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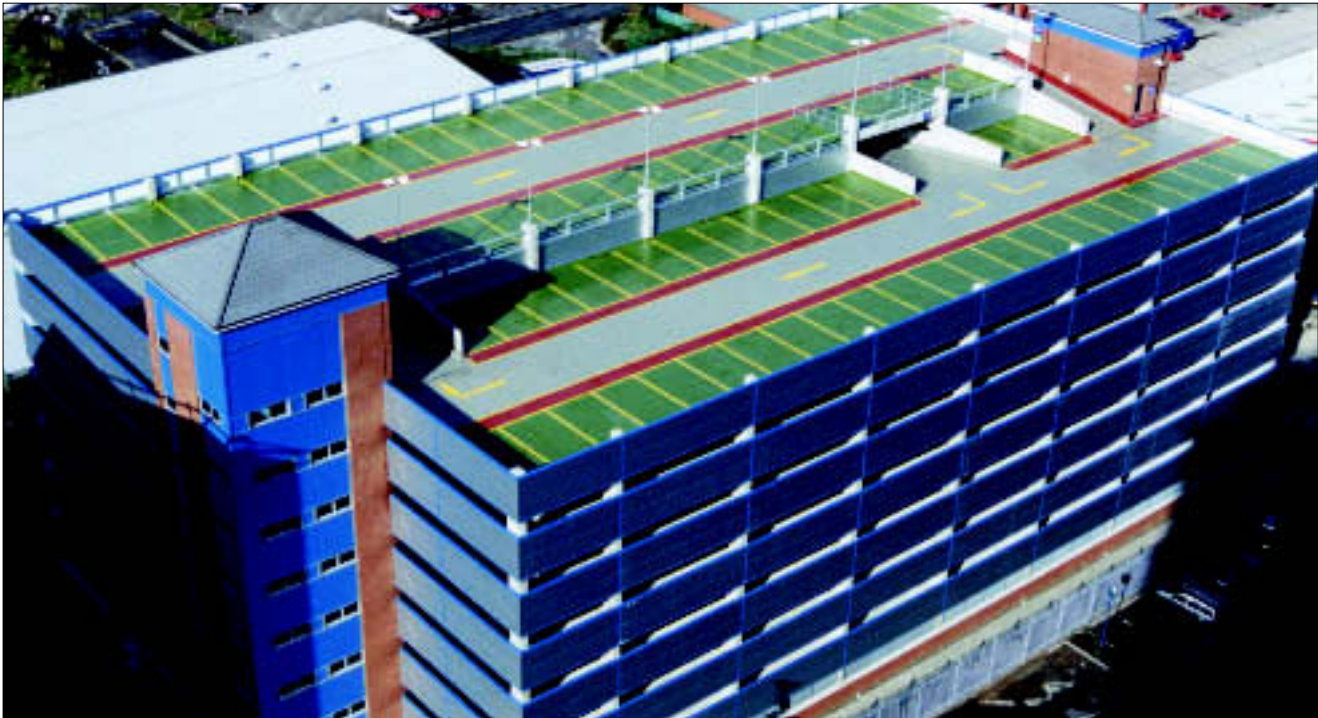
**Agrément
 Certificate
 No 97/3380**
*Fourth issue**

Designated by Government
 to issue
 European Technical
 Approvals

DECKSHIELD CAR PARK DECK SYSTEM

Membrane d'étanchéité
 Wasserdichtung


Product



- THIS CERTIFICATE RELATES TO THE DECKSHIELD CAR PARK DECK SYSTEM, A LIQUID APPLIED POLYURETHANE BASED ELASTOMERIC WATERPROOF WEARING SURFACE INCORPORATING A LAYER OF QUARTZ AGGREGATE.
- The system is for use as a waterproof wearing surface for trafficked concrete substrates, and asphalt surfaces, such as car park decks, elevated walkways, balconies, suspended floors of wet production areas and plant rooms.
- The system is manufactured and marketed by Flowcrete Car Park Structures Ltd and installed by Flowcrete licensed applicators.

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 waterproofing with the Building Regulations. In the opinion of the BBA, the Deckshield Car Park Deck System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: B4(2)	External fire spread
Comment:	When applied to a suitable concrete substrate, the system may be deemed to be of designation EXT.F.AA. See sections 11.1 and 11.2 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	Tests for water resistance on the system indicate that it meets this Requirement. See section 9 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The system comprises acceptable materials. See sections 13.1 and 13.2 of this Certificate.

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2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, the Deckshield Car Park Deck System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and Mandatory Standards as listed below.

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to a construction satisfying this Regulation. See sections 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		When applied to a suitable concrete substrate, the system may be deemed to be of designation EXT.F.AA. Therefore, the system can contribute to a construction satisfying this Standard with reference to clauses 2.8.1 ⁽¹⁾ and 2.8.2 ⁽¹⁾ . See sections 11.1 and 11.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Tests for water resistance on the system indicate that it meets the requirements of this Standard with reference to clause 3.10.1 ⁽¹⁾ . See section 9 of this Certificate.

(1) Technical Handbook (Non-Domestic).

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, the Deckshield Car Park Deck System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system comprises acceptable materials. See sections 13.1 and 13.2 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		Tests for water resistance on the system indicate that it meets the requirements of this Regulation. See section 9 of this Certificate.
Regulation:	E5	External fire spread
Comment:		When applied to a suitable concrete substrate, the system may be deemed to be of designation EXT.F.AA. See sections 11.1 and 11.2 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 sections: *6 Delivery and site handling* (6.3 and 6.4) and *8 Precautions during application* (8.1 and 8.2).

Technical Specification

5 Description

5.1 The Deckshield Car Park Deck System is a polyurethane system comprising a primer, elastomeric waterproof membrane and a flexible wearing surface incorporating a graded quartz aggregate. Components used are:

- Deckshield SF — a two- or three-component, solvent-free polyurethane primer for use on intermediate level concrete and asphalt substrates
- Deckshield EP — a two-component, solvent-free epoxy primer for use on high moisture

level concrete substrates and all exposed top decks

- Deckshield Elastomeric Membrane — a two-component, solvent-free, elastomeric crack bridging polyurethane membrane
- Deckshield Finish — a two-component, solvent-free, flexible polyurethane wearing surface
- Deckshield Topcoat — two-component, solvent based, flexible polyurethane wearing surface, with enhanced UV stability
- Deckshield Quartz — a size-graded aggregate for incorporation in the Deckshield finish layers to impart slip resistance. It is available in a range of gradings

- Flowprime 23 — a one-component polyurethane primer for reactivating surfaces prior to repair patching or where overcoating of the installed components cannot be carried out within the recommended open time.

5.2 Deckshield Finish and Deckshield Topcoat are available in a range of colours. The standard colours are detailed in Table 1.

Table 1 Deckshield Finish/Topcoat standard colours

Colour	BS 4800 ⁽¹⁾ reference
Mid Grey	18 B 21
Dark Grey	00 A 13
Tile Red	04 D 44
Forest Green	14 E 53

(1) Nearest BS 4800 reference.

5.3 Deckshield Topcoat is also available in a range of non-standard colours to special order. The colour stability of the Deckshield Finish range will be similar to that of the standard colours. The colour stability of the non-standard Deckshield Topcoat colours has not been assessed by the BBA.

5.4 Ancillary materials for use with the system include:

- Deckshield Line Marker — a one-component, acrylic-based, line marking paint available in white and yellow
- Flowsolve Cleaner — for use as an equipment cleaner
- Concrete repair mortar — the Certificate holder must be consulted for details of suitable materials.

5.5 The system components are manufactured by a batch blending process. A series of quality control checks is conducted on each batch of each component and on the mixed components.

6 Delivery and site handling

6.1 All system components are delivered to site as working kits, with each component packed separately in the specified mix proportions.

6.2 Each container bears a label with the manufacturer's name, product name, component identification, batch code number, colour, hazard warning and date of expiry.

6.3 The components are classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) and all containers bear the appropriate hazard warning label. Flashpoint and hazard classification is given in Table 2.

6.4 The two components of Deckshield Topcoat should be stored in a cool place, away from naked flames.

Table 2 Flashpoint and hazard classification

Material (Part)	Flashpoint (°C)	Classification
Deckshield SF Primer (A)	>100	—
Deckshield SF Primer (B)	>200	harmful
Deckshield EP Primer (A)	>100	irritant
Deckshield EP Primer (B)	104	corrosive
Flowprime 23	<4	highly flammable ⁽¹⁾ /harmful
Deckshield Elastomeric Membrane (A)	>176	harmful/dangerous for the environment
Deckshield Elastomeric Membrane (B)	>190	harmful
Deckshield Finish (A)	>100	—
Deckshield Finish (B)	>200	harmful
Deckshield Topcoat (A)	30	flammable/harmful
Deckshield Topcoat (B)	38	flammable/harmful

(1) Highly flammable materials must be isolated and stored in accordance with the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972.

6.5 The component containers must be kept tightly sealed and stored in accordance with the Certificate holder's instructions, and away from foodstuffs.

6.6 When correctly stored, the components generally have a shelf-life of at least 12 months; for Flowprime 23 and Deckshield Topcoats however, the shelf-life will be at least six months.

Design Data

7 General

7.1 The Deckshield Car Park Deck System applied to a concrete or asphalt surface on a concrete deck laid in accordance with BS 8110-1 : 1997 is satisfactory for use as a combined waterproof/wearing surface for car park decks, elevated walkways, balconies, suspended floors of wet production areas, plant rooms and similar situations. It may be applied to horizontal, inclined and vertical surfaces.

7.2 The system includes a Heavy Duty version for areas subject to heavy-duty traffic and an Interdeck version for use at lower levels without a requirement for a significant waterproofing performance. See sections 16.13 and 16.14 of this Certificate respectively.

7.3 The system has good chemical resistance to oils, petrol, diesel, hydraulic fluid and aqueous solutions of acids, alkalis and de-icing salts, and is unaffected by contact with an alkaline substrate.

7.4 It can accept, without damage, the foot and vehicular traffic as stated in this Certificate. Where continuous heavy point loading is envisaged, the Certificate holder should be consulted.

8 Precautions during application

8.1 Vapours from certain components of the Deckshield system may cause irritation to the respiratory system, eyes and skin. As some components contain isocyanates the system should be used only in areas with sufficient ventilation and air movement to prevent the build-up of harmful vapours. Contact with skin, eyes and clothing must be avoided. The Certificate holder's instructions and the relevant working procedures must be observed at all times.

8.2 Vapours given off from Flowprime 23 during application are highly flammable and are generally more dense than air. They will tend to move to the lowest point (eg downslopes, gullies). The system should be used only in the areas with sufficient ventilation to prevent build-up of vapours which could form an explosive mixture. All sources of ignition should be eliminated during the installation.

8.3 Once cured the system does not release flammable vapours.

9 Resistance to water and water vapour



Tests confirm that the system is an effective barrier against the passage of water and water vapour. It is flexible and can accommodate the movement due to cracking permitted by BS 8110-1 : 1997 and meets the requirements of:

England and Wales

Approved Document C, Requirement C2(b), Section 5.1

Scotland

Regulation 9, Mandatory Standard 3.10

Northern Ireland

Regulation C4.

10 Ability to accommodate movement

The system can accommodate the movement of construction joints and crack-inducing movement joints. The Certificate holder should be consulted for their approved designs.

11 Properties in relation to fire



11.1 The system⁽¹⁾, applied to a 50 mm thick concrete substrate, when tested to BS 476-3 : 1958, was designated EXT.F.AA. It may be assumed that this rating would be achieved on other non-combustible substrates.

(1) Comprising Deckshield SF, Deckshield Elastomeric Membrane and Deckshield Finish.

11.2 The designation of other specifications (eg featuring other components or on combustible substrates) should be confirmed by:

England and Wales

test or assessment in accordance with Approved Document B, Appendix A, Clause A1

Scotland

test to conform to Mandatory Standard 2.6

Northern Ireland

test or assessment by a UKAS accredited fire testing laboratory or an independent consultant with appropriate experience.

12 Maintenance and repair

12.1 Damaged areas are repaired by removing loose material, blast-cleaning the damaged area and adjacent Deckshield surface to give an overlap of 100 mm. The surface is reactivated with Flowprime 23 and the Deckshield system is applied to the original specification.

12.2 Where substantial damage has occurred, the Certificate holder should be consulted for a suitable repair specification.

12.3 Repaired areas must be allowed to cure for 24 hours and 72 hours before opening to foot and vehicular traffic, respectively.

12.4 Fast cure repair material is available to reduce the time required before a repaired area can be opened to traffic. The Certificate holder should be consulted for details.

13 Durability



13.1 The system has been used since 1994 and is performing satisfactorily. Accelerated weathering tests indicate that the system will retain suitable physical properties.

13.2 Available evidence indicates that with adequate repair and maintenance the system should have a serviceable life in excess of 10 years.

13.3 Some colour change may occur with the standard colour range but this will be slight and uniform.

Installation

14 General

14.1 Installation of the Deckshield Car Park Deck System is carried out by the Certificate holder approved installers only.

14.2 The system should be applied only to clean and dry surfaces free from ice and frost.

14.3 In addition, work should not be conducted when the air or substrate temperature falls below 5°C and/or the air temperature or substrate temperature rises above 35°C and 50°C, respectively.

14.4 Priming of exposed, unprotected decks must be undertaken using Deckshield EP Primer.

Additionally, on intermediate decks, where the moisture of the concrete deck is measured to be in excess of 75%, Deckshield EP Primer must be employed, in place of Deckshield SF.

14.5 Checks carried out on site include:

Before installation

A technically qualified representative from the licensee/sub-contractor will visit the site to determine the correct pre-treatment and specification to meet the full needs of the project.

During installation

The licensee/sub-contractor will continuously monitor environmental conditions, uniformity of coverage and time sequence of the various layers composing the system. Each component layer will be inspected to ensure that adequate curing has been achieved prior to further materials being applied.

After installation

A final inspection is carried out to ensure the system complies with the specification. Checks on film thickness, consistency of finish and slip resistance may be carried out if required.

14.6 Duplicate records of the inspections are passed to the Certificate holder.

15 Preparation

15.1 Concrete structures should be designed and built in accordance with BS 8110-1 : 1997.

15.2 New concrete should be well compacted and finished, preferably by power floating and power trowelling without excess laitance, to a dense, smooth finish free of physical defects. Concrete toppings and screeds should be properly formulated, applied and compacted. They should be bonded to the substrate and have a floated finish with minimum laitance.

15.3 Small surface defects may be repaired using a proprietary repair material approved by the Certificate holder.

15.4 A minimum curing period of 28 days is normally required before new concrete surfaces are primed. The Certificate holder must be consulted for advice if priming is to be carried out before 28 days.

15.5 Joints in the substrate should be sealed with a suitable joint sealant.

15.6 Construction joints, cracks next to expansion joints, termination grooves and all horizontal/vertical and vertical/vertical junctions are sealed by applying centrally a band of Deckshield Elastomeric Membrane not less than 50 mm wide and 0.5 mm thick. Areas such as gullies, rainwater outlets and penetrations are similarly treated.

15.7 Defects in asphalt surfaces should be repaired using a suitable mastic asphalt repair

material, blinded with a dried quartz aggregate approved by the Certificate holder.

15.8 All horizontal surfaces must be prepared by either enclosed shot-blasting or diamond grinding and then vacuum cleaned to remove all laitance and contamination. The required method of preparation will be subject to site survey.

15.9 Before installing the system, care should be taken to ensure that the substrate is dry, clean and free from frost. Particular care should be taken to ensure that the surface is free from laitance, oil, dust, grease or other contaminants that may affect the system's adhesion.

16 Application

Standard system

Primer

16.1 The Deckshield SF or Deckshield EP primer must be mixed using a slow-speed drill, fitted with a helical mixing head to ensure a homogeneous mix.

16.2 The mixed primer is applied evenly to the substrate, using a medium-pile roller and/or squeegee, ensuring it is worked into all surface irregularities, at a coverage rate of 0.3 kgm⁻² to 0.5 kgm⁻² for Deckshield EP Primer and 0.7 kgm⁻² to 1.0 kgm⁻² for Deckshield SF Primer. Porous surfaces may require two coats of primer. The second coat should be applied after the first coat has been allowed to cure, but within 24 hours.

16.3 The primer should be allowed to become tack free before application of the Deckshield Elastomeric Membrane.

Deckshield Elastomeric Membrane

16.4 The components (Parts A and B) are mixed using a slow-speed drill fitted with helical mixing head, ensuring minimal air entrapment.

16.5 The mixed membrane is applied evenly to the substrate by spreading with a roller at a minimum coverage rate of 1.0 kgm⁻².

Deckshield Finish or Deckshield Topcoat/quartz aggregate wearing surface

16.6 The application of the finish coat should be conducted within 48 hours.

16.7 If overcoating is not carried out within 48 hours, the membrane surface must be washed and abraded using a rotary scrubber, thoroughly dried and re-activated with a single coat of Flowprime 23.

16.8 The components (Parts A and B) are mixed using a slow-speed drill, fitted with a helical mixing head for a full two minutes. The mixed components are then transferred into another container and re-mixed.

16.9 Deckshield SF is applied at a coverage rate of 0.5 kgm⁻² and a full blinding of graded quartz aggregate (0.4 mm to 1.2 mm for Deckshield

Finish and 0.4 mm to 0.8 mm for Deckshield Topcoat) is immediately cast into the wet surface and allowed to cure for 16 to 24 hours.

16.10 A final finish coat is then applied, at the following minimum coverage rates:

Deckshield Finish	0.8 kgm ⁻²
Deckshield Topcoat	0.4 kgm ⁻² .

16.11 With non-standard colours, two or more coats may be required to achieve the necessary opacity.

Upstands

16.12 The finish coat is applied to the primed surface at a coverage rate of 0.5 kgm⁻² for Deckshield Finish or 0.3 kgm⁻² for Deckshield Topcoat to the height required. This work should be carried out following the application of reinforcement banding to horizontal surfaces.

Heavy Duty system

16.13 A high-build system is available for all areas subject to heavy-duty wear or traffic. The build-up specification is described below:

- Deckshield SF or Deckshield EP primer filled with a graded silica aggregate (supplied as a three-component pack) — applied at a coverage rate of 1.0 kgm⁻²
- Deckshield Elastomeric Membrane — applied at a coverage rate of 1.5 kgm⁻². If overcoating is not carried out within 48 hours, the membrane surface must be washed and abraded using a rotary scrubber, thoroughly dried and re-activated with a single coat of Flowprime 23.
- Deckshield SF primer filled with a graded silica aggregate (supplied as a three-component pack) — applied at a coverage rate of 1.0 kgm⁻² and fully blinded with a 0.4 mm to 1.2 mm graded quartz aggregate
- Deckshield Finish — applied (after vacuuming and sweeping the blinded surface) at a coverage rate of 0.9 kgm⁻².

Interdeck system

16.14 The Interdeck system is for use on intermediate levels where the waterproofing requirement is not required. It comprises:

- Deckshield SF — applied at a coverage rate of between 1.0 and 1.5 kgm⁻²
- Deckshield Quartz (0.4 to 1.2 mm) — applied to the wet surface at 2.5 kgm⁻²
- Deckshield Finish applied at 0.8 kgm⁻².

16.15 Each application must be allowed to cure to a tack-free state prior to overcoating.

16.16 If non-scattered surfaces are not overcoated within 24 hours, then the surface should be mechanically abraded and reactivated using Flowprime 23.

17 Miscellaneous

17.1 The system should be fully cured for a minimum of 24 hours before it is opened to pedestrian traffic, and 72 hours before it is opened to vehicular traffic.

17.2 During prolonged periods of low temperature the cure time before the system is able to accept traffic may be extended. Details should be confirmed with the Certificate holder.

Technical Investigations

The following is a summary of the technical investigations carried out on the Deckshield Car Park Deck System.

18 Tests

18.1 The results of characterisation and performance tests on the system and/or components are summarised in Tables 3 and 4, respectively.

Table 3 General physical properties

Test (unit)	Method ⁽¹⁾	Results		
Mean thickness (mm)	Direct measurement			
Dry film				
Deckshield SF Primer				0.30
Deckshield Elastomer				0.59
Deckshield Finish				0.37
Weight per unit area (kgm ⁻²)	Direct measurement			
Wet film				
Deckshield SF Primer				0.3
Deckshield Elastomer				0.7
Deckshield Finish				0.5
Effect of temperature on cure times (hours:minutes)	BBA <i>ad-hoc</i> method	Pot life	Setting time	Cure time
Deckshield SF				
5°C		1:30	7:30	<24:00
23°C		1:00	4:40	<18:00
35°C		0:55	3:30	6:40
Deckshield Elastomeric Membrane				
5°C		1:00	6:30	<24:00
23°C		1:30	6:00	<18:00
35°C		1:20	2:00	6:00
Deckshield Finish				
5°C		1:15	6:00	<24:00
23°C		0:55	4:50	<18:00
35°C		0:45	2:00	6:00
Tensile strength/elongation (Nmm ⁻²) (%)	BS 2782:3 : Method 320A			
Deckshield System				
Control				6.11/90.2
1 day heat aged at 70°C				5.37/50.4
7 days heat aged at 70°C				7.15/40.2
28 days heat aged at 70°C				7.17/30.5
Water vapour permeability (gm ⁻² day ⁻¹)	BS 3177			
Deckshield System				1.31
Ash content (%)	BS 2782-4 : Method 454A			
Deckshield System without aggregate				23.23
Water absorption (%)	BS 2782-4 : Method 430A			
Deckshield System				0.48
Tear strength (N)	MOAT 27 : Method 5.4.1			
Deckshield System				192

(1) Test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

Table 4 Service performance

Test (unit)	Method ⁽¹⁾	Results
Low temperature flexibility (°C) Deckshield Elastomeric Membrane	MOAT 27 : Method 5.4.2	No failure at -20°C ⁽²⁾
Resistance to water pressure Deckshield System	MOAT 27 : Method 5.1.4.2	No water penetration after 24 hours
Resistance to chloride ions Deckshield System	Highways Agency BD 47/94: Appendix B, B4.2(e) ⁽³⁾	No chloride ion penetration after 28 days
Resistance to cracking (crack width at failure) Deckshield Elastomeric Membrane ⁽⁴⁾ (0°C) Deckshield System 0°C 23°C Deckshield HD System 0°C 20°C	BBA test method T1/12	No failure of the membrane at 2.5 mm crack width Wearing course layer cracked at approximately 0.2 mm Failure of the membrane between 2.4–2.5 mm crack width Wearing course layer cracked at 0.2 mm crack width/ Waterproofing membrane undamaged at 2.5 mm crack width Wearing course layer cracked at 0.7 mm crack width/ Waterproofing membrane undamaged at 2.5 mm crack width
Resistance to chisel impact Deckshield System	Highways Agency, Appendix B, Method C (v) ⁽⁵⁾	Surface marking only. No indentation
Resistance to aggregate indentation Deckshield system	BBA Test Specification (400 N force delivered via a 20 mm diameter steel ball for 5 minutes)	No penetration
Tensile bond strength (Nmm ⁻²) Deckshield System on concrete substrate	BBA test method T1/14	Mode of failure
control (Deckshield SF Primer)		0.72 } Mainly substrate failure
1 day heat aged at 70°C		0.72 }
7 days heat aged at 70°C		0.71 } Substrate failure
28 days heat aged at 70°C		0.76 }
Deckshield HD system on concrete substrate		
control		0.77 — Mainly substrate failure
28 days heat aged at 70°C		0.73 — Substrate failure
7 days water immersion at 23°C		0.78 — Mainly substrate failure
Deckshield Elastomeric Membrane Deckshield Primer EP on concrete substrate		
control		0.66 } Substrate failure
7 days heat aged at 70°C		0.89 }
28 days heat aged at 70°C		0.94 }
7 days water immersion at 23°C		0.84 — Mainly substrate failure
Deckshield Elastomeric Membrane Deckshield Primer EP on asphalt substrate ⁽⁵⁾		
control		2.68 } Failure mainly between membrane and
28 days heat aged at 70°C		3.06 } asphalt substrate
7 days water immersion at 23°C		1.42 — Failure between membrane and asphalt substrate
Deckshield Interdeck on concrete substrate		
control		2.19 } Substrate failure
28 days heat aged at 70°C		1.86 }
7 days water immersion at 23°C		1.68 }
control (Flowprime 23 Primer)		0.77 }
Deckshield Interdeck on asphalt substrate		
control		2.24 } Failure in asphalt substrate
28 days heat aged at 70°C		2.18 }
7 days water immersion at 23°C		2.30 }
Hardness number Deckshield System without aggregate	BS 5284	Hardness number
control		3 } No observable effects after 7 days
7 days exposure to:		3 } exposure to these chemicals
— petrol		3 }
— diesel		3 }
— used engine oil		3 }
— battery acid		3 }
— anti-freeze		2 }
— hydraulic fluid		3 }
		Loss of surface sheen and some surface expansion on free film. Expansion not evident on bonded material.
Resistance to abrasion Deckshield System	BS 8204-2 (Annex B)	Mean depth of wear 0.20 mm
Resistance to long-term loading Deckshield System on concrete substrate	MOAT 27 : Method 5.1.9	
Resistance to dynamic indentation Deckshield System	MOAT 27 : Method 5.1.10	soft substrate L ₄ hard substrate
Slip resistance (coefficient of friction) Deckshield system	Generally to BS 8204-4 (4S rubber)	I ₂ I ₃
control		dry wet
after abrasion		0.89 0.77 0.72 0.65

(1) Test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.
(2) Test stopped at -20°C.
(3) Highways Agency BD 47 *Waterproofing and Surfacing of Concrete Bridge Decks, Appendix B Certification Test Requirements for Waterproofing Systems on concrete Bridge Decks*
(4) Deckshield Elastomeric Membrane applied at a coverage rate of 1.4 kgm⁻².
(5) 50 mm diameter pull-off plates used.

18.2 Investigations were also carried out to confirm the resistance to artificial weathering at the standard colour ranges of both finish coats. The results are summarised in Table 5.

Table 5 Resistance to artificial weathering⁽¹⁾

Product	ΔL^*	Δa^*	Δb^*	$\Delta E^{(2)}$
Deckshield Finish Tile Red	-0.64	3.78	5.73	6.89
Deckshield Finish Forest Green	0.02	3.12	1.17	3.33
Deckshield Finish Mid Grey	-1.59	-0.24	9.25	9.39
Deckshield Topcoat Tile Red	-0.94	2.75	5.06	5.33
Deckshield Topcoat Forest Green	1.41	-0.55	-1.06	1.85
Deckshield Topcoat Mid Grey	2.94	-0.18	0.39	2.98
Deckshield Topcoat Dark Grey	5.29	-0.20	0.92	5.38
Deckshield Topcoat Arabian Yellow	0.87	-1.32	-3.37	3.72
Deckshield Topcoat Traffic Blue	-1.40	2.67	0.07	3.02

(1) To MOAT No 34, CIELAB colour space measurements, washed samples.

(2) Measured total colour difference between control and exposed sample (after washing) calculated using the equation:

$$\Delta E^* = \sqrt{[(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]}$$

19 Investigations

19.1 An assessment was made of independent fire test reports relating to the system's performance in fire.

19.2 Visits were made to sites in progress in the UK to assess the system's practicability of installation.

19.3 An evaluation was made of data on existing sites in the UK to assess the system's performance in service.

19.4 An assessment was made of the system's durability and methods of maintenance and repair.

19.5 An examination was made of the Certificate holder's health and safety data covering the Deckshield System components.

Bibliography

- BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
- BS 2782-3.320A to 320F : 1976 *Methods of testing plastics — Mechanical properties — Tensile strength, elongation and elastic modulus*
- BS 2782-4.430A to 430D : 1983 *Methods of testing plastics — Chemical properties — Determination of water absorption at 23°C — Determination of water absorption at 23°C with allowance for water-soluble matter — Determination of boiling water absorption — Determination of boiling water absorption with allowance for water-soluble matter*
- BS 2782-4.454A and 454B : 1978 *Methods of testing plastics — Chemical properties — Determination of ash — Determination of sulphated ash*
- BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
- BS 4800 : 1989 *Schedule of paint colours for building purposes*
- BS 5284 : 1993 *Methods of sampling and testing mastic asphalt used in building and civil engineering*
- BS 8110-1 : 1997 *Structural use of concrete — Code of practice for design and construction*
- BS 8203 : 2001 *Code of practice for installation of resilient floor coverings*
- BS 8204-2 : 1999 *Screeds, bases and in-situ floorings — Concrete wearing surfaces — Code of practice*
- BS 8204-4 : 1993 *Screeds, bases and in-situ floorings — Code of practice for terrazzo wearing surfaces*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
- MOAT No 34 : 1986 *Precoated metal sheet roofing and cladding*
- BD 47/94 *Waterproofing and Surfacing of Concrete Bridge Decks, Appendix B Certification Test Requirements for Waterproofing Systems on concrete Bridge Decks*

Conditions of Certification

20 Conditions

20.1 This Certificate:

- (a) relates only to the product that is named, described, installed, used and maintained as set out in this Certificate;
- (b) 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;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) 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 and the manufacture and/or fabrication including all related and relevant processes thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine; and

(c) are reviewed by the BBA as and when it considers appropriate.

20.4 In granting this Certificate, the BBA is not responsible for:

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

20.5 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 Deckshield Car Park Deck System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 97/3380 is accordingly awarded to Flowcrete Car Park Structures Ltd.

On behalf of the British Board of Agrément

Date of Fourth issue: 4th August 2005

A handwritten signature in black ink, appearing to read 'G. A. Cooper', is written over a light grey background.

Chief Executive

**Original Certificate issued 19th August 1997. This amended version includes an additional finish coat and colour range, additional test data, addition of Interdeck system, reference to revised national Building Regulations, and new Conditions of Certification.*

Electronic Copy

British Board of Agrément

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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.