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**Agrément
Certificate
No 93/2888**

*Fifth issue**

Designated by Government
to issue
European Technical
Approvals

EVERDURE CALTITE SYSTEM

Additif pour béton imperméable
Beimischung zur Beton Wasserdichtung

Product



- *THIS CERTIFICATE RELATES TO THE EVERDURE CALTITE SYSTEM, A TWO-COMPONENT SYSTEM INCORPORATING A HYDROPHOBIC AND A PORE-BLOCKING INGREDIENT TO PROVIDE WATERTIGHT CONCRETE WITH ENHANCED DURABILITY AND IMPROVED PROTECTION AGAINST REINFORCEMENT CORROSION.*

- *The system comprises a water reducing superplasticiser and a separate component to provide hydrophobicity to the densified matrix together with a pore blocking ingredient.*

Regulations

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



In the opinion of the BBA, the use of the Everdure Caltite System, is not subject to these Regulations.

2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, the use of the Everdure Caltite System, is not subject to these Regulations.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, the use of the Everdure Caltite System, is not subject to these Regulations.

continued

continued

- When used in accordance with this Certificate the system has no detrimental effects on the properties of the concrete.

- The system can provide watertight concrete for basements, swimming pools, roofs, tunnels and similar structures.

- The products comply with the requirement of BS EN 934-2 : 2001 and the product packaging carries CE Marking, accordingly.

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections:

6 Delivery and site handling (6.1 and 6.3), and 14 Placing (14.2).

Technical Specification

5 Description

5.1 The Everdure Caltite System comprises two components, Superplastet (either SR or F) and Everdure Caltite, and is used for producing watertight and damp-proof concrete.

5.2 The Superplastet SR component is a liquid admixture⁽¹⁾ that significantly reduces the water/cement ratio of the mix while enhancing the workability of the concrete.

5.3 Superplastet F⁽¹⁾ is used when a very low water/cement ratio is required for higher early strength concrete.

(1) Conforming to the requirements BS EN 934-2 : 2001, Tables 3.1 and 3.2.

5.4 The Everdure Caltite component is an aqueous, hydrophobic liquid that provides waterproofing, pore-blocking and enhanced durability properties to concrete in which it is incorporated.

5.5 Both components are produced by a batch blending process. Quality control is exercised over raw materials, during production and on the final products.

6 Delivery and site handling

6.1 The products are delivered to site either in 210 litre drums or by bulk tanker. Drums are stencilled with the relevant product details and the batch number. A label containing the BBA identification mark incorporating the number of this Certificate is attached to the drum. A copy of each material's Safety Data Sheet accompanies the delivery.

6.2 The components are not flammable. They should be stored protected from frost.

6.3 The component items of the system are classified as non-hazardous, but Caltite has a pH value of 10 to 11 and may evolve ammonia. Overalls and gloves should be worn when handling the products and contact to the eyes should be avoided.

Design Data

7 General

7.1 Concrete containing the Everdure Caltite System can be designed in accordance with BS EN 206-1 : 2000 and BS 8500-2 : 2002 for use in all normal concreting methods, including precast, pre-stressed, post-tensioned, ready-mixed, reinforced, slip formed and pumped concrete.

7.2 The system produces concrete with enhanced durability and improved protection against reinforcement corrosion by:

- minimising the water/cement ratio of the concrete mix resulting in the reduction of the capillary network of the cured concrete, and
- providing a hydrophobic matrix and physical pore-blocking action that protects resulting concrete against water ingress via absorption and hydrostatic pressure.

7.3 The use of the system will produce a concrete with the following properties relative to a control:

- reduced porosity
- reduced permeability
- increased water resistance
- increased corrosion resistance.

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7.4 The concrete can be used in basements, roofs, swimming pools, tunnels, culverts and similar structures without the requirement for additional applied protection. Where exposure to aggressive soil conditions or chemicals is anticipated, a full assessment of the site should be made. In these situations the Certificate holder should be consulted on the suitability of the product.

8 Construction

8.1 Structures built incorporating the system should be designed to the relevant sections of BS 8007 : 1987, BS 8102 : 1990, BS 8110-1 : 1997, BS EN 1992-1-1 : 2004 and BS EN 1992-1-2 : 2004.

8.2 Concrete containing the system is suitable for Type B construction as described in BS 8102 : 1990, and it will be suitable for all grades defined in Table 1 of this Standard. For Grades 3 and 4 (where control of water vapour is required), it will be necessary to provide a mix with a sufficiently low vapour permeability in combination with an adequate section thickness (see sections 12.7 to 12.9).

8.3 Basements for dwellings should be designed in accordance with the guidance given in the Approved Document, *Basement for dwellings*⁽¹⁾.

(1) Published by the British Cement Association, Document No 48.062.

9 Mix design

9.1 Concrete containing the system prepared on site should be carried out in accordance with BS 8000-2.1 : 1990, the Certificate holder's instructions and this Certificate.

9.2 The system should be added to the concrete mix at the rate of:

Superplastet SR — approximately 1%⁽¹⁾ by weight of cement, litres per cubic metre
(or Superplastet F)

Everdure Caltite — 30 litres per cubic metre of concrete

(1) May be varied between 0.8% and 1.5% by agreement with the Certificate holder.

9.3 The concrete must have a minimum cement content of 335 kgm⁻³ and be batched with a maximum water/cement ratio of 0.45 and to a slump of class S2 or S3. Further details of suitable mixes can be obtained from the Certificate holder or their approved representatives.

10 Fresh concrete properties

Workability

10.1 Concretes produced using the Everdure Caltite System will, if designed as described in section 9 of this Certificate, have a markedly increased workability compared with similar plain concretes. Workability of the concrete is a function of the dosage rate of the Superplastet component

and can be designed by variation of this component (within the limits of section 9.1). The advice of the Certificate holder should be sought in particular cases.

Compatibility

10.2 Concretes containing the Everdure Caltite System are compatible with other hardened Portland cement concretes (including pulverized-fuel ash, ground granulated blastfurnace slag, or silica fume blends).

10.3 When adhesion to hardened concrete containing the product is required, a bonding agent is necessary. The Certificate holder should be contacted for details in particular cases.

10.4 Use of the system with an air-entraining agent is not covered by this Certificate.

11 Setting and hardening properties

11.1 The effect of the system on these properties, for a specific mix and site conditions may be evaluated through site trials prior to use.

11.2 Concrete containing the system has a reduced tendency to bleed and segregate compared with plain concrete. Site evidence confirms a significant reduction in drying shrinkage (see Table 1).

12 Hardened concrete properties

General

12.1 The effects of the system on the properties of concrete are given in Table 1.

Table 1 Effects of Everdure Caltite on concrete (typical laboratory results)

Property	Test reference	Control concrete	Everdure Caltite concrete
Water absorption (%)	BS 1881-5	3.1	0.8
Water permeability (ms ⁻¹)			
0-50 mm	Taywood/Valenta	2.23 x 10 ⁻¹²	1.14 x 10 ⁻¹²
50-100 mm		1.43 x 10 ⁻¹²	0.15 x 10 ⁻¹²
Drying shrinkage (%)	BS 1881-5	0.036	0.024
Wetting expansion (%)	BS 1881-5	0.020	0.007
Freeze/thaw expansion (%)	BS 5075-2	0.031	0.010
Initial surface absorption test (ISAT) (mlm ⁻² s ⁻¹)	BS 1881-5		
10 mins		0.50	0.11
30 mins		0.25	0.08
60 mins		0.16	0.04
120 mins		0.10	0.02

12.2 Treated concrete is subject to distinctly reduced cracking.

Drying shrinkage and wetting expansion

12.3 The drying shrinkage and wetting expansion of concrete containing the system shows a reduction compared to that of an equivalent plain concrete.

Resistance to leaching

12.4 Use of the system will reduce the leaching of lime from the hydrated cement in the concrete. Inspected sites and investigation of Everdure Caltite concrete up to 30 years old show no evidence of the active ingredients of the system within the concrete leaching out.

Potable water

12.5 The system is suitable for use in contact with potable water and has been approved for this use under the Water Regulations Advisory Scheme.

Water penetration

12.6 Concrete containing the system has significantly greater resistance to water penetration than equivalent plain concretes (see Table 1).

Water vapour permeability

12.7 Concrete containing the system has a significantly lower permeability to water vapour than the equivalent plain concrete.

12.8 The water vapour permeability of concrete is strongly dependent on the exact mix design. Concrete made with a high water/cement ratio can have a water vapour permeability above $3000 \times 10^{-12} \text{ gm(Ns)}^{-1}$.

12.9 The appropriate thickness for concrete with a specific permeability to achieve a water vapour resistance of 200 MNsg^{-1} or 550 MNsg^{-1} (suitable for grades 3 and 4 respectively of BS 8102 : 1990) is given by:

For 200 MNsg^{-1}

$$t = 0.2 \times 10^{12} \times p$$

For 550 MNsg^{-1}

$$t = 0.55 \times 10^{12} \times p$$

where t = concrete thickness, mm

and p = water vapour permeability in gm(Ns)^{-1} (from BS 3177 : 1959 test).

Water absorption

12.10 Concrete containing the system has greater resistance to water absorption than equivalent plain concrete.

Reinforcement protection

12.11 The high alkalinity ($\text{pH} > 13$) of concrete necessary to prevent corrosion of the reinforcement is maintained in Everdure Caltite concrete.

12.12 Corrosion of reinforcement is normally caused by the ingress of chloride to the steel or by the reduction in alkalinity of the concrete by the diffusion of carbon dioxide. These processes lead to the breakdown of the steel's corrosion-protective passive layer. The reduced permeability of concrete containing the system slows down diffusion of aggressive agents into the concrete and confers improved protection against corrosion. Data from aggressive sites indicate no significant

decrease in corrosion protection over a 30-year period.

Carbonation resistance

12.13 Concrete containing the system has a greater resistance to carbon dioxide diffusion than an equivalent plain concrete due to its reduced permeability.

Frost resistance

12.14 Everdure Caltite concrete has a greater freeze/thaw resistance than equivalent plain concrete.

Sulphate resistance

12.15 The lower permeability of concrete containing the system will reduce the ingress of sulphates. However, if sulphate-resistant concrete is required the advice of the Certificate holder should be sought.

Alkali silica reaction (ASR)

12.16 Concrete containing the system should be designed according to the BS EN 206-1 : 2000, Section 5.2.3.4 and BS 8500-2 : 2002, Section 5.2.1.

12.17 Petrographic analysis of concrete containing a known reactive aggregate showed no reaction in concrete containing the Everdure Caltite System when subject to wetting and drying cycling, while other data referring to similar reference concretes indicated ASR was occurring.

13 Durability

Concrete containing the system is more durable than equivalent plain concrete. Data and site observations indicate no significant decrease in performance over a 30-year period.

Installation

14 Placing

14.1 All aspects of installation of the Everdure Caltite System including choice of plant, machinery and small-scale site batch mixing, must be carried out in accordance with BS 8000-2.2 : 1990 the Certificate holder's instructions and this Certificate.

14.2 Concrete containing the system should not be placed in temperatures of 5°C or below unless special precautions are adopted (the advice of the Certificate holder should be sought in such cases).

14.3 Concrete containing the system should be properly placed and fully compacted.

14.4 Concrete containing the system should be placed in the same way as plain concrete, in accordance with the Certificate holder's health and safety guidance and the normal routine precautions for handling concrete. Since ammonia may be evolved from fresh concrete containing the product,

a breathing mask and goggles should be worn if placing in very confined or poorly ventilated areas.

15 Curing

The concrete should be cured strictly in accordance with BS 8110-1 : 1997 and in accordance with the Certificate holder's recommendations where site specific information exists.

16 Joints

16.1 Joints should be designed with waterstops as recommended in BS 8102 : 1990, to maintain watertightness of the whole structure. The advice of the Certificate holder should be sought on particular applications.

16.2 Penetrations of the concrete, such as pipe entries or formwork ties, must also be securely sealed to maintain watertightness. The advice of the Certificate holder should be sought on suitable systems.

17 Finishes

When water-based products are used to coat the Everdure Caltite concrete, a bonding agent may be needed. For specific cases, advice should be sought from the Certificate holder.

Technical Investigations

The following is a summary of the technical investigations carried out on the Everdure Caltite System.

18 Tests

Tests were carried out by the BBA to determine:

- characterisation tests on the system components including specific gravities, differential thermal analysis and gas chromatography
- comparative workability of fresh concrete
- compressive strength of cured concrete, and
- slip resistance of cured concrete.

19 Investigations

19.1 Data relating to the following aspects of the Everdure Caltite System concrete were examined and assessed:

- mix designs
- curing regime
- toxicity
- setting and hardening concrete characteristics (including setting time, bleeding, heat of reaction, curing and plastic shrinkage)
- hardened concrete characteristics (including density, colour, compressive strength, modulus of elasticity, drying shrinkage/wetting expansion, thermal shock resistance, tensile strength, porosity, pore distribution, bond strength to steel, permeability, resistance to carbonation, sulphate attack, chlorides, acid, freeze/thaw, water penetration and leaching, and water vapour permeability)
- requirements for surface finishes
- maintenance and repair requirements.

19.2 Visits were made to sites where installation of the system was taking place.

19.3 Visits were made to a number of sites where the product has been in service for some time.

19.4 Cementaid (UK) Limited's methods of technical support to clients were observed and assessed.

Bibliography

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

BS 1881-5 : 1970 *Testing concrete — Methods of testing hardened concrete for other than strength*

BS 5075-2 : 1982 *Concrete admixtures — Specification for air-entraining admixtures*

BS 8000-2.1 : 1990 *Workmanship on building sites — Code of practice for concrete work — Mixing and transporting concrete*

BS 8000-2.2 : 1990 *Workmanship on building sites — Code of practice for concrete work — Sitework with in-situ and precast concrete*

BS 8007 : 1987 *Code of practice for design of concrete structures for retaining aqueous liquids*

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

BS 8110-1 : 1997 *Structural use of concrete — Code of practice for design and construction*

BS 8500-2 : 2002 *Concrete — Complementary British Standard to BS EN 206-1 — Specification for constituent materials and concrete*

BS EN 206-1 : 2000 *Concrete — Specification, performance, production and conformity*

BS EN 934-2 : 2001 *Admixtures for concrete, mortar and grout — Concrete admixtures — Definitions and requirements, conformity, marking and labelling*

BS EN 1992-1-1 : 2004 *Eurocode 2 : Design of concrete structures. General rules and rules for buildings*

BS EN 1992-1-2 : 2004 *Eurocode 2 : Design of concrete structures. General rules and rules for buildings. Structural fire design*

BS EN 12350-2 : 2000 *Testing fresh concrete — Slump test*

Conditions of Certification

20 Conditions

20.1 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.

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

20.3 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.

20.4 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
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

20.5 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, use 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 or in the future; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any present or future 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.



In the opinion of the British Board of Agrément, the Everdure Caltite System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 93/2888 is accordingly awarded to Cementaid (UK) Limited.

On behalf of the British Board of Agrément

Date of Fifth issue: 16th June 2006

Chief Executive

**Original Certificate issued 9th March 1993. This amended version includes change of company address, revised minimum cement content, revised national Building Regulations and Building Standards and new Conditions of Certification.*

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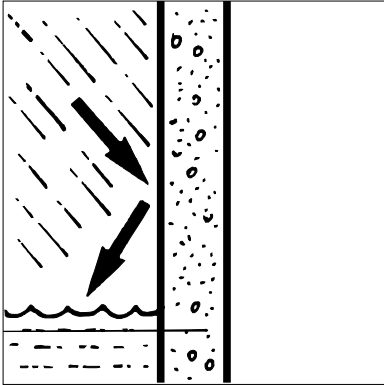


For technical or additional information,
contact the Certificate holder (see
front page).
For information about the Agrément
Certificate, including validity and
scope, tel: Hotline 01923 665400,
or check the BBA website.



**EVERDURE CALTITE SYSTEM
(BBA CERTIFICATE No 93/2888)
IRISH BUILDING REGULATIONS STATEMENT**

Second issue*



- THIS STATEMENT RELATES TO THE EVERDURE CALTITE SYSTEM AND SETS OUT THE OPINION OF THE BBA ON THE POSITION OF THE PRODUCT UNDER THE BUILDING REGULATIONS IN THE REPUBLIC OF IRELAND.
- It must be read in conjunction with BBA Certificate No 93/2888.
- It will remain valid provided BBA Certificate No 93/2888 is valid.

The Building Regulations 1997–2002 (Ireland)

In the opinion of the BBA, the Everdure Caltite System, is not subject to these Regulations.

On behalf of the British Board of Agrément

Date of Second issue: 30th June 2006

Chief Executive

*Original Statement issued 19th April 2002.