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**Agrément
Certificate
No 92/2837**
Fourth issue*

Designated by Government
to issue
European Technical
Approvals

FLEXCRETE CONCRETE REPAIR AND PROTECTION SYSTEM

Système pour la réparation du béton renforcé
Stahlbetonsanierungssystem

Product




• THIS CERTIFICATE RELATES TO THE FLEXCRETE CONCRETE REPAIR AND PROTECTION SYSTEM, A PRE-BATCHED, MULTI-COMPONENT SYSTEM BASED ON POLYMER, MICROSILICA AND FIBRE MODIFIED PORTLAND CEMENT MORTARS AND RESIN-RICH COATINGS.

- The system is for use in repairing untrafficked concrete damaged by reinforcement corrosion, impact or abrasion.
- It is essential that diagnosis, preparation and repair are carried out in accordance with the stipulations of the Design Data and Installation parts of this Certificate.

Regulations

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

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of concrete repair systems with the Building Regulations. In the opinion of the BBA, there are no requirements in the Regulations relating to the use of the Flexcrete Concrete Repair and Protection System in accordance with this Certificate; however, the following comments apply.

Requirement: A1	Loading
Requirement: A2	Ground movement
Requirement: A3	Disproportionate collapse
Comment:	The application of this system will not adversely affect the existing building in relation to compliance with these Requirements. See sections 9.1 to 9.4 of this Certificate.
Requirement: B4(1)	External fire spread
Comment:	The application of the system will not adversely affect the existing building in relation to compliance with the fire spread component of this Requirement. See sections 10.1 to 10.4 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The component products are acceptable materials. See sections 21.1 to 21.3 of this Certificate.

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2 The Building Standards (Scotland) Regulations 1990 (as amended)



In the opinion of the BBA, the Flexcrete Concrete Repair and Protection System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation:	10	Fitness of materials and workmanship
Standard:	B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:		The component products are acceptable materials. See sections 21.1 to 21.3 of this Certificate.
Regulation:	11	Structure
Standard:	C2.1	Stability
Standard:	C3.1	Disproportionate collapse
Comment:		The application of the systems will not adversely affect the existing building in relation to compliance with these Standards. See sections 9.1 to 9.4 of this Certificate.
Regulation:	12	Structural fire precautions
Standard:	D2.3	Structural protection — Non-combustible materials
Standard:	D10.1	Fire spread on an external wall
Comment:		The system is unrestricted by these Standards. See sections 10.1 to 10.4 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, the Flexcrete Concrete Repair and Protection System, if used in accordance with this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The component products are acceptable materials. See sections 21.1 to 21.3 of this Certificate.
Regulation:	D1	Stability
Regulation:	D2	Disproportionate collapse
Comment:		The application of the systems will not adversely affect the existing building in relation to compliance with these Regulations. See sections 9.1 to 9.4 of this Certificate.
Regulation:	E5	External fire spread
Comment:		The system is unrestricted under this Regulation. See sections 10.1 to 10.4 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

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

See section: *6 Delivery and site handling (6.1 and 6.4).*

Technical Specification

5 Description

5.1 The Flexcrete Concrete Repair and Protection System comprises:

Steel Reinforcement Protector 841 — a two-component, polymer modified, cementitious coating

Bonding Bridge 842 — a two-component, polymer modified, cementitious bonding aid

Marine Mortar S — a two-component, high-build, polymer modified, cementitious repair mortar

Marine Mortar HD — a three-component, thixotropic, high-build, polymer modified, cementitious repair mortar

Cementitious Coating 851 — a two-component, thixotropic, polymer modified, cementitious waterproofing and protective coating, available in grey or white

Monomix — a single-component, low density, high-build, polymer modified, cementitious repair mortar

Fastfill — a single-component, rapid hardening and rapid setting, polymer modified Portland cement repair mortar

Curing Membrane SB — a single-component, non-degrading acrylic resin, overcoatable curing compound

Bonding Primer — a two-component, water-based bonding primer

Decadex — a high performance, water-based, protective and decorative coating

Monolastex Smooth — a water-based, protective and decorative coating.

5.2 All components are manufactured under quality control procedures that include testing of basic materials and final products. A batch numbering system ensures traceability of production.

6 Delivery and site handling

6.1 The products are delivered to site in packaging and weights given in Table 1.

Table 1 Packaging and weights

Component	Weight	Package type
Steel Reinforcement Protector 841	5 kg	composite packs
Bonding Bridge 842	4 kg	composite packs
Marine Mortar S	30 kg	composite packs
Marine Mortar HD	30 kg	composite packs
Cementitious Coating 851	25 kg	composite packs
Monomix	25 kg	packs
Fastfill	25 kg	packs
Curing Membrane SB	25 litre	containers
Bonding Primer	5 litre	composite packs
Decadex	15 litre	containers
Monolastex Smooth	15 litre	containers

6.2 All components should be stored in a clean, dry place and protected from frost.

6.3 Details of the shelf-life of components can be obtained from the Certificate holder.

6.4 When handling the products on site, the normal health and safety procedures associated with cementitious materials should be observed.

Design Data

7 General

Flexcrete Concrete Repair and Protection System is suitable for use in repairing untrafficked concrete damaged by reinforcement corrosion impact or abrasion. It will not adversely affect the existing building in terms of surface spread of flame. The desired extended life of the building should be taken into account when preparing the repair specification. The overall repair situation must always be subject to appraisal by a suitably qualified engineer (see section 22.4).

8 Practicability of installation

The installation of the Flexcrete Concrete Repair and Protection System must be carried out by experienced specialist contractors. It is essential to adhere strictly to the detailed procedures described in this Certificate, the repair specification and the manufacturer's instructions.

9 Strength and stability

9.1 When tested in accordance with BS 4551 : 1980⁽¹⁾, the repair mortars had the 28-day strengths listed in Table 2.

Table 2 28-day strengths⁽¹⁾

Component	Compressive strength (Nmm ⁻²)	Flexural strength (Nmm ⁻²)
Marine Mortar S	67	17
Marine Mortar HD	73	15
Cementitious Coating 851 ⁽²⁾	43	22
Monomix	53	10
Fastfill	64	13

(1) The repair mortars were cured for 7 days under polythene followed by 21 days at 23°C/50% RH.

(2) Based on the grey product, results for the white product were similar.

9.2 The Flexcrete concrete repair mortars have thermal movement and wetting and drying characteristics similar to those of concrete.

9.3 The bond strength of the Flexcrete repair mortars to prepared concrete is similar to that of the cohesive strengths of the mortar and of concrete. An analysis of tests carried out by the BBA indicated no significant loss of bond strength following heat ageing, thermal shock or freeze/thaw cycling.

9.4 When determined in accordance with BS 1881-121 : 1983, the mortars had the static moduli of elasticity given in Table 3.

Table 3 Moduli of elasticity

Component	Static modulus of elasticity (GNm ⁻²)
Marine Mortar S	27.0
Marine Mortar HD	24.0
Monomix	19.5
Fastfill	26.0

10 Behaviour in relation to fire

10.1 When tested in accordance with BS 476-6 : 1989, the Flexcrete repair mortars and protective coatings, when applied to a non-combustible substrate, had the fire propagation indices and sub-indices given in Table 4.

Table 4 Fire propagation indices and sub-indices

Component	Fire propagation index (I)	Sub-indices		
		(i ₁)	(i ₂)	(i ₃)
Marine Mortar S	0.4	0.4	0.0	0.0
Marine Mortar HD	0.2	0.2	0.0	0.0
Monomix	0.9	0.7	0.2	0.0
Fastfill	0.0	0.0	0.0	0.0
Cementitious Coating 851 ⁽¹⁾	4.8	0.3	4.0	0.5
Decadex	7.8	0.4	6.6	0.8
Monolastex Smooth	0.3	0.3	0.0	0.0

(1) Based on the grey product, the white product will be similar.

10.2 When tested in accordance with BS 476-7 : 1987, the Flexcrete repair mortars and protective coatings, when applied to a non-combustible substrate, had Class 1 surfaces.

10.3 The data obtained indicate that the Flexcrete Concrete Repair and Protection System has a Class 0 or low risk surface as defined in the national Building Regulations:

England and Wales

Approved Document B, Appendix A, paragraph 1.2

Scotland

Technical Standards, Part D, Table 3 to (D1.3)

Northern Ireland

Technical Booklet E, section 2.4.

10.4 In situations where the reinstatement of fire protection is of prime importance, further testing or assessment will be necessary.

11 Resistance to liquid water

Tests indicate that water will not readily pass through the protective coatings. Under the conditions likely to be met in service, the coatings will tend to shed water and so considerably reduce the amount of water absorbed by the substrate.

12 Water vapour resistance

An analysis of test data indicates that in the anticipated service conditions the Flexcrete protective coatings will

allow satisfactory transmission of water vapour. The recommended criterion for a water vapour release layer is a maximum of 4 m equivalent air layer (Klopfer).

13 Carbon dioxide resistance

13.1 Test data indicate that the repair mortars provide significant resistance to the transmission of carbon dioxide. Additional protection can be acquired by application of one of the coating protection systems. The recommended criterion for a carbon dioxide resistant layer is a minimum of 50 m equivalent air layer (Klopfer).

13.2 While figures are not available for either Steel Reinforcement Protector 841 or Marine Mortar HD, an analysis of accumulated background data indicates that the performance of each product will be similar to Cementitious Coating 851 and Marine Mortar S, respectively.

13.3 Test data on the resistance to transmission of carbon dioxide of the coatings showed that both Decadex and Monolastex Smooth give increased protection, both initially and after 2000 hours exposure in tests to ASTM G 53-84 (using UV-B 313 lamps and 4 hours UV at 50°C with 4 hours condensation at 40°C). In similar initial tests, Cementitious Coating 851 provided significant resistance to the transmission of carbon dioxide.

14 Oxygen resistance

Test data indicate that the repair mortars provide good resistance to the transmission of oxygen and have oxygen diffusion coefficients for layer thicknesses as detailed in Table 5.

Table 5 Oxygen diffusion coefficients

Component	Oxygen diffusion coefficient ⁽¹⁾ (cm ² s ⁻¹)	Method
Steel Reinforcement Protector 841	52.4 × 10 ⁻⁶⁽²⁾	Diffusion cell
Cementitious Coating 851 ⁽⁴⁾	58.3 × 10 ⁻⁶⁽³⁾	Diffusion cell
Monomix	272 × 10 ⁻⁶	Diffusion cell

(1) Typical values through average permeability concrete at 28 days, conditioned at 55% relative humidity, are 500 × 10⁻⁶ to 5000 × 10⁻⁶ (ref: Concrete Society Technical Report No 31 *Permeability testing of site concrete — a review of methods and experience*).

(2) Due to the nature of this material, the layer thickness was for a composite of coated stainless steel wire mesh.

(3) Due to the nature of this material, the layer was applied in two coats to porous plates.

(4) Based on the grey product, the white product will be similar.

15 Chloride ion diffusivity

Test data indicate that Cementitious Coating 851 and Monomix provide adequate resistance to the transmission of chloride ions. Data is not available for Marine Mortar S, Marine Mortar HD and Fastfill. However, it is the opinion of the BBA that the repair mortars' performance characteristics will be similar to the tested products. Additional protection can be acquired by application of one of the coating protection systems.

16 Freeze/thaw resistance

16.1 As the surface coating reduces the availability of water, the Flexcrete Concrete Repair and Protection System, will have improved resistance to frost attack compared to that of the original concrete.

16.2 Tests carried out by the BBA, and other independent test data examined, indicate that the mortar

components of the Flexcrete Concrete Repair and Protection System have improved resistance to frost attack compared to that of a control concrete.

17 Resistance to thermal shock

An analysis of test results indicates that the repair system can resist the effects of thermal shock under the conditions likely to be met in service.

18 Protection of reinforcing steel against corrosion

Steel Reinforcement Protector 841 will provide a protective environment for reinforcing steel. The repair mortars and protective coatings resist carbon dioxide penetration and also reduce the availability of water in both the repair and parent concrete, so restricting the ingress of sulphate and chloride ions. Thus the Flexcrete Concrete Repair and Protection System, will protect the reinforcing steel against corrosion.

19 Movement and cracking

Tests carried out by the BBA indicate that the protective coatings will retain adequate flexibility under normal weathering conditions and will resist movement of the substrate resulting from anticipated service conditions of temperature and moisture variation. However, they are unlikely to resist movement of existing visible cracks in the substrate, and those occurring during its service life. Advice with regard to reinforcement to help relieve the situation should be sought from the Certificate holder. Reference should also be made to the recommendations under section 20 of this Certificate.

20 Maintenance

20.1 Since the protective function of the system is dependent on its integrity, provision should be made for periodic examination for local damage or defects. Early rectification of such flaws should be carried out using the relevant materials and techniques indicated in this Certificate.

20.2 Maintenance painting should be carried out to maintain protection and appearance when required, using the relevant materials and techniques indicated in this Certificate.

21 Durability



21.1 The cementitious components are durable and will extend the life of the repaired elements.

21.2 The coating components under normal conditions will perform their function as protective surface coatings, for a period of at least 10 years.

21.3 The Monolastex Smooth coating component under normal conditions will perform its function as a protective surface coating for a period of at least 15 years.

21.4 The coating components under normal conditions will perform their functions as decorative surface coatings with good colour stability for a period of at least 10 years.

21.5 The Monolastex Smooth coating component will perform its function as a decorative surface coating, with good colour stability, for a period of at least 15 years.

21.6 If during the diagnosis (see section 22.3) levels of chloride are detected which, under the scheme given in Table 4 of BRE Digest 444, *Corrosion of steel in concrete Part 2 Investigation and assessment*, would

give more than a low risk of reinforcement corrosion then further maintenance or repair may subsequently be required.

21.7 In laboratory tests the resistance to algal growth of Decadex was found to be limited. However, no evidence of algal growth was found on existing sites examined by the BBA.

Installation

22 Diagnosis and specification

22.1 Diagnosis should be carried out by suitably experienced and qualified personnel in accordance with the recommendations of Flexcrete Limited and current professional practice. Attention is also drawn to the advice on diagnosis contained in the Concrete Society Technical Report No 26 *Repair of concrete damaged by reinforcement corrosion* and BRE Digest 444.

22.2 An initial survey of the whole of the damaged structure should be carried out, with reference to the original plans if available, to establish suitable methods of testing and test locations. Possibly relevant factors such as the direction of the prevailing wind and the proximity of industrial plants should be noted.

22.3 A full diagnostic survey should follow using appropriate techniques to establish the cause or causes of the damage and the full extent of the damage and contamination. This may include chemical testing and petrographic examination of core samples.

22.4 The results of these tests must be interpreted by a suitably experienced and qualified engineer who must determine the extent of the damage and structural implications and ensure that areas of latent damage are identified. In particular, when repairing loadbearing elements, the engineer must identify those situations where the load must be supported before removing concrete. In addition he should include the suitability of the extent to which the repair mortar will carry structural loads in specific situations; the Certificate holder should be consulted if necessary.

22.5 A full repair specification should be prepared using suitably qualified and experienced personnel on the basis of the survey and diagnosis. For advice on the preparation of a specification and the associated Bills of Materials the Certificate holder should be consulted. Advice is also given in Concrete Society Technical Report No 38 *Patch Repair of Reinforced Concrete — subject to reinforcement corrosion. Model specification and Method of Measurement*.

23 Preparation

23.1 The concrete surface should be cleaned in accordance with the instructions of the Certificate holder and loading supports should be installed where required (see section 22.4). All damaged concrete identified during the survey should be removed back to sound concrete (see section 23.2). Areas to be repaired should be cut back at the edges to avoid feather-edging of the repairs.

23.2 Steel reinforcement should be exposed beyond its corroding length. Concrete should be removed from around corroding reinforcement only with the approval of the engineer responsible for the repair work.

23.3 Where cover to the steel reinforcement is low or absent, the recommendations of the engineer should be obtained with regard to the establishment of requisite

reinforcement necessary to maintain the structural and protective characteristics.

23.4 Exposed steel reinforcement should be thoroughly cleaned by abrasive blasting or, on certain thin sections, by the use of appropriate abrasive tools.

23.5 The preparation carried out as described in sections 23.1 to 23.4 should be ratified by the engineer responsible before repairs are conducted. Reference should be made to the relevant information contained in the Concrete Society Technical Report No 26 and BRE Digest 444.

24 Mixing

24.1 All the component products which comprise the Flexcrete Concrete Repair and Protection System should be mixed in accordance with the Certificate holder's instructions, and as described in sections 24.2 to 24.1.1 of this Certificate.

Steel Reinforcement Protector 841

24.2 Component A should be placed into a suitable mixing container and the corresponding quantity of Component B added (mixing ratio Component B: Component A is 3:1 by volume or 4:1 by weight). Mixing should be carried out for two to three minutes either by hand for small amounts or by using a low-speed, hand-held electric drill, fitted with a helical paddle for larger amounts (care must be taken to avoid aeration). The mix should be smooth and have a brushable, barely-dripping consistency. It may be adjusted by the addition of either of the two components.

Bonding Bridge 842

24.3 Component A should be shaken before half is added to a suitable container. Component B should be added slowly, while mixing with a low-speed, hand-held electric drill, fitted with a helical paddle. When homogeneous, the remainder of Component A should be added and mixing continued for two to three minutes to produce a smooth, thin-slurry consistency. Smaller amounts may be produced by using the measuring kit provided and mixing by hand.

Marine Mortar S

24.4 Mixing should take place in a forced action pan mixer or in a clean drum using a low-speed, hand-held electric drill, fitted with a helical paddle (a normal concrete mixer is not suitable). Component A should be shaken before pouring approximately half into the mixing vessel. Component B should then be added slowly, while mixing, and when homogeneous the remainder of Component A should be added, the mixing being continued. Mixing should normally take between two and three minutes, depending on the type of mixer, and care should be taken to avoid aeration.

Marine Mortar HD

24.5 Mixing should be as detailed in section 24.4. However, it should be noted that both Components B and C should be added slowly to Component A.

Cementitious Coating 851 (white or grey)

24.6 The modules must be mechanically mixed using a low-speed, hand-held electric drill, fitted with a helical paddle specially designed to entrap as little air as possible. One of the bottles marked Part A should be shaken before pouring approximately half into a suitable container. One of the packs marked Part B should then be added slowly, while mixing, and when homogeneous the remainder of the Part A bottle should be added. The

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mixing should be continued for a minimum of five minutes. This process may be repeated with the second containers of Parts A and B provided.

Monomix

24.7 Monomix should be mechanically mixed in a forced action pan mixer or in a clean drum, using a low-speed, hand-held electric drill, fitted with a helical paddle. For normal applications, a 25 kg bag should be added slowly to 3.5 litres of clean water and mixed until a uniform desired consistency is reached (normally two minutes), care being taken to avoid aeration.

Fastfill

24.8 The type of mixing equipment is as detailed in section 27.8. However, it should be noted that for normal applications a 25 kg bag should be added slowly to 3.5 litres of clean water and mixed until a uniform desired consistency is reached (normally one minute), care being taken to avoid aeration.

Curing Membrane SB

24.9 The product is supplied ready for use.

Bonding Primer

24.10 Mixing should be carried out by adding Component Part B into the Component Part A container, the composite being stirred until it is of a uniform non-streaky colour. Packs may be hand mixed with a flat stick.

Monolastex Smooth and Decadex

24.11 The coatings are supplied ready for use; however, they should be stirred immediately before application.

25 Application

General

25.1 Application must not take place in temperatures of 5°C or below. The coating protection system must not be applied in wet weather and freshly coated work should be protected from rain. The protective performance depends on achieving full integrity of the components. Care must be taken to achieve even and uniform coatings free from defects. At each stage of a repair, curing must be carried out correctly to prevent the occurrence of associated problems (including plastic shrinkage cracking).

Priming

25.2 The Steel Reinforcement Protector 841 should be applied to the cleaned reinforcing bars by brush, as soon as possible, to a thickness of approximately 1 mm. This must be carried out within a maximum of 24 hours. To ensure total protection, a second coat approximately 1 mm thick should be applied before the first coat is fully set, typically within 30 to 90 minutes depending on temperature.

25.3 The surrounding concrete substrate should be free from all unsound material such as dust, oil, grease, corrosion by-products, organic growth and surface laitance. The prepared substrate should be thoroughly soaked with clean water until uniformly saturated and be free from standing water, preferably 24 hours prior to application of the Bonding Bridge 842. This should be brushed onto and worked into the damp surface to be repaired. The bonding bridge must be protected from strong sunlight or drying winds. If the bonding bridge is allowed to dry, it must be mechanically removed before a re-application is carried out.

Repair

25.4 The repair mortars Marine S, HD, Monomix and Fastfill must be applied while the primer is still wet or tacky, and should be compacted by trowel or gloved hand to effect removal of any entrapped air. Care should be taken to ensure full compaction around any steel reinforcement. They may be finished by striking off with a straight-edge and closing with a steel float. For Fastfill advice should be sought from the manufacturer on the repair of pockets greater than 100 mm deep.

25.5 Analysis of test data and other information indicates that to provide effective curing, Curing Membrane SB should be spray applied within 15 minutes of striking the mortar (sooner if conditions of hot sun and drying winds prevail). Care must be taken to ensure complete coverage. If necessary a second coat may be applied in hot, drying conditions. To provide an acceptable finish and increased durability to the repaired structure the finishes detailed in sections 25.6 and 25.8 of this Certificate may be applied.

Waterproofing and finish

25.6 Highly-porous substrates may require sealing with Bonding Bridge 842. The Cementitious Coating 851 should preferably be spray applied but may be placed by brush or trowel, care being taken to ensure that air is not entrapped into the surface. To ensure full protection the first coat should be approximately 1 mm thick, the second coat being applied in the same way when the first coat is stable but not fully cured. This should be after approximately 30 minutes, depending on ambient temperature. Substrates exhibiting water infiltration must first be sealed in accordance with the Certificate holder's recommendations using well pointing techniques.

Note: If appearance is of paramount importance, the cementitious coating should be overcoated with a suitable finish, eg Monolastex Smooth, to provide both decoration and added algal protection.

Finishing

25.7 Prior to application of Decadex or Monolastex Smooth, Bonding Primer should be applied to the substrates. Individual surfaces should be cleaned and prepared as detailed by the Certificate holder.

25.8 Decadex⁽¹⁾ or Monolastex Smooth may be applied by spray, brush or roller after the Bonding Primer has dried. For individual application characteristics, reference should be made to the relevant data sheets.

(1) Decadex is applied by roller only under exceptional circumstances and the Certificate holder should be consulted for further information.

Technical Investigations

The following is a summary of the technical investigations carried out on the Flexcrete Concrete Repair and Protection System.

26 Tests

26.1 Tests were carried out to determine: characteristics of components bond strength to concrete

Steel Reinforcement Protector 841

product characteristics
adhesion to steel
adhesion to mortars

Bonding Bridge 842

adhesion to repair mortars

Marine Mortar S and Marine Mortar HD

strength characteristics
freeze/thaw resistance
resistance to thermal shock
resistance to heat ageing
resistance to impact
initial surface absorption
bond strength to steel and concrete

Monomix and Fastfill

strength characteristics
freeze/thaw resistance
resistance to thermal shock
resistance to heat ageing
resistance to impact
initial surface absorption
bond strength to concrete

Cementitious Coating 851 (grey)

strength characteristics
resistance to thermal shock
resistance to heat ageing
resistance to impact
initial surface absorption
bond strength to steel and concrete

Curing Membrane SB

product characteristics
water vapour permeability

Bonding Primer

product characteristics
adhesion characteristics

Decadex

extensibility
adhesion
compatibility with substrates
colour stability
resistance to algal growth

Monolastex Smooth

extensibility
adhesion
compatibility with substrates
colour stability
resistance to algal growth
water vapour permeability
resistance to impact
resistance to abrasion
resistance to wind-driven rain
resistance to soiling
surface spread of flame
fire propagation.

26.2 An examination was made of independent test reports on:

Marine Mortar S and Marine Mortar HD

behaviour in fire
linear drying shrinkage
linear coefficient of expansion
modulus of elasticity
resistance to carbon dioxide
water permeability
strength characteristics

Monomix and Fastfill

behaviour in fire
linear drying shrinkage
linear coefficient of expansion
modulus of elasticity
resistance to chloride diffusion (Monomix only)
water vapour permeability (Monomix only)
oxygen diffusion coefficient (Monomix only)
strength characteristics

Cementitious Coating 851

behaviour in fire
linear drying shrinkage
linear coefficient of expansion
resistance to carbon dioxide
resistance to chloride diffusion
water permeability
water vapour permeability
oxygen diffusion coefficient
abrasion resistance
strength characteristics

Curing Membrane SB

water retention efficiency

Decadex and Monolastex Smooth

behaviour in fire
water vapour resistivity (Decadex only)
water vapour permeability (Decadex only)
resistance to carbon dioxide
impact resistance (Decadex only)
resistance to salt spray (Decadex only)
resistance to water penetration (Decadex only).

27 Investigations

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

27.2 Visits were made to sites in progress to enable examinations to be made at various stages of diagnosis and repair:

(i) to enable an assessment to be made of the effectiveness of survey methods, as recommended and implemented by Flexcrete Limited

(ii) to provide an assessment of the practicability of installation and site storage.

27.3 Visits were made to finished sites to enable examination of finished repairs and resistance to algal growth.

27.4 The manufacturer's instructions concerning diagnosis, specification, preparation, mixing and application were reviewed.

27.5 An assessment was made of independently observed adhesion tests on the Curing Membrane SB.

27.6 An assessment was made based on manufacturer's data of the similarity of the grey and the white grades of the Cementitious Coating 851.

Additional Information

The management systems of Flexcrete Ltd have been assessed and registered as meeting the requirements of BS EN ISO 9001:1994 by the British Standards Institute Quality Assurance Services (Certificate No FM41091).

Bibliography

- BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*
- BS 476-7 : 1987 *Fire tests on building materials and structures — Method for classification of the surface spread of flame of products*
- BS 1881-121 : 1983 *Testing concrete — Method of determination of static modulus of elasticity in compression*
- BS 4551 : 1980 *Methods of testing mortars, screeds and plasters*
- BS EN ISO 9001 : 1994 *Quality systems. Model for quality assurance in design, development, production, installation and servicing*
- ASTM G 53-84 *Operating light and water exposure apparatus (fluorescent UV-condensation type) for exposure of nonmetallic materials*

Conditions of Certification

28 Conditions

28.1 This Certificate:

- relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- 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.

28.2 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, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

28.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabricating process(es) thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;
- continue to be checked by the BBA or its agents; and
- are reviewed by the BBA as and when it considers appropriate.

28.4 In granting this Certificate, the BBA makes no representation as to:

- the presence or absence of any patent or similar rights subsisting in the product or any other product;
- the right of the Certificate holder to market, supply, install or maintain the product; and
- the nature of individual installations of the product, including methods and workmanship.

28.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 recommendations 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 installation and use of this product.



In the opinion of the British Board of Agrément, the Flexcrete Concrete Repair and Protection System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 92/2837 is accordingly awarded to Flexcrete Limited.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'P. Q. Newson'.

Date of Fourth issue: 7th March 2003

Chief Executive

*Original Certificate issued 26th October 1992. This amended version includes change of Certificate holder's address, revised Building Regulations and CDM Regulations, and change in product names.