



SPECIFICATION DOCUMENT

FOR

Grosvenor House Roof Top

Car Park Deck and Ramp

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ALL MATERIAL SELECTION/COMPLIANCE

In all cases the Contractor shall provide evidence to verify that they meet the requirements set out in BS EN1504 and as such all materials where relevant should be 'CE' marked.

All materials must be compatible and shall not have any effects on long term durability and bond. The materials must be supplied from a BS EN 1504 approved manufacturing plant and supplied from a single manufacturer to ensure compatibility and ensure long term durability.

All works are to be undertaken as phased and directed by the client's representative and contract documents and drawings.

The resin decking and corrosion control materials must have the following min Performance requirements and must be fully tested to EN1504 part 2 and have full CE marking for all products. The selected decking system shall provide a wearing surface with waterproofing properties. The system shall provide a skid-resistant finish, which will be available in a range of colours. The System shall be based on a PMMA reactive acrylic resin, and must be fast setting. The benefit of any system shall be able to be applied at low temperatures and it is suited to rapid installation applications.

A fully reinforced waterproofing & non-slip system is required and must be applied as per the manufacturers recommendation, deck preparation to also be as per manufacturers requirements.

System proposal must meet the below performance requirements, this is a suggested system, but any Equivalent system must be submitted to meet these requirements at tender stage for evaluation, with independent test reports to support the full system, primer, waterproof reinforced layer and wear layer, including sand and seal coat must have these performance requirements.

Any proposed system must be supported by provision of examples from 3 past projects (min 5 years old) where system has been applied onto old asphalt surface, this must be provided with tender submission. Project details with specifier and client contact details (including exact breakdown of system used) must also be submitted with tender package.

Tenderers must submit full manufacturer and contractor specifications for all works, including what details they have allowed for with tender costs. This must be job specific and not a guide for discussion once works start. The concrete repairs and corrosion reinforcement products must also be from same manufacturer and also meet the below requirements.

ANY ALTERNATIVE PROPOSED SYSTEM MUST MEET THE FOLLOWING MINIMUM CRITERIA AND INDEPENDENT TEST CERTIFICATES MUST BE PROVIDED WITH THE TENDER SUBMISSION

Performance requirements of car park resin systems

All Car Park Deck systems including top deck, intermediate deck and ramp systems must be fully tested to EN1504 part 2 and have full CE marking for all products.

Essential characteristics	Performance	Test Standard	Harmonised technical specification
Abrasion resistance (Taber test):	< 3000 mg	EN ISO 5470-1	EN 1504-2: 2004
Permeability to CO ₂ :	S _D > 50 m	EN 1062-6	
Permeability to water vapour:	Class III	EN ISO 7783-1	
Capillary absorption and permeability to water:	w < 0.1 kg/(m ² x h ^{0.5})	EN 1062-3	
Resistance to severe chemical attack: ¹⁾	Loss of hardness <50%	EN 13529	
Impact resistance:	Class I	EN ISO 6272-1	
Crack bridging capability	A4 (-20 °C) B4,2 (-20 °C)	EN 1062-7	
Adhesion strength by pull-off test:	≥ 2.0 N/mm ²	EN 1542	
Fire Classification:	E _{fl} ²⁾	EN 13501-1	

Any alternative recommended System must be a PMMA membrane with hard wear layer and sealer coating system. The fully built up system must conform to BSEN1504 pt 2 standards in particular EN1062 Table 7 B4.2 upto 0.5mm crack bridging @ -20oc .

CORROSION MANAGEMENT – CORROSION CONTROL –NON REPAIR SITES ON Concrete Access Ramp

SURFACE APPLIED INHIBITOR (BS EN 1504-9 principle 11 method 11.3)

PERFORMANCE REQUIREMENTS OF CORROSION INHIBITOR

The corrosion inhibitor should consist of a multi-functional, water based, amino alcohol containing organic and in-organic elements. Specifically designed for the impregnation of reinforced concrete it should have an affinity for steel reinforcement whereby it forms a physically adsorbed film to reduce corrosion currents density and delays the onset or retards the rate of rusting. It must be ecologically orientated and provide the following performance properties:

Penetration Rate	2.0-20 mm/day
Penetration Depths	>80 mm
Film Thickness	10 ⁻⁸ m
Alkalinity Value	pH 11
Potential Values	300-500 mV
Current Densities	<0.2mA/cm ²
Weathering Resistance	Approx 10 years
Test Documentation	Likes of BRE or live past project monitored projects
Quality Assurance	BS5750/ISO9000

The inhibitor must have proven track record for use on concrete structures with monitored case studies and have been independently tested by external test houses/consultants.

CORROSION MANAGEMENT - CORROSION PREVENTION

GALVANIC ANODES - Free chloride concentrations exceeding 1% at level of rebar.

APPLICATION OF GALVANIC ANODES TO ALL REPAIRED CONCRETE AREAS TO PREVENT
INCIPIENT ANODE FORMATION

Materials Performance

Embedded galvanic anodes shall have the following nomination dimension: 65 mm x 80 mm x 30 mm, pre-manufactured, and consist of a minimum of 100 grams of zinc in compliance with ASTM B6 Special High Grade cast around a pair of steel tie wires in compliance with bright annealed ASTM A82 and encased in a highly alkaline cementitious shell with a pH of 14 or greater. The cementitious shell shall contain no added sulphate nor shall it contain chloride, bromide or other constituents that are corrosive to reinforcing steel or detrimental to the surrounding concrete. Anode units shall be supplied with integral unspliced wires with loop ties for directly tying to the reinforcing steel.

Application for equals to include:

1. A highly alkaline cementitious shell with a pH of 14 or greater.
2. Provide a minimum of 10 years service life (in similar environment).
3. Contain no added constituents corrosive to reinforcing steel or detrimental to concrete, e.g. chloride, bromide, sulphates, etc.
4. Proven track record showing a minimum of 10 years satisfactory field performance.
5. A minimum of three projects of similar size and application.
6. Anode units shall be supplied with solid zinc (ASTM B6 Special High Grade) core cast around integral bright annealed steel (ASTM A82) tie wires for tying to the reinforcing steel.
7. Anode units shall be supplied with integral unspliced tie wires such that the zinc anode is connected to the reinforcement with a continuous, unspliced wire.
8. Third party product evaluation, such as from Concrete Innovations Appraisal Service, BBA, etc.

All Concrete Repair must also comply to BS EN 1504 *Small Non Structural/overhead repair*

**WARRANTY MUST BE FROM SINGLE MANUFACTURE FOR THE CONCRETE REPAIRS
SYSTEMS AND DECK WATERPROOFING ITEMS**

WARRANTY MUST BE FOR A MINIMUM OF 10 YEARS FOR DECKING

WARRANTY MUST BE FOR A MINIMUM OF 10 YEARS FOR CONCRETE REPAIR & COATINGS

PROJECT OVERVIEW

EXISTING:

Proposal is to remove the failing surfaces and apply a new car park waterproofing system. The structure is a RC framed with roof deck car park to rear of the building. Built around 1970's.

The structure is constructed of reinforced concrete columns and ribbed beams to soffit of roof slab.

The top deck is believed to have light-aggregate screed with 75mm of very old asphalt topping that has had rubber mats with non-slip laid over it.

We have jointly agreed removal of these old surfaces to expose the asphalt base.

The condition of the asphalt appears to be in reasonable condition. However, the surface is rucking with wheel indentations and the aggregate within the asphalt has sunk from the surface. This is typically due to high asphalt temperatures at application and trafficking by vehicles over a long period of time. We have therefore recommended that the surface should be planed to remove the top minimum 5-10mm of asphalt to expose the aggregate within the system.

Initial pull off testing has been undertaken to assess the bond of the asphalt. It was cold and raining on the day of the preliminary pull off testing and only wire brushing was used before the dollies were applied.

The pull off results varied from lowest being 1.2 N/mm² to highest being 1.80 N/mm². All the failures were cohesive, at asphalt interface. Final preparation of asphalt top surface will be undertaken by a specialist based on their experience of such surfaces, but we have given some guidance within the proposal.

There are cracks and construction joints that have allowed water through the various layers above .

The cracks can be seen in the soffit of the canopy hang over, which has some form of coatings which are also failing and delaminating.

The ramp walls and upstands are coated, but these are very old, flaking and lifting in many places.

RECOMMENDATIONS:

Remove failing and delaminating mat layers off top deck and ramp.

Undertake pull out tests to ensure suitability of their proposed system

Carry out repairs to asphalt decks including wheel indentations, defective asphalt, splits and cracks.

If budgets permit, provide concrete repairs to soffit canopy areas and protective coatings to the upstand/parapet walls and all other concrete elements at risk of corrosion.

After mechanical preparation which is to include surface planing and vacuum shot blasting, all surface defects should be repaired using **proposed manufacturers products for asphalt repairs**. The defects include:

1. Existing splits and cracks to the asphalt
2. Existing Blisters
3. Wheel Indentations

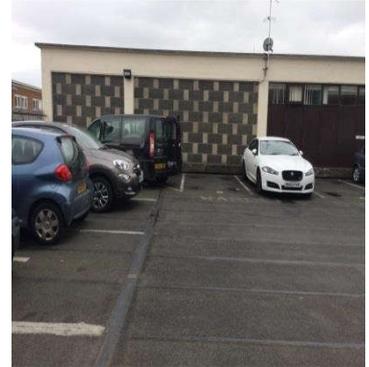
Once repairs are completed, the perimeter between old and repairs junction are to be protected with a band of **Reemat Fleece** encapsulated in **resin** (repairs perimeter) to the application of the main deck membrane. All details to be as per manufacturers requirements.



Roof top deck with rubber mats



There is poor drainage and falls



The buildup is understood to be mat, asphalt layers and lightweight screed onto structural slab



Canopy parapet is uncoated and has minor repairs due to reinforcement corrosion



Over hang canopy with car park above has many cracks allowing water penetration through



Subway with roof top car park above has minor repairs and delaminating coatings



Core sample of asphalt and screed below to structural slab. This clearly shows mat topping will have to be removed

SYSTEM PROPOSAL

#	Zone	Usage	Specification
1	Roof Top Deck and access Ramp	Car park area	Fully reinforced waterproofing & non-slip system
2	External Walls/Parapet and Canopy soffits	Concrete deck soffits with Corrosion management	Concrete Repairs Corrosion Control and Protective Coatings
3	All	Car Park	Details Suite

ASPHALT DECK PREPARATION

All deck areas, driving aisles and parking bays

All asphalt surfaces to be treated should be mechanically prepared to remove any existing coatings (matts), line markings and decking material (if present) and to provide a gripping profile that is clean, dry and free from laitance, dirt, grease, oil and any other form of surface contamination. Surface vacuum blasting or similar techniques are ideally suited.

Following preparatory works it is prudent to check for and identify any defects with the substrate which includes, blistering / splits to asphalt / wheel indentations and any other defects. All blisters / splits / wheel indentations should also be removed and repaired with manufacturers recommended products.

All joints are to be formed and dimensioned in accordance with the Engineer's requirements. Any arris damage and levelling of butt edges shall be made good and falls to new and existing gully drains laid prior to the application of the deck finish using the appropriate mortars.

All areas subject to potential movement including existing cracks / up-stands / day joints / beams lines and existing cracks should be fleece reinforced with Reemat and encapsulated with the **resin** after priming.

All static cracks should be prefilled and levelled with PMMA resin. All dynamic cracks should be assessed on site by a qualified structural engineer and, if necessary, primed reinforced with Reemat and encapsulated with the resin after priming, or designed as a movement joint.

Sudden irregularities are not permitted. Classification of surface regularity/flatness to BS 8204 – 6 SR1.

The substrate should be sound and of sufficient compressive strength (Min 25N/mm²). Minimum pull-off strength of substrate should be Min 1.0N/mm².

All following consumption rates and related figures are theoretical and do not allow for any additional material due to surface porosity, surface profile, variations in level, temperature and wastage etc.

DETERMINE SURFACE ROUGHNESS AFTER SURFACE PREPARATION - ASPHALT

Mechanical preparation should be carried out to provide a flat surface suitable for the application of the car park deck system. After this preparation, the surface roughness of the mechanically prepared surfaces can be assessed using a sand test as follows:

Test: Place the defined volume of quartz sand 0.06-0.3 mm onto the substrate ($V=50 \text{ cm}^3$). Distribute the quartz sand in a circling manner using a round wooden disc ($\varnothing 50 \text{ mm}$) until the troughs are filled. Measure the diameter of distributed quartz sand in cm. The surface roughness can then be determined using the table below or the following equation $R = (40 \times V) / (\pi \times d^2)$.

Example: $V=50 \text{ cm}^3$ (80grams or 50ml)

\varnothing in cm:	10	15	20	25	30	35	40	50
Surface roughness in mm:	6.4	2.83	1.59	1.02	0.71	0.52	0.4	0.26

A scratch coat is therefore required if the surface roughness is in excess of 0.52mm (Diameter of sand in test is less than 35cm)

SCRATCH COATS FOR CAR PARK DECK SYSTEMS IN RELATION TO THE SURFACE ROUGHNESS

PMMA Systems

Surface roughness from **0.5 to 3 mm**

Prime using system primer

Apply a scratch coat by trowel to level up the substrate blended from resin and Filler.

Typical mix ratio is 1:2.0 (Parts by weight) plus 1 – 2% (if required).

Consumption of resin: ca. 0.5- 1.5kg/m²/mm.

ASPHALT SUBSTRATE REPAIR

The asphalt shall be free from dust, loose material, surface contamination, existing mortar, laitance, coatings, and other materials which reduce the required adhesion values of the selected coating system.

Asphalt Removal

The asphalt shall be free from dust, loose material, surface contamination and materials which reduce bond of the repair materials.

Delaminated, weak, damaged and deteriorated asphalt shall be removed by suitable mechanical techniques.

The edges where asphalt is removed should be cut at a minimum angle of 90° to avoid undercutting and a maximum angle of 135° to reduce the possibility of debonding with the top surface of the adjacent sound asphalt and should be roughened sufficiently to provide a mechanical key between the original material and repair mortar.

PMMA repair materials can be applied onto a substrate with a moisture content of up to 4% as measured with a Tramex moisture meter.

Bonding Primer

Apply asphalt primer to the prepared asphalt and if applicable concrete surface at a minimum consumption rate of not less than 0.4kg/m² to act as a primer. In cases of varying porosity two applications may be required. The freshly applied primer coat can be blinded lightly with quartz sand 0.6-1.2mm, at approximately 0.2-0.5 kg/m². Once cured remove all excess by brush or vacuum.

Repair Mortar

Apply MMA repair with trowel, spatula etc. or press into place by hand (rubber gloves must be worn). Work the mortar well into the substrate. Begin at the centre of the area and work outwards towards the edges. Trowel the surface smooth until all pores are closed. If a textured surface finish is required, the freshly trowelled mortar may be lightly broadcast with quartz sand.

CONCRETE REPAIR AND PROTECTION

Overall car park structure, general fabric, upstands and outer edge beams/parapet

SUBSTRATE QUALITY AND PREPARATION

Deck and ramps

For deck preparation refer to specification for deck Preparation of all deck areas, driving aisles and parking bays

Other Concrete Surfaces (Uncoated)

The concrete shall be cleaned and all blowholes and honeycombed areas exposed.

The resulting surface shall be free from dust, loose material, surface contamination, existing renders, laitance, coatings, oil and other materials which could reduce the required adhesion values of a protective coating /membrane system.

Surfaces should be cleaned and prepared using abrasive blast cleaning techniques or high pressure waterblasting [up to 18 MPa (2700 psi)] techniques.

Where smoothing mortars/pore fillers and coatings are to be used, surfaces should be prepared to an open texture suitable for the coating system specified to achieve the following adhesion values:

BS EN 1504-2 adhesion test average for smoothing mortar/pore filler/coatings must be >0.8 N/mm² (MPa) with no single value below 0.5 N/mm² (MPa) for crack bridging coatings and 1.0 N/mm² (MPa) with no single value below 0.7 N/mm² (MPa) for rigid coatings.

Coated Concrete Surfaces (Removal)

The coated concrete shall have all existing coatings removed and all blowholes and honeycombed areas exposed.

The resulting surface shall be free from dust, loose material, surface contamination, existing renders, laitance, coatings, oil and other materials which could reduce the required adhesion values of a protective coating /membrane system.

Surfaces should be cleaned and prepared using abrasive blast cleaning techniques or high pressure waterblasting [up to 18 MPa (2700 psi)] techniques.

Where smoothing mortars/pore fillers and coatings are to be used, surfaces should be prepared to an open texture suitable for the coating system specified to achieve the following adhesion values:

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Coated Concrete Surfaces (Remain)

If it is deemed that existing coatings are to be over coated rather than removed, then compatibility testing between existing coating and new coating system together with additional tests outlined below should be undertaken prior to proceeding with the works. However, it should be borne in mind that failure to remove existing coatings may lead to an increased risk of technical compromise. Before proceeding, trial results must be interpreted by the Contract Administrator.

Existing Coatings

Existing coatings must be tested to confirm their suitability.

For existing coating to be considered for over coating with new coating, all test criteria from the dry cross-cut tests and adhesion tests shall be satisfied as stated below.

Dry Cross-Cut Test

Carried out in accordance with BS EN ISO 2409.

At least 2 cross-cut tests need to be performed for each zone to be assessed. The results shall be interpreted as acceptable if they achieve: GT O, 1 or 2.

Adhesion Test

Carried out in accordance with BS EN 1542.

At least 5 pull off tests shall be performed per zone.

The results shall be considered as acceptable if they achieve the following:

Crack bridging or flexible systems

Adhesion test average > 0.8 N/mm² (MPa) with no single value below 0.5 N/mm² (MPa) or cohesive failure in the substrate.

Rigid systems

Adhesion test average > 1.0 N/mm² (MPa) with no single value below 0.7 N/mm² (MPa) or cohesive failure in the substrate.

All testing shall be carried out using an accredited testing house.

Existing Coatings and new Coating System

Wait at least 2 weeks prior to conduct dry cross-cut test and adhesion tests.

All acceptance criteria mentioned for existing coatings apply for the existing coatings and new proposed coating system.

Thickness of existing coating shall also be assessed to ensure full system of existing and new coatings do not exceed requirements for permeability to water vapour SD< 5.0m to prevent water vapour build up and possible coating system failure.

Failure to carry out any of the above compatibility, crosscut and adhesion tests may invalidate any guarantee

By suitable means, remove all delaminating coatings (and exposed laitance) back to a firmly adhering edge to the approval of the Contract Administrator.

Remaining coatings must be cleaned by high pressure water jetting or blast cleaning to remove all surface contaminants such as grease, dirt, etc, prior to over coating.

The resultant surface should be sound, clean and stable, with all defective locations exposed for attention.

Concrete Removal

After removal of defective concrete, the prepared repair area shall be free from dust, loose material, surface contamination and materials which reduce bond or prevent suction or wetting by repair materials.

Delaminated, weak, damaged and deteriorated concrete and where necessary sound concrete shall be removed by suitable mechanical or very high pressure waterblasting [up to 110 MPa (16500 psi)] techniques.

Tying wire fragments, nails and other metal debris embedded in the concrete should be removed where possible.

The edges where concrete is removed should be cut at a minimum angle of 90° to avoid undercutting and a maximum angle of 135° to reduce the possibility of debonding with the top surface of the adjacent sound concrete and should be roughened sufficiently to provide a mechanical key between the original material and concrete repair mortar.

Ensure sufficient concrete is removed from around reinforcement to allow coating and compaction of the repair material.

Preparation of Steel Reinforcement

Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion shall be removed to a minimum standard of SA2 or SA2½ depending on the reinforcement coating used.

The whole circumference of the exposed reinforcement shall be uniformly cleaned, except where structural considerations prevent it.

Unless the cleaning is carried out immediately before application of the reinforcement corrosion protection coating, the reinforcement shall be protected against further contamination.

Surfaces should be prepared using abrasive blast cleaning techniques or high pressure waterblasting [up to 60 MPa (9000 psi)] techniques.

Method and choice of cleaning shall take into account bar congestion, contact between bars, proximity to concrete substrate and other factors which prevent access for cleaning.

Where exposed reinforcement is contaminated with chloride or other material which may cause corrosion, the reinforcement shall be cleaned by low pressure water blasting [up to 18 MPa (2700 psi)] techniques to wash away contaminants.

REINFORCEMENT CORROSION PROTECTION COATING APPLICATION (BS EN 1504-7 Classification)

Carbonation induced corrosion

Immediately after preparation to SA2, apply to the whole exposed circumference of reinforcement, two coats of reinforcement primer as per manufacturers requirements.

Chloride induced corrosion

Immediately after preparation to SA2½, apply to the whole exposed circumference of reinforcement, two coats of chloride resistant primer as per manufacturers requirements.

CORROSION MANAGEMENT – CORROSION PREVENTION

Galvanic Anodes

APPLICATION OF GALVANIC ANODES TO ALL REPAIRED CONCRETE AREAS TO PREVENT INCIPIENT ANODE FORMATION IN ADJACENT CHLORIDE CONTAMINATED CONCRETE. IF CHLORIDES ARE >1%

General

At the concrete repair areas where defective concrete has been removed and reinforcement steel has been prepared in accordance with the preparation of steel reinforcement clause above.

In the case of unknown ingressed chloride levels and steel density, chloride levels will be assumed to be in the high risk category (<2% BRE Digest 444 Part 2 Figure 5) and a steel density ratio of 1.81 – 2.1.

Galvanic anodes shall be installed along the perimeter of the repair with spacing as specified by the designer and located on the contract drawings. Anode spacing will vary with changes in the reinforcement steel density, the level of chloride in the structure, corrosion activity, etc.

In the absence of any further data regarding chlorides levels and steel density ratio for the structural elements.

Anodes should be used, spacing should be at 450 mm centres.

Anode centres may be adjusted as more information on chloride levels and rebar spacing's becomes available as work progresses.

In no case shall the distance between anodes exceed 750 mm.

Where stirrups are located, connect additional anodes at these locations.

Where a reinforcement protection coating is to be used as part of the concrete repair system, do not apply within 150 mm of the tie wires or anode casing.

Installation

Install the anodes on the side or beneath the exposed reinforcement as close as practical to the edge of the surrounding concrete making sure that enough space is left to fully encapsulate the anode with the pre-mixed Embedding Mortar.

Minimum cover over the anodes/embedding mortar must be 20mm or minimum thickness of the Concrete Repair material for trafficked areas, 10mm or minimum thickness of the Concrete Repair material for non-trafficked areas.

A 20mm minimum clearance on sides adjacent to repair edge should be maintained.

Pre-soak anode units thoroughly in clean water for a minimum of 10 minutes to a maximum of 20 minutes prior to application of the Embedding Mortar.

Securely fasten the anode to prepared reinforcing steel using a suitable wire twisting tool to eliminate free movement, and to ensure a good electrical connection. Steel continuity within the patch should be verified with an appropriate continuity meter. If discontinuous steel is present, re-establish continuity with steel tie wires.

Electrical Continuity

Following the anode installation, electrical connection between the anode tie wires and the clean reinforcing bar should be confirmed with an appropriate continuity meter. A value of between 0.1 – 1.0 Ohm shall be achieved.

Anode Embedment

With the anodes securely in position, begin the repair process by packing the pre-mixed Embedding Mortar between the anode and the substrate to provide a conductive path to the substrate. Allow mortar to harden sufficiently to secure anode in place before applying a concrete repair mortar.

CORROSION INHIBITOR – (Exposed concrete parapet upstands to parking area/ramp)

SURFACE APPLIED INHIBITOR (BS EN 1504-9 principle 11 method 11.3)

Application of multifunctional corrosion inhibitor to all unrepaired concrete areas to reduce existing corrosion rates and delay latent damage corrosion in carbonated and chloride contaminated concrete, where chloride levels are below 1% and half-cell readings are 'below moderate level'

General

Corrosion inhibitor should be applied after the concrete repair areas have been fully reinstated.

The following construction materials have to be protected from splashes of corrosion inhibitor application:

Aluminium, copper, galvanised steel, marble and other similar natural stone.

Substrate Quality and Preparation

Surface preparation should have been carried out. The concrete shall be free from dust, loose material, surface contamination, existing renders, laitance, coatings, oil and other materials which reduce or prevent penetration.

Depending on the condition of the existing preparation, further treatment may be considered for the circumstances below:

Fair faced concrete: water blast the concrete surface with pressure (up to 18 MPa – 180 bars).

Concrete surface to be further overcoated: roughen the surface using water blasting with high pressure (up to 60 MPa – 600 bars) or grit blasting

Do not use hot water.

Allow substrate to dry out before application of corrosion inhibitor.

Application

Apply corrosion inhibitor to saturation by brush, roller, low pressure or airless spray equipment. Corrosion inhibitor is supplied ready for use and shall not be diluted.

Apply the corrosion inhibitor to be 0.5kg/m² depending on chloride and half-cell reading.

Vertical surfaces

2 - 3 coats.

Horizontal Surfaces

Saturate surface using 2 – 3 coats taking care to avoid ponding.

Waiting time between coats

This is dependent on the porosity of the concrete and the weather conditions, normally 1-6 hours. Allow the surface to dry out between coats to a matt damp appearance.

After the application of the last coat, as soon as the surface becomes matt, carry out a low pressure water dousing to assist penetration (water hose). This process maybe omitted if tests show that penetration has been achieved without water dousing.

The day after application, the treated surfaces shall be cleaned of any residue by pressure washing (~ 10 MPa – 100 bars) or encapsulated blasting if time is limited and deck coating need to be applied.

Corrosion Rate Monitoring

Where it is required to monitor concrete elements of the structure for monitoring the performance of the Concrete Repair and Protection strategy, an appropriate monitoring system should be implemented. The system should be designed by an experienced Corrosion Engineer.

BONDING PRIMER APPLICATION (HAND PLACED REPAIRS)

Before applying the concrete repair mortar, apply a bonding primer to concrete surface.

Pre-wet the surface of the repair area.

The surface should not be allowed to dry before application of the concrete repair mortar. The surface should achieve a dark matt appearance without glistening and surface pores and pits should not contain water.

Apply the pre-mixed primer to pre-dampened repair substrate at a thickness of $\geq 1.0\text{mm}$.

CONCRETE REPAIR MORTAR APPLICATION

General fabric of structure, upstands and outer edge beams

Small Non Structural/Overhead Repairs Hand Applied (BS EN 1504-3 Classification R3)

Apply the pre-mixed mortar “wet on wet” onto the bonding primer between the minimum and maximum layer thicknesses and compacted without inclusion of entrapped air pockets using a trowel or gloved hand.

Where layers are to be built up to prevent sagging or slumping, each layer should be allowed to stiffen before applying subsequent layers “wet on wet”. When layers cannot be applied “wet on wet”, or if more than 24 hours between layers elapses, apply a bonding primer and apply repair mortar “wet on wet”.

Finishing of the applied repair mortar should be carried out to the required surface texture as soon as the mortar has started to stiffen. To prevent surface cracking, do not apply water or overwork the surface with finishing tools.

Site adhesion values to comply with BS EN 1504-3 Non-Structural repairs minimum value 0.7 N/mm² (MPa)

Small Structural Repairs / Hand Applied (BS EN 1504-3 Classification R4)

Apply pre-mixed structural mortar “wet on wet” onto the bonding primer between the minimum and maximum layer thicknesses and compacted without inclusion of entrapped air pockets using a trowel or gloved hand.

Where layers are to be built up to prevent sagging or slumping, each layer should be allowed to stiffen before applying subsequent layers “wet on wet”.

When layers cannot be applied “wet on wet”, or if more than 24 hours between layers elapses, apply a bonding primer and apply repair mortar “wet on wet”.

Finishing of the applied repair mortar should be carried out to the required surface texture as soon as the mortar has started to stiffen. To prevent surface cracking, do not apply water or overwork the surface with finishing tools.

Site adhesion values to comply with BS EN 1504-3 - Structural Repairs 1. 2 -1.5 N/mm² (MPa).

CURING TREATMENT

It is essential to cure the repair mortar immediately after application for a minimum of 3-7 days depending on site exposure and weather conditions, to ensure full cement hydration and to minimise cracking. Use polythene sheeting taped down at the edges or other approved method.

Curing compounds shall not be used if subsequent smoothing coats/pore filling or protective coatings are to be used.

SMOOTHING COAT/PORE FILLER APPLICATION

(General fabric, soffits and upper parapet units)

Surface preparation should have been carried out in accordance with concrete substrate quality and preparation clause for uncoated concrete prior to application.

Tightly trowel a pore filler/sealer with manufacturers recommended mortar over the concrete surface to ensure that all blowholes and other surface imperfections are filled to provide a pore (holiday) free surface in preparation for protective coatings.

PROTECTIVE COATING SYSTEM APPLICATION

Following application of the coat/pore filler and anti-carbonation primer in all cases.

Apply by brush, spray or roller 2-3 coats of anti-carbonation coating to achieve a minimum total dry film thickness as manufacturers recommendations. Ensure that satisfactory opacity is achieved.

A 3rd coat may be required depending on substrate, coating colour and final thickness required.

Site adhesion values to comply with BS EN 1504-2 Adhesion test average for coating must be 1.0 N/mm² (MPa) with no single value below 0.7 N/mm² (MPa) for rigid coatings.

To be confirmed by trials prior to full coating application.

It is recommended that samples of the coating are applied to areas of the structure as controls before application to the complete structure for adhesion tests, and agreement of colour and surface finish.

MISCELLANEOUS DETAILS

Metal Substrates

All metal edges should be prepared to remove all traces of rust and primed with two coats of steel primer, before the resin is applied. The second coat of the steel primer shall be broadcast with quartz sand to provide a mechanical key.

Line Marking

Using manufacturers recommended materials, lines should be marked in accordance with the client's requirements. This can be applied by brush, roller or spray and the minimum consumption should be 0.6 kg/m². To prevent excessive wear of the lines; markings should be avoided on turning circles in the direct line of tyre travel.

Gullies

The waterproofing system is to be taken into the internal face of the gullies.

Substrate Moisture

Prior to applying an impervious resin system, the moisture content of the concrete should be measured at no greater than 4% by meter (or 75% relative humidity). If the value exceeds this then consult with manufacturer for recommendations.

Banding

All areas subject to potential movement including existing cracks/up-stands/day joints/beams lines and existing cracks should be fleece reinforced with Reemat and encapsulated with the resin after priming. This is not normally required in if a fully fleeced system is to be applied. All static cracks should be prefilled and levelled with PMMA resin.

All dynamic cracks should be assessed on site by a qualified structural engineer.

SYSTEM COLOURS

Colours are for representative purposes only and not exact. Please consult an official RAL Chart for an exact match.



RAL 7040 (or similar approved)



RAL 7037 (or similar approved)