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ARGENT (KINGS CROSS) LTD,
LONDON & CONTINENTAL RAILWAYS
AND EXEL PLC

GREAT NORTHERN HOTEL ARCADE

Supporting Statement
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Arcade Finishing Materials

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Lawray architects
Southbank House
Black Prince Road
London
SE1 7SJ

tel: 020 7138 3560
fax: 020 7138 3567

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1.0 Introduction

1.1 The principal factors which have been considered in the selection of the finishing materials for the arcade of the Great Northern Hotel are:

- Aesthetic Appeal
- Context (with surrounding materials / finishes)
- Architectural Authenticity (contemporary v's traditional)
- Serviceability (functionality)
- Consistency (of colour, shape and surface quality)
- Durability.

1.2 A carefully limited palate of generic finishing materials for the arcade were established via the approval of the parent planning and listed building consents. These materials comprise:

- Sheet stainless steel metal cladding
- Concrete cladding
- Stone Paving
- Plain lime render

1.3 The purpose of this discharge of conditions application is to confirm the precise nature and composition of these materials and how they are to be used. (For reference purposes, these finishes are indicated on the finishes Scope of Works drawings 212_04_812/01 & 02 (Rev E) and CGI renderings - Illustration 1 and Illustration 2.

2.0 Precast, Glass Reinforced Concrete (GRC)

2.1 Cladding Philosophy

2.1.1 The trend in cladding construction is towards lighter-weight façade materials. Typically, the skin thickness of GRC components are 15-20mm, making it as much as 80 per cent lighter than a corresponding traditional precast concrete unit. Weight reduction of this magnitude offers substantial savings in materials, transportation, structure, handling and site erection costs.

2.1.2 GRC has been selected as a material to form a cladding around the outer portion of the structure framing the openings of the entrances at ground floor level around the arcade. It is also proposed as a series of circular shaped column casings around the new structural columns of the arcade.

2.2 Composition & Finish

2.2.1 GRC is composed of a mortar mix of cement, selected crushed aggregates, sand, fillers, admixtures, water and alkali- resistant glass fibre strands. The glass fibre is typically 6-51mm long and 10-30 microns in diameter.

2.2.2 It obtains its alkali resistance from a coating applied over the glass strands in the manufacturing process. The material is through coloured and can be finished smooth or with a fine sand blast surface to exposes the texture of the fine aggregates laid in the face of the mould.

2.3 Manufacture

2.3.1 The various techniques used to manufacture GRC products – manual, mechanised spray methods and linear flat bed wet casting – enable the material to be formed in a wide variety of shapes and profiles. It can be easily cast into moulds to suit either Classical or Modern architectural expression using either thin flat sheets combining angular surface profiles or curved and free form casings.

2.4 Durability / Strength

2.4.1 Being cement based with no metal reinforcement, GRC also has inherently good durability and chemical resistances. It is non-combustible and produces no toxic smoke emissions and has very high impact strength. It is not susceptible to rust staining or corrosion, and can be used in combination with insulating material and soundproofing.

2.5 Detailing and Movement

2.5.1 Constraining factors in detailing are generally due to its relatively large thermal and

moisture movement and low ductility.

2.5.2 The need for GRC cladding to be flexibly mounted on the supporting structure and to accommodate thermal and moisture is of prime importance. Many of the failure problems associated with GRC have resulted from the lack of mobility in fixing design, from errors of installations, or as a result of introducing some other unintended restraint to panel movement of the individual panels.

2.5.3 Whenever possible, GRC panels should be designed as independent skins to allow maximum freedom to shape, curve and profile the panels whilst allowing for movement. This is achieved with good detailing of panel size; reducing skyward horizontal flat surface areas (such as cills which tend to collect surface water and create high moisture gradients in the panel); and avoiding panel shapes that wrap around a building corner causing large thermal movements.

2.5.4 These essential considerations have been acknowledged in the detailed design of the cladding panels in terms of panel size and jointing and the proposed fixings reflect good practice detailing. These fixings are analogous with those, which would generally be encountered with stone claddings such as pins and dowels.

2.5.5 The GRC cladding is able to carry its own weight locally, and the self-weight of the upper components will rest on (whilst being able to move independently of) the lower components. These drawings are referenced herein (Troika drawings 20506/01 and BCM drawings 20506-BCM-01 & 05).

2.5.5 The proposed GRC material finish and colour are illustrated in the accompanying Photo Sheets.

3.0 Stainless Steel Cladding and Profiles

3.1 Metal Sheet Cladding / Protection

3.1.1 Stainless steel claddings fabricated from sheet material can provide interesting forms of modern architectural expression. This material has proved extremely popular in contemporary public realm projects where durability and resistance to wear are factors to be considered in addition to appearance. Stainless steel is not an inexpensive option, so the quality of its finished appearance should be commensurate with its intrinsic value. As a material, it is sometimes (unfortunately so) limited to rather utilitarian applications.

3.1.2 Stainless steel sheet has principally been specified to clad around the structure of the openings on the inner faces and reveals of the entrances around the arcade. It is, therefore, being used to express one of the main architectural features of the arcade. It is also proposed as a series of half-circular and full circular column protectors to the GRC column casings along with corner protectors to rendered walls, kick plates/ skirtings, and shop-front window cills.

3.1.3 The new emergency escape doorsets from the hotel stair cores situated within the projecting façade bays on Pancras Road are also proposed in a matching stainless steel finish.

3.2 Applied Finish

3.2.1 ‘Granex’ (Rimex Metals UK Ltd) is a high quality matt surface finish applied to sheet stainless steel that is suited to high quality architectural design applications. It forms a non-reflective and non-directional finish. Granex is made with a very controlled factory applied bead blasting process to sheet and coil rolled stainless steel. The machine operation produces a peened finish that can be reproduced very consistently. Shot peening can be applied by hand using compressors, blasting equipment and blasting beads of varying degree of grit, though this does not provide the same level of consistency as with a factory applied process. With large-scale components consistency of finish is invariably an issue when peening is entirely applied by hand. Nevertheless, as a touching-in process after welding (and chemical etching to remove bluing) it can provide a complimentary process.

3.2.2 Granex M1A is a medium texture finish (rather than fine or course). The sheet material is supplied with a protective plastic film applied to the finished face, which can be left in place once fitted for protection during adjacent construction works.

3.3 Manufacture

3.3.1 The working techniques available to manufactures of architectural cladding components (using pre-finished stainless steel sheet) are generally limited to folding, bending and rolling and, thereafter, using mechanical fixing and bonding techniques for jointing.

3.3.2 Welding a pre-finished bead blasted sheet causes a ‘bluing’ of the surface caused by the

intense temperatures involved in welding. This can only be removed with a chemical etching solution, which in turn requires re-finishing by hand.

3.4 Durability / Strength

3.4.1 Being a stainless steel, Granex sheet has inherently good durability and chemical resistances. When formed into shapes and profiles, it attains very high rigidity and strength through the formed geometry. It is non-combustible and produces no toxic smoke emissions and has very high impact strength. It is not susceptible to rust staining or corrosion.

3.5 Detailing and Movement

3.5.1 As a metal, stainless steel sheet formed into rigid shapes can resist compression and tension stresses reasonably well and there are fewer considerations limiting its size and detailing other than limitations on the size of pre-finished sheet. A metal will obviously tend to expand and contract depending on ambient temperature.

3.5.2 Stainless steel cladding can beneficially be mechanically bonded onto a dimensionally (more) stable backing such as Versapanel boards or plywood, and these backings can be used to bridge joints and provide alignment between adjacent pieces. The backing boards can also be used to provide secret fixings to metal sub frames.

3.5.3 Whenever possible, stainless panels should designed as independent skins to allow maximum freedom to shape, curve and profile the panels whilst allowing for movement. This is achieved with good detailing of panel size and avoiding panel shapes that curve the material in more than one plane / direction.

3.5.4 These essential considerations have been acknowledged in the detailed design of the shapes and jointing of the stainless steel cladding panels and for the arcade and the component and fixing drawings reflect good practice detailing. These drawings are referenced herein (Lawray drawings 212_04_502).

3.5.5 Samples of the proposed cladding profiles are illustrated in the accompanying Photo Sheets.

4.0 Natural Sandstone Paving ('Yorkstone')

4.1 Paving Context

4.1.1 Unique amongst the materials used in the arcade, the stone paving is the only material that links directly with surrounding areas outside the arcade. The essence of the arcade space is it a semi-external space being accessible to the public and that pedestrian flow can move freely between Pancras Road, the Southern and Northern Square areas and the Western Concourse areas.

4.1.2 A natural 'Yorkstone' type paving has always been envisaged as a suitable flooring material to cover the arcade and this is influenced by its context to adjacent 'stone' paved areas.

4.1.3 Discussion with both LBC and Network Rail has led to the specification of the same Yorkstone as used in the realignment of Pancras Road (Whitworth Blue), so that the surface finish within the public realm is designed and brought forward as a co-coordinated and coherent piece of public realm. The designs for the Western Concourse currently indicate the use of a flame textured grey granite tile within the concourse.

4.1.4 With respect to design co-ordination between the Arcade and Western Concourse, this will have the desired effect of helping members of the public to read the difference between internal building versus public realm space, without the floor finishes becoming 'cluttered'. Meetings between Argent and Network Rail are ongoing in respect of public realm; however, this principle has been established between both parties.

4.2 Composition & Finish

4.2.1 Whitwoth Blue Sandstone is a fine-grained material quarried from the Whitworth Quarry in Rochdale, Lancashire. The colour characteristics of the material vary from slab to slab, but the generality is a Blue / Grey colour with inclusions of Brown / Buff. It has a density of 2550 kg/m3. Whilst it can be supplied with a flame-textured face, a sawn face is being proposed for the arcade paving. This will provide the necessary slip resistance in a wet pedestrian environment. The cut sawn finish will also be supplemented with some in-situ grinding on site to create the necessary smooth 'wind' of the ramped areas at the transitions of level.

4.2.2 It will be possible to treat the sandstone with a surface impregnator – such as Lithofin MN StainStop to reduce staining and discolouration through general wear and tear. This will be subject to the final appearance of in-situ samples.

4.2 Manufacture

4.2.1 The paving will be manufactured at a nominal thickness of 50mm. The stone slabs fall into two categories of shape, namely rectangular and tapered and these will all be manufactured off-site, limiting site cutting as much as possible.

4.3 Durability / Strength

4.3.1 Whitworth Blue Sandstone is classified as 'Very Durable' with good weathering properties. It has a compressive strength of 123N/mm2 and a flexural strength of 15.36.

4.4 Detailing and Movement

4.4.1 The centre portion of the arcade area paving (GL's 04 to 12) is based on the curved geometry of the building, i.e. the façade following a true curve. Beyond these grid lines the outer wings of the building are orthogonal. To resolve this change in geometry along the centre of the arcade (without the need to cut radial paving throughout), narrow banding slabs centered & parallel to each grid line will be cut and laid using standard square cut floor slabs. This then requires the infill areas between each of the banding elements to be splay cut to make up the subtle changes in angle.

4.4.2 The recommendations of BS 5385-1:1995 'Code of Practice Design and Installation of…Stone..' and BS 8298:1994 'Code of Practice for Design and Installation of Natural Stone Cladding and Lining' in respect of expansion and movement joints have been incorporated into the design of the paving layout and this is best understood with reference to the paving installation drawings 212_04_150/1 & 2.

4.4.3 The proposed Whitworth Blue stone material finish and colour are illustrated in the accompanying Photo Sheets.

5.0 Hydraulic Lime Render - Walls & Vaults

5.1 Render Context

5.1.1 The arcade works comprise of two generic render specifications, namely lime based Stucco work (plain and moulded to the exterior features of the building) and plain lime based render to wall and vaulted ceiling surfaces to the interior (and part exterior walls) of the arcade.

5.1.2 The stucco on the exterior of the building is an existing material /feature and this will be adapted and altered with making good works where necessary to reinstate these stucco features. An element of new plain render is proposed (externally) between the portal opening frames and stucco features, i.e. over the structurally altered brick façade.

5.1.3 The new stucco composition has been designed to match the existing stucco composition using a naturally hydraulic lime as the binder mixed with sand. (See Appendix 1 -Proposed Mixes and St Astier NHL Render Method Statement for application and mix analysis).

5.1.4 The plain rendered surfaces (internal & external) are all new features to the building, and whilst this is proposed using a lime-based binder generally, this will be using proprietary factory batched mixes rather than site-gauged mixes. (See Appendices 2 & 3)

5.2 Composition & Finish

5.2.1 There are 2 similar specifications proposed for the plain lime render for walls and vaulted ceilings inside and outside the arcade, but with each having different substrates / backgrounds.

5.2.2 The substrates will comprise:

1. Original clay facing brick to the external ground floor arcade walls.
2. Original clay common brick to the interior arcade piers and retained walls
3. New concrete blockwork to proposed internal arcade walls
4. New magnesium silicate boards to vaulted ceilings

5.2.3 The proprietary plain render to be applied to items 1 to 3 above is a Lafarge Group Restaura 1 system comprising factory blended natural hydraulic lime and sand. This will be applied in accordance with the method statement outlined in Appendix 2.

5.2.4 It is proposed to form the ceiling vaults using 2-3 layers of thin fibre-reinforced magnesium silicate boards fixed onto a metal suspension system. The application of a render carrier board, rather than EML riblath finished with hand applied render, will assist in forming a very uniform curvature and level surface to the vaults (which are also tapered between grids 4 and 12) geometry. It will also provide a very dimensionally stable substrate that has limited in-situ shrinkage problems.

5.2.5 A fibreglass mesh-reinforced floating coat 5-6mm thick will be applied over the boards as a floating coat, followed by further thin hydraulic lime finishing coats. A flat and consistent surface finish to the vaults is of prime importance since these will be illuminated with uplighting from the lightshelf fittings above the arcade entrance openings. A traditional full thickness hand-applied lime render is very unlikely to give the quality of surface that will be called for by the (unforgiving) indirect lighting system selected.

5.2.6 The proprietary floating coat render proposed in this instance is an Adesan CPV 22 anti crack thin coat render applied at a thickness of 5-6mm. This is a polymer modified factory mixed cement based render which will float out any minor inconsistencies in the boarding (curving in 2 planes in the tapering vaults). This will be followed by 2 coats of Restaura Finish 05. (See Appendix 3).

5.1 Detailing and Movement

5.1.1 The 1840's masonry structure of the hotel was not originally designed or built with any 'express' movement joints and it has not been immune from thermal distress cracking over the years. EML reinforcement is generally being applied to existing masonry substrates to even out any ongoing thermal stresses which might otherwise adversely affect the new render finishes. Within the arcade, the proposed new (curved) enclosure walls around the foyer / core area will be are built from new lightweight concrete blocks. These have fairly predictable shrinkage and thermal movement characteristics (albeit they will be shaded from most extremes) and movement joints are proposed in regular locations along the curved arcade walls to prevent uncontrolled movement and cracking of the blockwork and finishes.

5.1.2 The interior elevations of the arcade walls with movement joint positions are indicated on drawings 212_04_708 and 212_04_711

Appendix 1

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Proposed Mortar Mixes – New brickwork and indented repair brickwork
Proposed Stucco Mixes – Making good / reinstatement stucco mouldings

Sample Location	**Suggested Matching Mix (by analysis)**	**Suggested Equivalent Lime Mix (by analysis)**	**Contractor Proposed Mix**
Basement Stucco	1:2:8 Portland Cement: non-hydraulic lime (hydrated): Quartz sand	1:2 Hydraulic Lime: Sand (moderately hydraulic NHL 2.5)	1:2:8 to 9 Cement: non-hydraulic lime(hydralime): Quartz Sand
Southern Accretion Brick mortar	1:1:5 to 6 – Portland Cement: non-hydraulic lime (hydrated): Quartz sand	1:2$^{1}/_{2}$ Hydraulic Lime: Sand (moderately hydraulic NHL 2.5)	Not applicable - demolished
Main Elevation Brick Mortar (sample from SW corner)	1:2 to 2.5 with addition of Pozzolan @ 10% by volume	1:2 to 2.5 Hydraulic Lime: Sand (moderately hydraulic NHL 2.5)	*Limetec® Moderately Hydraulic Mortar Mix HLM 2.5* Mix proportion 1:2$^{1}/_{4}$ Hydraulic lime:sand - HLM2.5 (class III) at 90 days
Stucco (window reveal) Stucco generally	1:4 to 5 OPC : Quartz Sand	1:2 to 2$^{1}/_{2}$ Hydraulic Lime: Sand (moderately hydraulic NHL 3.5)	*St Astier Moderately hydraulic lime: sand mix* Scratch coat (3-5mm) 1:1$^{1}/_{2}$ NHL 3.5: Sand by volume (cast on) Undercoat (15-20mm) 1:2 NHL 3.5: Sand Finishing coat (5-10mm) 1:2$^{1}/_{2}$ NHL 3.5: Sand

Refer to:
Mortar Analysis Test Reports 3220 to 3223 by Peter Ellis Historic Building Consultancy, Materials, Method and Mortar Analysis
Limetech Hydraulic Lime Mortar Product Data Sheet
St Astier Natural Hydraulic Lime (NHL) Renders Guidance and Sands for Lime Mortars (NHL)

Natural Hydraulic Lime (NHL) Renders

The correct specification for any render should consider the nature and condition of the background, site exposure, time of the year (weather maps / rainfall and wind driven rain indices are available from the BRE) and type of finish required.

The success of a render depends on ensuring good background preparation and suction control, the correct choice of a mortar and its application. Sample panels should always be carried out.
The durability of a render depends on mortars that will adhere to the background, are able to breathe and resist harsh climatic conditions that can and do occur even in relatively benign climate zones. A good bond to the substrate and between all coats is essential to the soundness of the render structure. Bonding is both physical and mechanical:

- A physical bond is achieved by controlling the suction correctly, such that a suction bond develops. The natural surface condition can also offer a good key.
- Mechanical bonding is induced by the method of application. Ensuring good keying between layers, and especially the first coat, by casting/harling or spraying is by far the most successful method.

To avoid potential de-bonding and cracking each coat should be not be richer in binder or thicker than the preceding one (thicker base coats are applicable on thin stipple/scratch coats).

Sands for renders.
In dubbing out, stipple coats and base coats the sands should be well graded, washed and free of clay/silt (particles below 0.075). Use sharp sands from 3 or 4mm, down to 0.075mm, with the bulk of the sand in the 1.18mm/0.6/0.3/0.15 range. Fine sands or monogranular sands (bulk in 1 or 2 grades only) are to be avoided.
In finishing coats, finer sands, still well graded, can be used for smooth finishes (avoid overtrowling). Particular attention will have to be paid to finishing coats with fine sands to avoid high shrinkage due to the high amount of water that fine sands absorb. The use of a wooden float, energetically applied in small circular motions, will help. Floating with plastic floats is not suitable. Sponge floats can be used after the wooden float work is completed to achieve a particular texture in the finish. Curing will also be important. Small hairline shrinkage cracks can be healed if treated in time with a light water mist.

Note: the finer sand particles are the ones mostly responsible for colour and therefore used for colour rendition. If the fines denote presence of clay (particles below 0.075) the NHL binder quantity should be reduced (clays are also binders!). A wet sieving analysis is recommended to check clay / silt content.

Check that any movement cracks are stable and where necessary ensure they are properly tied and if needed, grouted/pinned/pointed. Careful removal of existing renders will result in less remedial repairs prior to re-rendering. Removal of failed or inappropriate existing render or finishes, including many types of paint, may require the walls to be left to dry out properly before re-rendering and time should be allowed for this. Ensure all repairs to the background are completed and that loose pinning stones or defective bricks are repaired or replaced prior to commencement of any rendering. Partial or complete re-pointing / consolidation may be required. Remove all loose and friable materials, remove and treat all organic growth, use biocides where applicable, ensuring that they will not affect the mortar.

Newly built walls should be allowed to dry properly, usually 1 month. This will not take place readily in winter conditions.

Repointing before rendering: if this is necessary it should be done with a compatible mortar.

Detailing: inspect all details, i.e. copings etc. Check gutters and down pipes and all forms of roof drainage, ground drainage and general ground conditions. Make sure all the above items are functioning properly and where remedial action is required, ensure it is completed before proceeding with render work.
Rendering should never come into contact with soil. Renders should be kept clear of the ground or finish at the base of a wall into free draining gravel.

Dubbing out: on defaced surfaces or in areas with a large amount of damaged joints it will be necessary to apply a dubbing out coat to provide a level surface. In most cases this will be sufficient with mortar, however very deep joints or hollows should be pinned to reduce the mass of mortar. When a dubbing out coat is used, let it set sufficiently (8-10 hours) before scraping it and keying it. Apply the first coat after approx. 2 days (more if very deep recesses have been filled) and depending on weather conditions.
Dubbing out should leave a relatively flat surface, keyed as necessary, on which to render.

Suction control: if needed, apply sufficient water to reduce excessive suction, especially on bricks and porous stone. Old bricks often require more water than new ones. On many occasions this is done the day before, if necessary several times with the last damping just before application starts. Apply water starting at the top of the structure. Over saturation of the background will result in loss of bond. Never render backgrounds that have standing water on the surface. Always dampen preceding coats before applying next coat.

It should be noted that in the presence of diferent suction levels the degree of dampening will vary accordingly.

Keying: provide adequate keying between background and base coat and between each coat. Crisscross patterns are preferred to combing. Make sure that keying does not cut too deeply. Sometimes joints in brickwork are raked back (normally 10mm), this is not necessary with NHL renders if a stipple coat is applied cast on, harled or sprayed on.

Two coat work

Two coat work is suitable for renders with an overall thickness of approx. 15 mm. on surfaces that provide adequate suction and a good key. On surfaces offering poor suction and keying, it is recommended to use a stipple coat (3-4mm thick) applied by casting on, harling or spraying. The main coat can be applied after sufficient hardening and finished as required. Alternatively use 3 coat work by applying a finishing coat.
On two coat work the base coat will be the thickest (up to 10mm, more if applied in 2 passes) and with a binder: sand ratio of 1:1.5 or 1:2. Use mainly NHL 5 or NHL 3.5.
This can be laid on or preferably cast/sprayed on. Scour back and key after initial setting.
To ensure a flat and uniform surface see "Ensuring a level surface" under Undercoat in 3 coat work section.

Curing: check for initial shrinkage. If found, dampen surface lightly with water and tighten back and re-key. Repeated shrinkage is usually a function of poor quality sands, poor suction control or rapid drying.

Finishing coat: use NHL 3.5 (Chaux LC pure) or NHL 2 (Terechaux) (see individual product sheets) 5mm max. for smooth or light textured finishes, 7-8mm for coarse finishes (tyrolean, roughcast etc).

Smooth and light textured finishes: use finer well graded sands, 1-2mm down to 0.075mm. Add just enough water to obtain required workability. The more water is added the higher the risk of shrinkage. When the mortar is firm enough, proceed to float up with a cross-grained wood float. This is the most important phase of the finishing work and should be done diligently together with good curing and protection it is vital in obtaining a good finish. See "Protecting Lime Mortar".

Coarse finishes: use coarser sands if thick (rustic) granular finishes are required. The thickness of the coat depends on the final finish required. Some of these finishes, especially the ones requiring special skills such as cottage, scraped and travertine effects, could also be done by using the same type of sand as smooth and light textured (floated) finishes. In these and tooled renderings (patterned), if initial shrinkage takes place, lightly dampen the surface and re-float the area during the first day or two. Tooling is normally applied when the render is 5-7 days old.

Dry dashing: throw the chosen aggregate onto soft mortar and leave exposed. To speed up the work a plasterer throwing the aggregate can follow the laying on plasterer.
Curing: curing by water mist over 3 to 4 days, if necessary more than once a day, is essential when weather conditions would cause quick drying. See "Protecting Lime Mortar".

Three coat work

Background preparation, sands, suction control, keying and dubbing out: as previously described.
First coat: has to provide sufficient bonding. Stipple or spatterdash can be used on all backgrounds, but especially on impervious and smooth background. Leave these coats rough to provide a key. Use richer mix (1:1.5 preferably). The normal thickness is between 3 and 5 mm. On soft or weak background use 1:2 or 2:5. Successive coats must be weaker than this coat. The thickness of the first coat depends on the nature of the background and the overall thickness required of the render.

A laid on scratch coat can be used on old bricks or surfaces providing a good key (greater care is required in application to ensure good bonding with the background). It will be scoured back with a cross grained wood float and keyed (crisscross keying pattern preferred) once initial stiffening has taken place.

Second coat (straightening): to be applied 2 days (or more, depending on weather conditions) after completion of first coat. Its strength should be less than the first coat. Thickness will vary according to the overall thickness required but it is normally between 10 and 15 mm. It must not be over 20 mm thick. If this is required it should be done in successive coats each not exceeding 20 mm. The thicker the intermediate coats, the longer the waiting time before each subsequent application.

Ensuring a level surface: to achieve a uniform and level surface fix vertical timber battens or dab's on the wall at 2-2.5 m. interval. If the wall is uneven use spacers and check that battens are straight with a plumb level. Fill out to screeds, if necessary in layers. Screed off excess mortar between battens with a wooden straightedge spanning between the battens. When battens are taken down, fill in strips with the same mortar.
An alternative is to make running screeds 100mm. wide at regular intervals.
Scour back and key as usual after initial setting. Check for shrinkage during the first 2 days and, if necessary, lightly dampen the relevant area, tighten back and re-key. In case of intermediate coats this would apply to each coat. Do not apply finishing coat until undercoat is adequately hardened.

Finishing coat and curing: as per 2 coat work.

Protecting NHL mortars and renders

The setting properties of NHL mortars require protection against adverse weather conditions. Precautions are necessary and, if in doubt, your St. Astier Distributor will be able to advise further.

See "Protecting Lime Mortar".

Early exposure to rain will cause some moisture absorption in the first few millimeters of a fresh render. If frost occurs, there might be damage. The figures given above refer, therefore, to a render that has not been subject to water penetration in its early life.

The preferred form of protection is hessian covers that, with re-damping, will also contribute to curing the mortar. Hessian covers are essential to protect against frost. Plastic sheeting is effective against rain but should be kept clear of fresh work. If too tight it will generate condensation leading to unsightly staining. It will not protect against frost. Frost protection should be provided even if frost is not occurring at the moment of finishing the day's work but is forecast during the early days of a mortar. Work should not start in frost conditions or when frost is forecast or with temperatures below 5°C. In working with NHL 2 or in rendering with fine finishing coats, this should be 8°C. Protection from the quick drying effects of wind or direct strong sun should be provided by using shading sheets on scaffolding. See "Protecting Lime Mortar".

Good working practices

In this document we have already discussed items such as background preparation, suction control, detailing, keying, protection and curing. A good and durable result depends mainly on these factors, the correct mortar mix, sand, dosages and workmanship. One item not to be overlooked is scaffolding.

Where scaffolding is being used make sure that the scaffolding has adequate clearance from the face of the wall to allow application, avoiding unsightly lift lines. Scaffolding should project past all areas to be rendered to allow for protection of the new work against direct rainfall. Generally scaffolding should be capable of carrying the protective screens necessary to shade the work and prevent rapid uncontrolled drying and any covers needed to protect against frost. See "Protecting Lime Mortar".

NHL Renders Diagnostics

Defect	*Causes*	*Remedies*
Shrinkage & Cracking greater than 2mm	General or partial movement of the background or the building.	Check if movement is still active. (Engineer to check). If building stable, repair cracks / areas.
Less than 2mm	Thermal movement.Poor workmanship. Render too thick. Too much water in mix. Over saturated backgrounds. Insufficient setting between coats.	Depending on extent, open out crack and fill with same mortar.
Hairline cracks	Bad preparation of background.Over saturated background.Too much binder.Too many fines in sand.Finishing coat to thick.Too much water in the mix.Rapid drying / lack of protection. Too much sun or wind during curing.	Either apply slurry fill if sound or remove and replace properly.
Loss of Bond	Poor background preparation. Poor suction control. Over saturated background. Background too smooth. Incompatibility with existing background. Insufficient strength in bonding coat. Background movement. Metal corrosion.Salt crystallisation. Excessive or late towelling.	Repair or replace as appropriate.Consolidation by grouting may be considered.
Bulging	Poor background preparation.Incompatibility with existing background.Metal corrosion. Frost damage during curing.	Depending on the extent of damage, either partial repair or total replacement. Neutralise and treat any rusting metal.
Powdering / Friability	De-calcification of render (loss of binder). Poor background preparation. Poor suction control. Rapid evaporation of water during application, (pror to adequate set). Frost damage. Insufficient binder dosage. Variation in surface compaction / finishing. Poor sands.	Partial or total repair with correct mortar applying due protection and following best practice.
Water penetration.	Poor background preparation. Weak mortars. Bad detailing.	Partial repair. Light repairs with several coats of lime wash.Rectify detailing problems. Replace if necessary.

NHL Renders - Some recommended mixes

Background Prepare background Re-point and dub out as necessary with compatible mortar.	**Stipple Coat Cast or sprayed on only** Must be used on poor suction, dense / smooth surfaces. Leave as Cast Cure 2-4 days	First Coat Cast, spray or lay on. Well-keyed background. Control suction. Leave Keyed Cure 4-7 days	**Second Coat** Cast, spray or lay on. Control suction. Straightening coat. Leave keyed. Cure 7-10 days. Finishing coat in 2 coats work.	**Finish** Cast, spray or lay on.Control suctionFinish as required Cure min 3-10 days
Cob / Earth	Mix 1A - Sand SG3-5mm	Mix 1B - Sand SG10-15mm	Mix 1C - Sand SG5-10mm	Mix 1C - Sand SF / FS3-5mm
Wooden Lath		Mix 2B/3B - Sand SC12-15mm (8-10 cover)	Mix 2C - Sand SC8-10mm	Mix 1C - Sand SF3-5mmMix 2C - Sand SM5-8mm
Metal Lath		Mix 3B - Sand SC10-15mm (8-10 cover)	Mix 2B - Sand SM10-20mm	Mix 1C - Sand SF3-5mmMix 2C - Sand SM5-8mm
Soft Brick / StonePorous Blocks		Mix 1B - Sand SC10-15mmMix 2B - Sand SC10-15mm	Mix 1B/C - Sand SC/SM10-12mmMix 2B/C - Sand SC/SM10-12mm	Mix 1C - Sand SF3-5mmMix 2C - Sand SM5-8mm
Medium Brick / Stone / Blocks	Mix 2A/3B - Sand SG*3-5mm	Mix 2B/3C - Sand SC10-20mmMix 2B/3B - Sand SG**10-15mm	Mix 2C/3D Sand SC/SM8-12mmMix 2C/3C Sand SG**6-10mm	Mix 1C - Sand SF3-5mmMix 2C - Sand SM5-8mm
Dense Brick / Stone/ Blocks/ Concrete	Mix 2A/3A - Sand SG3-5mm	Mix 2B/3C - Sand SC10-20mmMix 2B/3B - Sand SG**10-15mm	Mix 2C/3D Sand SC/SM8-12mmMix 2C/3C Sand SG**6-10mm	Mix 1C - Sand SF3-5mmMix 2C - Sand SM5-8mm

Lime	**Mix A 1:1.5**	**Mix B 1:2**	**Mix C 1:2.5**	**Mix D 1:3**	**Mix E 1:4**
NHL 2	1A	1B	1C	1D	1E
NHL 3.5	2A	2B	2C	2D	2E
NHL5	3A	3B	3C	3D	

Sands	**Type**	**Particle Sizes**
SG	Sharp gritty	5mm down to 0.075
SC	Sharp coarse	3.35mm down to 0.075
SM	Sharp medium	2.36mm down to 0.075
SF	Sharp fine	1.18mm down to 0.075
FS	Fine soft	0.8mm down to 0.075

* Stipple coat optional, depending on background suction and conditions.
** For harling applications.

Note: a wide variety of finishes can be achieved by adopting different binder and sand mixes to satisfy all requirements.

Coat thickness and optional mix ratios are related to exposure and background conditions and are the responsibility of the designer.

Curing and protection must follow best working practice.

See "Protecting Lime Mortar".

For further Guidance, contact your St Astier Distributor.

Appendix 2

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Textured
European
Finishes

TECHNICAL DATA SHEET

N. V1210.S.698

ADESAN CPV 22

Polymer modified, cement based render in powder form

DESCRIPTION and USES

ADESAN CPV 22 is a high quality cement based render coat ideal for the following uses:
- to restore old wall surfaces, even in the presence to fine cracks;
- to uniform the finishing on supports of different nature are present on the same facing;
- it is the perfect render for use under mineral based systems such as IKOS, VIXALIT, SILICA PAINT, etc.;
- to recoat old textured coatings when a new look wants to be given.

ADESAN CPV 22 is also ideal for use in our exterior thermal insulating "Overcoat" system where it is used as an adhesive for bonding insulating boards to the substrate and as a base coat to embed the fibreglass mesh over the applied boards.

Characteristics of the product after application
The product has an excellent resistance to alkali, it is highly permeable to water vapour has outstanding adhesion properties to various substrata such as cement bricks, insulating boards, etc.

TECHNICAL CHARACTERISTICS

Composition	Based on white or grey cement, synthetic polymers, selected extenders, aggregates and additives.
Physical state	powder
Temperature range for use	between + 5°C and +35°C
Quantity of water to be added	about 22% in weight.
Pot-life of the prepared mixture	about 4 hours at 20°C and 65% R.H.
Drying time	about 4 - 5 days at 20° et 65% R.H.

ADVISED CONSUMPTION

As a render coat: about. 1.7 - 1.8 kg/m^2/mm of thickness applied
As adhesive/base coat in the insulating system: about 5 – 7 kg/m^2
The actual consumption of the finished render will depend totally on the condition of the substrate and on the application to be effected.

PACKING	**COLORS AVAILABLE**
Bags of 25 kg each	GREY and WHITE

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INSTRUCTIONS FOR USE

SURFACE TREATMENT OF THE SUBSTRATE

The substrata must not present depressions greater than 1 cm. If this should be the case, then it will be necessary to the restore the surface to an acceptable planarity. Ensure that the surface to be rendered is perfectly dry, clean, not powdery and free from traces of oils, old paint or other parts not perfectly anchored.

PREPARATION OF THE MIXTURE

Mix together 100 parts of ADESAN CPV 22 powder with about 22 parts of clean water (this means about 5,5 litres of water to every 25 kg bag). It is advisable to mix with a propeller on a drill or a mixing machine (at low r.p.m.) in order to obtain a perfectly well blended mixture. Wait for about 10 minutes before application to ensure that powder particles have perfectly absorbed the water. Use the mixture within about 4 hours

METHOD OF APPLICATION

As a render coat
Apply the prepared ADESAN CPV 22 mixture to the wall surface with a steel trowel so as to level and uniform the wall surface then pass over with a sponge trowel to remove all imperfections and attain the typical render finish.
For supports which present fissures and small cracks
Apply the prepared ADESAN CPV 22 to the wall with a stainless steel trowel then embed a layer of fibreglass mesh into the wet coat of render and lightly press the mesh into place with a steel trowel until a smooth surface is attained and the mesh is no longer visible.
For use in the thermal insulating "overcoat" system
For substrates such as renders, mortars, prefabricated panels, concrete:
Apply the prepared ADESAN CPV 22 onto one face of the insulating board using the appropriate notched trowel (our trowel n.1 with "v" shaped 6 mm notches) then fix the board firmly into place. The use of the notched trowel will control the quantity of product applied and will also give a homogeneous distribution of the paste.
For well laid brick or cement block walls or walls with a highly irregular planarity:
Apply the prepared ADESAN CPV 22 onto one face of the insulating board using the spot and ribbon method: distribute about 6-8 spots of paste over the panel surface and a ribbon of paste around the perimeter then fix the board firmly into place.
As a base coat over the applied insulation boards:
Apply the prepared ADESAN CPV 22 mixture over the surface of the boards using the appropriate notched trowel (our trowel n.3 with big "U" shaped notches and 20 mm pass) then embed the reinforcing fibreglass mesh into the wet base coat and lightly press the mesh into place with a steel trowel until a smooth surface is attained and the mesh is no longer visible.
N.B. It is advisable to consult the specific literature on the insulating system for more detailed information.

STORAGE

Store the bags in fresh and dry ambient conditions since any contact with water or excess humidity will damage the product.

WARNINGS AND SUGGESTIONS

The temperature for application and during drying is recommended to be between +5°C and +35°C. Do not work in the presence of wind, rain, under direct sunshine and if frosts are forecast for the night. Do not apply onto substrate that are either frozen or too hot.

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Restaura 1 – Plain Lime Render
Application Method Statement

General

All surface preparations requirements for the Restaura 1 system are similar as for ordinary sand and cement renders. BS 5262 Code of Practice for external rendering and BS 8000 Code of Practise workmanship on building sites part 10 should be followed.

Only clean water fit for drinking should be used for gauging.

Cement/lime products should not be applied to substrates which are frost laden or which have recently been subject to prolonged rain.

The product contains hydraulic lime and can cause burns. Always use suitable gloves and eye face protection. In case of contact with eyes, rinse with plenty of fresh water. If irritation persists seek medical advice.

Storage

Cement/lime products must be stored off the ground, under cover and in dry conditions.

Preparation

All surfaces must be clean, suitably dry, sound and free from anything that may interfere with the adhesion of the materials to be applied. All oil or laitance must be removed from the surface.

Further advice may also be included in the following substrate section.

Arrises and Feature Stops

Form angles, and feature stops with clean straight timber battens. Alternatively stainless steel stop beads can be used.

Suction

Before the application of any new lime coatings, hydraulic or non-hydraulic, it is very important to check to the degree of suction within the background, poor or excessive suction can result in a failure with the substrate caused by rapid drying

Of the newly applied render, this will result in a weak and powdery interface which will lead to later failure and separation.

Where there is little or no suction further action will be required to help bond the coating to the substrate. In situations where suction needs to be controlled, wetting down will be required, on dense blocks or near impervious masonry, simply dampening the surface with a mist spray may be all that is required, however on very porous surfaces such as old brickwork considerable wetting will be required. Wetting the wall by use of a hose, working from the top of the structure, downwards, may need to be carried out the previous day or several times throughout the day before rendering commences. The objective of the suction control is to achieve a thoroughly damp surface, but not wet, the surface must not have running or standing water remaining on the masonry or brick, as this will form a barrier between the

coating and substrate, also lime mortars adhere and stiffen through a certain amount of suction.

Substrates Bare Brick Substrates

Brush the wall well to remove all traces of loose and friable dust and any existing traces of efflorescence if found. See the paragraph on suction above which relates to the bare substrate.

Substrates smooth or no suction

Soak the wall with water within approximately 10mins apply a coat of Liquido Antisale by brush.

Immediately after the application of the Liquido Antisale, mix the Barriera Antisale with water and apply a rough coat of Barriera Antisale by splaterdash method or plastering machine to a thickness of approximately 8-10mm. leave the surface rough for adhesion of mortar.

Application Restaura 1

Mix the Restaura 1 with approximately 5 litres of water per 25kg bag. Mix with a rotary drill and whisk. Wet the wall surface and apply the prepared mix with a trowel to an even thickness of 10-12mm, level and rule off.

Allow to cure (feel hard to the touch) before applying subsequent coats. You must wet the wall surface in between coats; it should be damp and not running. Once the desired thickness has been achieved finish with a sponge or plastic float.

Appendix 3

RESTAURA FINISH 05

Natural white hydraulic lime based thin render

DESCRIPTION and USES

RESTAURA FINISH 05 is a white, lime based render used to attain thin renders on either interior or exterior walls over RESTAURA or RESTAURA DEUMIDIFICANTE or over mortars based on hydraulic lime, cement-lime or premixed mortars. RESTAURA FINISH 05 guarantees the maximum breathing capacity to the wall. It has good adhesion properties, is ecological, not flammable: Class MO, will not shrink and is insensible to the attach of primary bacteria and fungi. RESTAURA FINISH 05 is an ideal substrate for the application of lime based paints and decorative putties, silica based paints or emulsion paints. It is advisable for use in the restoration of historical buildings where lime based products must be used or in the modern building industry where ecological and breathable products are required.

TECHNICAL CHARACTERISTICS

Composition	Premixed mortar in powder form based on natural, white, hydraulic lime and selected extenders.
Granulometric size	0.5 mm maximum
Minimum temperature for application and curing	+ 5°C
Mixing water required	About 28 - 30%
Working time of the prepared mixture	About 4 hours at 20°C and 65% R.H.
Curing time	Allow about 28 days to pass before proceeding with the application of the coloured finish.

ADVISED CONSUMPTION

About 1,8 kg/m^2 per mm of thickness applied (normally 1,5 – 2 mm required)
The actual quantity required will be dependant on the conditions of the substrate and the finish achieved.

PACKING	COLOUR
Bags of 25 kg each.	Natural white colour of the hydraulic lime used

MATERIS PAINTS ITALIA S.p.A. - VIERO
Export office: Via Provinciale, 309 - 21030 CASSANO VALCUVIA (Varese) – Italy
Tel. (+39) 0332.999311 - Fax (+39) 0332.999399

INSTRUCTIONS FOR USE

SURFACE TREATMENT OF THE SUBSTRATE

Ensure that the substrate is clean and free from oils, grease, salts, powders and any foreign matter.

PREPARATION OF THE MORTAR

Mix RESTAURA FINISH 05 powder with about 7 litres of fresh, clean water to every 25 kg bag of product. The exact quantity of water required will however depend on the working consistency desired. It is advisable to mix with a mechanical mixer in order to achieve a good, homogenous mortar.

METHOD OF APPLICATION

1. Prior to the application of the RESTAURA FINISH 05 it will be necessary to wet the wall with water to refusal.
2. Apply the freshly prepared mortar with a trowel to an even thickness then smooth the surface with a sponge trowel in rotary movements to a thin finish (a wooden or plastic trowel can also be used)
3. Allow the mortar to cure for about 28 days before proceeding with the application of the final finish or paint, with exception of lime based finishes that can be applied even after 48 – 72 hours.
4. The ideal finish for this render is our SILICA PAINT, however VIXALIT, lime based paint, any lime based finish or synthetic based finish can be used.

STORAGE

The product can be stored for 6 months in original sealed bags. Protect from humidity, frost and strong heat.

WARNINGS AND SUGGESTIONS

The temperature during application and drying is recommended to be between +5°C and +35°C. Avoid application under strong sunshine, with high winds and rain.
The product contains hydraulic lime and can be irritant. Wear suitable gloves and eye/face protection during use. In case of contact with eyes, wash with plenty of water and seek medical advice.

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Tel. (+39) 0332.999311 - Fax (+39) 0332.999399