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Agrément Certificate
12/4896
Product Sheet 1

CETCO DAMP-PROOF COURSES

VOLSHEET DPC

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Volsheet DPC, for use as a horizontal, vertical or stepped damp-proof course (including cavity tray), in either solid or cavity walls of brick, block, stone or concrete.

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

Behaviour under load — the product will not extrude under load, up to the point of compressive failure of the wall (see section 6).

Resistance to water and water vapour — the product will provide an effective barrier against liquid water and water vapour (see section 7).

Compatibility with other materials — when used in normal construction, the product is compatible with all materials with which it will be in contact, except for timber preservatives based on creosote and tar oil (see section 8).

Durability — when properly specified and installed, the product, in normal circumstances, will remain effective during the lifetime of the building (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

Date of First issue: 5 April 2012

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Certificate amended on 9 July 2012 for the deletion of Clause 17.2.

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, Volsheet DPC, 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 presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement:	A1	Loading
Comment:		The dpc will not extrude under load, up to the point of failure of the wall, and will not adversely affect the ability of a properly designed and built wall to sustain and transmit compression loads. The presence of a dpc can reduce the shear and tensile strength of a wall at that point, and design may need to take account of this. See section 6.1 of this Certificate.
Requirement:	C2(a)(b)	Resistance to weather and ground moisture
Comment:		Properly installed in a correctly designed structure the product forms an effective barrier to the movement of water within the wall, enabling compliance with this Requirement. See section 7 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)	Fitness and durability of materials and workmanship
Comment:		The use of the product satisfies the requirements of this Regulation. See sections 9 and 10 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	1.1(a)(b)	Structure
Comment:		The dpc will not extrude up to the point of failure of the wall, and will not adversely affect the ability of a properly designed and built wall to sustain and transmit compression loads, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ and 1.1.3 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard:	3.4	Moisture from the ground
Standard:	3.10	Precipitation
Comment:		The product will form an effective barrier to the movement of moisture within the wall, enabling compliance with these Standards, with reference to clauses 3.4.1 ⁽¹⁾⁽²⁾ and 3.10.1 ⁽¹⁾⁽²⁾ . See section 7 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards – conversions
Comment:		All comments given for the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12 ⁽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:	C4(a)(b)	Resistance to ground moisture and weather
Comment:		Tests for water resistance on the dpc's, including joints, indicate that the product meets this Regulation. See section 7 of this Certificate.
Regulation:	D1	Stability
Comment:		The dpc will not extrude, up to the point of failure of the wall, and will not adversely affect the ability of a properly designed and built wall to sustain and transmit compression loads. See section 6.1 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: 1 *Description* (1.2) of this Certificate.

Additional Information

NHBC Standards 2011

NHBC accepts the use of Volsheet DPC, when installed and used in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.1 External masonry walls*.

1 Description

1.1 Volsheet DPC is a flexible sheet for use as a horizontal, vertical or stepped damp-proof course in either solid or cavity walls of brick, block, stone or concrete.

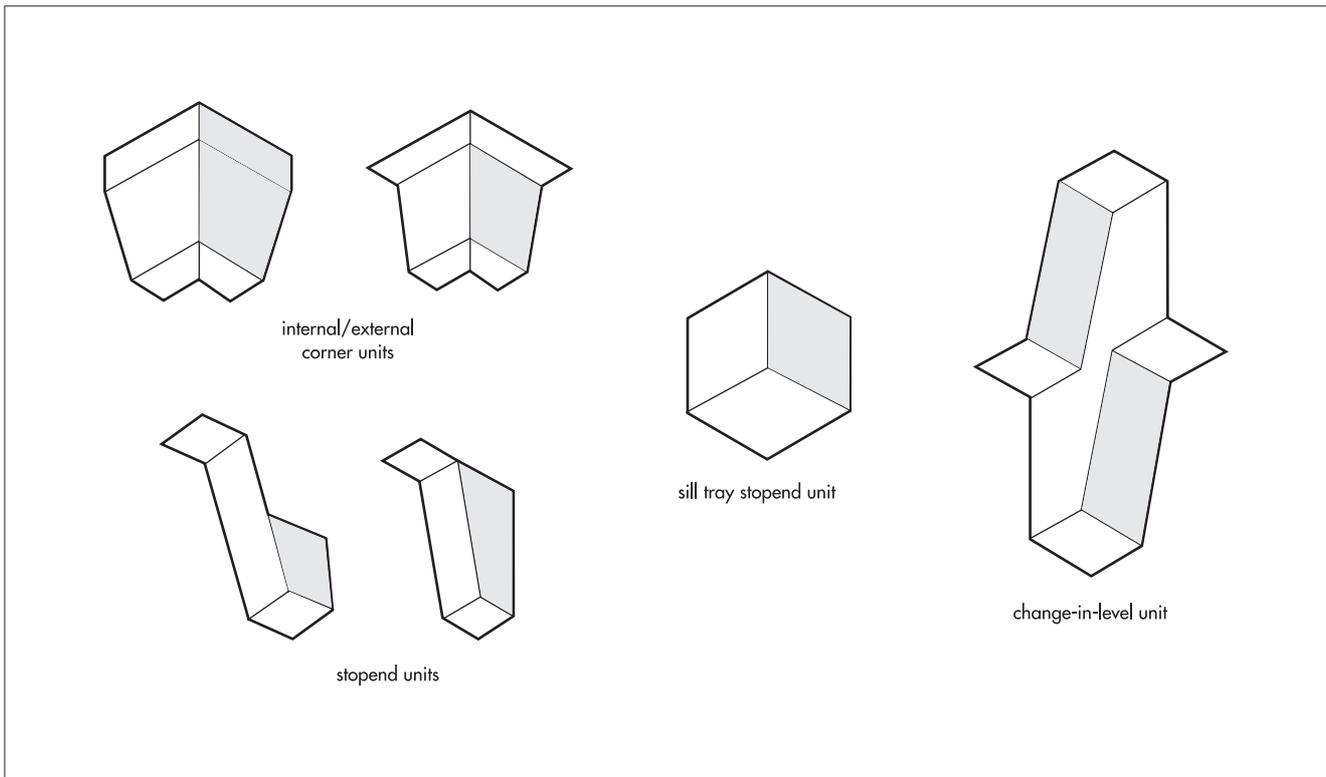
1.2 The sheet is manufactured to the following dimensions:

Nominal thickness (mm)	0.85 ⁽¹⁾
Nominal mass per unit area (kg·m ⁻²)	0.83
Roll length (m)	20
Roll widths (mm)	100, 113, 150, 225, 300, 338, 450, 500, 600, 650, 900, 1000.

(1) Thicknesses between 0.85 mm and 1.15 mm are available to special order.

1.3 Preformed cavity trays are flexible units for angles in stepped or horizontal damp-proof coursing. Typical examples are shown in Figure 1.

Figure 1 Typical range of cloaks



2 Manufacture

2.1 The product is manufactured from a blend of thermoplastic polymers, mineral fibres and other additives and extruded into sheet form.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The product is delivered to site in rolls wrapped in a pre-printed wrapper bearing the product name, roll dimensions and a roll manufacturing number. The rolls are packed on pallets with polyethylene when leaving the factory.

3.2 Rolls must be stored on end and under cover. Contact with organic solvents must be avoided.

3.3 If stored at low temperatures the product should be left in a warm place before use to improve handling.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Volsheet DPC.

Design Considerations

4 Use

4.1 Volsheet DPC and cavity tray units, when correctly specified and installed in accordance with this Certificate, are satisfactory for use as horizontal, vertical, or stepped damp-proof courses (including cavity trays) in either solid or cavity walls of brick, block, stone or concrete. General standards of good design practice are given in BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006, BS EN 1996-3 : 2006, their respective UK Annexes and PD 6697 : 2010.

4.2 Cavity trays, steps, angles and stop ends are preformed in the factory (see Figure 1).

4.3 These components may be used separately or with each other.

5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Behaviour under load

 6.1 Volsheet DPC will not extrude under load, up to the point of compressive failure of the wall, and will not adversely affect the ability of a properly designed and built wall to sustain and transmit compression. The presence of the product can, however, reduce the shear and tensile (and therefore, bending) strengths of a wall at that point, and designs may need to take account of this. Allowable stresses on the dpc are detailed in the product literature and further guidelines are available from the Certificate holder.

6.2 Volsheet DPC will withstand considerable movement of the wall, and is unlikely to be impaired by normally occurring movements up to the point where the wall itself is deemed to have failed.

7 Resistance to water and water vapour

 When correctly specified and installed the product will provide an effective barrier against liquid water and water vapour either from a source external to the structure, or from one part of the structure to another.

8 Compatibility with other materials

The product is compatible with all normal construction materials with which it will be in contact, except for timber preservatives based on creosote or tar oils. It is unaffected by timber preservatives which are water-based solutions of salts. Where there is doubt about the compatibility with materials in contact, the advice of the Certificate holder's Technical Department should be sought.

9 Maintenance

As the system is confined within the wall and wall cavity and has suitable durability (see section 10), maintenance is not required. However, any damage occurring before installation must be repaired (see section 1.5).

10 Durability

 Results of artificial ageing tests and assessment of constituent materials indicate that a satisfactory performance in use and retention of physical properties is achieved. When properly specified and installed, the product will in normal circumstances remain effective during the lifetime of the building.

Installation

11 General

11.1 Installation of the Volsheet DPC must follow normal good practice for the detailing of damp-proof courses, as set out in PD 6697 : 2010, and must be in accordance with the relevant Clauses of BS 8000-3 : 2001, BS 8215 : 1991, BRE Digest 380 *Damp-proof courses*, and the Certificate holder's instructions.

11.2 As with all flexible dpc's care should be taken to avoid impact damage from sharp objects (eg a chisel) during installation.

12 Handling

12.1 The product is handled and cut using the same techniques as traditional flexible damp-proof courses. It retains sufficient flexibility when used at the lowest temperature at which walls are normally built and does not become tacky in warm, ambient weather conditions.

12.2 Difficulties may occur when forming certain details, particularly when bending the Volsheet DPC through two angles at the same time. In such cases, care must be taken to achieve a satisfactory seal, and where necessary preformed cloaks should be used. Care should be taken at temperatures below 5°C to avoid the risk of condensation on jointed surfaces which may affect the efficiency of the self-adhesive tape.

13 Installation practice

13.1 The following installation practices are essential:

- the dpc must extend through the full thickness of the wall or wall-leaf, including pointing, applied rendering or other facing material
- the dpc must be laid on a wet, even bed of mortar (perforations in adjacent courses of brickwork must be closed with mortar) and project 5 mm beyond the finished face
- the dpc must always be sandwiched between wet mortar and not laid dry
- all lap joints in the dpc must have a minimum 100 mm overlap, be completely sealed with suitable tape and supported by a suitable joint system in accordance with the Certificate holder's instructions
- Volsheet DPC Preformed Cavity Tray Units must be used at stop ends, and at all corners or changes in levels of cavity trays
- where used as a cavity tray, the dpc laps must be sealed.

13.2 When using Volsheet DPC with boot lintels or similar constructions, it is recommended that the material is installed following the lintel profile, where appropriate.

13.3 In beam-and-block flooring, Volsheet DPC may be laid dry on a brick or block wall provided the following conditions are met:

- the minimum bearing of the beams recommended by the flooring system's manufacturer is achieved.
- the dead and applied loads upon the dpc via the beam do not exceed 2.5 N·mm⁻²
- the surface of the wall onto which the dpc and beam are to be installed is clean, smooth and free from projections and perforations. Failure to comply with this requirement could lead to perforation of the dpc. If this requirement cannot be met, the dpc should be laid on an even bed of mortar
- any loose aggregate is swept from the wall prior to installation of the dpc and from the dpc prior to the installation of the beam.

14 Cleaning cavities

As with other damp-proof course materials, damage can occur during cleaning of mortar droppings from the damp-proof course unless care is taken. The following recommendations minimise damage occurring:

- cavity battens should be used to prevent excessive amounts of mortar droppings reaching the damp-proof course
- mortar droppings should be removed before they have had time to harden
- implements such as steel rods should never be used for cleaning
- damp-proof courses should be examined for damage as work proceeds.

15 Repair

Damaged areas of the product can be easily repaired prior to being installed by cutting out and/or replacing the damaged section, ensuring joints are made in accordance with section 13.1. Once covered, the product cannot be repaired.

Technical Investigations

16 Tests

16.1 Samples were obtained from the manufacturer for the purpose of testing. Tests performed by the BBA and other independent test laboratories, which give typical results for the materials, are summarised in Tables 1 and 2.

Table 1 Physical properties — General

Test (units)	Mean results	Method ⁽¹⁾
Water vapour permeability (g·m ⁻² ·day ⁻¹)	0.65	BS 3177 (25°C/75% RH)
Water vapour transmission (MNsg ⁻¹)	316	BS 3177 (25°C/75% RH)
Water absorption (%)	0.22	BS 2782-4.430A
Resistance to leakage at joints	Pass	MOAT 27 : 5.2.1
Tensile strength of joint (N)		MOAT 27 : 5.2.2/3/4 (200 mm·min ⁻¹)
unaged	235	
heat aged ⁽²⁾	290	
water soak ⁽³⁾	257	
Cold flex temperature (°C)	-60	BS 2782-1.150B

(1) Test documents are listed in the *Bibliography*. Numbers/letters in the table relate to sections/parts of the various documents.

(2) Heat aged 80°C for 28 days.

(3) Water soak at 60°C for 7 days.

Table 2 Physical properties — directional (unaged)

Test (units)	Mean results		Method ⁽¹⁾
	Longitudinal	Transverse	
Tensile strength (N·mm ⁻²)	14.6	14.0	BS 2782-3.320A
Elongation at break (%)	558	671	BS 2782-3.320A
Tear strength (N·mm ⁻²)	88	118	BBA Method ⁽²⁾
Low temperature flexibility (°C)	≤30	≤-30	MOAT 27 : 5.4.2
Dimensional stability (%)	-1.4	-0.4	MOAT 27 : 5.1.6 (free)

(1) Test documents are listed in the *Bibliography*. Numbers/letters in the table relate to sections/parts of the various documents.

(2) BBA method based on BS 2782-3.360B: 1980 which has been superseded.

16.2 Tests were carried out to determine:

- thickness
- weight per unit area
- chisel impact
- long-term point loading
- puncture resistance.

17 Investigations

17.1 An examination was made of data relating to:

- short-term shear testing to BS DD 86-1 : 1986
- tensile strength and elongation after heat ageing, water soak and UV ageing
- low-temperature flexibility after heat ageing and exposure to bitumen.

Bibliography

- BS 2782-1 : Method 150B : 1976 *Methods of testing plastics — Thermal properties — Determination of cold flex temperature of flexible polyvinyl compound*
- BS 2782-3 : Methods 320A to 320F : 1976 *Methods of testing plastics — Mechanical properties — Tensile strength, elongation and elastic modulus*
- BS 2782-4 : Methods 430A to 430D : 1983 *Methods of testing plastics — Chemical properties — Determination of water absorption at 23°C with allowance for water-soluble matter*
- BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS 8215 : 1991 *Code of practice for design and installation of damp-proof courses in masonry construction*
- BS DD 86-1 : 1983 *Damp-proof courses — Methods of test for flexural bond strength and short term shear strength*
- BS EN 1996-1-1 : 2005 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- NA to BS EN 1996-1-1 : 2005 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- BS EN 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules — Structural fire design*
- NA to BS EN 1996-1-2 : 2005 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules — Structural fire design*
- BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*
- NA to BS EN 1996-3 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Simplified calculation methods for unreinforced masonry structures*
- BRE Digest 380 : 1993 *Damp-proof courses*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
- PD 6697 : 2010 *Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and 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.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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 their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.