting this Regulation. See sections 9.1, 9.2 and 10.1 and the *Installation* part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		Test data to BS 476-3 : 1958 and 2004 indicate that the systems, when applied to a non-combustible substrate, can be regarded as having low vulnerability under clause 2.8.1[1][2] of this Standard. See sections 6.1 to 6.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Tests for water resistance, indicate that the use of the systems will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1[1][2] and 3.10.7[1][2]. See sections 5.1 and 5.2 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for these systems 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 systems are acceptable. See section 10.1 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The systems are acceptable. See sections 9.1 and 9.2 of this of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		Tests for water resistance of the systems, including joints, indicate that the use of the systems will enable a roof to satisfy the requirements of this Regulation. See sections 5.1 and 5.2 of this Certificate.
Regulation:	E5(b)	External fire spread
Comment:		Test data to BS 476-3 : 1958 and 2004 indicate that on suitable substructures the use of the systems will enable a roof to be unrestricted under the requirements of this Regulation. See sections 6.1 to 6.5 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 section: 2 *Delivery and site handling* (2.1 and 2.4) and the *Installation* part of this Certificate.

Non-regulatory Information

NHBC Standards 2010

NHBC accepts the use of Rhenofol CV, CG and CGv, installed in accordance with this Certificate, as meeting Technical Requirement R3 in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and Balconies.*

General

The membranes are manufactured in Germany by Flachdach Technologie GmbH & Co. KG and are marketed in the UK by FDT, Flat Roof Design and Technology, Manheim House, Gelders Hall Road, Shepshed, Leicestershire LE12 9NH. Tel: 01509 505714, Fax: 01509 505475, e-mail: info@fdt.uk.com website: www.singleply.co.uk

Technical Specification

1 Description

1.1 The Rhenofol CV is a polyester mat reinforced PVC membrane for use as a mechanically fixed waterproofing layer, with solvent or hot-air welded lap joints. The membrane is fixed using galvanized or plastic, screw attached, fixing plates.

1.2 The Rhenofol CG is a glass mat reinforced PVC membrane for use as loose-laid and ballasted, with solvent or hot-air welded lap joints.

1.3 The Rhenofol CGv is a glass reinforced PVC membrane with a polyester fleece backing for use bonded. The membrane has a 50 mm longitudinal selvedge without fleece to allow jointing with solvent or hot-air.

1.4 The membranes comprise upper and lower layers manufactured by a calender-mould process. The layers are thermally fused together, sandwiching the reinforcement mat between the layers.

1.5 The membranes are manufactured with the nominal characteristics shown in Table 1.

Table 1 Nominal characteristics

	Membrane									
	CV				CG				CGv	
Thickness (mm)	1.2	1.5	1.8	2.0	1.2	1.5	1.8	2.0	1.8 (1.2 PVC + fleece)	2.1 (1.5 PVC + fleece)
Length (m)	20	15, 20	15	15	20	15	15	15	15	15
Width (m)	0.68,1.03 1.50, 2.05	0.50, 0.68,1.03 1.50, 2.05	1.03, 1.50 2.05	1.50	2.05	2.05	2.05	2.05	2.05	2.05
Weight (kg·m^{-2})	1.47	1.85	2.25	2.48	1.54	1.88	2.28	2.53	1.70	2.10
Colours	Grey, Anthracite, White, Blue, Green, Terracotta	Grey, Anthracite, White, Blue, Green, Terracotta	Grey	Grey	Grey	Grey	Grey	Grey	Grey, Anthracite	Grey, Anthracite

1.6 Other materials used with the systems include:

- Rhenofol C roof sheet — a non-reinforced PVC roofing sheet, used for on-site fabricated detailing
- Prefabricated details — a range of prefabricated internal and external corners manufactured from Rhenofol C
- Rhenofol coated metal — a 0.6 mm thick galvanized steel plate, coated with 0.85 mm of Rhenofol C compound, for use in edge detailing
- Rhenofol CGv adhesive – a single-component, polyurethane adhesive for use to bond Rhenofol CGv membrane to substrate
- Rhenofol Solvent Welding Agent (Tetrahydrofuran) — solvent for use in joint welding
- Rhenofol Contact Adhesive 20 — for use on upstands and other detailing
- 120 g·m^{-2} glass fibre mat — for use as a separation layer
- FDT Synthetic Fleece (300 g·m^{-2}) — for use as separation and/or protection layer
- polyethylene membrane — for use as a vapour control layer.

Quality control

1.7 A series of quality control checks are carried out during production and on the finished product.

2 Delivery and site handling

2.1 The membranes are delivered to site in rolls wrapped in paper bearing the Certificate holder, batch number and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls should be stored horizontally in its original packaging on a clean, dry, level surface and stacked no more than three pallets high.

2.3 Materials that are classified under *The Chemicals (Hazard Information and Packaging Supply) Regulations 2009* (CHIP4) are given in Table 2 along with flashpoints where relevant. These products bear the appropriate hazard warnings.

Table 2 Flashpoint and hazard classification

Material	Flashpoint (°C)	Classification
Rhenofol Contact Adhesive 20[1]	–18°C	Extremely flammable
Rhenofol CGv[1] adhesive	–10°C	Extremely flammable Harmful Dangerous for the environment
Rhenofol Solvent Welding Agent (Tetrahydrofuran)[1]	–14°C	Extremely flammable, Irritant

(1) These components 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 Rhenofol CV, CG and CGv.

Design Considerations

3 General

3.1 Rhenofol CV, CG and CGv membranes are satisfactory for use as waterproofing layer 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 must be taken, such as additional protection to the membrane.

3.3 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. Pitched roofs are defined as those having falls greater than 1:6. 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.

3.4 For ballasted installations, the roof slope must be less than 3° (fall of less than 1 in 19).

3.5 Decks to which this system is to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2010, Chapter 7.1.

3.6 Insulation materials used in conjunction with the systems must be in accordance with the manufacturer's instructions and 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.

3.7 The membranes can be adversely affected by contact with bituminous or coal tar products or polystyrene insulation boards. In these cases, the fleece-backed membrane, Rhenofol CGv, or a suitable separating layer must be used. Where doubt arises, the advice of the Certificate holder should be sought.

4 Practicability of installation

The systems should only be installed by installers who have been trained and approved by the Certificate holder.

5 Weathertightness

5.1 Data confirm that the membranes, including 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 thus:

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

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation C4(b).

5.2 The membranes are impervious to water and when used as described will give a weathertight roof covering capable of accepting minor structural movement without damage (see section 14, Tables for *Physical properties*).

6 Properties in relation to fire

6.1 When tested in accordance with BS 476-3 : 2004, systems comprising either Rhenofol CV 1.2 mm, 1.5 mm or 2.0 mm, mechanically fastened to a foil-faced polyisocyanurate (PIR) insulation on a loose-laid polyethylene vapour control layer on an OSB deck, achieved EXT.F.AB ratings.

6.2 When tested in accordance with BS 476-3 : 2004, a system comprising an 18 mm thick OSB deck, 1.7 mm bituminous vapour control layer, 100 mm PIR insulation and one layer of 1.8 mm Rhenofol CGv membrane bonded using Rhenofol CGv adhesive achieved an EXT.F.AB rating.

6.3 When tested in accordance with BS 476-3 : 1958, a system comprising a 20 mm thick flooring grade chipboard deck and one layer of glass fibre fleece (nominal weight 120 g·m^{-2}, nominal thickness 1.2 mm), and one layer of Rhenofol CV mechanically fixed to the deck, achieved an EXT.F.AA rating.

6.4 A roof waterproofed with Rhenofol CG and ballasted with a minimum depth of 50 mm of aggregate shall be deemed to be of designation AA.

6.5 The designation of other specifications should be confirmed by:

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

Scotland — To conform to Mandatory Standard 2.8, clause 2.8.1.

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

6.6 When tested in accordance with ENV 1187 : 2002, the systems described in sections 6.1 and 6.2 achieved a B_{ROOF} (t4) classification in accordance with EN 13501-5 : 2005.

7 Resistance to wind uplift

7.1 When installing Rhenofol CV systems in mechanically fixed specifications, the resistance to wind uplift of the membrane is provided by mechanical fasteners secured to the deck, passing through the membrane. The number, design, and position of these fixings will depend on a number of 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 EN 1991-1-4 : 2005 and the UK National Annex on the basis of the maximum permissible loads.

7.3 When installing Rhenofol CG systems in loose-laid and ballasted specifications, the precise ballast requirements should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and the UK National Annex, but should not be below a minimum thickness of 50 mm. In areas of high wind exposure, the use of paving slabs on suitable supports should be considered and the advice of the Certificate holder should be sought.

7.4 When installing Rhenofol CGv systems in bonded specifications, the resistance to wind uplift will normally be limited by the nature, condition and cohesive strength of the substrate. Tests indicate that the Rhenofol CGv membrane bonded with the Rhenofol CGv Adhesive to a concrete substrate will resist the effects of wind suction, thermal cycling or minor structural movements likely to occur in practice (see section 14, Table for *Rhenofol CGv physical properties*).

7.5 For other substrates, the advice of the Certificate holder should be sought and acceptable adhesion confirmed by test if necessary.

7.6 When bonding to insulation boards, the resistance to wind uplift may be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This should be taken into account when the insulation material is selected.

8 Resistance to foot traffic

Data indicate that the systems can accept, without damage, the limited foot traffic and light concentrated loads associated with installation and maintenance operations. Reasonable care should be taken, however, to avoid puncture by sharp objects or concentrated loads. In any situation where regular traffic is envisaged, eg maintenance of lift equipment, a walkway must be provided using concrete slabs supported on suitable bearing pads, or a protective layer (some types of bearing pads, in addition, will require the use of a protective sheet laid between the roof covering and the pads) see section 14, Table for *Rhenofol CV physical properties*. Alternatively, Rhenofol Walkway Slab or FDT Rubber Slab bonded onto the Rhenofol membrane can be installed to provide the appropriate mechanical protection.

9 Maintenance

9.1 Roofs covered with the systems should be the subject of routine maintenance inspections during the spring and autumn to ensure the continued security and performance of the waterproofing.

9.2 The roof, including the drains, should be cleared of debris and any damage to the waterproofing membrane repaired in accordance with the Certificate holder's instructions (see section 14).

10 Durability

10.1 Accelerated weathering tests confirm that satisfactory retention of physical properties is achieved. The available evidence indicates that the systems should have a life of at least 35 years.

10.2 The BBA has examined existing installations in Germany that have been in service since 1982. Tests conducted on materials sampled from these installations, including tests after additional accelerated ageing, confirm satisfactory retention of physical properties and indicate that an extended service life of up to 40 years can be achieved.

10.3 Where an extended service life is required, the Certificate holder or his agent must carry out inspections at the beginning, end and, if required, during the installation to ensure that the necessary preparatory work and installation has been carried out in accordance with the specification for the work. In addition, post-installation inspections should also be carried out under the Certificate holder's Quality Management System at maximum intervals of five years.

10.4 Routine maintenance inspections should also be carried out during the spring and autumn in accordance with the recommendations given in BS 6229 : 2003.

Installation

11 General

11.1 Installation of Rhenofol CV, CG and CGv membranes must be in strict accordance with the manufacturer's fixing instructions and should only be carried out by trained installers. Details of these are available from the Certificate holder.

11.2 Surfaces should be clean, dry, and free from sharp projections such as nail heads, concrete nibs.

11.3 In all cases, a vapour control layer should be used directly over the deck.

11.4 The membranes may be laid in conditions normal to roofing work. To prevent the entrapment of moisture under the membranes they must not be laid in wet or damp weather conditions, or at temperatures below 5°C.

11.5 Thermal insulation must be dimensionally stable. It can be rigid foam or mineral fibre and should be capable of supporting imposed loads during the installation and service without undue deflection. For mechanically fixed applications, the boards should have a high resistance to point loading. The Certificate holder must be consulted for suitable insulation materials.

11.6 The Rhenofol CV and CG membranes must not be laid directly onto expanded polystyrene or on timber substrates impregnated with substances containing solvents or oil (eg oil-based preservatives). A separating layer must be used in these cases.

12 Procedure

Mechanically fixed Rhenofol CV systems

12.1 The membrane should be laid flat onto the substrate without folds or ripples, and fixed to the deck by means of fixing elements attached by screws through the membrane.

12.2 The position and type of fixing elements with the number of fixing screws for each element must be in accordance with the fixing specifications provided by the Certificate holder.

12.3 The fixing elements are normally weatherproofed by the 100 mm overlap of the adjacent sheet, welded over the final 50 mm. The fixing elements may also be weatherproofed by hot-air or solvent welding 150 mm wide strips of the membrane over the fixing and to the main membrane.

12.4 The membrane must be fixed at all perimeters, penetrations and valleys with a deviation of more than 3° from the horizontal, by welding onto Rhenofol coated metal sheet. The Certificate holder should be consulted for suitable fixings and detail specifications.

Loose-laid and ballasted Rhenofol CG systems

12.5 The slope of the roof should not exceed 3° (approximate fall of 1:19) to minimise the loss of the ballast.

12.6 The membrane must be fixed at roof penetrations and at roof perimeters and made wind-tight to prevent the rapid intrusion of air under the membrane. The Certificate holder should be consulted for suitable fixings and detail specifications.

12.7 Lap joints are made by overlapping adjacent sheets by 50 mm and jointing using solvent or hot air in accordance with the Certificate holder's instructions.

12.8 Prior to the application of the ballast, a protection layer consisting of at least 0.2 mm thick polyethylene should be laid. The Certificate holder should be consulted for suitable specifications.

12.9 Ballast consisting of natural uncrushed stone (20/40 mm) should immediately be applied to provide a minimum 50 mm thick layer.

12.10 Alternatively, paving slabs may be used placed in a bed of fine gravel. In this case the manufacturer should be consulted for information on suitable protection layers.

Bonded Rhenofol CGv systems

12.11 The Rhenofol CGv adhesive should be applied to the clean and dry substrate at a coverage rate in accordance with Table 3 using the FDT application trolley. In places hard to reach with the bonding trolley, the adhesive can also be applied manually.

Table 3 Adhesive application rates

Roof zone	Application rate at roof height ($g \cdot m^{-2}$)	
	<8 m	>8 m to <20 m
Edges/corners	250	350
Central area	180	250

12.12 Longitudinal lap joints are formed by overlapping the two adjacent sheets by 60 mm to ensure that the fleece backing is continuous and forms a separation layer between bituminous or other non-compatible substrates and the membrane. A 50 mm wide joint is made by solvent or hot-air welding in accordance with the Certificate holder's instructions.

12.13 Due to the fleece backing, it is not possible to weld transverse laps together directly. These should be formed by overlapping the membrane by 50 mm and welding a 100 mm wide strip of Rhenofol C, CG or CV centrally over the lap using hot air or Rhenofol solvent welding agent.

12.14 The Certificate holder should be consulted for suitable fixings and detail specifications for perimeter, upstands and penetrations details.

13 Repair

In the event of damage, repairs to Rhenofol CV, CG and CGv should be carried out by applying a patch of Rhenofol C, CV or CG membrane extending at least 50 mm beyond the defect. The joint should be cleaned back to unweathered material and solvent or hot-air welded and finally sealed using Rhenofol paste.

Technical Investigations

14 Tests

14.1 Data from tests carried out by Bundesanstalt für Materialprüfung (BAM) were evaluated in the context of UK roofing practice. Additional data from tests carried out by the BBA were also evaluated. The results of these tests are summarised in Tables 4 to 6.

Table 4 Rhenofol CV physical properties — directional

Test (units)	Mean results		Method
	Longitudinal	Transverse	
Dimensional stability (%)			MOAT 29 : 4.15
6 hours at 80°C	–0.09	–0.00	
3 cycles (6 hours at 80°C, 24 hours at 23°C)	–0.15	–0.04	
Tear strength (N 50 mm^{-2})			DIN 53354
reinforcement	1153	1137	(test speed 100 mm min^{-1})
PVC (unreinforced)	712	707	
Elongation (%)			DIN 53354
reinforcement	16	16	(test speed 100 mm min^{-1})
PVC (unreinforced)	52	43	

Table 5 Rhenofol CV physical properties — general

Test (units)	Mean result	Method
Apparent density ($g \cdot cm^{-3}$)	1.28	BS 2782.6-620A
Water vapour permeability ($g \cdot m^{-2} day^{-1}$)	2.11	BS 3177 (25°C/75% RH)
Water vapour resistance ($MN \cdot s \cdot g^{-1}$)	97.3	BS 3177 (25°C/75% RH)
Ash content (%)	6.25	ISO 1270
Resistance to water pressure	pass	MOAT 27 : 5.1.4
Static indentation		MOAT 27 : 5.1.9
hard substrate	L_4	
soft substrate	L_4	
Dynamic indentation		MOAT 27 : 5.1.10
hard substrate	I_4	
soft substrate	I_3	
Low temperature flexibility (°C)	<220	MOAT 29 : 4.14
Tensile strength ($N \cdot mm^{-2}$)(1)		DIN 53455
unaged	12.5	(test speed 200 mm min^{-1})
heat aged(2)	11.9	
UV aged(3)	11.4	
SO_2 aged(4)	12.0	
alkali aged(5)	11.3	
brine aged(6)	12.3	
Elongation (%)(1)		DIN 53455
unaged	236	(test speed 200 mm min^{-1})
heat aged(2)	197	
UV aged(3)	182	
SO_2 aged(4)	244	
alkali aged(5)	224	
brine aged(6)	253	
Modulus of elasticity ($N \cdot mm^{-2}$)(1)(7)		DIN 53457
unaged	17.0	(test speed 5 mm min^{-1})
heat aged(2)	11.7	

(1) Samples cut at 45° angle to longitudinal direction.
(2) 28 days heat ageing at 80°C.
(3) UV aged for 2500 hours.
(4) 28 days exposure to sulfur dioxide.
(5) 28 days exposure to a dilute calcium hydroxide solution.
(6) 28 days exposure to a brine solution.
(7) Extension between 1% and 2%.

Table 6 Rhenofol CGv physical properties — general

Test (units)	Mean result	Method
Resistance to peel from substrate (N per 50 mm)(1)		MOAT 65 : 4.3.3
control	194	
heat aged(2)	237	
Resistance to cyclic movement (500 cycles)	Watertight	MOAT 65 : 4.3.7

(1) Concrete substrate.
(2) 28 days heat ageing at 80°C.

14.2 Test data relating to Rhenofol CV on the following properties were also examined:

- joint peel strength
- joint shear strength
- wind uplift.

14.3 Data from tests carried out by Staatliche Materialprufüngsanstalt Darmstadt (MPA) relating to Rhenofol CG (1.2 mm) and Rhenofol CGv on the following properties were also examined:

- thickness
- weight per unit area
- tensile strength and elongation
- flatness
- resistance to static loading
- resistance to impact.

15 Investigations

15.1 Existing data on the fire performance of the membrane were examined.

15.2 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

15.3 Visits were made to sites in progress to assess the methods of application.

15.4 An assessment of the products' durability was made based on the inspection and testing of material from existing installations.

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 2782-6.620A to 620D : 1991 *Methods of testing plastics — Dimensional properties — Determination of density and relative density of non-cellular plastics*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 *UK National Annex to Eurocode 1 : Actions on structures — General actions — Wind actions*

DIN 53354 : 1981 *Testing of artificial leather; Tensile test*

DIN 53455 : 1981 *Testing of plastics, tensile test*

DIN 53457 : 1987 *Testing of plastics; Determination of the elastic modulus by tensile, compression and bend testing*

EN 13501-5 : 2005 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*

ENV 1187 : 2002 *Test methods for external fire exposure to roofs*

ISO 1270 : 1975 *Plastics — PVC resins — Determination of ash and sulphated ash*

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 65 : 2001 *UEAtc Technical Guide for the Assessment of Non-Reinforced, Reinforced and/or Backed Roof Waterproofing Systems made of PVC*

16 Conditions

16.1 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.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 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
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 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.

16.5 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.

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