210063

Tuffin Ferraby Taylor LLP

Crown Estate

Fabric Enhancement Programme

Phase 2 Stewardship Enhancement Programme

14-01-2022

Refurbishment of external façades and roofs

Contents

C20
Demolition

General requirements

110 Desk study/ survey

1. Scope: Before starting deconstruction/ demolition work, examine available information, and carry out a survey of:
   1.1. the structure or structures to be deconstructed/ demolished,
   1.2. The identification and location of services above and below ground,
   1.3. The form, location and removal methods of any toxic or hazardous materials,
   1.4. the site on which the structure or structures stand, and
   1.5. the surrounding area.
2. Report and method statements: Submit, describing:
   2.1. Form, condition and details of the structure or structures, the site, and the surrounding area.
   2.2. Type, location and condition of features of historical, archaeological, geological or ecological importance.
   2.3. Type, location and condition of adjoining or surrounding premises that might be adversely affected by removal of the structure or structures, or by noise, vibration and/ or dust generated during deconstruction/ demolition.
   2.4. Identity and location of services above and below ground, including those required for the Contractor's use, and arrangements for their disconnection and removal.
   2.5. Form and location of flammable, toxic or hazardous materials, including lead-based paint, and proposed methods for their removal and disposal.
   2.6. Form and location of materials identified for reuse or recycling, and proposed methods for removal and temporary storage.
   2.7. Proposed programme of work, including sequence and methods of deconstruction/ demolition.
   2.8. Details of specific pre-weakening required.
   2.9. Arrangements for protection of personnel and the general public, including exclusion of unauthorized persons.
   2.10. Arrangements for control of site transport and traffic.
   2.11. Special requirements: Results of tests to determine the precise nature of hazardous materials
   Site waste management plan development and proposals
   Structural calculations in support of method statements
3. Format of report: Contractors' choice.

120 Opening up

1. General: Carry out opening up to determine the extent of structural defects, rot and the like, as itemised in the SMR, and agree remedial works with the Contract Administrator before commencing any works. Note that extensive opening up may require Listed Building Consent.

130 Architectural features

1. General: Protect all architectural features to remain with casings/protection to be agreed with the Contract Administrator before commencing any demolition.

140 Bench marks

1. General: Report any bench marks or other survey information, boundary markers and the like found on structures to be demolished. Do not destroy without the written permission of the Contract Administrator.

Services affected by deconstruction/ demolition

210 Services regulations

1. Work carried out to or affecting new and/ or existing services: Carry out in accordance with the byelaws and/ or regulations of the relevant Statutory Authority.

230 Services disconnection arranged by contractor

1. General: Arrange with the appropriate authorities for disconnection of services and removal of fittings and equipment owned by those authorities prior to starting deconstruction/ demolition.

270 Services to be retained

1. Damage to services: Give notice, and notify relevant service authorities and/ or owner/ occupier regarding damage arising from deconstruction/ demolition.
2. Repairs to services: Complete as directed, and to the satisfaction of the service authority or owner.

Deconstruction/ demolition work

310 Workmanship

1. Standard: Demolish structure(s) in accordance with BS 6187 and Health and Safety Executive Guidance Notes GS29/1, 3 and 4.
2. Operatives
   2.1. Appropriately skilled and experienced for the type of work.
   2.2. Holding, or in training to obtain, relevant CITB Certificates of Competence.
3. Site staff responsible for supervision and control of work: Experienced in the assessment of risks involved and methods of deconstruction/ demolition to be used.

320 Gas or vapour risks

1. Precautions: Prevent fire and/ or explosion caused by gas and/ or vapour from tanks, pipes, etc.

330 Dust control

1. General: Reduce airborne dust by periodically spraying deconstruction/ demolition works with an appropriate wetting agent. Keep public roadways and footpaths clear of mud and debris.
2. Lead dust: Submit method statement for control, containment and clean-up regimes.

340 Burning on site

1. General: Will not be permitted.

350 Noise

1. General: Works that cannot be executed without undue noise or vibration are to be carried out at such times as are to be agreed with the Contract Administrator.

355 Health hazards

1. General: Take adequate precautions to protect site operatives and the general public and neighbours from health hazards associated with dangerous fumes and dust arising during the course of the Works.

360 Adjoining property

1. Temporary support and protection: Provide. Maintain and alter, as necessary, as work proceeds. Do not leave unnecessary or unstable projections.
2. Defects: Report immediately on discovery.
3. Damage: Minimize. Repair promptly to ensure safety, stability, weather protection and security.
4. Support to foundations: Do not disturb.

365 Structures to be retained

1. Parts which are to be kept in place: Protect.
2. Interface between retained structures and deconstruction/ demolition: Cut away and strip out with care to minimize making good.
3. Prevent debris from overloading any part of the structure which is not to be demolished.

370 Partly demolished structures

1. General: Leave in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse. Make secure outside working hours.
2. Temporary works: Prevent overloading due to debris.
3. Access: Prevent access by unauthorized persons.

380 Dangerous openings

1. General: Provide guarding at all times, including outside of working hours. Illuminate during hours of darkness.
2. Access: Prevent access by unauthorized persons.

390 Asbestos encapsulation

1. General: Encapsulation of asbestos is not acceptable.

410 Unforeseen hazards

1. Discovery: Give notice immediately when hazards such as unrecorded voids, tanks, chemicals, are discovered during deconstruction/ demolition.
2. Removal: Submit details of proposed methods for filling, removal, etc.

420 Retaining walls

1. General: Ensure that retaining and party walls always have sufficient buttressing; provide temporary supports as necessary to the approval of a suitable experience Structural Engineer (preferably conservation accredited).

Materials arising

510 Demolition materials

1. General: Materials are not to be sold direct from the site.

511 Employer's property

1. General: Agree with the Contract Administrator, components and materials which are to remain the property of the Crown Estate. Carefully remove and store on site where directed. Protect until removed by the Crown Estate, reused in the works, or end of the Contract.

520 Surplus materials

1. General: Surplus materials which are the property of the CEPC are to be handed back to the CEPC.

Ω End of Section

C30
Shoring/ facade retention

To be read with preliminaries/ general conditions.

110 Loading and Maintaining Support Structures

1. General: Agree with the Contract Administrator and Structural Consultant the method statement for the loading and maintaining of support structures.

120 Commencement Condition Survey

1. Before starting work:
   1.1. Survey the existing state of structure to be kept in place to locate and record the magnitude and extent of all cracks, spalling, flaking and other irregularities of the fabric.
   1.2. Agree the commencement condition survey record with the Contract Administrator

130 Retention of Structure

1. Where structure is to be retained: Agree details of supporting structure and structural monitoring procedures with the Contract Administrator.

140 Unknown Hazards

1. General: Inform the Contract Administrator of any unrecorded voids, flues, services, etc. discovered during erection of support systems. Agree with the Contract Administrator methods for infill, making good, relocation of support connections, etc.

150 Damage

1. General:
   1.1. Promptly repair any damage caused to adjoining property by erection or connection of support systems. Make good to ensure safety, stability, weather protection and security.
   1.2. Report to the Contract Administrator any damage caused to retained facades by erection or connection of support systems. Agree methods of repair with the Contract Administrator.

160 Completion Condition Survey

1. General:
   1.1. After disconnection of support systems, survey and record the state of structure kept in place.
   1.2. Ensure that all defects caused by or due to support systems have been remedied.
   1.3. Agree the completion condition survey record with the Contract Administrator.

170 Making Good

1. General:
   1.1. Repair any connection holes made in the structure kept in place with methods and materials as agreed with the Contract Administrator.

System performance - Not Used

Products - Not Used

Execution - Not Used

Completion - Not Used

Ω End of Section

C40
Cleaning masonry/ concrete

General/ preparation

110 Cleaning masonry/ concrete

1. Cleaning
   1.1. The method of cleaning brickwork depends upon the degree and cause of the soiling.
   1.2. Contractors must be experienced in cleaning historic buildings.
   1.3. Present details of soiling and proposals for cleaning to the Contract Administrator for approval before commencing any work.
   1.4. Proposals must included details of collection of run-off and disposal/recycling of dirty water.
2. Comply with section 1 of BS 6270: Parts 1 and 2 in respect of:
   2.1. Means of access;
   2.2. Protection of building fabric, external and decorative fixtures;
   2.3. Protection of operatives, building users and public.

120 Algae and Lichens

1. General
   1.1. Remove any algae or lichens found in old weathered joints using an approved biocide following the manufacturers recommendations.
2. Biocides
   2.1. Apply a biocide as approved by the Advisory Committee on Pesticides following Health and Safety Executive guidelines and COSHH Regulations.

142 Removal of fittings

1. Timing: Before commencement of cleaning work.
2. Disturbance to surfaces: Minimize.

160 Protection

1. Surfaces not designated for cleaning: Prevent damage, including marking and staining.
2. Openings: Prevent ingress of water, cleaning agents, and detritus.
   2.1. Vents and grilles: Seek instructions before sealing up.
3. Temporary mechanical fastenings
   3.1. In masonry: Locate in joints.
   3.2. In other surfaces: Seek instructions.

175 Control and disposal of wash water and detritus

1. Disposal: Safely. Obtain approvals from relevant Authority.
2. Control of wash water: Collect and divert to prevent ingress and damage to building fabric and adjacent areas.
3. Above and below ground drainage systems: Keep free from detritus and maintain normal operation.

190 Cleaning generally

1. Operatives: Appropriately trained and experienced for each type of cleaning work.

1.1. Evidence of training: Submit on request.

2. Control of cleaning: Confine cleaning processes and materials to designated areas. Prevent wind drift.
3. Detritus: Remove regularly. Dispose of safely.
4. Monitoring: Frequently check results of cleaning compared to approved trial samples. If results established by trials are not achieved, seek instructions.
5. Modifications to cleaning methods and materials: Seek instructions.

215 Record of cleaning works

1. Written report: Record cleaning methods and procedures used for each type of surface and deposit.
   1.1. Content: Relevant attributes of cleaning methods used including:
      1.1.1. Equipment and settings.
      1.1.2. Dwell times.
      1.1.3. Number of applications.
      1.1.4. Ambient temperatures.
2. Additional documentation: Survey before cleaning: Photogrammetric drawings of each elevation
3. Submission: At completion of cleaning works.

230 Trial samples

1. Trial sample reference: TS001
   1.1. Surface: Portland Stone/ ceramic tiling
   1.2. Location/ Size: 0.25m2 area as directed in schedule of works
   1.3. Type of soiling: Atmospheric soiling
   1.4. Cleaning methods: Nebulous Water Clean
2. Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

230 Trial samples Type A

1. Trial sample reference: TS002
   1.1. Surface: Portland Stone/ ceramic tiling
   1.2. Location/ Size: 0.25m2 area as directed in schedule of works
   1.3. Type of soiling: Atmospheric soiling
   1.4. Cleaning methods: DOFF Steam Clean
2. Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

230 Trial samples Type B

1. Trial sample reference: TS003
   1.1. Surface: Portland Stone
   1.2. Location/ Size: 0.25m2 area as directed in schedule of works
   1.3. Type of soiling: Atmospheric soiling
   1.4. Cleaning methods: Plain Clay Poultice
2. Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

Products/ equipment

312 Surface biocides

1. Types: Registered by the Health and Safety Executive (HSE) and listed on the HSE website under non-agricultural pesticides.
2. Compatibility with surface: Free from staining or other harmful effects.

322 Abrasive cleaning equipment

1. Manufacturer/ Supplier: Submit proposals
   1.1. Product reference: Submit proposals
2. Nozzle types: Subject to site trials
3. Abrasives: Subject to site trials

332 Water spray (mounted nozzles)

1. Equipment
   1.1. Spray/ Nozzle types: Subject to site trials
   1.2. Nozzles: Position and direction adjustable, relative to surfaces and profiles.
   1.3. Controls: Submit proposals

352 Steam cleaning equipment

1. Manufacturer: Stonehealth Ltd Bowers Court
   The Broadwell
   Dursley
   Gloucestershire
   GL11 4JE
   Tel: 01453 540600 www.stonehealth.com
   1.1. Product reference: DOFF system high-pressure steam
   1.2. Operational pressure:: as recommended by manufacturer. Conduct sample to test minimum pressure necessary to avoid damage to surface.
   1.3. Nozzles:: 9mm standard, or as manufacturer's recommendations.
   1.4. Other requirements:: only operatives / subcontracting firms approved by the manufacturer will be allowed to carry out this work.

362 Chemical agents

1. Description: - PACKS/ POULTICES
2. Manufacturer: Submit proposals
   2.1. Product reference: Submit proposals

372 Plain poultices

1. Description: FOR SALTS REMOVAL
2. Poulticing medium manufacturer: Submit proposals
   2.1. Product reference: Submit proposals
3. Softening agent: Deionised water.

Application

412 Removal of loosely adhered deposits

1. Timing: Before commencement of other cleaning methods.

2. Surfaces: Prevent damage, including abrasion.

422 Biocide application

1. Preparation: Remove loose growths.
2. Surfaces: Prevent damage, including abrasion.
3. Biocide treatment: Appropriate solutions to kill growths and inhibit further growths.
   3.1. Dead growths: Remove.

432 Tooling

1. Tooling of surfaces: As trial sample

442 Abrasive blocks

1. Types: Suitable grades of carborundum or gritstone.
2. Application: Lubricate with water. Remove detritus.
3. Abrasive power tools: Prohibited.

452 Abrasives cleaning

1. Surfaces: Minimize abrasion.
   1.1. Ingrained deposits: Seek instructions.
2. Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.
3. Detritus: Remove with clean water.

462 Water sprayed cleaning (mounted nozzles)

1. Surfaces: Minimize water run-off. Prevent damage.
2. Adjustment of washing cycle and nozzle positions: Regularly to achieve optimum cleaning performance.

472 Pressurized water cleaning

1. Surfaces: Prevent damage, including abrasion.
2. Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.

482 Steam cleaning

1. Surfaces: Prevent damage, including abrasion.
2. Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.

495 Testing pH. values for chemical cleaning

1. pH indicator: To distinguish pH values between 1-14.
2. Testing before cleaning
   2.1. Clean rinsing water, wetted surfaces and joints: Test for pH. Record as 'control' values.
3. Testing after water rinsing and neutralization
   3.1. Wetted surfaces and joints: Record pH values.
   3.2. Acceptance criteria: Seek instructions

500 Chemical cleaning

1. Surfaces: Prevent damage, including discolouration, bleaching and efflorescence.
2. Product variables (including concentrations, dwell times and number of applications): Adjust for each surface to achieve optimum cleaning performance.
3. Application: To wetted surfaces.
   3.1. Drying out: Prevent unless recommended otherwise by cleaning product manufacturer.
4. Removal of chemicals and neutralization: As recommended by product manufacturer, including rinsing with clean water.
   4.1. Additional treatment: Where water rinsing is insufficient to neutralize surface, apply compatible neutralizing agent.
   4.2. Surfaces and joints: Minimize absorption of chemicals. Prevent damage, including abrasion.

515 Plain poulticing

1. Surfaces: Prevent damage, including abrasion.
2. Application: To wetted surfaces. Maintain contact with surfaces as poultice dries out.
3. Poultice reinforcement: Submit proposals
   3.1. Drying: Prevent excessively rapid or localized drying out.
4. Spent poultice material: Do not reuse.

Ω End of Section

C41
Repairing/ renovating/ conserving masonry

Generally/ preparation

110 Scope of work

1. Schedule: Refer to Schedule of Works
2. Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate to record bonding patterns, joint widths, special features, etc.
3. Identification of masonry units to be removed, replaced or repaired: Mark clearly, but not indelibly, on face of masonry units or parts of units to be cut out and replaced. Transcribe markings to drawings/ photographs.

120 Site inspection

1. Purpose: To confirm type and extent of repair/ renovation/ conservation work shown on drawings and described in survey reports and schedules of work.
2. Parties involved: Contract administrator
   Contractor's representative
   Structural engineer
3. Timing: At least 5 working days before starting each section of work
4. Instructions issued during inspection: Confirm in writing, with drawings and schedules as required, before commencing work

125 Removal of fittings/ fixtures

1. Items to be removed, and reinstated on completion of repair work: Refer to Schedule of Works
   1.1. Identification: Attach labels or otherwise mark items using durable, non-permanent means, to identify location and describe refixing instructions, where applicable.
   1.2. Treatment following removal: Refer to Schedule of Works
   1.3. Storage: Protect against damage, and store until required.
      1.3.1. Storage location: Off-site
   1.4. Reinstatement: Refit in original locations using original installation methods.
2. Items unsuitable or not required for reuse: Raise for the attention of the Contract Administrator.
   2.1. Disposal: Obtain instructions
3. Masonry fabric and surfaces: Do not damage during removal and replacement of fittings/ fixtures.

130 Removal of plant growths from masonry

1. Plants, root systems and associated soil/ debris: Carefully remove from joints, voids and facework.
2. Removal of roots: Where growths cannot be removed completely without disturbing masonry seek instructions.
3. Unwanted plants close to masonry: Where removal of root system is not possible or desirable, cut through stem as close to the ground as possible. Remove bark from stump and apply herbicide paste. Leave stump to wither.

140 Record of work

1. General: Record work carried out to masonry clearly and accurately using written descriptions, sketches, drawings and photographs, as necessary.
2. Documentation: Submit on completion of the work.
   2.1. Number of sets: One in electronic format.

Workmanship generally

150 Power tools

1. Usage for removal of mortar: Not permitted

155 Putlog scaffolding

1. Usage: Permitted only with prior approval

160 Protection of masonry units and masonry

1. Masonry units: Prevent overstressing during transit, storage, handling and fixing. Store on level bearers clear of the ground, separated with resilient spacers. Protect from adverse weather and keep dry. Prevent soiling, chipping and contamination. Lift units at designed lifting points, where provided.
2. Masonry: Prevent damage, particularly to arrises, projecting features and delicate, friable surfaces. Prevent mortar/ grout splashes and other staining and marking on facework. Protect using suitable nonstaining slats, boards, tarpaulins, etc. Remove protection on completion of the work.

165 Structural stability

1. General: Maintain stability of masonry. Report defects, including signs of movement that are exposed or become apparent during the removal of masonry units.

170 Disturbance to retained masonry

1. Retained masonry in the vicinity of repair works: Disturb as little as possible.
2. Existing retained masonry: Do not cut or adjust to accommodate new or reused units.
3. Retained loose masonry units and those vulnerable to movement during repair works: Prop or wedge so as to be firmly and correctly positioned.

180 Workmanship

1. Skill and experience of site operatives: Appropriate for types of work on which they are employed.
    1.1. Documentary evidence: Submit on request.

185 Adverse weather

1. General: Do not use frozen materials or lay masonry units on frozen surfaces.
2. Air temperature: Do not bed masonry units or repoint:
    2.1. In cement gauged mortars when ambient air temperature is at or below 3°C and falling or unless it is at least 1°C and rising, unless mortar has a minimum temperature of 4°C when laid and the masonry is adequately protected.
    2.2. In hydraulic lime:sand mortars when ambient air temperature is at or below 5°C and falling or unless it is at least 3°C and rising.
    2.3. In nonhydraulic lime:sand mortars in cold weather, unless approval is given.
3. Temperature of the work: Maintain above freezing until mortar has fully set.
4. Rain, snow and dew: Protect masonry by covering during precipitation, and at all times when work is not proceeding.
5. Hot conditions and drying winds: Prevent masonry from drying out rapidly.
6. New mortar damaged by frost: Rake out and replace.

190 Control samples

1. General

1.1. Obtain samples of facing bricks and voussoirs to be used in external brickwork to the Contract Administrator's approval; keep samples on site.

1.2. Prepare sample panels of brickwork and pointing to match existing, for approval by the Contract Administrator. Give notice to Contract Administrator of the removal of any sample panels.

1.3. In cases of fine brickwork, take samples of mortar for analysis by others; record positions of each sample.

195 Surface Repair

1. General: Comply with the general requirements of BS 6270 and use the particular method of repair specified in the Part and Section of BS 6270 stated below for the surface repair of:
   1.1. Mortar joints (Part 1, Section 3, paragraph 13)
   1.2. Brickwork (Part 1, Section 3, paragraph 14.3)

197 Stitching

1. Brickwork:
   1.1. Remove all mortar from all faces of the hole. Do not damage the arrisses of the retained brickwork
   1.2. Install reinforcement / ties in accordance with Particular Specification
   1.3. Fill hole with facing brickwork to match existing
   1.4. Point to match in with the wall
2. Stonework:
   2.1. Where possible, carefully cut out stone plug and set aside sound top section for re-use
   2.2. Protect face of stone with latex paint
   2.3. Drill hole for dowel or pin across fracture and flush out with volatile solvent
   2.4. Fill hole 2/3 full with epoxy resin
   2.5. Protect cored recess, and insert threaded stainless steel dowel cut to required length
   2.6. Point up recess or replace stone plug
   2.7. Remove protective latex paint

Materials/ production/ accessories

210 Advance registration

1. Material registered in advance by the Employer: Obtain from the supplier named in Preliminaries section A56.
   1.1. Ordering: Supersede the Employer's registration and take over responsibility by an order to the supplier covering price, supply and delivery to suit the progress of the work.

215 Material samples

1. Representative samples of designated materials: Submit before placing orders.
   1.1. Designated materials: Sands for grouting
   Sands for mortar repairs
2. Retention of samples: Unless instructed otherwise, retain samples on-site for reference. Protect from damage and contamination.

220 Recording profiles

1. Profiles: Take measurements from existing masonry units, as instructed, to allow accurate matching of replacements.
2. Recording in situ: If there are no suitable joints to allow use of inserts, seek instructions.

3. Drawings and templates: Prepare as necessary. Templates must be clearly and indelibly marked to identify use and location.

240 Stone

1. Standard: To BS EN 771-6
2. Supplier: Submit Proposals
3. Type: Portland stone
4. Quality: Free from vents, cracks, fissures, discolouration, or other defects that may adversely affect strength, durability or appearance. Thoroughly seasoned, dressed and worked in accordance with shop drawings prepared by the supplier.
5. Finish: To match existing

245 Replacement stone units

1. Sizes and profiles: To match existing masonry. Maintain existing joint widths.
2. Sinkings for fixings, joggles and lifting devices: Accurately aligned and positioned in relation to existing masonry.
3. Marking: Mark each block/ dressing clearly and indelibly on a concealed face to indicate the natural bed and position in the finished work.

250 Stone orientation

1. Orientation of natural bed
    1.1. In plain walling: Horizontal.
    1.2. In projecting stones and copings: Vertical and perpendicular to wall face.
    1.3. In arches: Perpendicular to line of thrust.

255 Ashlar blocks/ Dressings

1. Cutting and dressing stone: To true and regular surfaces, free from hollow or rough areas.

258 Existing templates

1. General: Templates for replacement stones are available for making copy templates.

260 Bricks

1. Standard: To BS EN 771-1.
2. Manufacturer: Submit proposals
    2.1. Product reference: Submit proposals
3. Size: To match existing

265 Salvaged and second hand bricks

1. General: Facing bricks reclaimed from demolitions and cutting away on the site will be approved for re-use only if they are free from fungus, have no deep or extensive cracks , or damaged corners or arises, and are free from old mortar.

281 Fixings

1. Description: Cramps and dowels
2. Type: Submit proposals.
3. Material: Austenitic stainless steel bedded in mortar or epoxy resin depending upon location
4. Size, strength and number: As necessary to resist loads likely to occur during the life of the building, and to prevent lateral displacement or pulling apart of the construction.

Dismantling/ rebuilding

310 Dismantling masonry for reuse

1. Masonry units to be reused: Remove carefully and in one piece.
   1.1. Treatment: Clean off old mortar, organic growths and dirt, and leave units in a suitable condition for rebuilding.
   1.2. Identification: Mark each unit clearly and indelibly on a concealed face, indicating its original position in the construction. Transcribe makings to drawings/ photographs.

320 Rebuilding

1. Replacement materials: Stone, as clause 240 and brick, as clause 260
2. Mortar: As section Z21.
   2.1. Standard: BS EN 998-2
   2.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   2.3. Sand source/ type: Sand/limestone dust (to BSEN13139)
3. Fixings: Cramps and dowels, as clause 281
4. Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
5. Joint surfaces: Dampen, as necessary, to control suction.
6. Laying masonry units: On a full bed of mortar; perpend joints filled.
7. Exposed faces: Remove mortar and grout splashes immediately.
8. Joints: To match existing
9. Other requirements: None

Replacements and insertions

330 Preparation for replacement masonry

1. Defective material: Carefully remove to the extent agreed. Do not disturb, damage or mark adjacent retained masonry.
2. Existing metal fixings, frame members, etc.: Report when exposed.
3. Redundant metal fixings: Remove.
4. Recesses: Remove projections and loose material; leave joint surfaces in a suitable condition to receive replacement units. Protect from adverse weather if units are not to be placed immediately.

340 Replacement of stone

1. Stone: Portland stone, as clause 240
2. Bedding depths: 100 mm 100 mm
3. Mortar: As section Z21.
   3.1. Standard: BS EN 998-2
   3.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   3.3. Sand source/ type: sand/limestone dust (to BSEN13139)
4. Fixings: Dowels and cramps, as clause 281
5. Joints: Flush
6. Other requirements: None

350 Stone inserts

1. Stone: Portland stone, as clause 240

2. Finish: Flush and to match existing.
3. Preparation and insertion: As clause 395.
4. Mortar: As section Z21.
   4.1. Standard: BS EN 998-2
   4.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   4.3. Sand source/ type: Sand/limestone dust (to BSEN13139)
5. Fine sand to approval
6. Fixings: Replacement cramps, as clause 281
7. Joints: Very fine.
8. Other requirements: None

355 Stone inserts

1. Stone: Portland stone, as clause 240
2. Finish: Flush and to match existing.
3. Preparation and insertion: As clause 395.
4. Adhesive: Resin based to approval
5. Fixings: Replacement cramps, as clause 281
6. Joints: Very fine with no adhesive visible.
7. Other requirements: None

365 Replacement of bricks

1. Bricks: Clay as clause 260
2. Mortar: As section Z21.
   2.1. Standard: BS EN 998-2
   2.2. Mix: 1:½:2½ nonhydraulic lime:pozzolanic admixture:sand
   2.3. Sand source/ type: Well graded crushed stone to approval
3. Fixings: Cramps, as clause 280
4. Joints: Double-struck
5. Other requirements: None

385 Laying replacement masonry units

1. Exposed faces of new material: Keep to agreed face lines.
2. Faces, angles and features: Align accurately. Set out carefully to ensure satisfactory junctions with existing masonry and maintain existing joint widths.
3. Joint surfaces: Dampen to control suction as necessary.
4. Laying units: On a full bed of mortar, all joints filled.
5. Exposed faces: Keep clear of mortar and grout.

395 Installing stone inserts

1. Pockets to receive inserts
   1.1. Cut out accurately. Undercut sides of pocket where necessary to provide space for bonding material.
   1.2. Adjust depth so that insert stands proud of existing stone for finishing in situ.
   1.3. Clean out thoroughly.
2. Inserts: Cut to the smallest rectangular shape necessary to replace the defective area and provide a firm seating. Install accurately and securely.

2.1. Exposed faces: Keep clear of bonding material.

3. Existing joint widths: Maintain. Do not bridge joints.

405 Bonded dowels

1. Standard: To BS EN 1090-1
2. Dowels: Austenitic stainless steel
3. Adhesive: Epoxy resin
4. Holes for dowels: Suitably sized and accurately aligned in masonry background and in rear of replacement/ insert stone; clean and dry.
5. Other requirements: Do not use adhesive to bond stones at joints unless instructed.

410 Corroded metal fixings

1. Removal: Cut out carefully, causing the least possible disturbance to surrounding masonry. Remove associated rust debris.
2. Replacement: Compatible fixings as clause 281.

420 Temporary distance pieces for joints in ashlar stonework

1. Material: Lead or stainless steel.
2. Removal: When mortar/ grout is sufficiently strong to take loading without compression.

Tooling/ dressing stone in situ

450 Weathering ledges at joints

1. Locations: Where stones project or are recessed.
2. Requirement: Carefully weather the ledge, to approval.
3. Method: Suitably graded carborundum blocks or tooling as appropriate.

455 Descaling stone

1. Requirement: Carefully remove loose scaling and powdering from stones to the extent agreed.
2. Method: Suitable bristle brushes or carborundum blocks. Do not use wire brushes.

458 Redressing stone

1. Requirement: Carefully dress back stones to the extent agreed.
2. Method: Suitably graded carborundum blocks or tooling as appropriate.

Mortar repairs

510 Preparation for mortar repairs

1. Repair area: Scribe area of masonry to be removed using straight horizontal and vertical lines parallel to joints. Where repair area abuts joints, maintain existing joint widths and do not bridge joints.
2. Decayed masonry: Cut back carefully to a minimum depth of 20 mm to a sound background. Where the depth of removal exceeds 50 mm, seek instructions.
3. Precautions: Do not weaken masonry by removing excessive material. Do not damage adjacent masonry.
4. Top and vertical reveals of repair area: Undercut.

515 Reinforcement for mortar repairs

1. Material: Austenitic stainless steel, phosphor bronze or copper alloy wire, …… diameter.

2. Armatures: Form to suit profiles of mortar repair and provide effective reinforcement.
3. Cover to reinforcement: Not less than 18 mm.
4. Installation: Drill holes into background to receive reinforcement, and bond firmly with a suitable epoxy resin.

520 Mortar repairs

1. Undercoats: As section Z21.
   1.1. Standard: BS EN 998-2
   1.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   1.3. Sand source/ type: Sand/limestone dust (to BSEN13139)
   1.4. Building up: In layers where necessary, each layer not exceeding 12 mm.
2. Finishing coat: To match approved samples.
   2.1. Standard: BS EN 998-2
   2.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   2.3. Sand source/ type: Sand/limestone dust (to BSEN13139)
   2.4. Finished thickness: 6 mm
   2.5. Finish: Scraped back, as clause 550 or floated, as clause 555, to approval
3. Reinforcement: Not required

540 Applying mortar

1. Surfaces to receive mortar: Clean, and free from dust and debris. Dampen to control suction.
2. Applying coats: Build up in layers to specified thickness. Apply mortar firmly, ensuring good adhesion with no voids. Form a mechanical key to undercoats by combing or scratching to produce evenly spaced lines.
3. Allow each layer to achieve an initial set before applying subsequent coats. Prevent each layer from drying out rapidly by covering immediately with plastics sheeting and/ or dampening intermittently with clean water.
4. Finishing mortar coat: Form accurately to required planes/ profiles, and finish flush with adjacent masonry.
5. Protection: Protect completed repairs from adverse weather until mortar has set.

550 Scraped finish to mortar repairs

1. Procedure: Finish final coat of repair mortar proud of existing masonry face. When mortar is set, but not too hard, scrape back to required face line using fine saw blade or other suitable means, to achieve required finish.

555 Float finish to mortar repairs

1. Procedure: Use a wood float and/ or a felt faced float to give an even overall texture. Do not use steel floats.

Crack repairs/ ties/ reinforcement

610 Mortar repair of cracks

1. Mortar: As section Z21.
   1.1. Standard: BS EN 998-2
   1.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   1.3. Sand source/ type: Sand/limestone dust (to BSEN13139)

2. Preparation: Clean out cracks to remove debris, dust and dirt. Dampen recesses, as necessary, to control suction.
3. Applying mortar: Press well into cracks so that they are fully filled. Ensure that mortar does not encroach upon exposed faces. Finish mortar flush with masonry face.
4. Other requirements: Exclude isolated hair line cracks (less than about 1.0 mm wide)

630 Ties

1. General: Ensure that the inner and outer skins of brickwork are properly bonded together; carry out remedial work as necessary using a suitable method of non-ferrous ties. Agree method with Contract Administrator.

Grouting rubble filled cores - Not Used

Pointing/ repointing

820 Pointing

1. Keyed pointing
   1.1. Rake out joints to a depth of 20 mm as the work proceeds. Point and form joints to approved profile with mortar in a continuous operation as scaffolding is taken down.
2. Fine pointing
   2.1. Lay a strip of carpet tape over the joint to be pointed.
   2.2. Slit the tape into the joint with a sharp knife, and press the edges of the tape into the cut.
   2.3. Point with mortar mix as Section Z21.
   2.4. Press the mortar home with a pointing key until the joint is full.
   2.5. Strike off and peel off the tape.
3. Repointing
   3.1. Clean out joints to a minimum of 25 mm using hand, not power tools
   3.2. Do not use angle grinders for cutting back joints
   3.3. Tamp or hand grout empty joints with mortar to a depth of 25 mm from the face of the masonry
   3.4. Clean the prepared face using a bristle brush
   3.5. Flush the joint out thoroughly with clean water, taking care to avoid saturation
   3.6. Remove all dust and loose material working from the top to the bottom of the wall
   3.7. Lightly wet the joints and point neatly in the appropriate mortar mix from Section Z21
   3.8. Brush over lightly with a stiff bristle brush or dab with a piece of coarse sacking after the initial set has taken to leave a slightly textured finish
4. Tuck pointing
   4.1. Prepare joints for pointing or re-pointing as above
   4.2. Mortar to match the colour of the brick
   4.3. Finish with a flush face
   4.4. Immediately afterwards cut a 3 mm deep groove carefully along each joint, width to match existing or approved sample
   4.5. Tuck in the groove with the aid of a pointing rule and a flat-edged jointer, with lime putty gauged with a small amount of silver sand
   4.6. Allow the putty to project 3 mm or to match existing brickwork adjoining
   4.7. Cut both top and bottom joints off neatly
   4.8. Form the bed joints first, followed by the vertical joints

840 Pointing with tools/ Irons

1. General: Press mortar well into joints using pointing tools/ irons that fit into the joints, so that they are fully filled.
2. Face of masonry: Keep clear of mortar. Use suitable temporary adhesive tape on each side of joints where necessary. Finish joints neatly.

850 Pointing with injection mortar

1. General: Inject mortar into joints so that they are fully filled with no voids.
2. Face of masonry: Keep clear of mortar. Finish joints neatly.

860 Brushed finish to joints

1. Timing: After initial mortar set has taken place remove laitance and excess fines by brushing, to give a coarse texture. Do not compact mortar.

Ω End of Section

C51
Repairing/ renovating/ conserving timber

General

110 Inspection

1. Purpose: To confirm nature and extent of repair/ renovation/ conservation work shown on drawings, and described in survey reports and schedules of work.
2. Parties involved: Contract administrator
   Contractor's representative
3. Timing: At least 5 days before starting each section of work
4. Instructions issued during inspection: Confirm in writing, with drawings and schedules as required, before commencing work

130 Opening up

1. Purpose: To reveal previously concealed areas of structure or fabric not recorded during initial surveys.
2. Extent: To be agreed
3. Timing: Give notice before starting opening up.
   3.1. Period of notice: At least 24 hours
4. Retained building structure/ fabric: Do not damage or destabilize.

150 Timber procurement

1. Timber (including timber for wood-based products): Obtained from well-managed forests and/ or plantations in accordance with:
   1.1. The laws governing forest management in the producer country or countries.
   1.2. International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
2. Documentation: Provide either in accordance with the chain of custody certification scheme requirements:
   2.1. documentary evidence (that has been or can be independently verified) regarding the provenance of all timber supplied; or
   2.2. evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood-based products.
3. Chain of Custody Certification scheme: Submit proposals
   3.1. Other evidence: None

Structural repairs/ alterations

250 Timber section repairs – external splice

1. Defective timber: Cut out to clean, regular profile.
2. Replacement timber: To match existing
3. Splice plates
   3.1. Material: Timber
   3.2. Size: Refer to schedule of works
4. Fixing to existing timber: Glued, with clamping action provided using countersunk stainless steel screws with dowel finish.

260 Joint strengthening – planar intersections

1. Gusset plates
   1.1. Material: Timber
   1.2. Size: Refer to schedule of works
2. Fixing to timber: Glued, with clamping action provided using countersunk stainless steel screws with dowel finish.

Products

360 Softwood for joinery repairs

1. Timber: Good-quality wood similar in species and moisture content to the parent timber
2. Quality: Generally to BS EN 942; free from decay and insect attack (except pinhole borers).
3. Treatment: None required

370 Hardwood for joinery repairs

1. Timber: Good-quality wood similar in species and moisture content to the parent timber
2. Quality: Generally to BS EN 942; free from decay and insect attack (except pinhole borers).
3. Treatment: None required

470 Nails

1. Standard: As section Z20.
2. Type: Wire
3. Material: Steel.
   3.1. Strength (minimum): Ultimate tensile strength 600 N/mm²
4. Finish as delivered: Galvanized

480 Screws

1. Standard: As section Z20.
2. Material: Stainless steel
3. Tensile strength (minimum): 550 N/mm²
4. Finish as delivered: Galvanized

540 Resin grout/ adhesive

1. Manufacturer: Triton Systems
   1.1. Contact details
      1.1.1. Address: Units 3-5,
      Crayford Commercial Centre
      Greyhound Way
      Crayford
      Kent
      DA1 4HF
      1.1.2. Telephone: +44 (0)1322 318830
      1.1.3. Web: www.tritonsystems.co.uk
      1.1.4. Email: info@tritonsystems.co.uk
   1.2. Product reference: Trimol 23 Epoxy Adhesive
2. Colour: Grey.

550 Epoxy resin repair system

1. Manufacturer: Repair Care International
   1.1. Product reference: Dry Fix 1 Elastic Woodstabiliser
2. Definition: Low viscosity solvent free two component based upon specific modified epoxy resins.
3. Primer: Check moisture content of wood. Ensure all decayed or excessively soft wood and weathered damage or burnt wood is completely removed until sound wood substrate is achieved. All surfaces must be free of dust, dirt, grease, raised wood fibres and general surface contamination. Remove any paint coatings from the surfaces to be treated and sand back to bare shiny wood Sand wood before the product is applied. Use brush to pre-treat the affected area with Dry Fix 1 before applying Dry Flex 1.
4. Preparation: Allow minimum of twenty minutes and a maximum of two hours for Dry Fix to penetrate the surface. Remove any excess Dry Fix 1 has not penetrated into the wood with absorbent paper. Apply Dry Flex 1.
5. Application: Check printed instructions. Shake bottles “A” and “B” before mixing. Use dosing guidelines on side of bottles. Use mix and fix set spatula and cup for correct dosing of components. Always add Component “B” to Component “A”. Dispense with dosing pistol. For mixing and applying use mixing plate and appropriate knives. To model corners use Perspex strips. Coat exposed areas of wood within one week.

Execution

600 Workmanship

1. Skill and experience of site operatives: Appropriate for types of work on which they are employed.
   1.1. Documentary evidence: Submit on request.

610 Temporary supports/ propping

1. General: Provide adequate temporary support at each stage of repair work to prevent damage, overstressing or uncontrolled collapse of any part of the structure.
2. Bearings for temporary supports/ propping: Suitable to carry loads throughout repair operations.

620 Protection of timber and wood components before and during installation

1. Storage: Keep dry, under cover, clear of the ground and with good ventilation. Support sections/ components on regularly spaced, level bearers on a dry, firm base.
2. Handling: Do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.

630 Material samples

1. Representative samples of designated materials: Submit before placing orders.

650 Dimensions generally

1. Site dimensions: Take as necessary before starting fabrication.
   1.1. Discrepancies with drawings: Report without delay and obtain instructions before proceeding.

665 Cross section dimensions of non-structural softwood

1. Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
2. Maximum permitted deviations from finished sizes: As stated in BS EN 1313-1, clause 6 for sawn sections.

670 Cross section dimensions of non-structural hardwood

1. Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
2. Maximum permitted deviations from finished sizes: As stated in BS EN 1313-2:
    2.1. Clause 6 for sawn sections.
    2.2. Clause NA.3 for further processed sections.

680 Warping of timber

1. Bow, spring, twist and cup: Not greater than the limits set down in BS 4978 or BS EN 14081-1 for softwood, or BS 5756 for hardwood

690 Processing treated timber

1. Cutting and machining: Carry out as much as possible before treatment.
2. Extensively processed timber: Retreat timber sawn lengthways, thicknessed, planed, ploughed, etc.
3. Surfaces exposed by minor cutting and/ or drilling: Treat with two flood coats of a solution recommended by main treatment solution manufacturer.

700 Wood components – as delivered finish

1. Components to be painted: Natural

710 Reuse of timber sections/ wood components

1. Sections/ components scheduled to be removed but not reused in existing locations: Agree extent of retention for reuse elsewhere in the works.
    1.1. Storage: Protect against damage, and store until required.
        1.1.1. Storage location: On site
2. Reuse: Adapt sections/ components, as necessary, and install in agreed locations.

720 Temporary removal and reinstatement of fittings/ fixtures

1. Items to be removed, and reinstated on completion of repair work
    1.1. Identification: Attach labels or otherwise mark items using durable, non-permanent means, to identify location and refixing instructions, where applicable.
    1.2. Treatment following removal:
    1.3. Storage: Protect against damage, and store until required.
        1.3.1. Storage location:
    1.4. Reinstatement: Refit in original locations using original installation methods.
2. Items unsuitable or not required for reuse: Obtain instructions regarding disposal.

730 Partial removal of existing decorative/ protective finish

1. Extent: Remove minimum necessary to expose damaged or decayed wood. Feather the edge of remaining coating around repair site.
2. Method: Submit proposals

740 Removal of existing decorative/ protective finish

1. Extent: Remove completely back to bare wood.
2. Method: Submit proposals

750 Cleaning dirty or stained wood

1. Generally: Scrub with neutral pH soap and clean, warm water.
2. Old varnish: Remove using mixture of turpentine (not turpentine substitute) and acetone in proportions determined by experiment, followed by washing down.

760 Repair of members – cutting out members

1. Extent of timber removal: Cut out full cross section of member where wood is defective or decayed, plus 50 mm of sound wood.
2. Joint profile: Square cut

770 Repair of compression members – piecing in

1. Defective wood: Remove only decayed or defective wood. Finish cut-outs to clean, regular profiles.
2. Timber inserts: Cut accurately to fit. Glue and pin in place. Lie of grain to match as closely as possible that of parent timber.
3. Joint profile: Plain scarf joint at 1 in 8 to grain

780 Repair of distorted timber members

1. Generally: Repair to shape that member has assumed.

850 Glued joints

1. Adhesive:
   1.1. Compatibility: Where relevant, obtain manufacturer's confirmation that adhesive is compatible with preservative/ fire-retardant treatment.
2. Glued structural components: Fabricated to BS 6446 in clean, controlled workshop conditions.

860 Moisture content checking

1. Procedure: Check moisture content of timber sections with an approved electrical moisture meter.
2. Test results: Keep records of all tests. If moisture content falls outside specified range, obtain instructions.

870 Moisture content testing

1. Procedure: Test timber sections with an electrical moisture meter with deep probes. (A meter that has been carefully calibrated against oven drying tests or otherwise guaranteed by an independent testing authority).
2. Test sample: Test 5% but not less than 10 lengths of each cross-section in the centre of the length.
3. Test results: 90% of values obtained to be within the specified range. Provide records of all tests.

Completion

910 Mechanicallyfastened joints

1. General: Inspect accessible bolted, coach screwed and timber pegged joints and tighten fasteners if necessary.
   1.1. Timing: On Completion and at end of Defects Liability Period or Rectification Period.

Ω End of Section

F10
Brick/ block walling

Types of walling

110 Clay facing brickwork

1. Bricks: To BS EN 771-1.
    1.1. Manufacturer: Wienerberger Ltd
        1.1.1. Contact details
            1.1.1.1. Address: Wienerberger House
            Brooks Drive
            Cheadle Royal Business Park
            Cheadle
            Cheshire
            SK8 3SA
            1.1.1.2. Telephone: +44 (0)161 4918200
            1.1.1.3. Web: www.wienerberger.co.uk
            1.1.1.4. Email: WBUKMarketing@wienerberger.com
        1.1.2. Product reference: Smeed Dean London Stock
    1.2. Third-party certification: BBA certified.
    1.3. Colour: To match existing
    1.4. Brick description: Facing brick.
    1.5. Work sizes: 215 x 32 x 65 mm.
    1.6. Special shapes: As required
2. Mortar: As section Z21.
3. Bond: To match existing
4. Joints: To match existing
5. Features: Imperial sizes to match existing bricks

110 Clay facing brickwork (A)

1. Bricks: To BS EN 771-1.
    1.1. Manufacturer: Wienerberger Ltd
        1.1.1. Contact details
            1.1.1.1. Address: Wienerberger House
            Brooks Drive
            Cheadle Royal Business Park
            Cheadle
            Cheshire
            SK8 3SA
            1.1.1.2. Telephone: +44 (0)161 4918200
            1.1.1.3. Web: www.wienerberger.co.uk
            1.1.1.4. Email: WBUKMarketing@wienerberger.com
        1.1.2. Product reference: Glazed White Brick
    1.2. Third-party certification: BBA certified.
    1.3. Colour: To match existing
    1.4. Brick description: Facing brick.
    1.5. Work sizes: 215 x 32 x 65 mm.

1.6. Special shapes: As required

2. Mortar: As section Z21.
3. Bond: To match existing
4. Joints: To match existing
5. Features: Imperial sizes to match existing bricks

230 Reclaimed brick facing brickwork

1. Reclaimed bricks: To match existing
   1.1. Condition: Sound, free from mortar and deleterious matter.
2. Mortar: As section Z21.
   2.1. Additional requirements:
3. Bond: To match existing
4. Joints: To match existing
5. Features: Imperial sizes to match existing bricks

315 Clay common brickwork

1. General: No flettons are to be used in any situation.

385 Engineering brickwork

1. Description: As included in Particular Specification/Schedule
2. Bricks: To BS EN 771-1.
3. Mortar: As section Z21.

Testing - Not Used

Workmanship generally

430 Conditioning of clay bricks and blocks

1. Bricks and blocks delivered warm from manufacturing process: Do not use until cold.
2. Absorbent bricks in warm weather: Wet to reduce suction. Do not soak.

440 Conditioning of concrete bricks/ blocks

1. Autoclaved concrete bricks/ blocks delivered warm from manufacturing process: Do not use.
2. Age of nonautoclaved concrete bricks/ blocks: Do not use until at least four weeks old.
3. Avoidance of suction in concrete bricks/ blocks: Do not wet.
   3.1. Use of water retaining mortar admixture: Submit details.

460 Mortar designations

1. Mix proportions: For a specified designation select a mix from the following:
   1.1. Designation (i) (BS EN 998-2 M12 equivalent)
      1.1.1.1:0-¼:3 (Portland cement:lime:sand with or without air entraining additive).
      1.1.2.1:3 (Portland cement:sand and air entraining additive).
   1.2. Designation (ii) (BS EN 998-2 class M6 equivalent)
      1.2.1.1:½:4-5 (Portland cement:lime:sand with or without air entraining additive).
      1.2.2.1:3 (masonry cement:sand containing Portland cement and lime in approximate ratio 1:1, and an air entraining additive).

1.2.3.1:2½-3½ (masonry cement:sand containing Portland cement and inorganic materials other than lime and air entraining additive).

1.2.4.1:3-4 (Portland cement:sand and air entraining additive).

1.3. Designation (iii) (BS EN 998-2 class M4 equivalent)

1.3.1.1:1:5-6 (Portland cement:lime:sand with or without air entraining additive).

1.3.2.1:3½-4 (masonry cement:sand containing Portland cement and lime in approximate ratio 1:1, and an air entraining additive).

1.3.3.1:4-5 (masonry cement:sand containing Portland cement and inorganic materials other than lime and air entraining additive).

1.3.4.1:5-6 (Portland cement:sand and air entraining additive).

1.4. Designation (iv) (BS EN 998-2 class M2 equivalent)

1.4.1.1:2:8-9 (Portland cement:lime:sand with or without air entraining additive).

1.4.2.1:4½ (masonry cement:sand containing Portland cement and lime in approximate ratio 1:1, and an air entraining additive).

1.4.3.1:5½-6½ (masonry cement:sand containing Portland cement and inorganic materials other than lime and air entraining additive).

1.4.4.1:7-8 (Portland cement:sand and air entraining additive).

2. Batching: Mix proportions by volume.
3. Mortar type: Continuous throughout any one type of masonry work.

500 Laying generally

1. Mortar joints: Fill vertical joints. Lay bricks, solid and cellular blocks on a full bed.
2. AAC block thin mortar adhesive and gypsum block adhesive joints: Fill vertical joints. Lay blocks on a full bed.
3. Clay block joints
   3.1. Thin-layer mortar: Lay blocks on a full bed.
   3.2. Interlocking perpends: Butted.
4. Bond where not specified: Half-lap stretcher.
5. Vertical joints in brick and concrete block facework: Even widths. Plumb at every fifth cross joint.

520 Accuracy

1. Courses: Level and true to line.
2. Faces, angles and features: Plumb.
3. Permissible deviations
   3.1. Position in plan of any point in relation to the specified building reference line and/ or point at the same level: ± 10 mm.
   3.2. Straightness in any 5 m length: ± 5 mm.
   3.3. Verticality up to 3 m height: ± 10 mm.
   3.4. Verticality up to 7 m height: ± 14 mm.
   3.5. Overall thickness of walls: ± 10 mm.
   3.6. Level of bed joints up to 5 m (brick masonry): ± 11 mm.
   3.7. Level of bed joints up to 5 m (block masonry): ± 13 mm.

535 Height of lifts in walling using cement-gauged or hydraulic lime mortar

1. General : Allow for the longer set time of lime mortar in determining the maximum height of each lift.
2. Quoins and advance work: Rack back.

3. Lift height (maximum): 1.2 m above any other part of work at any time.
4. Daily lift height (maximum): 1.5 m for any one leaf.

540 Height of lifts in walling using thin-layer mortar

1. Quoins and advance work: Rack back.
2. Lift height (maximum): 1.3 m above any other part of work at any time.

561 Coursing brickwork with existing

1. Gauge: Line up with existing brick courses.

580 Laying frogged bricks

1. Single frogged bricks: Frog uppermost.
2. Double frogged bricks: Larger frog uppermost.
3. Frog cavity: Fill with mortar.

635 Jointing

1. Profile: Consistent in appearance.

645 Accessible joints not exposed to view

1. Jointing: Struck flush as work proceeds.

665 Pointing

1. Description: TO ALL WALLING
2. Joint preparation: Remove debris. Dampen surface.
3. Mortar: As section Z21.
   3.1. Standard: To BS EN 998-2
   3.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)

690 Adverse weather

1. General: Do not use frozen materials or lay on frozen surfaces.
2. Air temperature requirements: Do not lay bricks/ blocks:
   2.1. In cement-gauged mortars when at or below 3°C and falling or unless it is at least 1°C and rising.
   2.2. In hydraulic lime:sand mortars when at or below 5°C and falling or below 3°C and rising, or as manufacturer's/ supplier's recommendations.
   2.3. In thin-layer mortars when outside the limits set by the mortar manufacturer.
3. Temperature of walling during curing: Above freezing until hardened.
4. Newly erected walling: Protect at all times from:
   4.1. Rain and snow.
   4.2. Drying out too rapidly in hot conditions and in drying winds.

Additional requirements for facework

710 The term facework

1. Definition: Applicable in this specification to brick/ block walling finished fair.
   1.1. Painted facework: The only requirement to be waived is that relating to colour.

730 Brick/ Concrete block samples

1. General: Before placing orders with suppliers submit for approval of appearance labelled samples of the following: Bricks as in clause F10/110.
2. Selection of samples: Representative of the range in variation of appearance.

750 Colour consistency of masonry units

1. Colour range: Submit proposals of methods taken to ensure that units are of consistent and even appearance within deliveries.
2. Conformity: Check each delivery for consistency of appearance with previous deliveries and with approved reference panels; do not use if variation is excessive.
3. Facing bricks should be blended on site from a minimum of three packs to ensure an even distribution of colour and texture variation.
4. Finished work: Free from patches, horizontal stripes and racking back marks.

760 Appearance

1. Brick/ block selection: Do not use units with damaged faces or arrises.
2. Cut masonry units: Where cut faces or edges are exposed cut with table masonry saw.
3. Quality control: Lay masonry units to match relevant reference panels.
   3.1. Setting out: To produce satisfactory junctions and joints with built-in features and components.
   3.2. Coursing: Evenly spaced using gauge rods.
4. Lifts: Complete in one operation.
5. Methods of protecting facework: Submit proposals.

790 Putlog scaffolding

1. Use: Not permitted in facework.

800 Toothed bond

1. New and existing facework in same plane: Bond together at every course to achieve continuity.

830 Cleanliness

1. Facework: Keep clean.
2. Mortar on facework: Allow to dry before removing with stiff bristled brush.
3. Removal of marks and stains: Rubbing not permitted.

Ω End of Section

F21
Natural stone/ ashlar walling/ dressings

Types of walling/ dressings

110 Ashlar

1. Description: WALLING AND DRESSINGS
2. Stone: To BS EN 771-6.
   2.1. Colour: To match existing
   2.2. Finish: To match existing
   2.3. Supplier: Submit proposals
   2.4. Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.
3. Mortar: As section Z21.
   3.1. Standard: To BS EN 998-2
   3.2. Mix: Cement-free lime : sand mortar 1:3 mix of NHL2 hydraulic lime (to BSEN459)
   3.3. Sand: Sand/limestone dust (to BSEN13139)
4. Bond: As existing
5. Joints: Flush.
   5.1. Width: To match existing
   5.2. Pointing: As clause 390
6. Other requirements: None

General/ production

250 Cutting and dressing of stone

1. Timing: After seasoning but before delivery to site.
2. Accuracy
   2.1. Exposed and joint surfaces: Square, true planes free from hollow or rough areas.
   2.2. Dimensions: Maintain specified joint widths.
3. Orientation for natural bed of stones: Appropriate to properties of stones and positions in walling/ dressings.

260 Identification of stone units

1. Marking: Clearly and indelibly on concealed faces to indicate the natural bed and position in the finished work.

Laying and jointing

315 Adverse weather

1. General: Do not use frozen materials or lay on frozen surfaces.
2. Air temperature: Do not lay stones:
   2.1. In cement gauged mortars: At or below 3°C and falling or below 1°C and rising.
   2.2. In hydraulic lime:sand mortars: At or below 5°C and falling or below 3°C and rising.
3. Temperature of walling during curing: Above freezing until mortar hardened.
4. Newly erected walling: Protect at all times from:

4.1. Rain and snow.

4.2. Drying out too rapidly in hot conditions and in drying winds.

325 Laying generally

1. Stone selection: Do not use units with damaged faces or arrises.
2. Accuracy
   2.1. Courses: Level and true to line.
   2.2. Faces, angles and features: Plumb.
   2.3. Setting out: Achieve satisfactory junctions and joints with adjoining or built-in elements and components.
3. Absorbent stones: Dampen in warm weather to reduce suction. Do not soak.
4. Mortar joints
   4.1. Laying: Full bed of mortar with all joints and voids filled.
   4.2. Temporary distance pieces: Lead or stainless steel. Remove when mortar is sufficiently strong.
   4.3. Appearance: Neat and consistent.
5. Cleanliness: Keep facework clean. Rubbing and other abrasive or chemical cleaning methods to remove marks and stains not permitted.

340 Putlog scaffolding

1. Use: Not permitted.

350 One piece sills/ Thresholds

1. Bed joints: Leave open except under:
   1.1. End bearings.
   1.2. Masonry mullions.
2. Pointing on completion: Mortar to match adjacent work.

360 Openings

1. Method of forming: Rigid templates, accurately fabricated to the required size.

370 Joggle joints

1. General: Fill with bedding mortar. Tamp to expel air.

390 Pointing

1. Joint preparation: Rake out to depth of 7-10 mm as work proceeds. Remove debris. Dampen surface.
2. Mortar application: Neat and consistent.

Ω End of Section

F30
Accessories/ sundry items for brick/ block/ stone walling

Cavities

160 Air bricks in external walling

1. Standard: To BS 493, class 1.
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Material/ Colour: Terracotta or cast iron
4. Placement: Built in with no gaps at joints.

Reinforcing/ fixing accessories

220 Wall ties

1. Description: For tying brick skins together
2. Manufacturer: To structural engineer’s specification
   2.1. Product reference: Submit proposals
3. Material/ finish: Austenitic stainless steel, minimum 18/8 composition and excluding free machining specifications

220 Wall ties Type A

1. Description: For improving bond
2. Manufacturer: To structural engineer’s specification
   2.1. Product reference: Submit proposals
3. Material/ finish: Austenitic stainless steel, minimum 18/8 composition and excluding free machining specifications
4. Sizes: 40-50 mm less in width than wall or leaf

Flexible damp proof courses/ cavity trays - Not Used

Installation of dpcs/ cavity trays - Not Used

Joints

610 Movement joints with sealant

1. General: Agree methods positions and procedures for providing movement joints with the Contract Administrator before commencing any work.

Proprietary sills/ lintels/ copings/ dressings

721 Natural stone sills laid in hydraulic lime:sand mortar

1. Standard: To BS 5642-1.
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Dimensions: As shown on drawings.
4. Finish: To match exisiting
5. Mortar for bedding/ jointing: as section Z21.

6. Joints: Flush.
7. Bedding one-piece sills: Leave bed joints open except under end bearings and masonry mullions. On completion, point to match adjacent work.

760 Coping units

1. Standard: To BS 5642-2.
2. Material: Natural stone to match existing
3. Manufacturer: Contractor's choice
   3.1. Product reference: Submit proposals
4. Finish: To match exisitng
5. Mortar for bedding/ jointing: as section Z21.
6. Joints: Full and finished flush.
7. Placement: Lay on a full bed of mortar to line and level.

Miscellaneous items - Not Used

Ω End of Section

H62
Natural slating

Types of slating

105 Roof slating

1. Slates
   1.1. Supplier: Contractor's choice
      1.1.1. Product reference: Submit proposals
   1.2. Type: Blue Grey Welsh slates to match original
   1.3. Size: To match existing
2. Fixing: Two nails each slate.

120 Vertical slating

1. Slates
   1.1. Supplier: Contractor's choice in accordance with clause 280
      1.1.1. Product reference: Submit proposals
   1.2. Type: Blue Grey Welsh slates to match original
   1.3. Size: To match existing
   1.4. Fixing: Two nails each slate.

Performance - Not Used

Slating generally

210 Basic workmanship

1. General: Fix slating and accessories to make the whole sound and weathertight at earliest opportunity.
2. Setting out: To true lines and regular appearance, with neat fit at edges, junctions and features.
3. Fixings for slating accessories: As recommended by manufacturer.
4. Gutters and pipes: Keep free of debris. Clean out at completion.

220 Removing existing slating

1. General: Carefully remove slates, battens, underlay, etc. with minimum disturbance of adjacent retained slating.
2. Undamaged slates: Set aside for reuse.

275 Slate fixing

1. Setting out: Lay slates with an even overall appearance with slightly open (maximum 5 mm) butt joints. Align tails.
2. Slate thickness: Consistent in any one course. Lay with thicker end as tail.
3. Ends of courses: Use extra wide slates to maintain bond and to ensure that cut slates are as large as possible. Do not use slates less than 150 mm wide.
4. Top course: Head-nail short course to maintain gauge.
5. Fixing: Centre nail each slate twice through countersunk holes 20-25 mm from side edges.
   5.1. Nails: Copper clout to BS 1202-2 or aluminium clout to BS 1202-3.

5.2. Nail dimensions: Determine in accordance with BS 5534 to suit site exposure, withdrawal resistance and slate supplier's recommendations.

Roof slating edges/ junctions/ features

305 Generally

1. Fittings and accessories: As recommended by slate supplier, do not improvise.
   1.1. Exposed fittings and accessories: To match slate colour and finish.
2. Cut slates: Cut only where necessary, to give straight, clean edges.
3. Flashings: Fix with or immediately after slating. Form neatly.

690 Roof windows

1. Roof slates: Cut as necessary and fix closely all round.

840 Ventilator slates

1. Ventilator slates
   1.1. Manufacturer: Marley Eternit
      1.1.1. Product reference: Eternit In-line natural slate ventilator
   1.2. Requirement: To ventilate roof void

Vertical slating edges/ junctions - Not Used

Ω End of Section

H71
Lead sheet fully supported roof and wall coverings/ flashings etc.

Types of leadwork

110 Lead sheet fully supported roof covering

1. Roof covering system: Rolled lead sheet batten roll
2. Air and vapour control layer: Existing AVCL
3. Sarking or roof boarding: Existing timber boarding
4. Membrane: Existing roof membrane
5. Substrate: Existing timber boarding
6. Type of lead: Rolled to BS EN 14783
7. Pretreatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying
8. Eaves detail: To match Existing

150 Lead sheet fully supported covering to dormers

1. Main roof covering: Lead sheet, as110
2. Covering system: Rolled lead sheet batten roll
3. Sarking, roof boarding or sheathing: Existing timber boarding
4. Membrane: Existing roof membrane
5. Type of lead: Rolled to BS EN 14783
    5.1. Thickness: As existing
6. Pretreatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying
7. Joints in top/ sill: Welted seams
8. Joints in cheeks: Vertical welted seams

209 Gutter lining – box, parapet, tapered and flat roof valley

1. Substrate: Existing timber boarding
    1.1. Preparation: Make good as required
2. Sheet underlay: Building paper to BS 1521, Class A1
3. Type of lead: Rolled to BS EN 12588
    3.1. Thickness: 2.50 or 2.65 mm (Code 6)
4. Pretreatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying
5. Joints in direction of fall: To match existing
    5.1. Spacing: To match existing
6. Cross joints: To match existing
    6.1. Spacing: To match existing
7. Outlets: Lead-welded flashing to internal rainwater pipe

230 Valley gutter lining to slate/ tile roofs

1. Sheet underlay: Building paper to BS 1521, Class A1

2. Type of lead: Rolled to BS EN 12588
   2.1. Thickness: 2.50 or 2.65 mm (Code 6)
3. Pretreatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying
4. Laying: Over and beyond tilting fillets
5. Lengths: Not more than 1500 mm.
   5.1. Cross joints: Lapped not less than 150 mm.
6. Fixing: Welt edges. Nail top edge of each sheet. Dress bottom end neatly into eaves gutter

235 Valley gutter lining to lead roofs

1. Sheet underlay: Building paper to BS 1521, Class A1
2. Type of lead: Rolled to BS EN 12588
   2.1. Thickness: 2.50 or 2.65 mm (Code 6)
3. Pretreatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying
4. Laying: Dress lead sheet into shallow valley box gutter
   4.1. Gutter width: 150 mm
5. Lengths: Not more than 1500 mm.
   5.1. Cross joints: Lapped not less than 150 mm.
6. Fixing: Nail top edge only of each sheet. Dress bottom end neatly into eaves gutter
7. Roofing sheets: Dress over each side of gutter lining, forming laps of not less than 150 mm.

240 Valley gutter lining to lead roofs

1. Sheet underlay: Building paper to BS 1521, Class A1
2. Type of lead: Rolled to BS EN 12588
   2.1. Thickness: 2.50 or 2.65 mm (Code 6)
3. Pretreatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying
4. Laying: Dress lead sheet into valley.
5. Lengths: Not more than 1500 mm.
6. Cross joints: Lapped not less than 150 mm.
7. Fixing: Nail top edge only of each sheet. Dress bottom end neatly into eaves gutter.
8. Roofings sheets: Dress over each side of gutter lining, forming laps of not less than 150 mm.
   8.1. Central gutter gap: 150 mm

310 Ridge/ hip rolls to lead roofs

1. Core: Rounded timber.
   1.1. Size: To match existing
   1.2. Shape: Tapered to a flat base 30 mm wide
   1.3. Fixing: To Ridge/ hip board with brass or stainless steel countersunk screws at not more than 600 mm centres.
2. Roof covering: Dress roofing sheets up roll to form 35 mm upstand.
   2.1. Fixing: Nail each sheet at underlapping end.
3. Lead capping
   3.1. Thickness: As roof covering.

3.2. Lengths: Not more than 1500 mm.

3.3. Wings: Extend not less than 75 mm on to roof.

3.4. Laps in length: Not less than 150 mm for ridges, 100 mm for hips.

4. Fixing: Secure wings with one copper or stainless steel clip per roofing bay and at each lap.

315 Ridge/ hip rolls to slate roofs

1. Clips: At capping laps and not more than 500 mm.

1.1. Fixing: Nail to top of ridge/ hip board before fixing core. Nail each side not more than 50 mm from edge of capping (drill slates as necessary).

2. Core: Rounded timber.

2.1. Size: To match existing

2.2. Shape: Tapered to a flat base 30 mm wide.

2.3. Fixing: To ridge/ hip board with brass or stainless steel screws at not more than 600 mm centres, with base not less than 5 mm above slates.

3. Lead capping

3.1. Thickness: 1.75 or 1.80 mm (Code 4)

3.2. Lengths: Not more than 1500 mm.

3.3. Hip capping: Nail head of each length around core.

3.4. Laps: Not less than 150 mm for ridges, 100 mm for hips.

3.5. Cover: Wings of capping to extend not less than 150 mm on to roof.

322 Soakers for mitred hips to slate/ plain tile roofs

1. Lead

1.1. Thickness: 1.25 or 1.32 mm (Code 3).

2. Dimensions

2.1. Length: Slate/ tile gauge + lap + 25 mm.

2.2. Underlaps: Not less than 100 mm.

324 Soakers for mitred valleys to slate roofs

1. Lead

1.1. Thickness: 1.25 or 1.32 mm (Code 3).

2. Dimensions

2.1. Length: Slate/ length of valley mitre + 25 mm.

2.2. Underlaps: Not less than 150 mm.

325 Soakers for mitred valleys to slate/ plain tile roofs

1. Lead

1.1. Thickness: 1.25 or 1.32 mm (Code 3).

2. Dimensions

2.1. Length: Slate/ tile gauge + lap + 25 mm.

2.2. Underlaps: Not less than 150 mm.

326 Soakers for swept valleys to slate/ plain tile roofs

1. Lead

1.1. Thickness: 1.25 or 1.32 mm (Code 3).

2. Dimensions: To suit sweep and pitch of tiles. Allow adequate length for turning over head of cut tiles and width for underlay to first standard tile on each side.

410 Apron flashings

1. Lead
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
2. Dimensions
   2.1. Lengths: Not more than 1500 mm.
   2.2. End to end joints: Laps of not less than 100 mm.
   2.3. Upstand: Not less than 75 mm.
   2.4. Cover to abutment: Not less than 75 mm.
3. Fixing: Lead wedges into bed joint, clips to bottom edge at laps and 500 mm centres

420 Cover flashings

1. Lead
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
2. Dimensions
   2.1. Lengths: Not more than 1000 mm.
   2.2. End to end joints: Laps of not less than 100 mm.
   2.3. Cover: Overlap to upstand of not less than 75 mm.
3. Fixing: Lead wedges into bed joint, clips to lead upstand at laps and 500 mm centres

440 Soakers and step flashings

1. Lead soakers
   1.1. Thickness: 1.75-2.00 mm (Code 4)
   1.2. Dimensions
      1.2.1. Length: Slate/ tile gauge + lap + 25 mm.
      1.2.2. Upstand: Not less than 75 mm.
      1.2.3. Underlay: Not less than 100 mm.
   1.3. Fixing: By roofer.
2. Lead step flashings
   2.1. Thickness: 1.75 or 1.80 mm (Code 4)
   2.2. Dimensions
      2.2.1. Lengths: Not more than 1500 mm.
      2.2.2. End to end joints: Laps of not less than 100 mm.
      2.2.3. Cover: Overlap to soaker upstands of not less than 65 mm.
   2.3. Fixing: Lead wedges at every course.

450 Step and cover flashings

1. Lead
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
2. Dimensions
   2.1. Lengths: Not more than 1500 mm.
   2.2. End to end joints: Laps of not less than 100 mm.
   2.3. Upstand: Not less than 85 mm.

2.4. Cover to roof: Not less than 150 mm.

3. Fixing: Lead wedges at every course and clips at not more than 500 mm centres along free edge.

452 Single-step and cover flashings

1. Lead
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
2. Single-step flashings
   2.1. Dimensions
      2.1.1. End to end joints: Laps of not less than 50 mm.
      2.1.2. Cover: Overlap to cover flashing upstands of not less than 65 mm.
   2.2. Fixing: Lead wedges at every step.
3. Cover flashings
   3.1. Dimensions
      3.1.1. Lengths: Not more than 1500 mm.
      3.1.2. End to end joints: Laps of not less than 100 mm.
      3.1.3. Upstand: Not less than 85 mm.
      3.1.4. Cover to roof: Not less than 150 mm and over first full tile corrugation.
   3.2. Fixing: Turn over head of tile and clip (clause 715) at not more than 500 mm centres along free edge. At pitches over 30°, plug and screw upstand to abutment in top third of each length only.

454 Single-step flashings

1. Lead
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
2. Dimensions
   2.1. Lengths: Not more than 1500 mm.
   2.2. End to end joints: Laps of not less than 50 mm.
   2.3. Cover: Overlap to lead roof upstand of not less than 65 mm.
3. Fixing: Lead wedges at every step.

456 Step flashings with secret gutter

1. Lead step flashings
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
   1.2. Dimensions
      1.2.1. Lengths: Not more than 1500 mm.
      1.2.2. End to end joints: Laps of not less than 100 mm.
      1.2.3. Cover: Overlap to gutter lining upstand of not less than 65 mm.
   1.3. Fixing: Lead wedges at every course.
2. Lead secret gutter lining
   2.1. Thickness: 1.75 or 1.80 mm (Code 4)
   2.2. Dimensions
      2.2.1. Lengths: Not more than 1500 mm.
      2.2.2. End to end joints: Laps of not less than 100 mm.
      2.2.3. Upstand: Not less than 65 mm above tiles.

2.3. Fixing: Dress into secret gutter and form a welted edge at side to be tiled. Nail top edge of each sheet. Dress bottom end neatly into gutter.

470 Flashings

1. Lead
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
2. Dimensions
   2.1. Lengths: Not more than 1500 mm.
3. Fixing: Fixing: Nail top edge at 150 mm centres and welt edge. Clip bottom edge at laps and 500 mm centres.

472 Chimney flashings to slate/ plain tile roofs

1. Lead front apron
   1.1. Thickness: 1.75 or 1.80 mm (Code 4)
   1.2. Dimensions
      1.2.1. Length: Width of chimney plus not less than 150 mm underlap to each side flashing.
      1.2.2. Upstand: Not less than 75 mm.
      1.2.3. Cover to roof: Not less than 150 mm.
   1.3. Fixing: Lead wedges into bed joint.
2. Lead soakers
   2.1. Thickness: 1.25 or 1.32 mm (code 3).
   2.2. Dimensions
      2.2.1. Length: Slate/ tile gauge + lap + 25 mm.
      2.2.2. Upstand: Not less than 75 mm.
      2.2.3. Underlap: Not less than 100 mm.
3. Lead step flashings
   3.1. Thickness: 1.75 or 1.80 mm (Code 4)
   3.2. Dimensions
      3.2.1. Lengths: Not more than 1500mm.
      3.2.2. End to end joints: Laps of not less than 100 mm.
      3.2.3. Front end: Turn 75 mm around chimney over apron.
      3.2.4. Cover: Overlap to soaker upstands of not less than 65 mm.
   3.3. Fixing: Lead wedges at every course.
4. Lead back gutter
   4.1. Thickness: 1.75 or 1.80 mm (Code 4)
   4.2. Dimensions
      4.2.1. Length: Width of chimney plus not less than 100 mm overlap to each side flashing.
      4.2.2. Upstand: Not less than 100 mm.
      4.2.3. Gutter sole: Not less than 150 mm.
      4.2.4. Cover up roof: Not less than 225 mm.
5. Lead back gutter cover flashing
   5.1. Thickness: 1.75 or 1.80 mm (Code 4)
   5.2. Dimensions
      5.2.1. Length: Width of chimney plus not less than 100 mm overlap to each side flashing.

5.2.2. Cover: Overlap to back gutter upstand of not less than 75 mm.

5.3. Fixing: Lead wedges into bed joint.

476 Chimney damp-proof course

1. Position: Level with Top edge of front apron.
2. Lead
   2.1. Thickness: 1.75 or 1.80 mm (Code 4)
3. Protection: Fully coated with high build bitumen based paint on surfaces to be embedded.
4. Dimensions
   4.1. Plan area of chimney plus laps on perimeters: turned up 50 mm against stack in roof void, turned down 50 mm over stack externally, through flue lining and turned up 25 mm all round internally.
5. Laying: On a thin even bed of wet mortar.
   5.1. Next layer of overlying construction: Bed on mortar without delay and finish joint neatly.

General requirements/ preparatory work

510 Workmanship generally

1. Standard: In accordance with BS EN 14783 and BS EN 12588 and to BS 6915 and latest edition of 'Rolled lead sheet. The complete manual' published by the Lead Sheet Training Academy.
2. Fabrication and fixing: To provide a secure, free draining and completely weathertight installation.
3. Operatives: Trained in the application of lead coverings/ flashings. Submit records of experience on request.
4. Preforming: Measure, mark, cut and form lead prior to assembly wherever possible.
5. Marking out: With pencil, chalk or crayon. Do not use scribers or other sharp instruments without approval.
6. Bossing and forming: Straight and regular bends, leaving sheets free from ripples, kinks, buckling and cracks.
7. Solder: Use only where specified.
8. Sharp metal edges: Fold under or remove as work proceeds.
9. Finished work: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
10. Protection: Prevent staining, discolouration and damage by subsequent works.

515 Lead-welding

1. In situ lead-welding: Not permitted.

516 Lead-welding

1. In situ lead-welding: Is permitted, subject to completion of a 'hot work permit' form and compliance with its requirements.

520 Lead sheet

1. Production method
   1.1. Rolled, to BS EN 12588, or
   1.2. Machine cast and BBA-certified, or
   1.3. Sand cast, from lead free from bitumen, solder, other impurities, inclusions, laminations, cracks, air, pinholes and blowholes; to code thicknesses but with a tolerance (by weight) of ±10%.

2. Identification: Labelled to show compliance with the harmonized standard (hEN) BS EN 14783, where appropriate, and detail of the thickness/ code, weight and type.

550 Lightning protection

1. Lead coverings: Attach the following to a lightning protection system: …….
   1.1. Electrical continuity: Provide between lead sheets. Discontinuous sections must be separately bonded.

555 Layout

1. Setting out of longitudinal and cross joints: Submit proposals.

610 Suitability of substrates

1. Condition: Dry and free of dust, debris, grease and other deleterious matter.

620 Preparation of existing timber substrates

1. Remedial work: Adjust boards to level and securely fix. Punch in protruding fasteners and plane or sand to achieve an even surface.
2. Defective boards: Give notice.
3. Moisture content: Not more than 22% at time of covering. Give notice if greater than 16%.

625 Existing membrane

1. Defective, unsuitable or missing membrane: Give notice.

627 Existing AVCL

1. Defective, unsuitable or missing AVCL: Give notice.

630 Plywood overlay

1. Standard: Manufactured to an approved national standard and to BS EN 636, section 8 (plywood for use in humid conditions).
   1.1. Sheet size: 2400 or 1200 x 1200 mm and 6 mm thick.
2. Moisture content: Not more than 22% at time of covering. Give notice if greater than 16%.
3. Laying: Parallel to perimeter edges with cross joints staggered and a 0.5-1 mm gap between sheets.
4. Fixing: With 25 mm annular ringed shank copper or stainless steel nails, at 300 mm grid centres over the area of each sheet and at 150 mm centres along edges, set in 10 mm from perimeter edges and in pairs across joints.
   4.1. Nail heads: Set flush with or just below the surface.

640 Timber for use with leadwork

1. Quality: Planed, free from wane, pitch pockets, decay and insect attack (ambrosia beetle excepted).
2. Moisture content: Not more than 22% at time of fixing and covering. Give notice if greater than 16%.
3. Preservative treatment: Organic solvent as section Z12 and Wood Protection Association Commodity Specification C8.

645 Sheet underlay

1. Manufacturer: Contractor's choice

1.1. Product reference: Submit proposals

650 Laying sheet underlay

1. Handling: Prevent tears and punctures.
2. Laying: Butt or overlap jointed onto a dry substrate.
   2.1. Fixing edges: With copper or stainless steel staples or clout nails.
   2.2. Do not lay over roof edges but do turn up at abutments.
   2.3. Wood core rolls: Fixed over sheet underlay.
   2.4. Protection: Keep dry and cover with lead at the earliest opportunity.

Fixing lead

705 Head fixing lead sheet

1. Top edge: Secured with two rows of fixings, 25 mm and 50 mm from top edge of sheet, at 75 mm centres in each row, evenly spaced and staggered.
2. Sheets less than 500 mm deep: May be secured with one row of fixings, 25 mm from top edge of sheet and evenly spaced at 50 mm centres.

710 Fixings

1. Nails to timber substrates: Copper clout nails to BS 1202-2, or stainless steel (austenitic) clout nails to BS 1202-1.
   1.1. Shank type: Annular ringed, helical threaded or serrated.
   1.2. Shank diameter: Not less than 2.65 mm for light duty or 3.35 mm for heavy duty.
   1.3. Length: Not less than 20 mm or equal to substrate thickness.
2. Screws to concrete or masonry substrates: Brass or stainless steel.
   2.1. Diameter: Not less than 3.35 mm.
   2.2. Length: Not less than 19 mm.
   2.3. Washers and plastic plugs: Compatible with screws and lead.
3. Screws to composite metal decks: Self tapping as recommended by the deck and lead manufacturer/ supplier for clips.

715 Clips

1. Manufacturer: Contractor's choice
2. Material
   2.1. Lead clips: Cut from sheets of same thickness/ code as sheet being secured.
   2.2. Copper clips
      2.2.1. Thickness: 0.60 mm
      2.2.2. Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere; dipped in solder if exposed to view.
   2.3. Stainless steel clips
      2.3.1. Thickness: 0.46 mm
      2.3.2. Grade: BS EN 10088-1, 1.4301(304) terne-coated if exposed to view.
3. Dimensions
   3.1. Width: 50 mm where not continuous.
   3.2. Length: To suit detail.

4. Fixing clips: Secure each to substrate with either two screw or three nail fixings not more than 50 mm from edge of lead sheet. Use additional fixings where lead downstands exceed 75 mm.
5. Fixing lead sheet: Welt clips around edges and turn over 25 mm.

760 Continuous clips

1. Manufacturer: Contractor's choice
2. Material: Material:
   - 2.1. Lead continuous clips
   - 2.2. Copper continuous clips
   - 2.3. Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere.
   - 2.4. Stainless steel continuous clips
     - 2.4.1. Grade: BS EN 10088-1, 1.4301(304).
3. Dimensions
   - 3.1. Width: To suit detail.
4. Fixing clips: Secure at 200 mm centres.
5. Fixing lead sheet: Welt edge around continuous clip and dress down.

765 Continuous clips for cross joints in roofing

1. Lead continuous clips: 50 mm wide, cut from sheets of same thickness/ code as sheet being secured.
2. Fixing clips: Lead-weld top edge of clips to underlap sheet, 50 mm from lower edge of overlap.
3. Fixing lead sheet: Welt edge around continuous clip and dress down.

770 Wedge fixing into joints/ Chases

1. Joint/ chase: Rake out to a depth of not less than 25 mm.
2. Lead: Dress into joint/chase.
   - 2.1. Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
3. Sealant:
   - 3.1. Application: As section Z22.

780 Wedge fixing into damp-proof course joints

1. Joint: Rake/ cut out under damp-proof course to a depth of not less than 25 mm.
2. Lead: Dress lead into joint.
   - 2.1. Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
3. Sealant:
   - 3.1. Application: As section Z22.

790 Screw fixing into joints/ Chases

1. Joint/ chase: Rake out to a depth of not less than 25 mm.
2. Lead: Dress into joint/ chase and up back face.
   - 2.1. Fixing: Into back face with stainless steel screws and washers and plastics plugs at not more than 450 mm centres, at every change of direction, and with at least two fixings for each piece of lead.
3. Sealant:

3.1. Application: As section Z22.

Jointing lead

810 Forming details

1. Method: Bossing or lead-welding except where bossing is specifically required.
2. Lead-welded seams: Neatly and consistently formed.
   2.1. Seams: Do not undercut or reduce sheet thickness.
   2.2. Filler strips: Of the same composition as the sheets being joined.
   2.3. Butt joints: Formed to a thickness one third more than the sheets being joined.
   2.4. Lap joints: Formed with 25 mm laps and two loadings to the edge of the overlap.
3. Bossing: Carried out without thinning, cutting or otherwise splitting the lead sheet.
   3.1. Details where bossing must be used:

840 Wood-cored roll joints without splash lap

1. Wood core
   1.1. Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
   1.2. Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
2. Undercloak: Dress half way around core.
3. Copper or stainless steel clips. Fix to core at not more than 450 mm centres. Do not restrict thermal movement of the undercloak.
4. Overcloak: Dress around core with edge welted around ends of clips, finishing 5 mm clear of main surface.

845 Wood-cored roll joints with splash lap

1. Wood core
   1.1. Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
   1.2. Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
2. Undercloak: Dress three quarters around core.
   2.1. Fixing: Nail to core at 150 mm centres for one third length of the sheet starting from the head.
3. Overcloak: Dress around core and extend on to main surface to form a 40 mm splash lap.

847 Hollow roll joints

1. Joint allowance: 125 mm overcloak and 100 mm undercloak.
2. Copper or stainless steel clips: Fix to substrate at not more than 450 mm centres.
3. Overcloak: Welt with clips around undercloak to form a roll of consistent cross section.

860 Drips with splash laps

1. Underlap: Dress into rebate along top edge of drip.
   1.1. Fixing: One row of nails at 50 mm centres on centre line of rebate.
2. Overlap: Dress over drip and form a 40 mm splash lap.

862 Drips with splash laps

1. Underlap: Dress up full height of drip upstand.

1.1. Fixing: Two rows of nails to lower level substrate, 25 mm and 50 mm from face of drip. At 75 mm centres in each row, evenly spaced and staggered. Seal over nails with a soldered or lead-welded dot.

2. Overlap: Dress over drip and form a 75 mm splash lap.
   2.1. Fixing: Lead clips, lead-welded to underlap, with not less than one per bay.

865 Drips without splash laps

1. Underlap: Dress into rebate along top edge of drip.
   1.1. Fixing: One row of nails at 50 mm centres on centre line of rebate.
2. Overlap: Dress over drip to just short of lower level.

880 Welted joints

1. Joint allowance: 50 mm overlap and 25 mm underlap.
2. Copper or stainless steel clips: Fix to substrate at not more than 450 mm centres.
3. Overlap: Welt around underlap and clips and lightly dress down.

970 Patination oil

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Location: To all leadwork
3. Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions.

Ω End of Section

H73
Copper strip/ sheet fully supported roof coverings/ flashings

To be read with preliminaries/ general conditions.

3 Copper sheet fully supported roof covering

1. Covering system: Traditional sheet
2. Fire performance: Not required
3. Insulation: Existing
4. Sarking or roof boarding: Existing
5. Membrane: Existing roof membrane
6. Substrate: Existing
   6.1. Preparation: Make good, as clause 63
7. Sheet underlay: 'Tyvek Supro' by DuPont Tyvek (tel: 01275 879770) or such other similar, suitable geotextile breather membrane as is approved in writing by the Contract Administrator.
8. Copper
   8.1. Type: As clause 51
   8.2. Material condition:

      8.2.1. R220 (soft) for the cap to the dome above the glazed timber lantern; and
      8.2.2. R240 (half-hard) for the main dome and dome ribs.
   8.3. Thickness:
      8.3.1. The thickness of copper sheet to be used for both the cap and the main dome/ribs is 0.6mm natural sheet.
      8.3.2. Sheet is to be rolled to BS EN 1172, material designation CWO24A, and stamped or labelled with temper and thickness as specified.
   8.4. Finish: To match existing
9. Joints in direction of fall: Batten rolls
   9.1. Spacing: 500 mm
10. Cross joints: Double and Single-lock cross welts.
    10.1. Spacing: 1800 mm Determined by contractor

5 Copper sheet fully supported covering to dormers

1. Covering system: Traditional sheet
2. Fire performance: Not required
3. Insulation: Existing
4. Sarking or roof boarding: Existing
5. Membrane: Existing roof membrane
6. Substrate: Existing
   6.1. Preparation: Make good as clause 63
7. Sheet underlay: 'Tyvek Supro' by DuPont Tyvek (tel: 01275 879770) or such other similar, suitable geotextile breather membrane as is approved in writing by the Contract Administrator.
8. Copper
   8.1. Type: As clause 51
   8.2. Material condition:

8.2.1. R220 (soft) for the cap to the dome above the glazed timber lantern; and

8.2.2. R240 (half-hard) for the main dome and dome ribs.

8.3. Thickness:

8.3.1. The thickness of copper sheet to be used for both the cap and the main dome/ribs is 0.6mm natural sheet.

8.3.2. Sheet is to be rolled to BS EN 1172, material designation CWO24A, and stamped or labelled with temper and thickness as specified.

8.4. Finish: To match existing

9. Joints in top/ sill: Batten rolls
10. Joints in cheeks: Horizontal double lock welts

19 Ridge/ Hip batten rolls

1. Core: Rectangular timber
   1.1. Size: To match existing
   1.2. Fixing: To ridge/ hip board with brass or stainless steel countersunk screws at not more than 600 mm centres
2. Roof coverings: Fix two clips to each roof bay. Form roof coverings each side with upstands to 10 mm above height of core. Welt clips over upstands. Single lock welt upstands to cappings.
3. Capping: Copper of the same temper, thickness and finish as roof, in lengths not more than 3 m, with single lock welt end to end joints.

27 Batten roll eaves

1. Copper underlap: Continuous clip
   1.1. Projection: 20 mm for forming into drip welt.
   1.2. Fix: Avoid through fixings at batten roll positions.
2. Batten roll cores: Fix over underlap, notching over anticapillary welt. Cut core ends with equal splays.
3. Roof tray upstands and batten roll capping ends: Close with welts to form weathertight termination.
4. Roof covering: Fold around underlap projection and single welt to form drip.

29 Batten roll verge

1. Top edge
   1.1. Batten roll longitudinal joint: Position flush with verge.
   1.2. Forming: Secure top of verge under batten roll cappings with batten roll clips.
2. Bottom edge
   2.1. Continuous clips: Fix at 200 mm centres.
   2.2. Forming: Secure bottom of verge around clip with fold.

36 Apron flashings

1. Copper
   1.1. Type: As clause 51
   1.2. Material condition:
      1.2.1. R220 (soft) for the cap to the dome above the glazed timber lantern; and
      1.2.2. R240 (half-hard) for the main dome and dome ribs.
   1.3. Thickness:

1.3.1. The thickness of copper sheet to be used for both the cap and the main dome/ribs is 0.6mm natural sheet.

1.3.2. Sheet is to be rolled to BS EN 1172, material designation CWO24A, and stamped or labelled with temper and thickness as specified.

1.4. Finish: To match existing

2. Dimensions

2.1. Lengths: Not more than 1.8 m, with single lock welt end to end joints.

2.2. Upstand: Not less than 100 mm.

2.3. Cover to abutment: Not less than 150 mm.

3. Fixing: Copper wedge into bed joint, clips to bottom edge at welts and 500 mm centres.

41 Soakers and step flashings

1. Copper

1.1. Type: As clause 51

1.2. Material condition:

1.2.1. R220 (soft) for the cap to the dome above the glazed timber lantern; and

1.2.2. R240 (half-hard) for the main dome and dome ribs.

1.3. Thickness:

1.3.1. The thickness of copper sheet to be used for both the cap and the main dome/ribs is 0.6mm natural sheet.

1.3.2. Sheet is to be rolled to BS EN 1172, material designation CWO24A, and stamped or labelled with temper and thickness as specified.

1.4. Finish: To match existing

2. Soakers: Cut and folded for fixing by roofer.

2.1. Length: Slate/ tile gauge + lap + 25 mm.

2.2. Upstand: Not less than 75 mm.

2.3. Underlap: Not less than 100 mm.

3. Step flashings

3.1. Lengths: Not more than 1.8 m, with single lock welt end to end joints.

3.2. Cover: Overlap to soaker upstands not less than 60 mm.

3.3. Fixing: Copper wedges at every course.

46 Flashings

1. Copper

1.1. Type: As clause 51

1.2. Material condition:

1.2.1. R220 (soft) for the cap to the dome above the glazed timber lantern; and

1.2.2. R240 (half-hard) for the main dome and dome ribs.

1.3. Thickness:

1.3.1. The thickness of copper sheet to be used for both the cap and the main dome/ribs is 0.6mm natural sheet.

1.3.2. Sheet is to be rolled to BS EN 1172, material designation CWO24A, and stamped or labelled with temper and thickness as specified.

1.4. Finish: To match existing

1.5. Lengths: Not more than 1200 mm.

50 Materials design and workmanship generally

1. Copper strip/ sheet: To BS EN 14783. Designation Cu-DHP to BS EN 1172.
2. Design and workmanship: Generally to CP 143-12 and latest editions of the Copper Alliance publications and Federation of Traditional Metal Roofing Contractor's 'UK guide to good practice in fully supported metal roofing and cladding'.
3. Fabrication and fixing: To provide a secure, free draining and completely weathertight installation.
4. Preforming: Measure, mark, cut and form copper prior to assembly wherever possible.
5. Marking out: Do not use scribers or other sharp instruments without approval.
6. Folding: To give straight, regular and tight bends, leaving panels free from ripples, kinks, buckling and cracks.
7. Free edges: Fold under by 10 mm to provide additional stiffness. Remove sharp metal edges as work proceeds.
8. Finished copperwork: Fully supported, adequately fixed to resist wind uplift and able to accommodate thermal movement without distortion or stress.
   8.1. Protection: Prevent staining or discolouration by subsequent work.

51 Copper strip/ Sheet

1. Type: Material designation Cu-DHP
2. Description: To match existing
3. Standard: To BS EN 14783
4. Manufacturer: Contractor's choice
   4.1. Product reference: Submit proposals

52 Soldering and brazing

1. In situ soldering and brazing: Not permitted.

60 Timber for use with copper work

1. Quality: Planed, free from wane, pitch pockets, decay and insect attack (ambrosia beetle excepted).
2. Moisture content: Not more than 22% at time of fixing and covering.
3. Preservative treatment: Organic solvent as section Z12 and Wood Protection Association Commodity Specification C8.

61 Sheet underlay

1. Manufacturer: DuPont Tyvek
   1.1. Product reference: Tyvek Supro

62 Laying sheet underlay

1. Handling: Prevent tears and punctures.
2. Laying: Onto a dry substrate. Fix/ seal with 20 x 3 mm extra large head copper clout nails .
3. Protection: Keep dry and cover with copper at the earliest opportunity.

63 Preparation of existing timber substrates

1. Remedial work: Adjust boards to level and securely fix. Punch in protruding fasteners and plane or sand to achieve an even surface.
2. Defective boards: Give notice.
3. Moisture content: Not more than 22% at time of covering. Give notice if greater than 16%.

65 Fixings for clips

1. Nails to timber substrates: Copper clout nails to BS 1202-2, table 2 for copper clips. Stainless steel (austenitic) for stainless steel clips.
   1.1. Shank type: Annular ringed or helical threaded.
   1.2. Length: Not less than 25 mm or equal to substrate thickness.
2. Screws to concrete or masonry substrates: Brass.
   2.1. Length: Not less than 25 mm.
   2.2. Washers and plastic plugs: Compatible with screws.

69 Clips

1. Copper or stainless steel (austenitic) clips: Supplied preformed by the strip/ sheet manufacturer, or cut and formed in situ as recommended by the strip/ sheet manufacturer.
2. Dimensions, temper, number of fixings and provision for movement: As recommended by the strip/ sheet manufacturer.

73 Wedge fixing into joints/ Chases

1. Joint/ Chase: Rake/ Cut out to a depth of not less than 25 mm (under dpc where in the same joint).
2. Copper: Fold 25 mm into joint/ chase with a 2 mm end upstand waterstop.
3. Fixing: Copper wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of copper.
4. Sealant:
   4.1. Application: As section Z22.

74 Clips

1. Manufacturer: Contractor's choice
2. Material
   2.1. Copper
      2.1.1. Standard/ grade: Temper to BS EN 1172, designation R220 Temper to BS EN 1172, designation R240
      2.1.2. Thickness: 0.60 mm
   2.2. Stainless steel
3. Dimensions
   3.1. Width: 50 mm where not continuous.
   3.2. Length: To suit detail.
4. Fixing clips: Secure each to substrate with either two screw or three nail fixings not more than 50 mm from edge of lead sheet. Use additional fixings where lead downstands exceed 75 mm.
5. Fixing lead sheet: Welt clips around edges and turn over 25 mm.

75 Continuous clips

1. Manufacturer: Contractor's choice
2. Material
   2.1. Copper continuous clips
      2.1.1. Standard/ grade: Temper to BS EN 1172, designation R220 Temper to BS EN 1172, designation R240
      2.1.2. Thickness: 0.60 mm
   2.2. Stainless steel continuous clips

2.2.1. Standard/ grade: Grade to BS EN 10088-1, 1.4301(304)

2.2.2. Thickness: 0.38 mm

3. Dimensions
   3.1. Width: To suit detail.
4. Fixing lead sheet: Welt edge around continuous clip and dress down.

80 Standing seam joints

1. Joint allowances: 45 mm overlap, 35 mm underlap and not less than 3 mm gap for thermal movement.
2. Clip positions
   2.1. Fixed clips at 300 mm centres.
   2.2. Sliding clips At 300 mm centres.
3. Forming: Double welt overlap and clips around underlap to form a standing seam 25 mm high of consistent cross section.

82 Batten roll joints

1. Timber core
   1.1. Size: 40 mm high x 45 mm wide tapering to 32 mm at apex.
   1.2. Fixings to substrate: Brass or stainless steel countersunk screws at not more than 500 mm centres.
2. Copper covering
   2.1. Joint allowances: Form strips/ sheet each side of core with 3 mm gap for thermal movement and upstands to 10 mm above height of core.
   2.2. Fixing: Clips at 450 mm centres, welted over upstands. Single lock welt upstands to capping.
3. Cappings: Copper of the same temper, thickness and finish as covering.
   3.1. Length: Not more than 3 m.
   3.2. Fixing: Single lock welt end to end joints.

85 Drip/ Step joints

1. Strip/ sheet from below step: Fold up full height of step, with allowance for thermal movement.
2. Form copper underlap
   2.1. Cover to roof slope: Not less than 135 mm with anticapillary welt at top edge.
   2.2. Projection: 35 mm for forming into drip welt.
   2.3. Downstand: Not less than 40 mm with welt at bottom edge.
   2.4. Fixing: To roof slope at 100 mm centres.
3. Strip/ sheet from above step: Fold over clips and underlap projection. Single welt lightly and fold down at an obtuse angle to form a drip and to allow freedom of movement.

87 Single lock welt joints

1. Joint allowance: 100 mm overlap and 50 mm underlap.
2. Overlap: Welt around underlap and dress down.
3. Forming: Fold welts lightly to allow freedom of movement.

90 Double lock welt joints

1. Joint allowance: 90 mm overlap and 60 mm underlap.
2. Underlap: Welt and secure with clips, one per bay.

3. Overlap: Double welt around underlap and dress down.

Ω End of Section

J21
Mastic asphalt roofing/ insulation/ finishes

Types of coating/ paving - Not Used

Performance

210 Roof performance

1. General: Secure, free-draining and weathertight.

220 Vapour control

1. Interstitial condensation risk of roof: Modify calculation method to conform to BS 5250.
2. Basic design data:
   - 2.1. Outdoor notional psychometric conditions, winter: Page 3 of 6 Date: 12 February 2013 CDPM3
   - 2.2. Insulated Temperature: -5oC. Relative humidity: 90%. Vapour pressure: 0.36kPa. Duration: 60 days.
   - 2.3. Outdoor notional psychometric conditions, summer: Temperature: 18oC. Relative humidity: 65%. Vapour pressure: 1.34kPa. Duration: 60 days.
   - 2.4. Indoor notional psychometric conditions: Temperature: 20oC Relative humidity: 35% Vapour pressure: 2.45kPa.
3. Winter interstitial condensate:
   - 3.1. Calculated amount (maximum): 0.35 kg/m2.
   - 3.2. Calculated annual net retention: Nil.
4. Vapour control layer: If calculated amounts of condensate exceed allowed maxima, provide a suitable membrane so that damage and nuisance from interstitial condensation do not occur.

Products

320 Primer

1. Type: Adhesive primer.
2. Manufacturer and product reference:: Approved Supplier to be agreed with Contract Administrator

370 Reinforced bitumen membrane

1. Manufacturer: Contractor's choice
   - 1.1. Product reference: Submit proposals
2. Bitumen membrane: To BS EN 13707
3. Width: 150 mm.

495 Solar reflective paint

1. Manufacturer: Contractor's choice
   - 1.1. Product reference: Submit proposals
2. Colour: White

Execution generally

510 Adverse weather

1. General: Do not lay mastic asphalt in wet or damp conditions unless effective temporary cover is provided over working area.
2. Unfinished areas of the roof: Keep dry.

520 Incomplete work

1. Daywork joints in warm roofs and edges of phased roofing: Adequately protected and fully weathertight.

525 Preparing edges of existing mastic asphalt

1. Single-coat applications
   1.1. Cut edges: Soften and clean.
2. Two-coat applications
   2.1. Cut edges: Soften and remove half depth of softened material for minimum width of 75 mm.
   2.2. Jointing: Lapped between new and existing material at prepared edges.
3. Torching: Not permitted.
4. Timing: Immediately prior to laying mastic asphalt.

530 Applying primers

1. Coverage per coat (minimum): 0.2 L/m²
2. Surface coverage: Even and full.
3. Coats: Fully bonded. Allow volatiles to dry off thoroughly between coats.

Substrates/ air and vapour control layers/ warm deck roof insulation

610 Suitability of substrates

1. Substrates generally
   1.1. Secure, even-textured, clean, dry and frost-free.
2. Preliminary work: Completed, including:
   2.1. Chases (minimum): 25 x 25 mm.
   2.2. External angles: Chamfered where required to maintain full thickness of mastic asphalt.
   2.3. Formation of upstands and kerbs.
   2.4. Grading to correct falls.
   2.5. Movement joints.
   2.6. Penetrations/ outlets.
3. Moisture content and stability of substrate: Must not impair integrity of roof.

620 Removing existing mastic asphalt

1. Areas to be removed: Refer to Schedule of Works
2. Existing roof: Do not damage.
3. Timing: Only remove sufficient mastic asphalt as will be replaced and made weathertight on same day.

630 Making good existing mastic asphalt

1. Existing items to be removed: Refer to Schedule of Works

2. Defective areas of mastic asphalt: Soften and carefully cut out.
   2.1. Hammers, chisels, etc.: Do not use to cut cold mastic asphalt.
   2.2. Substrate: Clean and dry.
   2.3. Separating membrane: Make good.
   2.4. Mastic asphalt: Patch level with existing surface in two coats, the topcoat lapped to a minimum of 75 mm onto existing asphalt and to half its depth.

Asphalting

720 Delivery

1. Condition of mastic asphalt as delivered to site
   1.1. Hot-prepared; do not remelt on site.
   1.2. Blocks: Remelt on site, mix thoroughly. Temperature of material (maximum), 230°C.

730 Transporting

1. Transport distances: Minimize to avoid excessive cooling of molten mastic asphalt.
2. Buckets, barrows or dumpers used for mastic asphalt: Line with minimum quantity of fine inert dust. Use silica or similar acid-resisting dust where acid-resisting mastic asphalt is being used.

735 Localized heating

1. Blowlamps and gas torches: Only use types with controlled gradual heating during laying, removal and repair of mastic asphalt.

740 Laying mastic asphalt

1. Standard: To BS 8218.
2. Application
   2.1. In bays to even thickness.
   2.2. Reheated asphalt: Do not use.
3. External angles, junctions and tuck-ins: Maintain full thickness of asphalt.
4. Fillets at internal angles: Solid, fully fused to asphalt coating.
5. Previously laid coats: Protect whilst exposed.
6. Successive coats
   6.1. Timing: Apply without delay and within same working period.
   6.2. Coats: Apply at right angles to preceding.
   6.3. Stagger joints between bays in consecutive coats (minimum): 75 mm.
7. Condition of contact edges of previously laid bays: Warm and clean.
8. Blowing: Pierce and make good affected areas while mastic asphalt is still at working temperature.
9. Completion: During final floating operation, whilst asphalt is still warm, apply sand to horizontal surfaces and rub in well using wooden float. Remove surplus material.
10. Surface condition at completion: Smooth and free from imperfections. Firmly adhered, weatherproof and free-draining.

750 Mastic asphalt skirtings and vertical work

1. Top edge: Tuck into 25 x 25 mm continuous splayed chase or groove.
2. External angles: Maintain full thickness of asphalt.
3. Splayed top: Form to shed water away from substrate.

Surfacing

820 Laying stone ballast

1. Condition of substrate: Clean.
2. Gravel guards: Fit to outlets.
3. Previously laid materials: Protect during laying of ballast.
4. Laying: Spread evenly. Do not pile to excessive heights.
   4.1. Depth (minimum): To match existing

840 Laying precast concrete paving slabs

1. Condition of substrate: Clean.
2. Setting out: Minimize cutting.
3. Laying: To match existing
4. Joints: Open.

870 Laying chippings

1. Condition of substrate: Clean.
2. Gravel guards: Fit to outlets.
3. Dressing compound: Hot or cold application. Evenly pour at 1.5 kg/m².
4. Chippings application (approximately): 16 kg/m².
5. Completion: Remove excess chippings without exposing asphalt.

880 Applying solar reflective paints

1. Number of coats: Two
2. Surface coverage: Even and full.
3. Coats: Fully bonded.

Completion

910 Inspection

1. Interim and final roof inspections: Submit reports.

940 Completion

1. Roof areas: Clean.
   1.1. Outlets: Clear.
2. Work necessary to provide a weathertight finish: Complete.
3. Storage of materials on finished surface: Not permitted.
4. Completed mastic asphalt roof coating: Do not damage. Protect from petroleum-based solvents and other chemicals, traffic and adjacent or high-level working.

Ω End of Section

J31
Liquid-applied waterproof roof coatings

Types of coating

110 Cold deck roof coating

1. Substrate: Existing mastic asphalt
   Felt roofs
   1.1. Preparation: Make good existing mastic asphalt
2. Waterproof coating: As clause 353

Performance

210 Roof performance

1. General: Firmly adhered, free-draining and weathertight.

Products

310 Ancillary products

1. General: Recommended by coating manufacturer.

353 Waterproof coating

1. Manufacturer: Kemper System Ltd
   Kemper House, 30 Kingsland Grange
   Woolston, Warrington
   Cheshire, WA1 4RW
   Tel: 01925 445532
   Fax: 01925 575096
   General: enquiries@kempersystem.co.uk
   Sales: sales@kempersystem.co.uk
   Technical: technical@kempersystem.co.uk
   1.1. Product reference: Kemperol V210
2. Primer: Kempertec D-/R- Primer
3. Application: As clause J31/722, J31/760.
4. Colour: Anthracite
5. Minimum dry film thickness: Dry film thickness of 2 mm

Execution generally

410 Adverse weather

1. Do not apply coatings
   1.1. In wet conditions or at temperatures below 5°C, unless otherwise permitted by coating manufacturer.
   1.2. In high winds (speeds > 7 m/s), unless adequate temporary windbreaks are erected adjacent to working area.
2. Unfinished areas of roof: Keep dry.

420 Suitability of substrates

1. Substrates generally

1.1. Secure, clean, dry, smooth, free from frost, contaminants, loose material, voids, protrusions and organic growths.

1.2. Compatible with coating system.

2. Preliminary work: Complete, including:

2.1. Formation of upstands, kerbs, box gutters, sumps, grooves, chases and expansion joints.

2.2. Fixing of battens, fillets and anchoring plugs/ strips.

3. Moisture content and stability: Must not impair integrity of roof.

Existing substrates

540 Making good existing mastic asphalt covering

1. Defective areas: Soften and carefully cut out.

1.1. Hammers, chisels, etc: Do not use to cut cold mastic asphalt.

1.2. Substrate: Dry out.

1.3. Separating membrane: Make good.

1.4. Mastic asphalt: Patch level with existing surface in two coats, the topcoat lapped minimum 75 mm onto existing mastic asphalt and to half its depth.

575 Final power wash to existing coverings

1. General: Water jet-clean all areas. Allow to dry.

580 Sterilization treatment to existing coverings

1. Preliminary work: Complete, including making good and cleaning down.
2. Biocidal solution: Apply to all areas previously subject to organic growth. Allow to dry.

New substrates/ vapour control layers/ warm deck roof insulation - Not Used

Roof coating system

710 Adhesion tests

1. Requirement: Carry out a trial coating to determine priming requirements and/ or system suitability.
2. Nature of test: The contractor shall carry out a “peel” test to each roof area prepared for waterproofing, by applying Kemperol V210 resin to areas of the deck to test for proper adhesion. This must be carried out strictly in accordance with the manufacturer’s requirements, as set out in the Kemper Installation and Quality Assurance Manual.
3. Test results: Submit and arrange for inspection.

720 Applying primers/ conditioners

1. Surface coverage: 0.3kg per m2 depending on substrate porosity and profile.
2. Coats: Allow to dry before overcoating.

730 Membrane application to details

1. General

1.1. The waterproofing system is applied to structural details first i.e. upstands, outlets, cracks etc. before the main deck area is waterproofed.

1.2. Note there are optional build ups that can be applied to the details. The choice will be dependent on a number of criteria i.e. project size, number of visits to site required by the waterproofing contractor, construction sequence etc. See clause 770.

760 Application of roof coatings

1. Thickness: Monitor by taking wet/ dry film thickness readings.
2. Continuity: Maintain full thickness of coatings around angles, junctions and features.
3. Rainwater outlets: Form with watertight joints.
4. Drainage systems: Do not allow liquid coatings to enter piped rainwater or foul systems.
5. Edge trims: Apply coatings over horizontal leg of trim and into recess.

765 Organic growths

1. All vegetation: Carefully remove / scrape off and remove from site.
2. Treatment biocide: Apply appropriate solution to growth areas and surrounding surfaces (Contractor's choice).
3. Residual effect biocide: Apply appropriate solution to inhibit re-establishment of growths.

Surfacing - Not Used

Completion

910 Inspection

1. Coating surfaces: Check when cured for discontinuities.
    1.1. Defective areas: Apply another coating.

940 Completion

1. Roof areas: Clean.
    1.1. Outlets: Clear.
    1.2. Flashings: Dressed into place.
2. Work necessary to provide a weathertight finish: Complete.
3. Storage of materials on finished surface: Not permitted.
4. Completed coatings: Protect against damage.

Ω End of Section

L10
Windows/ rooflights/ screens/ louvres

General

110 Evidence of performance

1. Ensure all supplies of timber and timber based products (including those used for temporary works) conform to the specified certification standard listed below:
   1.1. FSC (refer to NBS clause 123) – All tropical hardwoods, all non- European sourced temperate hardwoods (e.g. North American sourced oak and walnut), all non-European sourced softwoods (e.g. North American sourced Western Red Cedar), Plywood (except where formed from Birch or Douglas Fir).
   1.2. PEFC (refer to NBS clause 124) – All European sourced softwoods (White Wood, Deal, Douglas Fir, Larch, Yew, etc.), European sourced hardwoods not listed under D (European), Birch, Maple, etc.
   1.3. Provide evidence to the Contract Administrator to review on request.

Products

250 Timber windows

1. Type: To match original
2. Standard: BS EN 942:2007
3. Manufacturer: Contractor's choice
4. Exposure category to BS 6375-1/ design wind load: (Design wind pressure): 1600 (Pa)
5. Operation and strength characteristics: To BS 6375-2.
6. Timber: Generally to BS EN 942.
   6.1. Species: Class 1 for glazing beads, drip mouldings and the like.
   Class 2 for all other members.
7. Appearance class: J10 for glazing beads, drip mouldings, etc. J40 or better for all other members.
8. Moisture content on delivery: 12-19%.
9. Preservative treatment: Organic solvent as section Z12 and British Wood
10. Finish as delivered: As Schedule of Works
11. Glazing details: As section L40
12. Ironmongery/ accessories: Original repaired if possible, or to match

310 Steel windows

1. Type: To match existing
2. Standard: Non-fire and/ or smoke-rated windows to BS EN 14351-1 and BS 6510
3. Manufacturer: Contractor's choice
4. Finish as delivered: As Schedule of Works
5. Glazing details: As L40
6. Ironmongery/ accessories: Original repaired if possible, or to match

420 Timber subframes

1. Timber: To BS EN 942.
   1.1. Moisture content on delivery: 12-19%.
2. Joinery workmanship: As section Z10.

3. Preservative treatment: Organic solvent as section Z12

460 Rooflights

1. Manufacturer: The Rooflight Company
   1.1. Contact details
      1.1.1. Address: Wychwood Business Centre
      Milton Road
      Shipton-under-Wychwood
      Oxfordshire
      OX7 6XU
      1.1.2. Telephone: +44 (0)1993 833108
      1.1.3. Web: www.therooflightcompany.co.uk
      1.1.4. Email: info@therooflightcompany.co.uk
   1.2. Product reference: Conservation Rooflight®
2. Size: To suit existing apertures
3. Colour: Dark grey to match slates
4. Glazing details: 4 mm SGG PLANITHERM® Total + (Low E) toughened inner, 16 mm argon cavity, 4 mm SGG PLANILUX® Toughened outer
5. Ironmongery: Manual Operation

Execution

710 Protection of components

1. General: Do not deliver to site components that cannot be installed immediately or placed in clean, dry floored and covered storage.
2. Stored components: Stack vertical or near vertical on level bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

760 Replacement window installation

1. Standard: In accordance with BS 8213-4.

765 Window installation generally

1. Installation: Into prepared openings.
2. Gap between frame edge and surrounding construction
   2.1. Minimum:
   2.2. Maximum:
3. Distortion: Install windows without twist or diagonal racking.

780 Fixing of timber frames

1. Standard: As section Z20.
2. Fasteners:
   2.1. Spacing: When not pre-drilled or specified otherwise, position fasteners not more than 150 mm from ends of each jamb, adjacent to each hanging point of opening lights, and at maximum 450 mm centres.

810 Sealant joints/ putty

1. Sealant
   1.1. Manufacturer: Repair Care International

1.1.1. Product reference:

Dry Seal MP White

1.2. Colour: To match window frames

1.3. Application: As section Z22 to prepared joints. Finish triangular fillets to a flat or slightly convex profile.

820 Ironmongery

1. Fixing: In accordance with any third-party certification conditions applicable. Assemble and fix carefully and accurately using fasteners with matching finish supplied by ironmongery manufacturer. Do not damage ironmongery and adjacent surfaces.
2. Checking/ adjusting/ lubricating: Carry out at Completion and ensure correct functioning.

Ω End of Section

L20
Doors/ shutters/ hatches

General

110 Evidence of performance

1. Certification: Provide independently certified evidence that all incorporated components comply with specified performance requirements.

112 Timber procurement

1. Timber (including timber for wood-based products): Obtain from well managed forests and/ or plantations in accordance with:
   1.1. The laws governing forest management in the producer country or countries.
   1.2. International agreements such as the 'Convention on International Trade in Endangered Species of wild fauna and flora (CITES)'.
2. Documentation: Provide either in accordance with chain of custody certification scheme requirements:
   2.1. Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied, or
   2.2. Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood-based products.

115 Fire-resisting and smoke control pedestrian doors/ door assemblies/ doorsets

1. UKCA/ UKNI/ CE marked fire-resisting and smoke control pedestrian doorsets: To BS EN 16034 and in conjunction with BS EN 13241, BS EN 14351-1 and BS EN 14351-2.
2. Door products: As defined in BS EN 12519.
3. Evidence of fire performance: Provide certified evidence, in the form of a product conformity certificate, directly relevant fire test report or engineering assessment, that each door/ door assembly/ doorset supplied will comply with the specified requirements for fire-resisting and/ or smoke control if tested to BS 476-22, BS EN 1634-1, BS EN 1634-3 or is UKCA/ UKNI/ CE marked to BS EN 16034. Specified values should not be a combination of both standards. Such certification must cover door and frame materials, glass and glazing materials and their installation, essential and ancillary ironmongery, hinges and seals.
4. Components, assemblies or sets will be marked to the relevant UKCA/ UKNI/ CE marking European product standard (hEN), national product standard and/ or third-party certification rating.

120 Non-fire-resisting pedestrian doors/ door assemblies/ doorsets

1. Provide certified evidence, in the form of a product conformity certificate or engineering assessment, that each pedestrian door/ doorset/ assembly supplied will comply with the specified requirements to BS EN 14351-1. Such certification must cover door and frame materials, glass and glazing materials and their installation, essential and ancillary ironmongery, hinges and seals.
2. Components and assemblies will be marked to the relevant UKCA/ UKNI/ CEI marking European product standard (hEN), national product standard and/ or third-party certification rating.

150 Site dimensions

1. Procedure: Before starting work on designated items take site dimensions, record on shop drawings and use to ensure accurate fabrication.

Products

230 Timber flush doors

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Facings: To match exisiting
3. Lippings: To match exisiting
4. Preservative treatment: Not required
5. Finish as delivered: Prepared and primed, as section M60
6. Glazing/ infill details: Site-glazed as section L40
7. Frame: To be retained

Execution

710 Protection of components

1. General: Do not deliver to site components that cannot be installed immediately or placed in clean, dry, floored and covered storage.
2. Stored components: Stacked on level bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

730 Priming/ sealing

1. Wood surfaces inaccessible after installation: Primed or sealed as specified before fixing components.

810 Fire-resisting and smoke control doors/ door assemblies/ doorsets/ roller shutters and curtains – contractor installed

1. Gaps between frames and supporting construction: Filled as necessary in accordance with requirements for certification and/ or door/ doorset manufacturer's instructions.

830 Fixing ironmongery generally

1. Fasteners: Supplied by ironmongery manufacturer.
   1.1. Finish/ corrosion resistance: To match ironmongery.
2. Holes for components: No larger than required for satisfactory fit/ operation.
3. Adjacent surfaces: Undamaged.
4. Moving parts: Adjusted, lubricated and functioning correctly at completion.

850 Location of hinges

1. Primary hinges: To match existing
2. Hinges for fire-resisting doors: Positioned in accordance with door leaf manufacturer's recommendations.

860 Installation of emergency exit devices

1. Standard: Unless specified otherwise, install panic bolts/ latches in accordance with BS EN 1125.

Ω End of Section

L40
General glazing

General requirements

130 Removal of glass/ plastics for reuse

1. Existing glass/ plastics and glazing compound, beads, etc.: Remove carefully, avoiding damage to frame, to leave clean, smooth rebates free from obstructions and debris.
2. Deterioration of frame/ surround: Submit report on defects revealed by removal of glazing.
   2.1. Affected areas: Do not reglaze until instructed.
3. Reusable materials: Clean glass/ plastics, beads and other components that are to be reused.

140 Material samples

1. Representative samples of designated materials: Submit before cutting panes.

150 Workmanship and positioning generally

1. Glazing generally: In accordance with BS 6262 series.
2. Integrity: Glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
3. Dimensional tolerances: Panes/ sheets to be within ± 2 mm of specified dimensions.
4. Materials
   4.1. Compatibility: Glass/ plastics, surround materials, sealers, primers and paints/ clear finishes to be used together to be compatible. Avoid contact between glazing panes/ units and alkaline materials such as cement and lime.
   4.2. Protection: Keep materials dry until fixed. Protect insulating glass units and plastics glazing sheets from the sun and other heat sources.

152 Preparation

1. Surrounds, rebates, grooves and beads: Clean and prepare before installing glazing; ensure compliance with any certified installation requirements.

155 Glass generally

1. Standards: To BS 952 and relevant parts of:
   1.1. BS EN 572 for basic soda lime silicate glass.
   1.2. BS EN 1748-1-1 for borosilicate glass.
   1.3. BS EN 1748-2-1 for ceramic glass.
   1.4. BS EN 1863 for heat-strengthened soda lime silicate glass.
   1.5. BS EN 12150 for thermally toughened soda lime silicate safety glass.
   1.6. BS EN 12337 for chemically strengthened soda lime silicate glass.
   1.7. BS EN 13024 for thermally toughened borosilicate safety glass.
   1.8. BS EN ISO 12543 for laminated glass and laminated safety glass.
2. Panes/ sheets: Clean and free from obvious scratches, bubbles, cracks, rippling, dimples and other defects.
   2.1. Edges: Generally undamaged. Shells and chips not more than 2 mm deep and extending not more than 5 mm across the surface are acceptable if ground out.

160 Linear patterned/ wired glass

1. Alignment: Vertical/ Horizontal as appropriate, and pattern matched across adjacent panes in close proximity.

180 Bead-fixing with pins

1. Pin spacing: Regular at maximum 150 mm centres, and within 50 mm of each corner.
2. Exposed pin heads: Punched just below wood surface.

181 Bead-fixing with screws

1. Screw spacing: Regular at maximum 225 mm centres, and within 75 mm of each corner.

Types of glazing

210 Putty-fronted single-glazing

1. Pane material: 4mm clear float glass
2. Surround: Steel
   2.1. Sealer: Priming/ sealing not required
3. Type of putty: Metal casement
4. Thermal performance (U-value maximum): Unrated
5. Glass installation
   5.1. Glass: Located centrally in surround using setting and location blocks, and secured with glazing sprigs/ cleats/ clips at 300 mm centres.
   5.2. Finished thickness of back bedding after inserting glazing (minimum): 1.5 mm.
   5.3. Front putty: Finished to a smooth, neat triangular profile stopping 2 mm short of sight line. Surface lightly brushed to seal putty to glass and left smooth with no brush marks.
6. Sealing putty: Seal as soon as sufficiently hard but not within 7 days of glazing. Within 28 days apply either:
   6.1. The full final finish, suitably protected until completion and cleaned down and made good as necessary, or
   6.2. Two coats of primer applied locally to the compound, to be followed nearer completion with the full specified finish.
7. Opening lights: Keep in closed position until putty has set sufficiently to prevent displacement of glazing when opened.

230 Bead-fixed single-glazing

1. Pane material: 4mm clear float glass
2. Surround/ bead: Steel
   2.1. Bead location: Inside
3. Glazing compound: Two part rubberizing compound
4. Thermal performance (U-value maximum): Unrated
5. Glazing installation
   5.1. Glass: Located centrally in surround using setting and location blocks and distance pieces.
   5.2. Finished thickness of back bedding after inserting glazing (minimum): 3 mm.
   5.3. Front bedding: Applied to fill voids.
   5.4. Beads: Bedded in glazing compound and fixed securely.
   5.5. Visible edge of glazing compound: Finished internally and externally with a smooth chamfer.

Ω End of Section

M20
Plastered/ rendered/ roughcast coatings

Types of coating

110 Portland cement render

1. Location: To repair Portland cement-based renders to the exterior
2. Substrate: Existing
   2.1. Preparation: As clause M10/556
3. Cement: Ordinary Portland cement
   3.1. Sand:
      - Coarse sand to BS 1199, to pass a No. 7 sieve
      - Mix Proportions: 1:3 cement sand by volume.
      - Thickness: 3 to 5 mm thick. Do not level or smooth in any way
4. Undercoats
   4.1. Mix (cement:lime:sand): 1:1:6
      4.1.1. Cement type: Ordinary Portland cement
   4.2. Thickness (excluding dubbing out and keys): Not more than 10 mm in any one coat, and to decrease each subsequent undercoat
5. Final coat
   5.1. Mix (cement:lime:sand): 1:2:9
      5.1.1. Cement type: Ordinary Portland cement
   5.2. Thickness: Average 7 mm
   5.3. Finish: wood float, leave ready for painting. A single pass with a steel float will match new work to the original surface.

680 Moulded works

1. Substrate: Existing
   1.1. Preparation: As clause 556
2. Cement: lime:sand mortar:
   2.1. Type: Ordinary Portland cement
   2.2. Pigment: To match existing render; subject to site trials
3. Undercoats
   3.1. Mix (cement:lime:sand): 1:1:6
      3.1.1. Cement type: Ordinary Portland cement
   3.2. Thickness (excluding dubbing out and keys): Not more than 10 mm in any one coat
4. Final coat
   4.1. Mix (cement:lime:sand:coarse aggregate): 1:2:9
      4.1.1. Cement type: Ordinary Portland cement
   4.2. Coarse aggregate: To BS EN 12620.
   4.3. Finish: To match existing

General - Not Used

Materials and marking of mortar

438 Cements for mortars

1. Cement: To BS EN 197-1.
   1.1. Types: Portland cement, CEM I.
2. Portland slag cement, CEM II.
3. Portland fly ash cement, CEM II.
   3.1. Strength class: 32.5, 42.5 or 52.5.
4. White cement: To BS EN 197-1.
   4.1. Type: Portland cement, CEM1.
   4.2. Strength class: 52.5.
5. Sulfate resisting Portland cement: To BS EN 197-1.
   5.1. Strength class: 42.5.

478 Hydraulic lime

1. Standard: To BS EN 459-1.
   1.1. Type: Natural hydraulic lime (NHL).

481 Ready prepared lime putty

1. Type: Slaked directly from CL 90 quicklime to BS EN 459-1, using an excess of water.
   1.1. Maturation: In pits/ containers that allow excess water to drain away.
   1.2. Density of matured lime putty: 1.3-1.4 kg/L.
2. Maturation period before use (minimum): 90 days.
3. Storage: Prevent drying out or wetting: Protect from frost.

Preparing substrates

556 Removing defective existing render

1. Render for removal: Detached, hollow, soft, friable, badly cracked, affected by efflorescence or otherwise damaged.
2. Removing defective render: Cut out to regular rectangular areas with straight edges.
   2.1. Horizontal and vertical edges: Square cut or slightly undercut.
   2.2. Bottom edges to external render: Do not undercut.
   2.3. Render with imitation joints: Cut back to joint lines.
3. Cracks
   3.1. Fine hairline cracking/ crazing: Leave.
   3.2. Other cracks:
4. Dust and loose material: Remove from exposed substrates and edges.

Backings/ beads/ joints - Not Used

Mouldings/ decorative plasterwork - Not Used

Internal plastering - Not Used

External rendering

810 Application generally

1. Application of coatings: Firmly and in one continuous operation between angles and joints. Achieve good adhesion.
2. Appearance of finished surfaces: Even and consistent. Free from rippling, hollows, ridges, cracks and crazing.
   2.1. Accuracy: Finish to a true plane, to correct line and level, with angles and corners to a right angle unless specified otherwise, and with walls and reveals plumb and square.
3. Drying: Prevent excessively rapid or localized drying out.

820 Dubbing out rendering

1. General: Correct substrate inaccuracies.
2. Thickness of any one coat (maximum): 16 mm.
   2.1. Total thickness (maximum): 20 mm, otherwise obtain instructions.
3. Mix: As undercoat.
4. Application: Achieve firm bond. Allow each coat to set sufficiently before the next is applied. Comb surface of each coat.

840 Undercoats generally

1. General: Rule to an even surface. Comb to provide a key for the next coat. Do not penetrate the coat.
2. Undercoats on metal lathing: Work well into interstices to obtain maximum key.

845 Thrown undercoats for lime:sand roughcast (harling)

1. Application of undercoats and dubbing out: Throw from a casting trowel or scoop.
2. Finishing: Press back to give an even thickness without smoothing the surface.

856 Final coat – plain floated finish

1. Finish: Even, open texture free from laitance.

861 Final coat – scraped finish

1. Finish: Scraped to expose aggregate and achieve an even texture.

866 Final coat – roughcast (harling) finish

1. Finish: Left as cast with an even thickness and texture.

880 Curing and drying

1. General: Prevent premature setting and uneven drying of each coat.
2. Curing coatings: Keep each coat damp by covering with polyethylene sheet and/ or spraying with water.
   2.1. Curing period (minimum):
   2.2. Final coat: Hang sheeting clear of the final coat.

3. Drying: Allow each coat to dry thoroughly, with drying shrinkage substantially complete before applying next coat.
4. Protection: Protect from frost and rain.

885 Curing and drying nonhydraulic lime render

1. General: Prevent premature setting and uneven drying of each coat.
2. Curing coatings: Keep each coat damp by covering with sheeting hung clear of coating. Spray with water until sufficiently firm.
   2.1. Sheeting:
3. Shrinkage: Thoroughly consolidate/ scour each coat one or more times as necessary to control shrinkage.

Ω End of Section

M60
Painting/clear finishing

Coating systems

130 Gloss paint

1. Description: TO EXTERNAL METALWORK
2. Manufacturer: AkzoNobel
   2.1. Product reference: Dulux Trade Metalshield Gloss
3. Surfaces: Existing external previously decorated metal handrails, pipes, conduits and other general surfaces
   3.1. Preparation: As clauses 400, 420, 440 and 490.
4. Initial coats: Patch prime
5. Undercoats:
   5.1. Number of coats: 2
6. Finishing coats: Full gloss
   6.1. Number of coats: 1

130 Gloss paint Type A

1. Description: TO EXTERNAL PREVIOUSLY PAINTED RENDERED WALLS
2. Manufacturer: AkzoNobel
   2.1. Product reference: Dulux Trade Weathershield Exterior High Gloss
3. Surfaces: Existing external previously decorated render
   3.1. Preparation: As clauses 400, 420, 440, 456, 461, 471 and 481
4. Initial coats: Patch prime
5. Undercoats:
   5.1. Number of coats: 2
6. Finishing coats:
   6.1. Number of coats: 1

160 Decorative woodstain/ varnish/ preservative

1. Description: TO EXTERNAL PREVIOUSLYWOODSTAINED TIMBER
2. Manufacturer: AkzoNobel
   2.1. Product reference: Dulux Trade Weathershield Ultimate Opaque
3. Surfaces: Wood exterior products
   3.1. Preparation: Ensure surfaces are clean and dry
4. Initial coats:
   4.1. Number of coats: 1
5. Finishing coats:
   5.1. Number of coats: 1

170 Masonry coating

1. Description: TO EXTERNAL PREVIOUSLY PAINTED RENDERED WALLS
2. Manufacturer: AkzoNobel
   2.1. Product reference: Dulux Trade Weathershield Maximum Exposure Smooth Masonry Paint

3. Texture: Smooth.
4. Colour: To match existing
5. Additives: Fungicide.
6. Surfaces: Existing external previously decorated wood doors, frames, eaves and verge boarding, handrails and other general surfaces
   6.1. Preparation: As clauses 400, 420, 440, 456, 461, 471 and 481
7. Initial coats: Patch prime
   7.1. Number of coats:
8. Undercoats:
   8.1. Number of coats: 2
9. Finishing coats:
   9.1. Number of coats: 1

Generally

215 Handling and storage

1. Coating materials: Deliver in sealed containers, labelled clearly with brand name, type of material and manufacturer's batch number.
2. Materials from more than one batch: Store separately. Allocate to distinct parts or areas of the work.

220 Compatibility

1. Coating materials selected by contractor
   1.1. Recommended by their manufacturers for the particular surface and conditions of exposure.
   1.2. Compatible with each other.
   1.3. Compatible with and not inhibiting performance of preservative/fire-retardant pretreatments.

280 Protection

1. 'Wet paint' signs and barriers: Provide where necessary to protect other operatives and general public, and to prevent damage to freshly applied coatings.

320 Inspection by coating manufacturers

1. General: Permit manufacturers to inspect work in progress and take samples of their materials from site if requested.

Preparation

400 Preparation generally

1. Standard: In accordance with BS 6150.
2. Refer to any pre-existing CDM Health and Safety File.
3. Refer to CDM Construction Phase Plan where applicable.
4. Suspected existing hazardous materials: Prepare risk assessments and method statements covering operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
5. Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
6. Substrates: Sufficiently dry in depth to suit coating.
7. Efflorescence salts: Remove.

8. Dirt, grease and oil: Remove. Give notice if contamination of surfaces/ substrates has occurred.
9. Surface irregularities: Remove.
10. Joints, cracks, holes and other depressions: Fill flush with surface, to provide smooth finish.
11. Dust, particles and residues from preparation: Remove and dispose of safely.
12. Water based stoppers and fillers
    12.1. Apply before priming unless recommended otherwise by manufacturer.
    12.2. If applied after priming: Patch prime.
13. Oil based stoppers and fillers: Apply after priming.
14. Doors, opening windows and other moving parts
    14.1. Ease, if necessary, before coating.
    14.2. Prime resulting bare areas.

440 Previously coated surfaces generally

1. Preparation: In accordance with BS 6150, clause 11.5.
2. Contaminated or hazardous surfaces: Give notice of:
    2.1. Coatings suspected of containing lead.
    2.2. Substrates suspected of containing asbestos or other hazardous materials.
    2.3. Significant rot, corrosion or other degradation of substrates.
3. Suspected existing hazardous materials: Prepare risk assessments and method statements covering operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
4. Removing coatings: Do not damage substrate and adjacent surfaces or adversely affect subsequent coatings.
5. Loose, flaking or otherwise defective areas: Carefully remove to a firm edge.
6. Alkali affected coatings: Completely remove.
7. Retained coatings
    7.1. Thoroughly clean to remove dirt, grease and contaminants.
    7.2. Gloss-coated surfaces: Provide key.
8. Partly removed coatings
    8.1. Additional preparatory coats: Apply to restore original coating thicknesses.
    8.2. Junctions: Provide flush surface.
9. Completely stripped surfaces: Prepare as for uncoated surfaces.

451 Previously coated surfaces – blast cleaning

1. Operatives
    1.1. Trained/ experienced in blast cleaning.
    1.2. Submit evidence of training/ experience on request.
2. Dust and nuisance: Minimize.

456 Previously coated surfaces – burning off

1. Risk assessment and method statement: Prepare, and obtain approval before commencing work.
2. Adjacent areas: Protect from excessive heat and falling scrapings.
3. Exposed resinous areas and knots: Apply two coats of knotting.
4. Removed coatings: Dispose of safely.

461 Previously coated wood

1. Degraded or weathered surface wood: Take back to provide suitable substrate.
2. Degraded substrate wood: Repair with sound material of same species.
3. Exposed resinous areas and knots: Apply two coats of knotting.

471 Preprimed wood

1. Areas of defective primer: Take back to bare wood and reprime.

490 Previously coated steel

1. Defective paintwork: Remove to leave a firm edge and clean bright metal.
2. Sound paintwork: Provide key for subsequent coats.
3. Corrosion and loose scale: Take back to bare metal.
4. Residual rust: Treat with a proprietary removal solution.
5. Bare metal: Apply primer as soon as possible.
6. Remaining areas: Degrease.

622 Organic growths

1. Dead and loose growths and infected coatings: Scrape off and remove from site.
2. Treatment biocide: Apply appropriate solution to growth areas and surrounding surfaces.
3. Residual effect biocide: Apply appropriate solution to inhibit re-establishment of growths.

631 Previously painted window frames

1. Paint encroaching beyond glass sight line: Remove.
2. Loose and defective putty: Remove.
3. Putty cavities and junctions between previously painted surfaces and glass: Clean thoroughly.
4. Finishing
    4.1. Patch prime, reputty as necessary, and allow to set.
    4.2. Seal and coat as soon as fully set.

640 External pointing to existing frames

1. Defective sealant pointing: Remove.
2. Joint depth: Approximately half joint width; adjust with backing strip if necessary.
3. Sealant
    3.1. Manufacturer:
        3.1.1. Product reference:
    3.2. Preparation and application: As section Z22.

651 Existing gutters

1. Dirt and debris: Remove from inside of gutters.
2. Defective joints: Clean and seal with suitable jointing material.

Application

711 Coating generally

1. Application standard: In accordance with BS 6150, clause 9.
2. Conditions: Maintain suitable temperature, humidity and air quality during application and drying.

3. Surfaces: Clean and dry at time of application.
4. Thinning and intermixing of coatings: Not permitted unless recommended by manufacturer.
5. Overpainting: Do not paint over intumescent strips or silicone mastics.
6. Priming coats
   6.1. Thickness: To suit surface porosity.
   6.2. Application: As soon as possible on same day as preparation is completed.
7. Finish
   7.1. Even, smooth and of uniform colour.
   7.2. Free from brush marks, sags, runs and other defects.
   7.3. Cut in neatly.
8. Doors, opening windows and other moving parts: Ease before coating and between coats.

720 Priming joinery

1. Preservative treated timber: Retreat cut surfaces with two flood coats of a suitable preservative before priming.
2. End grain: Coat liberally allow to soak in, and recoat.

730 Workshop coating of concealed joinery surfaces

1. General: Apply coatings to all surfaces of components.

731 Site-coating of concealed joinery surfaces

1. General: After priming, apply additional coatings to surfaces that will be concealed when fixed in place.
   1.1. Components:
   1.2. Additional coatings:

740 Concealed metal surfaces

1. General: Apply additional coatings to surfaces that will be concealed when component is fixed in place.
   1.1. Components:
   1.2. Additional coatings:

751 Staining wood

1. Primer: Apply if recommended by stain manufacturer.
2. Application: Apply in flowing coats and brush out excess stain to produce uniform appearance.

760 Varnishing wood

1. First coat:
   1.1. Brush well in and lay off avoiding aeration.
2. Subsequent coats: Provide light key and smooth along the grain between coats.

770 External doors

1. Bottom edges: Prime and coat before hanging doors.

780 Bead glazing to coated wood

1. Before glazing: Apply first two coats to rebates and beads.

790 Putty

1. Setting: Allow putty to set for seven days.
2. Sealing
   2.1. Within a further 14 days, seal with a solvent-borne primer.
   2.2. Fully protect putty with coating system as soon as it is sufficiently hard.
   2.3. Extend finishing coats on to glass up to sight line.

800 Glazing

1. Etched, sand blasted and ground glass: Treat or mask edges before coating to protect from contamination by oily constituents of coating materials.

810 Water-repellent

1. Application: Liberally flood surface, giving complete and even coverage.

Ω End of Section

P21
Door/ window ironmongery

Pre-tender - Not Used

General

120 Ironmongery range selected by Contractor

1. Source: Single co-ordinated range.
2. Notification: Submit details of selected range, manufacturer and/ or supplier.
3. Principal material/ finish: To match existing

141 Sample boards

1. General: Before placing orders with suppliers submit a sample board, containing labelled samples of ironmongery and showing methods of fixing.

180 Strength class or category of duty for door ironmongery

1. General: Durability of ironmongery components to be compatible with stated category of duty of each door leaf.
    1.1. Exclusions: Ironmongery with specific duty or 'category of use' defined elsewhere.
    1.2. Documentation: Before placing orders with suppliers submit documentation showing product compliance with stated category of duty.

Door hanging devices

310 Single axis door hinges

1. Standard: To BS EN 1935.

Window hanging devices

365 Single axis window hinges

1. Standard: To BS EN 1935.

390 Spiral sash balances

1. Manufacturer: Contractor's choice
    1.1. Product reference: Submit proposals
2. Sash heights: To be determined by contractor
3. Sash weight: To be determined by contractor
4. Type: To match existing in every respect

395 Boxed sash hanging fittings

1. Manufacturer: Contractor's choice
    1.1. Product reference: Submit proposals
2. Axle pulleys: To match existing in every respect
3. Cords/ Chains: To match existing in every respect
4. Weights:
    4.1. Matched to weights of glazed sashes.

Door operating devices

410 Overhead door closers

1. Standard: To BS EN 1154.

471 Electromagnetic hold open/ swing free devices

1. Standard: To BS EN 1155.

Door securing devices

515 Door locks

1. Standard: To BS EN 12209.

540 Door latches

1. Standard: To BS EN 12209.

571 Emergency exit devices

1. Standard: To BS EN 179.

582 Door bolts

1. Standard: To BS EN 12051.

Window securing devices

592 Sash fasteners

1. Manufacturer: Contractor's choice
    1.1. Product reference: Submit proposals
2. Type: To match existing in every respect
3. Size: To match existing in every respect

593 Sash screws

1. Manufacturer: Contractor's choice
    1.1. Product reference: Submit proposals
2. Type: To match existing in every respect
3. Size: To match existing in every respect

596 Casement/ Sash mortice bolts

1. Manufacturer: Contractor's choice
    1.1. Product reference: Submit proposals
2. Type: To match existing in every respect
3. Size: To match existing in every respect

Door furniture

610 Lever handles

1. Standard: To BS EN 1906.

620 Door knobs

1. Standard: To BS EN 1906.

641 Pull handles

1. Standard: To BS 8424.

Window furniture

900 Casement handles

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Type: To match existing

910 Window lever handles

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Type: To match existing

940 Sash lift handles

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Type: To match existing in all respects
3. Material/ finish to match existing .

950 Sash eyes

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Type: To match existing in all respects
3. Material/ finish to match existing .

Ω End of Section

Q25
Slab/ brick/ sett/ cobble pavings

General

110 Natural stone slab paving

1. Granular sub-base: Existing
2. Base: Existing
3. Laying course: Site mixed mortar
   3.1. Accessories: None
4. Paving units: To match original as closely as possible
5. Jointing: Site mixed mortar
   5.1. Bond: To match existing

120 Concrete flag paving

1. Granular sub-base: Existing
2. Base: Existing
3. Laying course: Site mixed mortar
   3.1. Accessories: None
4. Paving units: To match original as closely as possible
5. Jointing: Site mixed mortar
   5.1. Bond: To match existing

130 Rigid brick paving

1. Granular sub-base: Existing (nom. 200 mm)
2. Base: Existing
3. Paving units: To match original as closely as possible
4. Bedding and jointing: Site mixed mortar
   4.1. Bond: To match existing
5. Movement joints: Submit proposals

System performance - Not Used

Products

375 Sand/ Fine aggregate for site mixed mortar

1. Standard: To BS EN 12620, designations:
   1.1. Flag and slab paving laying course:
   1.2. Flag and slab paving jointing:
   1.3. Concrete sett paving laying course and jointing:
   1.4. Rigid brick paving laying course and jointing:
   1.5. Precast concrete and grass or gravel paving:

380 Lime for site mixed mortar

1. Standard: Nonhydraulic to BS EN 459-1, -2 and -3, type CL 90 or, if ready-mixed lime:sand, to BS EN 998-2.

390 Sand/ fine aggregate for unbound laying course and jointing of concrete flag paving

1. Standard: To BS 7533-4, unbound construction laying course and jointing material.
2. Purity: Free from deleterious salts, contaminants, lime and cement.
3. Procurement: Obtain from one source and ensure consistent grading.

Execution

620 Adverse weather

1. General
   1.1. Temperature: Do not lay or joint paving if the temperature is below 3°C on a falling thermometer or below 1°C on a rising thermometer.
   1.2. Frozen materials: Do not use. Do not lay bedding on frozen or frost covered bases.
2. Paving with mortar joints and/ or bedding
   2.1. Protect from frost damage, rapid drying out and saturation until mortar has hardened.
3. Paving laid and jointed in sand/ fine aggregate
   3.1. Stockpiled laying course sand/ fine aggregate: Protect from saturation.
   3.2. Exposed areas of unbound laying course and uncompacted areas of unbound paving: Protect from heavy rainfall.
   3.3. Saturated unbound laying course: Remove and replace, or allow to dry before proceeding.
   3.4. Laying dry sand/ fine aggregate jointed paving in damp conditions: Brush in as much jointing sand as possible. Minimize site traffic over paving. As soon as paving is dry, top up joints and complete compaction.

625 Laying pavings – general

1. Appearance: Smooth and even with regular joints and accurate to line, level and profile.
2. Falls: To prevent ponding.
3. Bedding of paving units: Firm so that rocking or subsidence does not occur or develop.
   3.1. Bedding/ Laying course: Consistently and accurately graded, spread and compacted to produce uniform thickness and support for paving units.
4. Slopes: Lay paving units upwards from the bottom of slopes.
5. Paving units: Free of mortar and sand stains.
6. Cutting: Cut units cleanly and accurately, without spalling, to give neat junctions with edgings and adjoining finishes.

630 Levels of paving

1. Permissible deviation from specified levels
   1.1. Generally: ± 6 mm.
2. Height of finished paving above features
   2.1. At gullies: +6 to +10 mm.
   2.2. At drainage channels and kerbs: +3 to +6 mm.

635 Regularity of paved surfaces

1. Maximum variation in gap under a 3 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface)
   1.1. Precast concrete paving blocks and clay pavers for flexible pavements: 10 mm.
   1.2. Precast concrete flags or natural stone slabs: 3 mm.

2. Difference in level between adjacent paving units (maximum): 2 mm.
3. Sudden irregularities: Not permitted.

637 Regularity of paved surfaces

1. Maximum undulations in the surface of pavings (except tactile paving surfaces) under a 1 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface): 3 mm.
2. Joints between paving units or utility access covers
   2.1. Joints flush with the surface: difference in level between adjacent units to be no more than twice the joint width (with a 5 mm max difference in level).
   2.2. Recessed, filled joints: difference in level between adjacent units to be no greater than 2 mm; the recess to be no deeper than 5 mm.
   2.3. Unfilled joints: difference in level between adjacent units to be no greater than 2 mm.
3. Sudden irregularities: Not permitted.

645 Protection

1. Cleanliness: Keep paving clean and free from mortar droppings, oil and other materials likely to cause staining.
2. Materials storage: Do not overload pavings with stacks of materials.
3. Handling: Do not damage paving unit corners, arrises, or previously laid paving.
4. Mortar bedded pavings: Keep free from traffic after laying:
   4.1. Pedestrian traffic (minimum): 4 days
   4.2. Vehicular traffic (minimum): 10 days
5. Access: Restrict access to paved areas to prevent damage from site traffic and plant.

650 Cementitious bases and sub-bases

1. General: Protect from moisture loss, if not covered by another pavement course within 2 hours of completion.

655 Condition of sub-bases/ bases before spreading laying course

1. Trenches and excavation of soft or loose spots in subgrade: Fill and thoroughly compact.
2. Granular surfaces: Lay and compact so as to be sound, clean, smooth and close-textured enough to prevent migration of bedding/ laying course materials into the sub-base during compaction and use, free from movement under compaction plant and free from compaction ridges, cracks and loose material.
3. Prepared existing and new bound bases (roadbases): Sound, clean, free from rutting or major cracking. Remove sharp stones, projections and debris.
4. Sub-base/ Roadbase level tolerances: To BS 7533-7, Annex A.
5. Levels and falls: Accurate and within the specified tolerances.
6. Drainage outlets: Within 0-10 mm of the required finished level.
7. Features in unbound paving (including mortar bedded restraints and drainage ironwork): Complete to required levels; adequately bed and haunch in mortar.
8. Sub-bases containing cement/ hydraulic binder: Cure for minimum times specified in BS 7533-4.

695 Site mixed mortar

1. Mix: 1:3 cement:sand
2. Consistency: Workable

725 Laying rigid brick paving

1. Standard generally: In accordance with Brick Development Association Design Note 8.
2. Bedding and jointing method: Simultaneous bedding and jointing with stiff plastic mortar.
3. Cement slurry: Apply thin slurry (1-3 mm) of neat cement or 1:1 cement:soft sand over the freshly laid mortar bed immediately prior to laying bricks.
4. Laying: Wet bricks as necessary (but do not soak), butter joint faces and press down firmly to give a level surface with 10 mm regular joints.

760 Laying precast concrete and gravel paving

1. Laying: Tamp down into lightly compacted laying course.
   1.1. Nominal thickness of laying course after compaction:
2. Filling: Allow to settle and refill level with surface.

Completion - Not Used

Ω End of Section

R10
Rainwater drainage systems

General

110 Gravity rainwater drainage system

1. Rainwater outlets: Proprietary
2. Gutters: Cast iron
3. Pipework: Cast iron, flexible couplings
   Cast iron, spigot and socket
4. Disposal: To surface water drainage

System performance

221 Collection and distribution of rainwater

1. General: Complete, and without leakage or noise nuisance.

Products

315 Cast iron gutters

1. Standard: To BS 460
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Profile: Deep half-round beaded
4. Jointing type: Jointing clips
5. Nominal size: To match existing
6. Finish as supplied: Primary coating, to receive paint finish as section M60
7. Brackets: Submit proposals

315 Cast iron gutters Type A

1. Standard: To BS 460
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Profile: Ogee
4. Jointing type: Jointing clips
5. Nominal size: To match existing
6. Finish as supplied: Primary coating, to receive paint finish as section M60
7. Brackets: Submit proposals

360 Sealant for gutters

1. Type: Low modulus silicone sealant

365 Proprietary rainwater outlets

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Type of grate/ Fittings: Flange and clamping collar for roof membrane
3. Outlet: Type and direction to suit pipework with suitable adaptors and connections.

375 Cast iron pipework - flexible couplings

1. Standard: To BS EN 877, Agrément certified.
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Coupling type: Bolted
4. Nominal size: To match existing
5. Finish as supplied: Anti rust primer, to receive paint finish as section M60
6. Brackets: Cast iron holderbats
   6.1. Fixings: Stainless steel screws

380 Cast iron pipework - spigot and socket

1. Standard: To BS 460
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Type: To match existing
4. Nominal size: To match existing
5. Finish as supplied: Primary coating, to receive paint finish as section M60
   5.1. Fixings: Stainless steel screws

385 Cast iron pipework - spigot and socket - sealed

1. Standard: To BS 416-1.
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Type: To match existing
4. Nominal size: To match existing
5. Finish as supplied: Water based primer, to receive paint finish as section M60
6. Brackets: Cast iron holderbats
   6.1. Fixings: Stainless steel screws

Custom made products - Not Used

Execution

605 Installation generally

1. Electrolytic corrosion: Avoid contact between dissimilar metals where corrosion may occur.
2. Plastics and galvanized steel pipes: Do not bend.
3. Allowance for thermal and building movement: Provide and maintain clearance as fixing and jointing proceeds.
4. Protection
   4.1. Fit purpose made temporary caps to prevent ingress of debris.
   4.2. Fit access covers, cleaning eyes and blanking plates as the work proceeds.

610 Fixing and jointing gutters

1. Joints: Watertight
2. Brackets: Securely fixed.
   2.1. Fixings: Bolted into masonry

2.1.1. Fixing centres: 1500 mm

2.2. Additional brackets: Where necessary to maintain support and stability, provide at joints in gutters and near angles and outlets.

3. Roofing underlay: Dressed into gutter.

615 Setting out eaves gutters - to falls

1. Setting out: To true line and even gradient to prevent ponding or backfall. Position high points of gutters as close as practical to the roof and low points not more than 50 mm below the roof.
2. Outlets: Align with connections to below ground drainage.

630 Installing rainwater outlets

1. Fixing: Secure. Fix before connecting pipework.
   1.1. Method: Support plate and clamp
2. Junctions between outlets and pipework: Accommodate movement in structure and pipework.

635 Fixing pipework

1. Pipework: Fix securely, plumb and/ or true to line.
2. Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.
3. Externally socketed pipes and fittings: Fix with sockets facing upstream.
4. Additional supports: Provide as necessary to support junctions and changes in direction.
5. Vertical pipes
   5.1. Provide a loadbearing support at least at every storey level.
   5.2. Tighten fixings as work proceeds so that every storey is self supporting.
   5.3. Wedge joints in unsealed metal pipes to prevent rattling.
6. Wall and floor penetrations: Isolate pipework from structure.
   6.1. Pipe sleeves: As section P31.
   6.2. Masking plates: Fix at penetrations if visible in the finished work.
7. Expansion joint pipe sockets: Fix rigidly to buildings. Elsewhere, provide brackets and fixings that allow pipes to slide.

640 Fixing vertical pipework

1. Bracket fixings: Bolted into masonry
2. Distance between bracket fixing centres (maximum): 1500 mm

645 Fixing low gradient pipework

1. Bracket fixings: Bolted into masonry
2. Distance between bracket fixing centres (maximum): 1500 mm

650 Jointing pipework and gutters

1. General: Joint with materials and fittings that will make effective and durable connections.
2. Jointing differing pipework and gutter systems: Use adaptors intended for the purpose.
3. Cut ends of pipes and gutters: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
4. Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
5. Junctions: Form with fittings intended for the purpose.
6. Jointing material: Strike off flush. Do not allow it to project into bore of pipes and fittings.
7. Surplus flux, solvent jointing materials and cement: Remove.

660 Jointing external pipework

1. Jointing: Cold caulking compound

665 Installing prefabricated galvanized steel pipework

1. Installation: Do not cut pipes to length or otherwise damage coatings.

670 Installing full-bore flow drainage pipework

1. Fixing: Secure. Prevent movement during extreme operating conditions including oscillating pressure and cavitation. Provide for thermal movement.
2. Number of joints, bends and offsets: Minimize.
3. Condition on completion: Smooth, consistent bore, clean and free from distortion, wrinkling, cracks and other defects.

675 Cutting coated pipework and gutters

1. Cutting: Recoat bare metal.

680 Fixing insulation to internal pipelines and gutters

1. Fixing: Secure and neat. Provide continuity at supports and leave no gaps. Fix split pipe insulation with the split on 'blind' side of pipeline.
    1.1. Method:
2. Timing: Do not fit insulation until completion of pipe airtightness or leakage testing.

685 Identification of internal rainwater pipework

1. Standard: In accordance with Water Regulations Advisory Scheme (WRAS) Information and guidance note 9-02-05 and BS 8515.

690 Electrical continuity - pipework

1. Joints in metal pipes with flexible couplings: Clips (or suitable standard pipe couplings) supplied for earth bonding by pipework manufacturer to ensure electrical continuity.

695 Electrical continuity - gutters

1. Joints in metal gutters: Purpose made links supplied by the gutter manufacturer to ensure electrical continuity.

700 Access for testing and maintenance

1. General: Install pipework and gutters with adequate clearance to permit testing, cleaning and maintenance, including painting where necessary.
2. Access fittings and rodding eyes: Position so that they are not obstructed.

Completion

900 Testing generally

1. Dates for testing: Give notice.
    1.1. Period of notice (minimum): 5 working days
2. Preparation
    2.1. Pipework: Complete, securely fixed, free from defects, obstruction and debris before testing.
3. Testing
    3.1. Supply clean water, assistance and apparatus.

3.2. Do not use smoke to trace leaks.

4. Records: Submit a record of tests.

910 Gutter test

1. Preparation: Temporarily block all outlets.
2. Testing: Fill gutters to overflow level and after 5 minutes closely inspect for leakage.

915 Maintenance instructions

1. General: At completion, submit printed instructions recommending procedures for maintenance of the rainwater installation, including full details of recommended inspection, cleaning and repair procedures.

920 Immediately before handover

1. Construction rubbish, debris, swarf, temporary caps and fine dust which may enter the rainwater system: Remove. Do not sweep or flush into the rainwater system.
2. Access covers, rodding eyes, outlet gratings and the like: Secure complete with fixings.

Ω End of Section

R11
Above ground foul drainage systems

General - Not Used

System performance - Not Used

Products

330 Cast iron pipework – flexible couplings

1. Standard: To BS EN 877.
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Type: To match existing
4. Coupling type: Push fit
5. Nominal sizes: To match existing
6. Finish: Factory anti rust primer
7. Brackets: Cast iron holderbats, screw to wall type
   7.1. Fixings: Stainless steel screws

335 Cast iron pipework – spigot and socket

1. Standard: To BS 416-1 with sockets.
2. Manufacturer: Contractor's choice
   2.1. Product reference: Submit proposals
3. Type: To match existing
4. Nominal sizes: To match existing
5. Finish: Factory epoxy coating
6. Brackets: Cast iron holderbats, screw to wall type
   6.1. Fixings: Stainless steel screws

Fabrication - Not Used

Execution

601 Installation generally

1. Standard: To BS EN 12056-5.
2. Components: From the same manufacturer for each type of pipework.
3. Electrolytic corrosion: Avoid contact between dissimilar metals where corrosion may occur.
4. Plastics and galvanized steel pipes: Do not bend.
5. Allowance for thermal and building movement: Provide and maintain clearance as fixing and jointing proceeds.
6. Concealed or inaccessible surfaces: Decorate before starting work specified in this section.
7. Protection
   7.1. Purpose made temporary caps: Fit to prevent ingress of debris.
   7.2. Access covers, cleaning eyes and blanking plates: Fit as the work proceeds.

605 Pipe routes

1. General: The shortest practical, with as few bends as possible.
   1.1. Bends in wet portion of soil stacks: Not permitted.
   1.2. Routes not shown on drawings: Submit proposals before commencing work.

610 Fixing pipework

1. Pipework: Fix securely plumb and/ or true to line. Fix discharge stack pipes at or close below socket collar or coupling.
2. Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.
3. Externally socketed pipes and fittings: Fix with sockets facing upstream.
4. Additional supports: Provide as necessary to support junctions and changes in direction.
5. Vertical pipes: Provide a load bearing support not less than every storey level. Tighten fixings as work proceeds so that every storey is self supporting.
6. Wall and floor penetrations: Isolate pipework from structure, e.g. with pipe sleeves.
   6.1. Masking plates: Fix at penetrations if visible in the finished work.
7. Expansion joint sockets: Fix rigidly to the building.
8. Fixings: Allow the pipe to slide.

615 Fixing vertical pipework

1. Description: - CAST IRON, FLEXIBLE COUPLINGS
   - CAST IRON, SPIGOT AND SOCKET
2. Bracket fixings: Bolted into masonry
3. Distance between bracket fixing centres (maximum): 1500 mm

620 Fixing low gradient pipework

1. Description: - CAST IRON - FLEXIBLE COUPLINGS
   - CAST IRON - SPIGOT AND SOCKET
2. Bracket fixings: Bolted into masonry
3. Distance between bracket fixing centres (maximum): 1500 mm

630 Jointing pipework – generally

1. General: Joint with materials, fittings and techniques that will make effective and durable connections.
2. Jointing differing pipework systems: With adaptors intended for the purpose.
3. Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
4. Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
5. Junctions: Form with fittings intended for the purpose.
6. Jointing material: Do not allow it to project into bore of pipes and fittings.
7. Surplus flux, solvent jointing materials and cement: Remove from joints.

640 Jointing pipework – cast iron – flexible couplings

1. Jointing: Paint cut ends of pipes.

645 Jointing pipework – cast iron – spigot and socket

1. Jointing: Cold caulking compound

Completion - Not Used

Ω End of Section

Z10
Purpose made joinery

To be read with preliminaries/ general conditions.

110 Fabrication

1. Standard: To BS 1186-2.
2. Sections: Accurate in profile and length, and free from twist and bowing. Formed out of solid unless shown otherwise.
   2.1. Machined surfaces: Smooth and free from tearing, wooliness, chip bruising and other machining defects.
3. Joints: Tight and close fitting.
4. Assembled components: Rigid. Free from distortion.
5. Screws: Provide pilot holes.
   5.1. Screws of 8 gauge (4 mm diameter) or more and screws into hardwood: Provide clearance holes.
   5.2. Countersink screws: Heads sunk at least 2 mm below surfaces visible in completed work.
6. Adhesives: Compatible with wood preservatives applied and end uses of timber.

120 Cross section dimensions of timber

1. General: Dimensions on drawings are finished sizes.
2. Maximum permitted deviations from finished sizes
   2.1. Softwood sections: To BS EN 1313-1:-
      2.1.1. Clause 6 for sawn sections.
   2.2. Hardwood sections: To BS EN 1313-2:-
      2.2.1. Clause 6 for sawn sections.
      2.2.2. Clause NA.3 for further processed sections.

130 Preservative treated wood

1. Cutting and machining: Completed as far as possible before treatment.
2. Extensively processed timber: Retreat timber sawn lengthways, thicknessed, planed, ploughed, etc.
3. Surfaces exposed by minor cutting and/ or drilling: Treat as recommended by main treatment solution manufacturer.

140 Moisture content

1. Wood and wood based products: Maintained within range specified for the component during manufacture and storage.

210 Laminated plastics veneered boards/ panels

1. Fabrication: To British Laminated Plastics Fabricators Association Ltd (BLF) fabricating standards.
2. Balancing veneer: From decorative veneer manufacturer and of similar composition. Applied to reverse side of core material.
3. Finished components: Free from defects, including bow, twist, scratches, chipping, cracks, pimpling, indentations, glue marks, staining and variations in colour and pattern.
4. Joints visible in completed work: Tight butted, true and flush.

220 Wood veneered boards/ panels

1. Core material and veneers: Conditioned before bonding.
2. Setting out: Veneer features and grain pattern aligned regularly and symmetrically unless instructed otherwise.
3. Balancing veneer: Applied to reverse side of core material.
   3.1. Moisture and temperature movement characteristics: As facing veneer.
4. Veneer edges: Tight butted and flush, with no gaps.
5. Tolerance of veneer thickness (maximum): ± 0.5 mm.
6. Finished components: Free from defects, including bow, twist, scratches, chipping, splits, blebs, indentations, glue marks and staining.
7. Surface finish: Fine, smooth, free from sanding marks.

250 Finishing

1. Surfaces: Smooth, even and suitable to receive finishes.
   1.1. Arrises: Eased unless shown otherwise on drawings.
2. End grain in external components: Sealed with primer or sealer as section M60 and allowed to dry before assembly.

Ω End of Section

Z11
Purpose made metalwork

To be read with preliminaries/ general conditions.

310 Materials generally

1. Grades of metals, section dimensions and properties: To appropriate British Standards. When not specified, select grades and sections appropriate for the purpose.
2. Prefinished metal: May be used if methods of fabrication do not damage or alter appearance of finish, and finish is adequately protected.
3. Fasteners: To appropriate British Standards and, unless specified otherwise, of same metal as component being fastened, with matching coating or finish.

320 Steel long and flat products

1. Hot rolled structural steels (excluding structural hollow sections and tubes): To BS EN 10025-1.
2. Fine grain steels, including special steels: To BS EN 10025-3 and -4.
3. Steels with improved atmospheric corrosion resistance: To BS EN 10025-5.

330 Steel plate, sheet and strip

1. Plates and wide flats, high yield strength steel: To BS EN 10025-6.

340 Hot rolled steel plate, sheet and strip

1. Flat products, high yield strength for cold forming: To BS EN 10149-1, -2 and -3.
2. Carbon steel sheet and strip for cold forming: To BS EN 10111.
3. Narrow strip, formable steel and steel for general engineering purposes: To BS 1449-1.8 and BS 1449-1.14.

350 Cold rolled steel plate, sheet and strip

1. Steel sections: To BS EN 10162.
2. Flat products, high yield strength micro-alloyed steels for cold forming: To BS EN 10268.
3. Carbon steel flat products for cold forming: To BS EN 10130 and BS EN 10131.
4. Uncoated carbon steel narrow strip for cold forming: To BS EN 10139 and BS EN 10140.
5. Narrow strip steel for general engineering purposes: To BS EN 10132-1, -2, and -3.
6. Carbon steel flat products for vitreous enamelling: To BS EN 10209.

360 Coated steel flat products

1. Hot dip zinc coated carbon steel sheet and strip for cold forming: To BS EN 10346 and BS EN 10143.
2. Hot dip zinc coated structural steel sheet and strip: To BS EN 10143 and BS EN 10346.
3. Hot dip zinc-aluminium (za) coated sheet and strip: To BS EN 10346.
4. Hot dip aluminium-zinc (az) coated sheet and strip: To BS EN 10346.
5. Organic coated flat products: To BS EN 10169.

370 Steel structural hollow sections (SHS)

1. Non alloy and fine grain steels, hot finished: To BS EN 10210-1 and -2.
2. Non-alloy and fine grain steels, cold formed welded: To BS EN 10219-2.
3. Weather resistant steels, hot finished: To BS 7668.

380 Other steel sections

1. Equal flange tees: To BS EN 10055.
2. Equal and unequal angles: To BS EN 10056-1 and -2.
3. Wire, carbon steel for general engineering purposes: To BS 1052.
4. Wire and wire products, general: To BS EN 10218-2.
5. Tubes
    5.1. Seamless circular: To BS EN 10297-1.
    5.2. Seamless cold drawn: To BS EN 10305-1.
    5.3. Welded and cold sized square and rectangular: To BS EN 10305-5.
    5.4. Welded circular: To BS EN 10296-1.
    5.5. Welded cold drawn: To BS EN 10305-2.
    5.6. Welded cold sized: To BS EN 10305-3.

400 Stainless steel products

1. Chemical composition and physical properties: To BS EN 10088-1.
2. Sheet, strip and plate: To BS EN 10088-2.
3. Semi-finished products bars, rods and sections: To BS EN 10088-3.
4. Wire: To BS EN 1088-3.
5. Tubes
    5.1. Welded circular: To BS EN 10296-2.
    5.2. Seamless circular: To BS EN 10297-2.

410 Aluminium alloy products

1. Designations
    1.1. Designation system, chemical composition and forms: To BS EN 573-1, -2, -3 and -5.
    1.2. Temper designations: To BS EN 515.
2. Sheet, strip and plate: To BS EN 485-1 to -4.
3. Cold drawn rods, bars and tubes: To BS EN 754-1 and -2.
4. Extruded rods, bars, tubes and profiles: To BS EN 755-1 and -2.
5. Drawn wire: To BS EN 1301-1, -2 and -3.
6. Rivet, bolt and screw stock: To BS 1473.
7. Structural sections: To BS 1161.

420 Copper alloy products

1. Sheet, strip, plate and circles for general purposes: To BS EN 1652.
2. Sheet and strip for building purposes: To BS EN 1172.
3. Rods: To BS EN 12163.
4. Profiles and rectangular bars: To BS EN 12167.
5. Wire: To BS EN 12166.
6. Tubes: To BS EN 12449.

Fabrication

515 Fabrication generally

1. Contact between dissimilar metals in components: Avoid.

2. Finished components: Rigid and free from distortion, cracks, burrs and sharp arrises.
   2.1. Moving parts: Free moving without binding.
3. Corner junctions of identical sections: Mitre.

520 Cold formed work

1. Profiles: Accurate, with straight arrises.

525 Adhesive bonding

1. Preparation of surfaces of metals to receive adhesives
   1.1. Degrease.
   1.2. Abrade mechanically or chemically etch.
   1.3. Prime: To suit adhesive.
2. Adhesive bond: Form under pressure.

555 Brazing

1. Standard: To BS EN 14324.
2. Testing
   2.1. Destructive testing: To BS EN 12797.
   2.2. Nondestructive testing: To BS EN 12799.

Finishing

710 Finishing welded and brazed joints visible in complete work

1. Standard: To BS EN ISO 8501-3.
   1.1. Preparation grade:
2. Butt joints: Smooth, and flush with adjacent surfaces.
3. Fillet joints: Neat.
4. Grinding: Grind smooth where indicated on drawings.

745 Preparation for application of coatings

1. General: Complete fabrication, and drill fixing holes before applying coatings.
2. Paint, grease, flux, rust, burrs and sharp arrises: Remove.

750 Liquid organic coating for aluminium alloy components

1. Standard: To BS 4842.

760 Zinc and cadmium plating of iron and steel surfaces

1. Zinc plating: To BS EN ISO 2081.
2. Cadmium plating: To BS EN ISO 2082.

770 Chromium plating

1. Standard: To BS EN ISO 1456.

780 Galvanizing

1. Standard: To BS EN ISO 1461.
2. Preparation

2.1. Vent and drain holes: Provide in accordance with BS EN ISO 14713-1 and -2. Seal after sections have been drained and cooled.

2.2. Components subjected to cold working stresses: Heat treat to relieve stresses before galvanizing.

2.3. Welding slag: Remove.

2.4. Component cleaning: To BS EN ISO 8501-3.

2.5. Grade:

790 Vitreous enamelling

1. Standard: To BS EN ISO 28722.
2. Substrate metal: Steel to BS EN 10209.

Completion

910 Documentation

1. Submit
   1.1. Manufacturer's maintenance instructions.
   1.2. Guarantees, warranties, test certificates, record schedules and log books.

920 Completion

1. Protection: Remove.
2. Cleaning and maintenance: Carry out in accordance with procedures detailed in fabricators' guarantees.

Ω End of Section

Z12
Preservative/ flame-retardant treatment

To be read with preliminaries/ general conditions.

110 Treatment application

1. Timing: After cutting and machining timber, and before assembling components.
2. Processor: WPA Benchmark-accredited for the specified treated components.

120 Commodity specifications

1. Standard: In accordance with the Wood Protection Association (WPA) publication 'Code of practice: Industrial Wood Preservation'.

130 Preservative treatment solution strengths/ treatment cycles

1. General: Select to achieve specified service life and to suit treatability of specified wood species.

140 Copper-organic preservative treatment

1. Solution
    1.1. Manufacturer: Arch Timber Protection
        1.1.1. Product reference: Tanalith E
    1.2. Application: High-pressure impregnation.
2. Moisture content of wood
    2.1. At time of treatment: Not more than 28%.
    2.2. After treatment: Timber to be surface dry before using.

160 Organic solvent preservative treatment

1. Solution
    1.1. Manufacturer:
        1.1.1. Product reference:
    1.2. Application: Double vacuum and low-pressure impregnation, or immersion.
2. Moisture content of wood
    2.1. At time of treatment: As specified for the timber/ component at time of fixing.
    2.2. After treatment: Timber to be surface dry before use.

165 Water-based microemulsion preservative treatment

1. Solution
    1.1. Manufacturer: Arch Timber Protection
        1.1.1. Product reference: Vac-Vac
    1.2. Application: Double vacuum and low-pressure impregnation.
2. Moisture content of wood
    2.1. At time of treatment: As specified for the timber/ component at time of fixing.
    2.2. After treatment: Timber to be surface dry before use.

167 Boron compound preservative treatment

1. Solution
    1.1. Manufacturer: Arch timber protection or Contractor's choice

1.1.1. Product reference: Dricon

1.2. Application: High-pressure impregnation.

2. Moisture content of wood

2.1. At time of treatment: Not more than 28%.

2.2. After treatment: Timber to be surface dry before using.

210 Flame-retardant treatment

1. Standard: In accordance with the Wood Protection Association (WPA) publication 'Industrial flame retardant treatment of wood and wood-based panel products'.
2. Solution type: EXT

2.1. Manufacturer: Arch Timber Protection or Contractor's choice

2.1.1. Product reference: Non-Com Exterior

2.2. Application: Vacuum and pressure impregnation.

3. Moisture content of wood

3.1. At time of treatment: As specified for the timber/ component at time of fixing

3.2. After treatment (INT1 only): Timber to be re-dried slowly at temperatures not exceeding 60°C to minimize distortion and degradation.

610 Making good to preservative treatment on site

1. Preservative solution: Compatible with off-site treatment.
2. Application: In accordance with preservative manufacturer's recommendations.

620 Making good to flame-retardant treatment on site

1. Flame-retardant: Compatible with off-site treatment.
2. Application: In accordance with flame-retardant manufacturer's recommendations.

Ω End of Section

Z20
Fixings and adhesives

Products

310 Fasteners generally

1. Materials: To have:
   1.1. Bimetallic corrosion resistance appropriate to items being fixed.
   1.2. Atmospheric corrosion resistance appropriate to fixing location.
2. Appearance: Submit samples on request.

320 Packings

1. Materials: Noncompressible, corrosion proof.
2. Area of packings: Sufficient to transfer loads.

330 Nailed timber fasteners

1. Nails
   1.1. Steel: To BS 1202-1 or BS EN 10230-1.
   1.2. Copper: To BS EN 1202-2.
   1.3. Aluminium: To BS 1202-3.

340 Masonry fixings

1. Light duty: Plugs and screws.
2. Heavy duty: Expansion anchors or chemical anchors.

350 Plugs

1. Type: Proprietary types to suit substrate, loads to be supported and conditions expected in use.

360 Anchors

1. Types
   1.1. Expansion: For use in substrate strong enough to resist forces generated by expansion of anchor.
   1.2. Adhesive or chemical
      1.2.1. For use in substrate where expansion of anchor would fracture substrate.
      1.2.2. For use in irregular substrate where expansion anchors cannot transfer load on anchor.
   1.3. Cavity: For use where the anchor is retained by toggles of the plug locking onto the inside face of the cavity.

370 Wood screws

1. Type
   1.1. Wood screws (traditional pattern).
      1.1.1. Standard: To BS 1210.
   1.2. Wood screws.
      1.2.1. Pattern: Parallel, fully threaded shank or twin thread types.
2. Washers and screw cups: Where required are to be of same material as screw.

380 Miscellaneous screws

1. Type: To suit the fixing requirement of the components and substrate.
   1.1. Pattern: Self-tapping, metallic drive screws, or power driven screws.
2. Washers and screw cups: Where required to be of same material as screw.

390 Adhesives

1. Standards
   1.1. Hot-setting phenolic and aminoplastic: To BS 1203.
   1.2. Thermosetting wood adhesives: To BS EN 12765.
   1.3. Thermoplastic adhesives: To BS EN 204.

410 Powder actuated fixing systems

1. Types of fastener, accessories and consumables: As recommended by tool manufacturer.

Execution

610 Fixing generally

1. Integrity of supported components: Select types, sizes, quantities and spacings of fixings, fasteners and packings to retain supported components without distortion or loss of support.
2. Components, substrates, fixings and fasteners of dissimilar metals: Isolate with washers/ sleeves to avoid bimetallic corrosion.
3. Appearance: Fixings to be in straight lines at regular centres.

620 Fixing through finishes

1. Penetration of fasteners and plugs into substrate: To achieve a secure fixing.

630 Fixing packings

1. Function: To take up tolerances and prevent distortion of materials and components.
2. Limits: Do not use packings beyond thicknesses recommended by fixings and fasteners manufacturer.
3. Locations: Not within zones to be filled with sealant.

640 Fixing cramps

1. Cramp positions: Maximum 150 mm from each end of frame sections and at 600 mm maximum centres.
2. Fasteners: Fix cramps to frames with screws of same material as cramps.
3. Fixings in masonry work: Fully bed in mortar.

650 Nailed timber fixing

1. Penetration: Drive fully in without splitting or crushing timber.
2. Surfaces visible in completed work: Punch nail heads below wrot surfaces.
3. Nailed timber joints: Two nails per joint (minimum), opposed skew driven.

660 Screw fixing

1. Finished level of countersunk screw heads
   1.1. Exposed: Flush with timber surface.
   1.2. Concealed (holes filled or stopped): Sink minimum 2 mm below surface.

670 Pelleted countersunk screw fixing

1. Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
2. Pellets: Cut from matching timber, match grain and glue in to full depth of hole.
3. Finished level of pellets: Flush with surface.

680 Plugged countersunk screw fixing

1. Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
2. Plugs: Glue in to full depth of hole.
3. Finished level of plugs: Projecting above surface.

690 Using powder actuated fixing systems

1. Powder actuated fixing tools: To BS 4078-2 and Kitemark certified.
2. Operatives: Trained and certified as competent by tool manufacturer.

700 Applying adhesives

1. Surfaces: Clean. Adjust regularity and texture to suit bonding and gap filling characteristics of adhesive.
2. Support and clamping during setting: Provide as necessary. Do not mark surfaces of or distort components being fixed.
3. Finished adhesive joints: Fully bonded. Free of surplus adhesive.

Ω End of Section

Z21
Mortars

Cement gauged mortars - Not Used

Lime:sand mortars

310 Lime:sand mortar mixes

1. Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

320 Sand for lime:sand masonry mortars

1. Type: Sharp, well graded.
   1.1. Quality, sampling and testing: To BS EN 13139.
   1.2. Grading/ Source: As specified elsewhere in relevant mortar mix items.

330 Ready prepared lime putty

1. Type: Slaked directly from CL 90 quicklime to BS 890, using an excess of water.
   1.1. Maturation: In pits/ containers that allow excess water to drain away.
   1.2. Density of matured lime putty: 1.3 - 1.4 kg/litre.
2. Maturation period before use (minimum): 30 days

345 Admixtures for hydraulic lime:sand mortars

1. Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents.
2. Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.

350 Storage of lime:sand mortar materials

1. Sands and aggregates: Keep different types/ grades in separate stockpiles on hard, clean, free-draining bases.
2. Ready prepared nonhydraulic lime putty: Prevent drying out and protect from frost.
3. Nonhydraulic lime:sand mortar: Store on clean bases or in clean containers that allow free drainage. Prevent drying out or wetting and protect from frost.
4. Bagged hydrated hydraulic lime: Store off the ground in dry conditions.

360 Making lime:sand mortars generally

1. Batching: By volume. Use clean and accurate gauge boxes or buckets.
2. Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
3. Contamination: Prevent intermixing with other materials, including cement.

400 Making hydraulic lime:sand mortars

1. Mixing hydrated hydraulic lime:sand: Follow the lime manufacturer's recommendations for each stage of the mix.
   1.1. Water quantity: Only sufficient to produce a workable mix.
2. Working time: Within limits recommended by the hydraulic lime manufacturer.

Ω End of Section

Z22
Sealants

Products

310 Joints

1. Manufacturer: Contractor's choice
   1.1. Product reference: Submit proposals
2. Primer, backing strip, bond breaker: Types recommended by sealant manufacturer.

Execution

610 Suitability of joints

1. Presealing checks
   1.1. Joint dimensions: Within limits specified for the sealant.
   1.2. Substrate quality: Surfaces regular, undamaged and stable.

620 Preparing joints

1. Surfaces to which sealant must adhere
   1.1. Remove temporary coatings, tapes, loosely adhering material, dust, oil, grease, surface water and contaminants that may affect bond.
   1.2. Clean using materials and methods recommended by sealant manufacturer.
2. Vulnerable surfaces adjacent to joints: Mask to prevent staining or smearing with primer or sealant.
3. Backing strip and/ or bond breaker installation: Insert into joint to correct depth, without stretching or twisting, leaving no gaps.
4. Protection: Keep joints clean and protect from damage until sealant is applied.

630 Applying sealants

1. Substrate: Dry (unless recommended otherwise) and unaffected by frost, ice or snow.
2. Environmental conditions: Do not dry or raise temperature of joints by heating.
3. Sealant application: Fill joints completely and neatly, ensuring firm adhesion to substrates.
4. Sealant profiles
   4.1. Butt and lap joints: Slightly concave.
   4.2. Fillet joints: Flat or slightly convex.
5. Protection: Protect finished joints from contamination or damage until sealant has cured.

Ω End of Section

Specification created using NBS Chorus