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Agrément Certificate
86/1650
Product Sheet 7

VOLCLAY WATERPROOFING SYSTEM FOR STRUCTURES

VOLCLAY TYPE 1 PANEL

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Volclay Type 1 Panel, for use in waterproofing and damp-proofing underground reinforced concrete structures.

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

Resistance to water and water vapour — the system provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 5).

Resistance to puncturing — the panel has the ability to self-heal if punctured (see section 6).

Durability — when fully protected, the system provides an effective barrier to the transmission of water and water vapour for the life of the building in which it is incorporated (see section 11).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. The system 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: 17 August 2009

Originally certificated on 2 September 1986

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, Volclay Type 1 Panel, 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:	A1	Loading
Comment:		When adequately confined, the system contributes to satisfying this Requirement. See section 8 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		The system is an effective barrier to water and water vapour. See sections 5.1 and 5.2 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See section 11 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 system satisfies the requirements of this Regulation. See sections 10 and 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	1.1(a)(b)	Structure
Comment:		The application of the system will not adversely affect the building's ability to transmit loadings, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ , 1.1.3 ⁽¹⁾⁽²⁾ and 1.1.4 ⁽¹⁾⁽²⁾ . See section 8 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The system is an effective barrier to liquid water and water vapour, with reference to clauses 3.4.1 ⁽¹⁾⁽²⁾ , 3.4.2 ⁽¹⁾⁽²⁾ , 3.4.5 ⁽¹⁾⁽²⁾ , 3.4.6 ⁽¹⁾⁽²⁾ and 3.4.7 ⁽¹⁾⁽²⁾ respectively. See sections 5.1 and 5.2 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this system 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 system is acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The system does not normally require maintenance. See section 10 of this Certificate
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		The system is an effective barrier to liquid water and water vapour. See sections 5.1 and 5.2 of this Certificate.
Regulation:	D1	Stability
Comment:		When adequately confined, the system contributes to satisfying this Requirement. See section 8 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 obligation under these Regulations.

See section: 2 *Delivery and site handling* (2.1 to 2.5).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Volclay Type 1 Panel, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.1 *Substructure and ground bearing floors*.

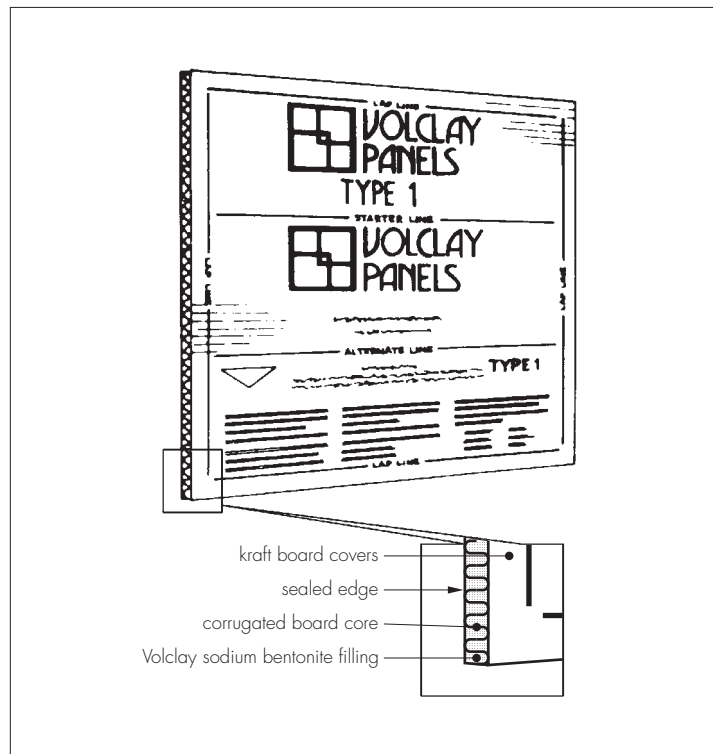
Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Volclay Type 1 Panel, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 3 *Substructure*, Sub-section *Basements*.

1 Description

1.1 Volclay Type 1 Panel, the membrane component of the Volclay Waterproofing System, comprises a waterproofing corrugated cardboard panel, 1220 mm square and 5 mm thick, with the flutes filled with dry granular sodium bentonite and sealed at the edges (see Figure 1).

Figure 1 Cross-section through Volclay Type 1 Panel



1.2 Other components used with Volclay Type 1 Panel include:

- Waterstop RX — a black, extruded strip of sodium bentonite/butyl rubber backed with a silicone release paper and used as a water bar in construction joints and in conjunction with Volclay Type 1 Panel
- Bentoseal — a trowel-grade sodium bentonite compound used for detailing work, eg around penetrations
- Voltex Granules — a loose form of granular sodium bentonite used to prevent the seepage of water from backfill material or mixed with water and used as a paste for sealing
- Volclay Hydrobar Tubes — a water soluble polyvinyl alcohol tube, filled with natural sodium bentonite and sealed at each end. It is used to seal constructions at the base of walls waterproofed with Volclay panels.

1.3 Quality control is exercised over raw materials, during manufacture and on the final products.

2 Delivery and site handling

2.1 Volclay Type 1 Panels are 1220 mm square and 5 mm thick, each panel weighs approximately 8 kg. The panels are packed horizontally on pallets protected by cardboard wrapping and corner pieces. Each pallet carries 125 panels.

2.2 Coils of Waterstop RX, 25 mm by 19 mm are packaged in cartons. Each carton contains six coils of 5 m length⁽¹⁾, each box weighs 25 kg.

2.3 Bentoseal is supplied in 14.25 litre tubs⁽¹⁾, each tub weighs 18 kg.

2.4 Voltex Granules are supplied in 20 kg bags.

2.5 Volclay Hydrobar Tubes are approximately 610 mm long and 50 mm in diameter. The tubes are packaged in cartons. Each carton contains 16 tubes, each box weighs 25 kg.

2.6 The product and components must be stored in dry conditions, under cover and away from the possibility of damage or premature contact with water. Waterstop RX should also be stored away from direct heat.

(1) Weights and sizes are subject to change, users are advised to consult current manufacturer's literature.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Volclay Type 1 Panel.

3 Use

3.1 Volclay Type 1 Panel is satisfactory for use in waterproofing and damp-proofing underground reinforced concrete structures and is satisfactory for Type A reinforced concrete basement construction grades 2, 3 and 4 as defined in Table 1 of BS 8102 : 1990.

3.2 The system stops the passage of water between the panel and the concrete structure to which it is fixed. The panel must be adequately confined to ensure a watertight seal is achieved in service.

3.3 Waterstop RX is satisfactory for use as a water bar in reinforced concrete construction joints, on Type B constructions as defined in Table 1 of BS 8102 : 1990. It is also used as an accessory in structures waterproofed with Volclay Type 1 Panel.

3.4 Waterstop RX is not designed for use in movement joints.

3.5 The product and components must never remain permanently exposed.

4 Practicability of installation


4.1 The system should only be installed by contractors who have been trained and approved by the Certificate holder.

4.2 The panel is easy to handle and can be cut using a sharp knife.

4.3 Volclay Type 1 Panel may be applied under most normal site conditions, including subzero temperatures, but must not be installed during heavy rainfall.

4.4 Waterstop RX should not be applied during heavy rainfall or where there is free-standing water.

5 Resistance to water and water vapour

 5.1 The system provides an effective barrier to the passage of liquid water and water vapour from the ground.

5.2 A single layer of the panels with lap joints, will provide an effective barrier to the passage of liquid water up to 1 bar. At higher pressures, a double layer of panels, with staggered joints, will be required.

6 Resistance to puncturing

If a dry panel is punctured, provided no bentonite is lost, it will self-heal when hydrated. If bentonite is lost, the waterproofing properties of the panel will be reduced. However, these properties can be restored by applying a layer of Bentoseal or a second layer of panels to the damaged area or by replacement of the damaged panel.


7 Chemical resistance

7.1 The gelling of sodium bentonite is adversely affected by the presence of electrolytes (particularly trivalent ions) and may also be affected by the presence of soluble cations such as those found in chalk or lime soils. In such cases advice should be sought from the Certificate holder.

7.2 The panel is not affected by organic contaminants.

7.3 In chemically-contaminated areas either a double layer of panels is used or the panels are hydrated by deliberate soaking with mains water. In badly contaminated areas both techniques are used.


8 Resistance to loading

 Provided the panel is adequately confined, properly hydrated and not subject to point loading, an installation beneath a foundation slab will transmit dead and imposed loads to the ground safely and without excessive deformation. In situations where point loading is anticipated the Certificate holder's advice should be sought.


9 Resistance to substrate movement

The panels are not bonded to the substrate and can thus accommodate any likely structural movement in service, eg differential settlement or movement at joints.

10 Maintenance

 As the system is confined by the concrete and has suitable durability (see section 11), maintenance is not required.

11 Durability

 A fully-protected Volclay Type 1 Panel, when installed with the appropriate ancillary products, will provide an effective barrier to water and water vapour for the life of the building in which it is incorporated.

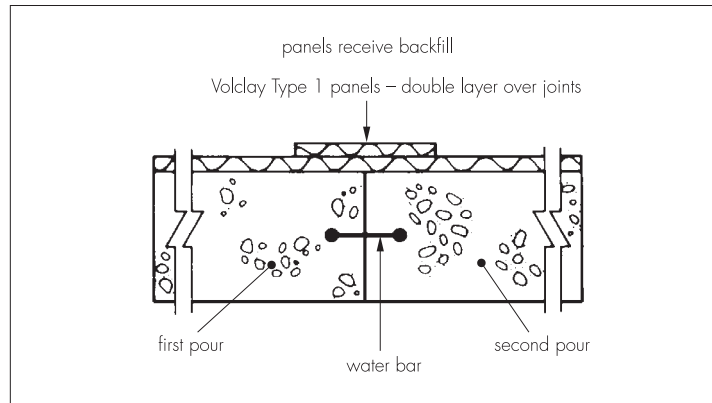
12 General

12.1 Surfaces to be waterproofed need not be clean and may be damp but must be free from cavities, projecting ribs and standing water.

12.2 Panels are cut as necessary to avoid pipes, conduits, ducts or other penetrations, but the continuity of the membrane is maintained by a 25 mm deep trowel application of Bentoseal.

12.3 At joints, Waterstop RX is included in the joint (see sections 13.8 to 13.14) or a proprietary water bar and an extra layer of Volclay Type 1 panels is applied (see Figure 2).

Figure 2 Concrete wall plan — proprietary water bar



13 Procedure

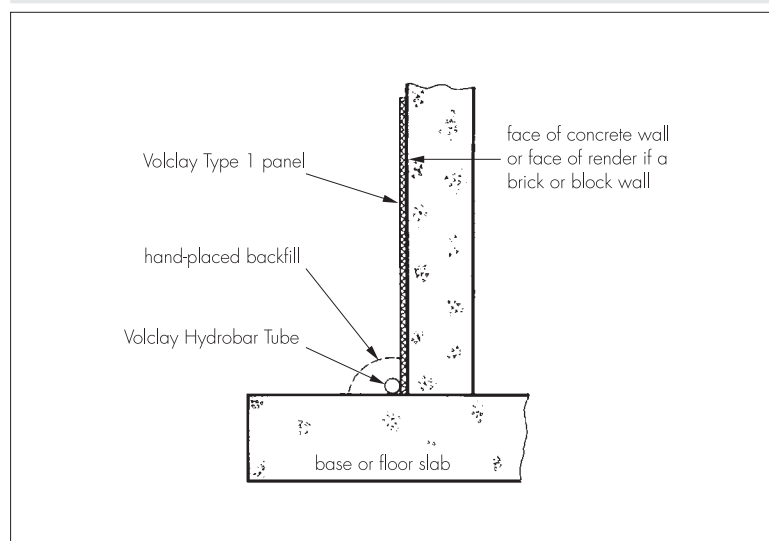
Volclay Type 1 Panel

Vertical surfaces

13.1 Cracks wider than 1 mm and discontinuities are sealed with Bentoseal. Volclay Type 1 panels are then fixed to the foundation wall using hard nails, or are retained in position with backfill. Panels are overlapped up to the marked margin and, at corners, panels are bent along the line of the flutes. Where cut across the flutes, panels are wetted along the cut to prevent sodium bentonite loss.

13.2 A second course of Volclay Type 1 panels is installed, overlapping the first, with the joints staggered. When panels are not used under the structure, Hydrobar tubes are then laid at the base of the wall in accordance with the Certificate holder's instructions (see Figure 3). Any discontinuities present in the membrane are sealed with a trowel application of Bentoseal.

Figure 3 Volclay Hydrobar Tube installation details



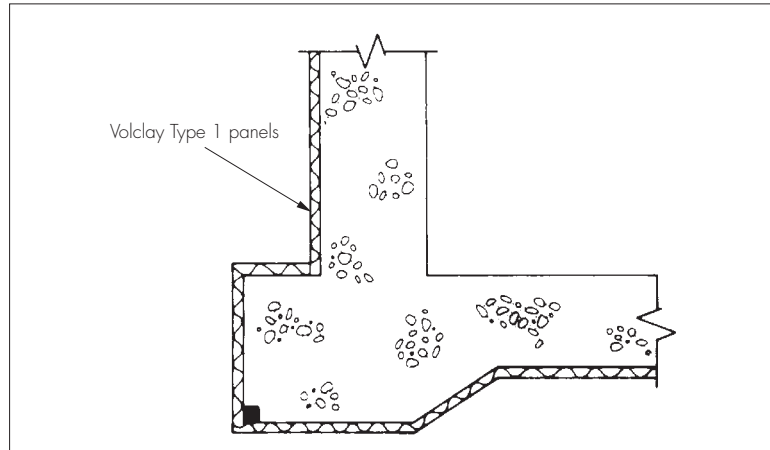
13.3 Normally, backfill is applied immediately. A bead of backfill is tamped over the Volclay Hydrobar Tube at the base and the backfill is applied and compacted to at least 85% Modified Proctor, to within 50 mm of the panels' edge. Backfill must be well-graded, rounded material, not exceeding 50 mm and must be free from angular broken material; otherwise panels must be protected by boards. If backfill cannot be applied immediately, Volclay Type 1 panels are protected against rainfall by polythene sheet. Panels damaged mechanically or by wetting are replaced before backfilling.

13.4 After backfilling, the application of Volclay Type 1 panels is continued. Panels must not be installed above the intended final ground level. The installation is completed with a flashing (or other technique).

Beneath the base of structures designed to resist hydrostatic pressure

13.5 The substrate is levelled and finished with a blinding of either 100 mm granular material or 50 mm concrete. Type 1 panels are laid, overlapping, with successive rows staggered. Volclay Type 1 panels may be protected from rainwater during installation with polythene sheet. Care is taken to avoid damage to the panels when the slab is poured and vibrated. A blinding screed is applied where heavy reinforcement is to be placed. Particular attention is necessary to ensure continuity of protection at junctions with walls (see Figure 4).

Figure 4 Hydrostatic structure



13.6 The concrete slab to be poured should have a minimum thickness of 150 mm.

On roofs of underground structures (tunnels, reservoirs, etc)

13.7 Volclay Type 1 panels are overlapped, nailed in position, and covered with compacted earth, sand or gravel (maximum aggregate size 18 mm) with a minimum depth of 450 mm (if trafficking is not envisaged, a 300 mm depth of cover is adequate).

Waterstop RX

Surface preparation

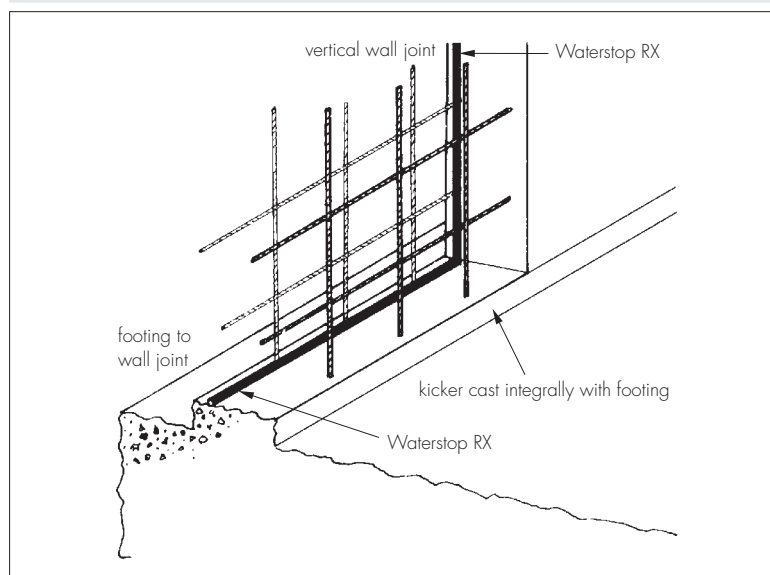
13.8 Joint surfaces should be clean, dry and free from cavities and spalling. Any irregularities in the surface do not normally need to be filled. If required, these can be filled with a suitable strength cement grout or mortar while the concrete is still green, and made smooth.

13.9 Waterstop RX is positioned in the centre of the reinforced concrete construction joint, ensuring that a minimum of 75 mm concrete cover is provided to all sides of the product.

Installation

13.10 A strip of Waterstop RX is uncoiled and placed in position leaving the release paper temporarily intact so it can be pushed firmly in place into any undulations in the concrete surface (see Figure 5). Once sufficient product is positioned, the release paper is removed.

Figure 5 Waterstop RX installation details



13.11 Continuity of consecutive strips is maintained by butt jointing.

13.12 To prevent movement during concrete placement, the strips of Waterstop RX are covered by placing Revofix mesh over the product. The successive lengths of mesh are overlapped and fixed using nails at each overlap and at a spacing of approximately 300 mm in between.

Swelling

13.13 If the material exhibits considerable swelling prior to confinement in the joint, it must be replaced with new material.

Concrete casting

13.14 Casting of retaining walls and floor slabs is carried out immediately after fixing Waterstop RX in position.

Technical Investigations

14 Tests

Volclay Type 1 Panel

14.1 The following tests were carried out as part of the assessment resulting in the issue of the previous Certificate 83/1081:

- a trial installation was built using the Volclay system and observations were made of the ease of installation at corners, laps and around obstructions, and the rate and pattern of water penetration
- tests were conducted to determine the resistance to electrolytes.

14.2 A trial installation was built and observations were made of the ease of installation at corners, laps and around obstructions, and the rate and pattern of water penetration

Volclay Hydrobar Tubes

14.3 Volclay Hydrobar Tubes were included as part of a trial installation and rate of water penetration test conducted on Volclay panels.

14.4 An assessment was made on Volclay Hydrobar Tubes and Voltex Granules, using relevant data from the previous assessments.

15 Investigations

15.1 The following investigations were carried out as a part of the assessment resulting in the issue of the previous Certificate 83/1081:

- the manufacturing process was examined, and the raw material specifications and quality control procedures established
- an assessment was made of reports from English, American and German sources, concerning environmental cycling, resistance to damage, resistance to hydrostatic pressure, pressure caused by hydration, effect of electrolytes, and durability
- a visit was made to a site in progress.

15.2 As part of the assessment resulting in the issue of this Certificate a survey of contractors was conducted to assess the product's performance in use and a re-examination was made of data and investigations on which the previous Certificate was based. The conclusions drawn from the original data remain valid.

15.3 A test was conducted by Hatfield Polytechnic, under the BBA's supervision, to determine the water vapour resistance of a Volclay Type 1 panel on a 150 mm concrete structure.

15.4 No failure of the product in use has been reported to the BBA.

15.5 Regular factory inspections have been carried out to ensure that quality is being maintained.

Bibliography

BS 8102 : 1990 *Code of practice for protection of structures against water from the ground*

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.