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D20
Excavating and filling
D20 Excavating and filling

To be read with Preliminaries/General conditions

GENERALLY/THE SITE

CLEARANCE/EXCAVATING

220 STRIPPING TOPSOIL
• General: Before beginning general excavation or filling, strip topsoil from areas where there will be regrading, buildings, pavings/roads and other areas shown on drawings.
  • Depth:
    - Remove to an average depth of 300 mm.
    - Give notice where the depth of topsoil is difficult to determine.
• Handling: Handle topsoil for reuse or sale in accordance with clause 225.
• Around trees: Do not remove topsoil from below the spread of trees to be retained.
• Site storage: Keep separate from excavated sub-soil.

225 HANDLING TOPSOIL
• Aggressive weeds:
  - Species: Included in the Weeds Act, section 2 or the Wildlife and Countryside Act, Schedule 9, part II.
  - Give notice: Obtain instructions before moving topsoil.
• Earthmoving equipment: Select and use to minimize disturbance, trafficking and compaction.
• Contamination: Do not mix topsoil with:
  - Subsoil, stone, hardcore, rubbish or material from demolition work.
  - Oil, fuel, cement or other substances harmful to plant growth.
  - Other grades of topsoil.
• Multiple handling: Keep to a minimum. Use topsoil immediately after stripping.
• Wet conditions: Handle topsoil in the driest condition possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limit as defined by BS 3882, Annex N2.

240 ADJACENT EXCAVATIONS
• Proximity: Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto must be completed before the higher excavation is made.
  • Angle of line from horizontal: 45°.

250 PERMISSIBLE DEVIATIONS FROM FORMATION LEVELS
• Beneath mass concrete foundations: ±25 mm.
• Beneath ground bearing slabs and r.c. foundations: ±15 mm.
• Embankments and cuttings: ±50 mm.
• Ground abutting external walls: ±50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.
260 INSPECTING FORMATIONS
• Give notice: Make advance arrangements for inspection of formations for foundations and filling formations.
• Preparation: Just before inspection remove the last 150 mm of excavation. Trim to required profiles and levels, and remove loose material.
• Seal: Within 4 hours of inspection, seal formations with blinding concrete.

270 FOUNDATIONS GENERALLY
• Give notice if:
  - A natural bearing formation of undisturbed subsoil is not obtained at the depth shown on the drawings.
  - The formation contains soft or hard spots or highly variable material.

280 TRENCH FILL FOUNDATIONS
• Excavation: Form trench down to formation in one operation.
• Safety: Prepare formation from ground level.
• Inspection of formations: Give notice before commencing excavation.
  - Period of notice: Three working days.
• Shoring: Where inspection of formation is required, provide localised shoring to suit ground conditions.
• Concrete fill: Place concrete immediately after inspection and no more than four hours after exposing the formation.

290 FOUNDATIONS IN MADE UP GROUND
• Depth: Excavate down to a natural formation of undisturbed subsoil.
• Discrepancy: Give notice if this is greater or lesser than depth given.

310 UNSTABLE GROUND
• Generally: Ensure that the excavation remains stable at all times.
• Give notice: Without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.
• Take action: If instability is likely to affect adjacent structures or roadways, take appropriate emergency action.

330 UNRECORDED FEATURES
• Give notice: If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered.

360 EXCESS EXCAVATION
• Excavation taken wider than required:
  - Backfill: As instructed.
• Excavation taken deeper than required:
  - Backfill: Under ground bearing slabs: Hardcore as clause 710.

DISPOSAL OF MATERIALS

410 EXCAVATED TOPSOIL STORAGE
• Storage: Stockpile in temporary storage heaps on site.

415 EXCAVATED TOPSOIL REMOVAL
• General: Remove from site.
WATER
- Generally: Keep all excavations free from water until:
  - Formations are covered.
  - Below ground construction are completed.
  - Basement structures and retaining walls are able to resist leakage, water pressure and flotation.
- Drainage: Form surfaces of excavations and fill to provide adequate falls.
- Removal of water: Provide temporary drains, sumps and pumping as necessary. Do not pollute watercourses with silt laden water.

GROUND WATER LEVEL/ RUNNING WATER
- Give notice: If it is considered that the excavations are below the water table.
- Springs/ Running water: Give notice immediately if encountered.

PUMPING
- General: Do not disturb excavated faces or stability of adjacent ground or structures.
- Pumped water: Discharge without flooding the site or adjoining property.
- Sumps: Construct clear of excavations. Fill on completion.
  - Locations: Contractor’s choice.

FILLING
PROPOSED FILL MATERIALS
- Details: Submit full details of proposed fill materials to demonstrate compliance with specification, including:
  - Type and source of imported fill.
  - Proposals for processing and reuse of material excavated on site.
  - Test reports as required elsewhere.
- Timing: At least 21 days before starting filling.

HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS
- General: Do not use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling, including material that is:
  - Frozen or containing ice.
  - Organic.
  - Contaminated or noxious.
  - Susceptible to spontaneous combustion.
  - Likely to erode or decay and cause voids.
  - With excessive moisture content, slurry, mud or from marshes or bogs.
  - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
  - Unacceptable, class U2 as defined in the Highways Agency ‘Specification for highway works’, clause 601.
520 FROST SUSCEPTIBILITY
• General: Except as allowed below, fill must be non frost-susceptible as defined in Highways Agency 'Specification for Highway Works', clause 801.17.
• Test reports: If the following fill materials are proposed, submit a laboratory report confirming they are non frost-susceptible:
  - Fine grained soil with a plasticity index less than 20%.
  - Coarse grained soil or crushed granite with more than 10% retained on a 0.063 mm sieve.
  - Crushed chalk.
  - Crushed limestone fill with average saturation moisture content in excess of 3%.
  - Burnt colliery shale.
• Frost-susceptible fill: May only be used within the external walls of buildings below spaces that will be heated. Protect from frost during construction.

530 PLACING FILL
• Excavations and areas to be filled: Free from loose soil, rubbish and standing water.
• Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
• Adjacent structures, membranes and buried services:
  - Do not overload, destabilise or damage.
  - Submit proposals for temporary support necessary to ensure stability during filling.
  - Allow 14 days (minimum) before backfilling against in situ concrete structures.
• Layers: Place so that only one type of material occurs in each layer.
• Earthmoving equipment: Vary route to avoid rutting.

550A GEOTEXTILE SHEET
• Manufacturer: Visqueen Building Products.
  - Web: www.visqueenbuilding.co.uk.
  - Email: riba@visqueenbuilding.co.uk.
  - Product reference: Visqueen GX Geomembrane (hydrocarbon)

610 COMPACTED FILLING FOR LANDSCAPE AREAS
• Fill: Material capable of compaction by light earthmoving plant.
• Filling: Layers not more than 200 mm thick. Lightly compact each layer to produce a stable soil structure.

617 HIGHWAYS AGENCY TYPE 1 GRANULAR FILLING
• Fill: To Highways Agency 'Specification for highway works', clause 803:
  - Crushed rock (other than argillaceous rock).
  - Crushed concrete.
  - Recycled aggregates.
  - Crushed non-expansive slag to clause 801.2.
  - Well-burned non-plastic colliery shale.
• Filling: To Highways Agency 'Specification for highway works', clauses 801.3 and 802.

700 BACKFILLING AROUND FOUNDATIONS
• Under oversite concrete and pavings: Hardcore.
• Under grassed or soil areas: Material excavated from the trench, laid and compacted in 300 mm maximum layers.
710 HARDCORE FILLING
• Fill: Granular material, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111, and in any one layer only one of the following:
  - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
  - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
  - Crushed non-expansive slag.
  - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
  - Well-burned non-plastic colliery shale.
  - Natural gravel.
  - Natural sand.
• Filling: Spread and level in 150 mm maximum layers. Thoroughly compact each layer.

730 BLINDING
• Surfaces to receive sheet overlays or concrete:
  Blind with:
  - Concrete where shown on drawings; or
  - Sand, fine gravel, or other approved fine material applied to fill interstices. Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
• Sand for blinding: To BS EN 12620, grade 0/4 or 0/2 (MP).
• Permissible deviations on surface level: +0 -25 mm.
D50
Underpinning
D50 Underpinning

To be read with Preliminaries/ General conditions.

GENERAL

115 UNDERPINNING DESIGN
- Purpose: To reduce slab level in basement below existing foundations.
- Extent: As structural engineers drawing.
- Standards: Mass concrete underpinning to BS 8004.
- Requirement:
  - Working loads: As drawing.
  - Load factor: To BS EN 1997-1.
  - Assumed bearing strata: As drawing.
- Design proposals: Confirm as adequate for the particular ground conditions revealed in the works or submit alternatives.

165 EXPLORATORY HOLES
- Requirement: Excavate holes to determine: The depth and profile of adjacent existing foundations.
  - Timing: Before commencing excavation for underpinning.
- Findings: Submit details.
- Backfill:
  - Below foundation level: Concrete.
  - Above foundation level but below ground supported slabs: Compacted hard core.
  - Elsewhere: Compacted hard core.

170 DISCONNECTION OF SERVICES IN WORKING AREAS
- Disconnections required: Electric power.
  - Timing: Before commencing underpinning works within the building.
- Reconnection: Ensure that services cannot be reinstated by site operatives without consent.
TYPES OF UNDERPINNING

210 CONTINUOUS MASS CONCRETE UNDERPINNING

- Underpinning blocks:
  - Depth: as per engineers drawing.
  - Length (maximum): 1.0 m.
  - Width on either side of wall centre line (minimum): As drawing.
  - Depth of hard pack: 50-75 mm.

- Materials:
  - Concrete: Designated as section E10.
    Water content: Sufficient only to ensure that packing binds together.

- Sequence: As drawing.

- Curing periods (minimum):
  - Between casting underpinning block and pinning up: 24 hours.
  - Between completion of pinning up and commencement of excavation for the next sequence of underpinning: 24 hours.
    Extend curing periods to allow for inclement weather.

- Shear connection between underpinning blocks: Not required.

- Features: Backfill remainder of working space with compacted excavated material.

ACCESSORIES FOR UNDERPINNING

435 IN SITU CONCRETE GENERALLY

- Standard: To BS 8110-1.
- Concrete: Designated concrete as section E10.
  - Immature concrete: Protect from drying, frost and loading for a minimum period of 7 days.
    - Extend period to allow for inclement weather.

- Cover to reinforcement (minimum): 75mm.
  - Top face: 75 mm.
  - Faces cast against soil.

440 MAKING CONCRETE GENERALLY

- Standard: To BS 8500-2.
- Exchange of information: Provide concrete producer with information required by BS 8500-1, clauses 4 and 5.

460 MORTAR OR CEMENT GROUT WITH FILLER

- Standard: To BS EN 12715.
- Compressive strength: 50 N/mm² at 28 days.
- Cement: CEM1.
- Sand/ Filler: Sand grading 0/2 (MP) to BS EN 12620.
- Limiting values for composition:
  - Cement content (minimum): 330 kg/m³.
  - Water:cement ratio (maximum): 0.55.

- Admixtures: Not permitted.
- Properties of fresh grout: As BS EN 447, clause 5.
- Temperature at grouting: Air and grout temperatures to BS EN 446, clause 7.5.
- Other requirements: None.
STEEL REINFORCEMENT GENERALLY
- Type/ Grade: Plain round wire to BS 4482.
- Cutting and bending: To BS 8666.
- Lap lengths (minimum): As drawing.
- Supplier: Firm holding a valid certificate of approval issued under a product certification scheme operated by a third party certification body with appropriate Category 2 accreditation from the United Kingdom Accreditation Service (UKAS).
- Cleanliness: At time of placing concrete, reinforcement to be clean, free of corrosive pitting and loose millscale or rust.

PREFABRICATED REINFORCEMENT
- Usage: Obtain from a manufacturer holding valid certification of approval for welded fabrications issued by the UK Certification Authority for Reinforcing Steels (CARES).

EXECUTION

REPAIR OF MASONRY
- Specification: As section C41.
- Timing: After completion of underpinning.

CONSTRUCTION OF MASS CONCRETE UNDERPINNING
- Block and working space: Excavate together.
- Formation:
  - Preparation: Remove or compact loose material.
  - Protection: Cover with 50 mm thickness of concrete if there will be a delay of more than four hours between completion of excavation and casting of concrete underpinning.
- Split sleeves: Provide around drain/ service passing through underpinning. Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.
- Clearance around drain/ service (minimum): 150 mm.
- Dowels/ Shear key/ Front shutter: Provide where required.
- Casting underpinning: In one lift, leaving a gap for packing up beneath existing foundation.
- Packing: On completion of concrete curing period, hard pack gap between underpinning block and existing foundation. Allow packing to cure before commencing excavation for the next sequence of underpinning.

CONSTRUCTION OF INTERMITTENT MASS CONCRETE UNDERPINNING/ UNDERPINNING PIERS
- Block and working space: Excavate together. Excavated length not to exceed design length by more than 100 mm.
- Formation:
  - Preparation: Remove or compact loose material.
  - Protection: Cover with 50 mm thickness of concrete if there will be a delay of more than four hours between completion of excavation and casting of concrete underpinning.
- Front shutter: Provide where required.
- Casting underpinning: In one lift, leaving a gap for packing up beneath existing foundation.
- Packing: On completion of concrete curing period, hard pack gap between underpinning block and existing foundation. Allow packing to cure before commencing excavation for the next sequence of underpinning.
COMPLETION

HEALTH AND SAFETY FILE - MASS CONCRETE UNDERPINNING

- Requirement: Collate and submit a full set of records for inclusion in the health and safety file.
  - Number of copies: Two.
- Content: For each underpinning block record:
  - Date of casting.
  - Depth of base below datum.
  - Length.
  - Width either side of wall.
  - Details of drains and services built into block and diameter of sleeving.
- Latest date for submission: Within 14 days of completion.
In situ concrete/Large precast concrete
In situ concrete construction generally
E05 In situ concrete construction generally

To be read with Preliminaries/General conditions.

220 DESIGN OF STRUCTURAL CONCRETE
• Standards:
  - Design: To BS 8110-1 and -2.
  - Drawings: To BS EN ISO 3766.
  - Reinforcement schedules: To BS 8666.
• Finished product: To comply with the requirements of design standard.

290 ACCURACY OF CONSTRUCTION
• Reference system: To BS 5964-1
• Element shape and position: To BS 5606.
  - Substitution of alternative requirements: None.

300 LEVELS OF STRUCTURAL CONCRETE FLOORS
• Tolerances (maximum):
  - Level of floor: As Preliminaries section A33.
  - Steps in floor level: Not applicable.

310 SURFACE REGULARITY OF CONCRETE FLOORS TO BS 8204 - GENERAL
• Standard: To BS 8204-1 or -2.
• Measurement: From underside of a 2m straightedge (between points of contact) placed anywhere on surface and using a slip gauge.

315 SURFACE REGULARITY OF CONCRETE FLOORS TO BS 8204 - TOLERANCE CLASS S R1
• Location: As drawing.
• Abrupt changes: 2 mm maximum.
E10
Mixing/casting/curing in situ concrete
E10 Mixing/casting/curing in situ concrete

To be read with Preliminaries/General conditions.

CONCRETE MIXES

101 SPECIFICATION
  • Concrete generally: To BS 8500-2.
  • Exchange of information: Provide concrete producer with information required by BS 8500-1, clauses 4 and 5.

110 BASIC DESIGNATED CONCRETE TO GROUND FLOOR SLAB AND UNDERPINNING
  • Designation: RC35/45.
  • Coarse recycled aggregates: Not permitted.
  • Consistence class: Contractor's choice.
  • Additional requirements: Submit proposals.

MATERIALS, BATCHING AND MIXING

215 READY-MIXED CONCRETE
  • Production plant: Currently certified by a body accredited by UKAS to BS EN 45011 for product conformity certification of ready-mixed concrete.
  • Source of ready-mixed concrete: Obtain from one source if possible. Otherwise, submit proposals.
    - Name and address of depot: Submit before any concrete is delivered.
    - Delivery notes: Retain for inspection.
  • Declarations of nonconformity from concrete producer: Notify immediately.

225 CHANGES TO SPECIFICATION
  • Changes to specification of fresh concrete (outside concrete producer's responsibility): Submit proposals.

415 ADMIXTURES
  • Calcium chloride and admixtures containing calcium chloride: Do not use.

PROJECT TESTING/ CERTIFICATION

505 PROJECT TESTING OF CONCRETE - GENERAL
  • Testing: BS EN 206-1, Annex B.
    - Nonconformity: Obtain instructions immediately.
  • Recording: Maintain complete correlated records including:
    - Concrete designation.
    - Sampling, site tests, and identification numbers of specimens tested in the laboratory.
    - Location of the parts of the structure represented by each sample.
    - Location in the structure of the batch from which each sample is taken.
PLACING/ COMPACTION/ CURING AND PROTECTION

630 PREMATURE WATER LOSS
- Requirement: Prevent water loss from concrete laid on absorbent substrates.
  - Underlay: Select from:
    Polyethylene sheet: 250 micrometres thick.
    Building paper: To BS 1521, grade B1F.
  - Installation: Lap edges 150 mm.

650 SURFACES TO RECEIVE CONCRETE
- Cleanliness of surfaces immediately before placing concrete: Clean with no debris, tying wire clippings, fastenings or free water.

680 PLACING
- Records: Maintain for time, date and location of all pours.
- Timing: Place as soon as practicable after mixing and while sufficiently plastic for full compaction.
- Temperature limitations for concrete: 30°C (maximum) and 5°C (minimum), unless otherwise specified. Do not place against frozen or frost covered surfaces.
- Continuity of pours: Place in final position in one continuous operation up to construction joints. Avoid formation of cold joints.
- Discharging concrete: Prevent uneven dispersal, segregation or loss of ingredients or any adverse effect on the formwork or formed finishes.
- Thickness of layers: To suit methods of compaction and achieve efficient amalgamation during compaction.
- Poker vibrators: Do not use to make concrete flow horizontally into position, except where necessary to achieve full compaction under void formers and cast-in accessories and at vertical joints.

690 COMPACTING
- General: Fully compact concrete to full depth to remove entrapped air. Continue until air bubbles cease to appear on the top surface.
  - Areas for particular attention: Around reinforcement, under void formers, cast-in accessories, into corners of formwork and at joints.
- Consecutive batches of concrete: Amalgamate without damaging adjacent partly hardened concrete.
- Methods of compaction: To suit consistence class and use of concrete.

810 CURING GENERALLY
- Evaporation from surfaces of concrete: Prevent, including from perimeters and abutments, throughout curing period.
  - Surfaces covered by formwork: Retain formwork in position and, where necessary to satisfy curing period, cover surfaces immediately after striking.
  - Top surfaces: Cover immediately after placing and compacting. If covering is removed for finishing operations, replace it immediately afterwards.
- Surface temperature: Maintain above 5°C throughout the specified curing period or four days, whichever is longer.
811 COVERINGS FOR CURING

- Sheet coverings: Suitable impervious material.
- Curing compounds: Selection criteria:
  - Curing efficiency: Not less than 75% or for surfaces exposed to abrasion 90%.
  - Colouring: Fugitive dye.
  - Application to concrete exposed in the finished work: Readily removable without disfiguring the surface.
  - Application to concrete to receive bonded construction/finish: No impediment to subsequent bonding.
- Interim covering to top surfaces of concrete: Until surfaces are in a suitable state to receive coverings in direct contact, cover with impervious sheeting held clear of the surface and sealed against draughts at perimeters and junctions.

818 CURING PERIODS GENERALLY

- Minimum periods: When not otherwise indicated to BS 8110-1, table 6.1.

840 PROTECTION

- Prevent damage to concrete, including:
  - Surfaces generally: From rain, indentation and other physical damage.
  - Surfaces to exposed visual concrete: From dirt, staining, rust marks and other disfiguration.
  - Immature concrete: From thermal shock, physical shock, overloading, movement and vibration
  - In cold weather: From entrapment and freezing expansion of water in pockets, etc.
E30
Reinforcement for in situ concrete
E30 Reinforcement for in situ concrete

To be read with Preliminaries/ General conditions.

110 QUALITY ASSURANCE OF REINFORCEMENT
• Standards:
  - Reinforcement: To BS 4449, BS 4482, BS 4483 or BS 6744.
  - Cutting and bending: To BS 8666.
• Source of reinforcement: Companies holding valid certificates of approval for product conformity issued by the UK Certification Authority for Reinforcing Steels (CARES).

115 DESIGN - REINFORCEMENT
• Design: Complete the design of concrete reinforcement.
• Standards: To BS 8110-1 and -2.
• Proposals: Submit drawings, technical information, calculations and manufacturers' literature.
• Finished product: To comply with the requirements of design standard.

140 PLAIN BAR REINFORCEMENT
• Standard: To BS 4482.
  - Strength grade: 250.

210 STANDARD FABRIC REINFORCEMENT
• Standard: To BS 4483.
• Grade: AS DRAWINGS.

310 CUTTING AND BENDING REINFORCEMENT
• General: To schedules and to BS 8666.
  - Bending on site, including minor adjustments: Obtain instructions.

320 PROTECTION OF REINFORCEMENT
• Dropping from height, mechanical damage and shock loading: Prevent.
• Cleanliness of reinforcement at time of pouring concrete: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the reinforcement, concrete, or bond between the two.

425 LAPS NOT DETAILED ON DRAWINGS
• Laps in bar reinforcement (minimum): 600 mm.
  - Laps at corners: Avoid four layer build-up.
• Laps in fabric reinforcement (minimum): 600 mm.
  - Laps at corners: Avoid four layer build-up.

451 FIXING REINFORCEMENT
• Standard: To BS 7973-1 and -2.
• Installation: In addition to any spacers and chairs shown on drawings or schedules, provide adequate support, tie securely and maintain the specified cover.
• Tying:
  - Wire type: 16 gauge black annealed. Use stainless steel wire for stainless steel reinforcement.
  - Ends of tying wire: Prevent intrusion into the concrete cover. Remove loose ends.
• Compatibility of metals: Prevent contact between ordinary carbon steel and stainless or galvanized reinforcement.
Designed joints in in situ concrete
E40 Designed joints in in situ concrete

To be read with Preliminaries/General conditions.

120 CONSTRUCTION/MOVEMENT JOINTS GENERALLY
- Accuracy: Position and form joints accurately, straight, well-aligned and truly vertical or horizontal or parallel with setting out lines of the building.
- Modifications to joint design or location: Submit proposals.
- Placing concrete to form movement joints:
  - Maintain effectiveness of joints. Prevent concrete entering joints or penetrating or impregnating compressible joint fillers.
  - Do not place concrete simultaneously on both sides of movement joints.

132 ADDITIONAL CONSTRUCTION JOINTS
- Joints additional to those required by designer: Not permitted in watertight concrete.
- Approval of additional joints: Submit proposals.

210 FORMED JOINTS
- Forms/stop ends generally: Rigid and grout-tight.
- Forms/stop ends for projecting continuity reinforcement: To accommodate bars or fabric without temporary bending or displacement.

211 FORMED JOINTS IN CONCRETE WEARING SURFACES
- Temporary forms: Square edged with a steel top surface.
- Placing concrete: Compact thoroughly at edges to give level, closely abutted joints with no lipping.

230 PREPARATION OF CONSTRUCTION JOINTS
- Roughening of joint surfaces: Select from:
  - Brushing and spraying: Remove surface laitance and expose aggregate finish while concrete is still green.
  - Other methods: Submit proposals.
- Condition of joint surfaces immediately before placing fresh concrete: Clean and damp.

410 CARBON STEEL TIE BARS
- Standard: To BS 4449.
  - Product form: Plain.
  - Strength grade: 250.
- Cleanliness: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the tie bars, reinforcement, concrete, or bond between the two.
- Position: Centred on joint.
- Other requirements: as per structural engineers drawings.

420 FABRIC TIE STRIPS
- Standard: To BS 4483.
- Cleanliness: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the fabric, concrete, or bond between the two.
- Position: Width of the mesh strip centred on the joint.
530 SEALANT GENERALLY
• Manufacturer: Contractors choice.
  - Product reference: Polysulphide.
  - Colour of surfaces exposed to view: Contractors choice.
• Preparation and application: As section Z22.

545A SEALING STRIP SYSTEM GENERALLY
• Manufacturer: Fosroc.
  - Product reference: hydrocell.
  - Colour: na.
E60
Precast/ composite concrete floors/ roof decks
E60 Precast/ composite concrete floors/ roof decks

To be read with Preliminaries/ General conditions.

**PROPRIETARY FLOORS/ ROOF DECKS**

110 PRECAST BEAM AND BLOCKFLOOR
- Beams: As structural eng drawings.
  - Manufacturer: Contractor’s choice
  - Product reference: Contractor’s choice.
  - Type: Submit proposals.
  - Infill blocks: Proprietary.
- Structural concrete topping: As drawing.
- Other requirements: As drawing.

**GENERAL/ PERFORMANCE**

240 DETAILING OF PROPRIETARY SYSTEM
- Installation details: Submit location and assembly drawings showing every aspect of the construction, incorporated components and features, trimming for voids, holes for services, and related work by others.
  - Purpose: To allow checking of compatibility with surrounding structure and coordination of services.
- Method statement and risk assessment for installation: Submit.
- Programme: Submit well in advance of construction.

290 STANDARD PRECAST CONCRETE INFILL BLOCKS
- Type: Solid block to BS EN 771-3.
  - Size: 440 x 215 x 100 mm.
- Density: As drawings.
- Compressive strength (minimum): As drawing.
- Transverse load capacity (minimum): 3.5 kN/m² measured on a 420 mm span.
- Other requirements: none.

**INSTALLATION**

315 INFILLING AT BEAM BEARINGS
- Type: As drawing J1024/03.
- Installation: Infill gaps in walling below built in standard flooring blocks.

325 GROUTING
- Mix: Contractor’s choice.
- Preparation: Thoroughly clean and wet surfaces.
- Extent: Fill all joints and surface irregularities.
340 LATERAL RESTRAINT STRAPS
• Preparation: Floors/roof decks must tightly abut walls.
• Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
• Material: As drawing.
• Size:
  - Section: Minimum 30 x 5 mm cross section.
  - Length: To extend minimum 800 mm from inside face of wall.
• Form: Both ends cranked 100 mm.
• Position: As drawing.
• Build in:
  - External cavity walls: One cranked end in tight contact with cavity face of wall inner leaf, the other cranked end grouted into floor/roof deck joint.

345 IN SITU CONCRETE TOPPING
• Concrete: As drawing & Schedule Works.
  - Thickness (minimum): 75 mm.
• Formwork: As required.
• Reinforcement: As drawing & Schedule.
  - Cover: As drawing.
• Construction/Movement joints: As section E40.
• Finish: Floated
  - Surface regularity: As section E05, suitable for specified floor finish.

350 LEVELS OF STRUCTURAL CONCRETE FLOORS
• Tolerances: See Preliminaries section A33.
F
Masonry
F10
Brick/ block walling
**F10 Brick/ block walling**

To be read with Preliminaries/ General conditions.

**WORKMANSHIP GENERALLY**

**430 CONDITIONING OF CLAY AND CALCIUM SILICATE BRICKS**
- Bricks delivered warm from manufacturing process: Do not use until cold.
- Absorbent bricks in warm weather: Wet to reduce suction. Do not soak.

**440 CONDITIONING OF CONCRETE BRICKS/ BLOCKS**
- Autoclaved concrete bricks/ blocks delivered warm from manufacturing process: Do not use.
- Age of non autoclaved concrete bricks/ blocks: Do not use until at least four weeks old.
- Avoidance of suction in concrete bricks/ blocks: Do not wet.
  - Use of water retaining mortar admixture: Submit details.

**500 LAYING GENERALLY**
- Mortar joints: Fill vertical joints. Lay bricks, solid and cellular blocks on a full bed.
- Bond where not specified: Half lap stretcher.
- Vertical joints in facework: Even widths. Plumb at every fifth cross joint.

**535 HEIGHT OF LIFTS IN WALLING USING CEMENT GAUGED OR HYDRAULIC LIME MORTAR**
- Quoins and advance work: Rack back.
- Lift height (maximum): 1.2 m above any other part of work at any time.
- Daily lift height (maximum): 1.5 m for any one leaf.

**545 LEVELLING OF SEPARATE LEAVES USING CEMENT GAUGED OR HYDRAULIC LIME MORTAR**
- Locations for equal levelling of cavity wall leaves: As follows:
  - Every course containing vertical twist type ties or other rigid ties.
  - Every third tie course for double triangle/ butterfly ties.
  - Courses in which lintels are to be bedded.

**560 COURSING BRICKWORK**
- Gauge: Four brick courses including bed joints to 300 mm.

**561 COURSING BRICKWORK WITH EXISTING**
- Gauge: Line up with existing brick courses.

**580 LAYING FROGGED BRICKS**
- Single frogged bricks: Frog uppermost.
- Double frogged bricks: Larger frog uppermost.
- Frog cavity: Fill with mortar.

**610 SUPPORT OF EXISTING WORK**
- Joint above inserted lintel or masonry: Fully consolidated with semidry mortar to support existing structure.

**620 BLOCK BONDING NEW WALLS TO EXISTING**
- Pocket requirements: Formed as follows:
  - Width: Full thickness of new wall.
  - Depth (minimum): 100 mm.
  - Vertical spacing:
Brick to brick: 4 courses high at 8 course centres.
Block to block: Every other course.

- Pocket joints: Fully filled with mortar.

635 JOINTING
- Profile: Consistent in appearance.

645 ACCESSIBLE JOINTS NOT EXPOSED TO VIEW
- Jointing: Struck flush as work proceeds.

671 FIRE STOPPING
- Avoidance of fire and smoke penetration: Fit tightly between cavity barriers and masonry.
  Leave no gaps.

690 ADVERSE WEATHER
- General: Do not use frozen materials or lay on frozen surfaces.
  - Air temperature requirements: Do not lay bricks/ blocks:
    - In cement gauged mortars when at or below 3°C and falling or unless it is at least 1°C and rising.
    - In hydraulic lime:sand mortars when at or below 5°C and falling or below 3°C and rising.
    - In thin joint mortar glue when outside the limits set by the mortar manufacturer.
  - Temperature of walling during curing: Above freezing until hardened.
  - Newly erected walling: Protect at all times from:
    - Rain and snow.
    - Drying out too rapidly in hot conditions and in drying winds.

ADDITIONAL REQUIREMENTS FOR FACEWORK

710 THE TERM FACEWORK
- Definition: Applicable in this specification to all brick/ block walling finished fair.
  - Painted facework: The only requirement to be waived is that relating to colour.

745 MASONRY SAMPLE PANELS
- Sampling frequency: A panel for each type and delivery of masonry unit.
- Selection of masonry units: Reasonably representative of the average quality of the whole order to be delivered.
- Panel types: As clause 740.

750 COLOUR CONSISTENCY OF MASONRY UNITS
- Colour range: Submit proposals of methods taken to ensure that units are of consistent and even appearance within deliveries.
- Conformity: Check each delivery for consistency of appearance with previous deliveries and with approved reference panels; do not use if variation is excessive.
- Finished work: Free from patches, horizontal stripes and racking back marks.

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

780 GROUND LEVEL
- Commencement of facework: Not less than 150 mm below finished level of adjoining ground or external works level.

790 PUTLOG SCAFFOLDING
- Use: Not permitted in facework.

800 TOOTHED BOND
- New and existing facework in same plane: Bond together at every course to achieve continuity.

830 CLEANLINESS
- Facework: Keep clean.
- Mortar on facework: Allow to dry before removing with stiff bristled brush.
- Removal of marks and stains: Rubbing not permitted.
F30
Accessories/ sundry items for brick/ block/ stone walling
F30 Accessories/ sundry items for brick/ block/ stone walling

To be read with Preliminaries/ General conditions

CAVITIES

110 CONCRETE FILL TO BASE OF CAVITY
• Concrete generally: To BS EN 206-1 and BS 8500-2.
  - Designated concrete: GEN 1.
  - Workability: High.
• Extent: Maintain 75 mm between top of fill and external ground level and a minimum of 225 mm between top of fill and ground level dpc.
• Placement: Compact to eliminate voids.

120 CLEANLINESS
• Cavity base and faces, ties, insulation and exposed dpcs: Free from mortar and debris.

132 PERPEND JOINT PLASTICS WEEP HOLES
• Manufacturer: Cavity Trays Limited
  Tel: 01935 474 769.
  - Product reference: Type W Cavitray weep-vent.
• Locations: Through outer leaf immediately above base of cavity, at cavity trays, stepped dpcs and external openings. 75 mm above top of cavity fill at base of cavity.
• Provision: At not greater than 1000 mm centres and not less than two over each opening.

155A PARTIAL FILL CAVITY INSULATION
• Manufacturer: Kingspan Insulation Ltd.
  - Email: techline.uk@insulation.kingspan.com.
  - Product reference: Kooltherm® K8 Cavity Board
• Insulation thickness: 50 mm.

180 CAVITY CLOSERS GENERALLY
• Manufacturer: CEMEX UK - Thermabate
  www.cemex.co.uk
  gb-thermabatesales@cemex.com
  T: +44 (0)1924 362081
  F: +44 (0)1924 290126
  - Product reference: Thermabate 100.
• Accessories: Wall fixing ties.

REINFORCING/ FIXING ACCESSORIES

210 CAVITY WALL TIES GENERALLY
• Standard: To BS 1243.
  - Type: 1 (Masonry heavy duty).
• Material/ finish: Stainless steel.
• Sizes: 255 mm.
225 FIXING TIES IN MASONRY CAVITY WALLS
• Embedment in mortar beds (minimum): 50 mm.
• Placement: Sloping slightly downwards towards outer leaf, without bending. Drip centred in the cavity and pointing downwards.
• Spacing: Staggered in alternate courses.
  - Horizontal centres: 450mm.
  - Vertical centres: 450mm.
• Additional ties: Provide within 225 mm of reveals of unbonded openings.
  - Spacing: At not more than 300 mm centres vertically.

228 FIXING TIES IN MASONRY CAVITY WALLS WITH FULL FILL CAVITY INSULATION
• Embedment in mortar beds (minimum): 50 mm.
• Placement: Sloping slightly downwards towards outer leaf, without bending. Drip centred in the cavity and pointing downwards.
• Spacing: Staggered in alternate courses.
  - Horizontal centres: 900.
  - Vertical centres: 400.
• Provision of additional ties:
  One row to support lowest row of insulation batts. Within 225 mm of reveals of unbonded openings.
  Spacing: In every course.

241 WALL STARTERS/ CONNECTORS
• Manufacturer: Ancon Building Products
  Technical Hotline: 0114 275 5224
  Web site: www.ancon.co.uk.
  - Product reference: Staifix Universal Wall Starter System
    Channel and tie system for joining new walls to existing masonry. The system comprises 2 channel strips, 5 screws, 5 washers and 10 wall ties. The system is suitable for walls up to 2400mm high.
  - Sizes: 2.4m long.

FLEXIBLE DAMP PROOF COURSES/ CAVITY TRAYS
330A DAMP PROOF COURSE -
• Manufacturer: Icopal (UK) Ltd.
  - Web: www.icopal.co.uk.
  - Email: info.uk@icopal.com.
  - Product reference: Xtra-Load Elite
  - Roll width: Contractors Choice.
  - Accessories: Xtra-Load DPC jointing tape.

385 PREFORMED DPC/ CAVITY TRAY JUNCTION CLOAKS/ STOP ENDS
• Manufacturer: Hyload Structural Waterproofing, member of the IKO Group
  www.hyload.co.uk
  technical@ruberoid.co.uk
  T: +44 (0)844 412 7228
  F: +44 (0)844 412 7229
  Coney Green Business Park, Coney Green Road, Clay Cross, Chesterfield. S45 9HZ.
  - Product references and locations: As shown on drawings.
  - Placement: Seal laps with dpcs and/ or cavity trays.
SITE FORMED DPC/ CAVITY TRAY JUNCTIONS/ STOP ENDS

- Three dimensional changes in shape: Form to provide a free draining and watertight installation. Seal laps.
- Alternative use of preformed junction cloaks/ stop ends: Submit proposals.

INSTALLATION OF DPCS/ CAVITY TRAYS

HORIZONTAL DPCS
- Placement: In continuous lengths on full even bed of fresh mortar, with 100 mm laps at joints and full laps at angles.
- Width: At least full width of leaf unless otherwise specified. Edges of dpc not covered with mortar or projecting into cavity.
- Overlying construction: Immediately cover with full even bed of mortar to receive next masonry course.
- Overall finished joint thickness: As close to normal as practicable.

GROUND LEVEL DPCS
- Joint with damp proof membrane: Continuous and effectively sealed.

STEPPE DPCS IN EXTERNAL WALLS
- External walls on sloping ground: Install dpcs not less than 150 mm above adjoining finished ground level.

SILL DPCS
- Form and placement: In one piece and turned up at back when sill is in contact with inner leaf.

COPING/ CAPPING DPCS
- Placement: Bed in one operation to ensure maximum bond between masonry units, mortar and dpc.
- Dpcs crossing cavity: Provide rigid support to prevent sagging.

SEALING DPCS GENERALLY
- Overlaps and junctions: Seal with Adhesive recommended by dpc manufacturer.

DPC/ CAVITY TRAY LEADING EDGE IN FACEWORK - FLUSH
- Treatment at face of masonry: Finish flush and clear of mortar at the following locations: Generally.

VERTICAL DPCS GENERALLY
- Form: In one piece wherever possible.
  - Joints: Upper part overlapping lower not less than 100 mm.

JAMB DPCS AT OPENINGS
- Joint with cavity tray/ lintel at head: Full underlap.
- Joint with sill/ horizontal dpc at base: Full overlap.
- Projection into cavity: Not less than 25 mm.
- Relationship with frame: In full contact.
JOINTS

610 MOVEMENT JOINTS WITH SEALANT TO EXTERNAL WALL STARTER LOCATIONS
- Joint preparation and sealant application: As section Z22.
- Filler: Closed cell polyethylene foam.
  - Thickness: To match design width of joint.
  - Manufacturer: Contractor’s choice.
  - Product reference: Contractor’s choice.
  - Placement: Build in as work proceeds with no projections into cavities and to correct depth to receive sealant system.
- Sealant:
  - Designation: ISO 11600-F-20LM.
  - Manufacturer: Contractor’s choice.
  - Product reference: Contractor’s choice.
  - Colour: Black.

650 POINTING IN FLASHINGS
- Joint preparation: Free of debris and lightly wetted.
- Pointing mortar: As for adjacent walling.
- Placement: Fill joint and finish flush.

660 PINNING UP TO SOFFITS
- Top joint of loadbearing walls: Fill and consolidate with mortar.

670 TOPS OF NONLOADBEARING WALLS
- Restraints: 50 x 50 mm continuous softwood battens fixed at 600 mm centres with 14 gauge screws.
  - Fixing: Secure to soffit.
- Joint filler: rockwool.
  - Placement: Full, no gaps.

PROPRIETARY SILLS/ LINTELS/ COPINGS/ DRESSINGS

735 PRECAST CONCRETE LINTELS
- Standard: To BS EN 845-2.
- Manufacturer: Naylor Lintels, Longlands Industrial Estate, Milner Way, Ossett, West Yorkshire, WF5 9JE. Tel: 01924 267 286. Fax: 01924 265 674. Technical Freephone Hotline: 0800 542 4192. Technical Fax: 01924 272 587. Email: lintels@naylor.co.uk Web: www.naylorlintels.co.uk.
- Types: Single.
- Sizes: As schedule.
- Additional requirements: As schedule.
- Placement: Bed on mortar used for adjacent work.
  - Bearing length (minimum): 150 mm.
PREFABRICATED STEEL LINTELS

Standard: To BS EN 845-2.
Manufacturer: [IG Lintels Cwmbran
Avondale Road, Cwmbran, Gwent, NP44 1XY.
T: +44 (0)1633 486486
F: +44 (0)1633 486465
E: info@igltd.co.uk ].

- Product reference: [L1/S100].
  Types: [Combined].
  Material/ finish: [manufacturers standard].
  Sizes: [as drawings and specification].
  Additional requirements: [None].
  Placement: Bed on mortar used for adjacent work.
- Bearing length (minimum): [150 mm].
G

Structural/Carcassing metal/timber
G12
Isolated structural metal members
G12 Isolated structural metal members

To be read with Preliminaries/ General conditions.

PRODUCTS

320 STEEL
- Steel: To BS EN 10025-2.
  - Grade: S275JR.
  - Section properties and dimensions: To BS 4-1.
  - Surface condition: Free from heavy pitting and rust, burrs, sharp edges and flame cutting dross.

340 BOLT ASSEMBLIES
- Designation: As Eng Spec.
- Size: As shown on drawings.
- Nuts and washers: Material grade and finish to suit bolts.
- Coating applied by manufacturer: As Eng Spec.
- Other requirements: As Eng Spec.

FABRICATION

510 FABRICATION OF STEEL MEMBERS
- Cuts and holes: Accurate and neat.
- Welding: Metal arc method to BS EN 1011-2.
  - Welded joints: Fully fused, with mechanical properties not less than those of the parent metal.
  - Site welding: Obtain approval.
- Joints: Location and layout of fastenings as drawing As Drawing.

EXECUTION

610 INSTALLATION
- Accuracy: Members positioned true to line and level using, if necessary, steel packs of sufficient area to allow full transfer of loads to bearing surfaces.
- Fixing: Use washers under bolt heads and nuts.
  - Tapered washers: Provide under bolt heads and nuts bearing on sloping surfaces. Match taper to slope angle and align correctly.

650 SHOP PRIMING GENERALLY
- Preparation: To BS EN ISO 12944-4. Remove fins, burrs, sharp edges and weld spatter and clean out crevices.
  - Surface finish: As Eng Spec.
  - Prepared surfaces: Keep in a dry atmosphere and apply first coating without delay.
- Priming:
  - Primer: As Eng Spec.
    Number of coats: As Eng Spec.
    Dry film thickness (minimum): As Eng Spec.
  - Application: To BS EN ISO 12944-7.
- Other requirements: Refer to Eng Spec.
G20
Carpentry/ timber framing/ first fixing
G20 Carpentry/ timber framing/ first fixing

To be read with Preliminaries/ General conditions.

GENERAL

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

150 STRENGTH GRADING OF TIMBER
   • Grader: A company currently registered under a third party quality assurance scheme operated by a certification body approved by the UK Timber Grading Committee.

160 GRADING AND MARKING OF SOFTWOOD
   • Timber of a target/finished thickness less than 100 mm and not specified for wet exposure:
     Graded at an average moisture content not exceeding 20% with no reading being in excess of 24% and clearly marked as 'DRY' or 'KD' (kiln dried).
   • Timber graded undried (green) and specified for installation at higher moisture contents:
     Clearly marked as 'WET' or 'GRN'.
   • Structural timber members cut from large graded sections: Regraded to approval and marked accordingly.

PRODUCTS

210 STRUCTURAL SOFTWOOD (GRADED DIRECT TO STRENGTH CLASS) FOR STRUCTURAL USE GENERALLY
   • Grading standard: To BS 4978, BS EN 14081-1, or other national equivalent and so marked.
   • Strength class to BS EN 338: C16.
   • Treatment: Organic solvent impregnation to NBS section Z12 and Wood Protection Association Commodity Specification C8, Service life: 40 years.

WORKMANSHIP GENERALLY

401 CROSS SECTION DIMENSIONS OF STRUCTURAL SOFTWOOD AND HARDWOOD
   • Dimensions: Dimensions in this specification and shown on drawings are target sizes as defined in BS EN 336.
   • Tolerances: The tolerance indicators (T1) and (T2) specify the maximum permitted deviations from target sizes as stated in BS EN 336, clause 4.3:
     - Tolerance class 1 (T1) for sawn surfaces.
     - Tolerance class 2 (T2) for further processed surfaces.
402 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL SOFTWOOD
• Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
• Maximum permitted deviations from finished sizes: As stated in BS EN 1313-1:
  - Clause 6 for sawn sections.
  - Clause NA.2 for further processed sections.

403 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL HARDWOOD
• Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
• Maximum permitted deviations from finished sizes: As stated in BS EN 1313-2:
  - Clause 6 for sawn sections.
  - Clause NA.3 for further processed sections.

420 WARPING OF TIMBER
• 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.

430 SELECTION AND USE OF TIMBER
• Timber members damaged, crushed or split beyond the limits permitted by their grading: Do not use.
• Notches and holes: Position in relation to knots or other defects such that the strength of members will not be reduced.
• Scarf joints, finger joints and splice plates: Do not use without approval.

440 PROCESSING TREATED TIMBER
• Cutting and machining: Carry out as much as possible before treatment.
• Extensively processed timber: Retreat timber sawn lengthways, thickness, planed, ploughed, etc.
• Surfaces exposed by minor cutting/drilling: Treat with two flood coats of a solution recommended by main treatment solution manufacturer.

450 MOISTURE CONTENT
• Moisture content of wood and wood based products at time of installation: Not more than:
  - Covered in generally unheated spaces: 24%.
  - Covered in generally heated spaces: 20%.
  - Internal in continuously heated spaces: 20%.

510 PROTECTION
• Generally: Keep timber dry and do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.
• Timber and components: Store under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Open pile to ensure free movement of air through the stack.
• Trussed rafters: Keep vertical during handling and storage.

530 PAINTED FINISHES
• Structural timber to be painted: Primed as specified before delivery to site.

540 CLEAR FINISHES
• Structural timber to be clear finished: Keep clean and apply first coat of specified finish before delivery to site.
EXPOSED TIMBER

• Planed structural timber exposed to view in completed work: Prevent damage to and marking of surfaces and arrises.

JOINTING TIMBER

JOINTING/FIXING GENERALLY

• Generally: Where not specified precisely, select methods of jointing and fixing and types, sizes and spacings of fasteners in compliance with section Z20.

BOLTED JOINTS

• Bolt spacings (minimum): To BS 5268-2, table 81.
• Holes for bolts: Located accurately and drilled to diameters as close as practical to the nominal bolt diameter and not more than 2 mm larger.
• Washers: Placed under bolt heads and nuts that would otherwise bear directly on timber. Use spring washers in locations which will be hidden or inaccessible in the completed building.
• Bolt tightening: So that washers just bite the surface of the timber. Ensure that at least one complete thread protrudes from the nut.
  - Checking: At agreed regular intervals up to Completion. Tighten as necessary.

ANTICORROSION FINISHES FOR FASTENERS

• Galvanizing: To BS 7371-6, with internal threads tapped and lightly oiled following treatment.
• Sherardizing: To BS 7371-8, Class 1.
• Zinc plating: To BS EN ISO 4042 and passivated.

ERECTION AND INSTALLATION

TEMPORARY BRACING

• Provision: As necessary to maintain structural timber components in position and to ensure complete stability during construction.

ADDITIONAL SUPPORTS

• Provision: Position and fix additional studs, noggings and/ or battens to support edges of sheet materials, and wall/ floor/ ceiling mounted appliances, fixtures, etc. shown on drawings.
• Material properties: Additional studs, noggings and battens to be of adequate size and have the same treatment, if any, as adjacent timber supports.

WALL PLATES

• Position and alignment: To give the correct span and level for trusses, joists, etc.
• Bedding: Fully in fresh mortar.
• Joints: At corners and elsewhere where joints are unavoidable use nailed half lap joints. Do not use short lengths of timber.

JOISTS GENERALLY

• Centres: Equal, and not exceeding designed spacing.
• Bowed joists: Installed with positive camber.
• End joists: Positioned approximately 50 mm from masonry walls.
786  JOISTS ON HANGERS
   • Hangers: Bedded directly on and hard against supporting construction. Do not use packs or bed on mortar.
   • Joists: Cut to leave not more than 6 mm gap between ends of joists and back of hanger. Rebated to lie flush with underside of hangers.
   • Fixing to hangers: A nail in every hole.

795  TRIMMING OPENINGS
   • Trimmers and trimming joists: When not specified otherwise, not less than 25 mm wider than general joists.
H
Cladding/Covering
H71
Lead sheet coverings/ flashings
H71 Lead sheet coverings/ flashings

To be read with Preliminaries/ General conditions.

GENERAL REQUIREMENTS/ PREPARATORY WORK

510 WORKMANSHIP GENERALLY

- Fabrication and fixing: To provide a secure, free draining and completely weathertight installation.
- Operatives: Trained in the application of lead coverings/ flashings. Submit records of experience on request.
- Preforming: Measure, mark, cut and form lead prior to assembly wherever possible.
- Marking out: With pencil, chalk or crayon. Do not use scribers or other sharp instruments without approval.
- Bossing and forming: Straight and regular bends, leaving sheets free from ripples, kinks, buckling and cracks.
- Solder: Use only where specified.
- Sharp metal edges: Fold under or remove as work proceeds.
- Finished work: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
- Protection: Prevent staining, discolouration and damage by subsequent works.

516 LEADWELDING

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

520 LEAD SHEET

- Production method:
  - Rolled, to BS EN 12588, or
  - Machine cast, Agrément certified and to code thicknesses with a tolerance (by weight) of ±5%, or
  - 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%.
- Identification: Labelled to show thickness/ code, weight and type.

580 EXISTING METAL REUSED

- Type/ Location/ Extent: Throughout, remove from site.
- Handling/ Storage: Keep for reuse in the Works.

610 SUITABILITY OF SUBSTRATES

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

620 PREPARATION OF EXISTING TIMBER SUBSTRATES

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

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

UNDERLAY

- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.
- Handling: Prevent tears and punctures.
- Laying: Butt or overlap jointed onto a dry substrate.
  - Fixing edges: With copper or stainless steel staples or clout nails.
  - Do not lay over roof edges but do turn up at abutments.
- Wood core rolls: Fixed over underlay.
- Protection: Keep dry and cover with lead at the earliest opportunity.

FIXING LEAD

HEAD FIXING LEAD SHEET

- 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.
- 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.

FIXINGS

- Nails to timber substrates: Copper clout nails to BS 1202-2, or stainless steel (austenitic) clout nails to BS 1202-1.
  - Shank type: Annular ringed, helical threaded or serrated.
  - Shank diameter: Not less than 2.65 mm for light duty or 3.35 mm for heavy duty.
  - Length: Not less than 20 mm or equal to substrate thickness.
- Screws to concrete or masonry substrates: Brass or stainless steel to BS 1210, tables 3 or 4.
  - Diameter: Not less than 3.35 mm.
  - Length: Not less than 19 mm.
  - Washers and plastic plugs: Compatible with screws and lead.
- Screws to composite metal decks: Self tapping as recommended by the deck and lead manufacturer/ supplier for clips.
CLIPS
- Manufacturer: Contractor's choice.
- Material:
  - Lead clips: Cut from sheets of same thickness/ code as sheet being secured.
  - Copper clips:
    - Thickness: 0.70 mm.
    - Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere;
      dipped in solder if exposed to view.
  - Stainless steel clips:
    - Thickness: 0.71 mm.
    - Grade: BS EN 10088, 1.4301(304) terne coated if exposed to view.
- Dimensions:
  - Width: 50 mm where not continuous.
  - Length: To suit detail.
- 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.
- Fixing lead sheet: Welt clips around edges and turn over 25 mm.

WEDGE FIXING INTO JOINTS/ CHASES
- Joint/ chase: Rake out to a depth of not less than 25 mm.
- Lead: Dress into joint/ chase.
  - 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.
- Sealant: Contractor's choice.
  - Application: As section Z22.

WEDGE FIXING INTO DAMP PROOF COURSE JOINTS
- Joint: Rake/ cut out under damp proof course to a depth of not less than 25 mm.
- Lead: Dress lead into joint.
  - 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.
- Sealant: Contractor's choice.
  - Application: As section Z22.

SCREW FIXING INTO JOINTS/ CHASES
- Joint/ chase: Rake out to a depth of not less than 25 mm.
- Lead: Dress into joint/ chase and up back face.
  - 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.
- Sealant: Contractor's choice.
  - Application: As section Z22.

JOINTING LEAD

FORMING DETAILS
- Method: Bossing or leadwelding except where bossing is specifically required.
- Leadwelded seams: Neatly and consistently formed.
  - Seams: Do not undercut or reduce sheet thickness.
  - Filler strips: Of the same composition as the sheets being joined.
  - Butt joints: Formed to a thickness one third more than the sheets being joined.
  - Lap joints: Formed with 25 mm laps and two loadings to the edge of the overlap.
- Bossing: Carried out without thinning, cutting or otherwise splitting the lead sheet.
  - Details where bossing must be used: Ends of hollow rolls.
830 STANDING SEAM JOINTS
- Joint allowance: 100 mm overlap, 75 mm underlap and copper or stainless steel clips at not more than 750 mm centres.
- Forming joint: Welt overlap and clips around underlap, loosely turn over to form a standing seam of consistent cross section.

845 WOOD CORED ROLL JOINTS WITH SPLASH LAP
- Wood core:
  - Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
  - Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
- Undercloak: Dress three quarters around core.
  - Fixing: Nail to core at 150 mm centres for one third length of the sheet starting from the head.
- Overcloak: Dress around core and extend on to main surface to form a 40 mm splash lap.

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

862 DRIPS WITH SPLASH LAPS
- Underlap: Dress up full height of drip upstand.
  - 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 leadwelded dot.
- Overlap: Dress over drip and form a 75 mm splash lap.
  - Fixing: Lead clips, leadwelded to underlap, with not less than one per bay.

865 DRIPS WITHOUT SPLASH LAPS
- Underlap: Dress into rebate along top edge of drip.
  - Fixing: One row of nails at 50 mm centres on centre line of rebate.
- Overlap: Dress over drip to just short of lower level.

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

970 PATINATION OIL
- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.
- Location: all areas.
- Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions.
K

Linings/Sheathing/Dry partitioning
K10
Plasterboard dry linings/ partitions/ ceilings
K10 Plasterboard dry linings/ partitions/ ceilings

To be read with Preliminaries/ General conditions.

INSTALLATION

335 ADDITIONAL SUPPORTS
- Framing: Accurately position and securely fix to give full support to:
  - Partition heads running parallel with, but offset from main structural supports.
  - Fixtures, fittings and service outlets. Mark framing positions clearly and accurately on linings.
  - Board edges and lining perimeters, as recommended by board manufacturer to suit type and performance of lining.

375 NEW WET LAID BASES
- Dpcs: Install under full width of partitions/ freestanding wall linings.
  - Material: Bituminous sheet or plastics.

435 DRY LININGS GENERALLY
- General: Use fixing, jointing, sealing and finishing materials, components and installation methods recommended by board manufacturer.
- Cutting plasterboards: Neatly and accurately without damaging core or tearing paper facing.
  - Cut edges: Minimize and position at internal angles wherever possible. Mask with bound edges of adjacent boards at external corners.
- Fixings boards: Securely and firmly to suitably prepared and accurately levelled backgrounds.
- Finishing: Neatly to give flush, smooth, flat surfaces free from bowing and abrupt changes of level.

445 CEILINGS
- Sequence: Fix boards to ceilings before installing dry lined walls and partitions.
- Orientation of boards: Fix with bound edges at right angles to supports and with ends staggered in adjacent rows.
- Two layer boarding: Stagger joints between layers.

455 METAL FRAMING FOR PARTITIONS/ WALL LININGS
- Setting out: Accurately aligned and plumb.
  - Frame/ Stud positions: Equal centres to suit specified linings, maintaining sequence across openings.
  - Additional studs: To support vertical edges of boards.
- Fixing centres at perimeters (maximum): 600 mm.
- Openings: Form accurately.
  - Doorsets: Use sleeved or boxed metal studs and/ or suitable timber framing to achieve strength grade requirements for framing assembly and adequately support weight of door.
  - Services penetrations: Allow for associated fire stopping.
475 METAL FURRINGS FOR WALL LININGS
- Setting out: Accurately aligned and plumb.
  - Vertical furring positions: Equal vertical centres to suit specified linings, maintaining sequence across openings. Position adjacent to angles and openings.
  - Additional vertical furrrings: To support vertical edges of boards and at junctions with partitions.
  - Horizontal furring positions: To provide continuous support to edges of boards.
- Adhesive bedding to furrrings:
  - Dabs: Length 200 mm (minimum). Located at ends of furrrings and thereafter at 450 mm (maximum) centres.
  - Junctions with partitions: Continuous bed with no gaps across cavity.

485 SUSPENDED CEILING GRIDS
- Setting out: Accurately aligned and level.
  - Grid members and hangers: Centres to suit specified linings and imposed loads.
  - Additional grid members: Provide bracing and stiffening at upstands, partition heads, access hatches, etc.
- Fixing: Securely at perimeters, grid joints, top and bottom hanger fixings.

505 INSTALLING MINERAL WOOL INSULATION
- Fitting insulation: Closely butted joints and no gaps. Use fasteners to prevent slumping or displacement.
- Services:
  - Electrical cables overlaid by insulation: Sized accordingly.
  - Ceilings: Cut insulation around electrical fittings, etc.

510 SEALING GAPS AND AIR PATHS
- Location of sealant: To perimeter abutments and around openings.
  - Pressurized shafts and ducts: At board-to-board and board-to-metal frame junctions.
- Application: To clean, dry and dust free surfaces as a continuous bead with no gaps.
  - Gaps greater than 6 mm between floor and underside of plasterboard: After sealing, fill with jointing compound.

530 CAVITY FIRE BARRIERS WITHIN PARTITIONS/ WALL LININGS
- Metal framed systems:
  - Material: Wire reinforced mineral wool 50 mm (minimum) thick.
  - Installation: Form accurately and fix securely with no gaps to provide a complete barrier to smoke and flame.
- Adhesive fixed wall lining systems:
  - Material: Adhesive compound.
  - Installation: Form in a continuous line with no gaps to provide a complete barrier to smoke and flame.

555 FIRE STOPPING AT PERIMETERS OF DRY LINING SYSTEMS
- Material: Tightly packed mineral wool or intumescent mastic/ sealant.
- Application: To perimeter abutments to provide a complete barrier to smoke and flame.

560 JOINTS BETWEEN BOARDS
- Tapered edged plasterboards:
  - Bound edges: Lightly butted.
  - Cut/ unbound edges: 3 mm gap.
- Square edged plasterboards: 3 mm gap.
- Square edged fibre reinforced gypsum boards: 5 mm gap.
VERTICAL JOINTS
- Joints: Centre on studs.
  - Partitions: Stagger joints on opposite sides of studs.
  - Two layer boarding: Stagger joints between layers.

HORIZONTAL JOINTS
- Surfaces exposed to view: Horizontal joints not permitted. Seek instructions where height of partition/lining exceeds maximum available length of board.
- Two layer boarding: Stagger joints between layers by at least 600 mm.
- Edges of boards: Support using additional framing.
  - Two layer boarding: Support edges of outer layer.

INSULATION BACKED PLASTERBOARD
- General: Do not damage or cut away insulation to accommodate services.
- Installation at corners: Carefully cut back insulation or plasterboard as appropriate along edges of boards to give a continuous plasterboard face, with no gaps in insulation.

FIXING PLASTERBOARD TO METAL FRAMING/ FURRINGS
- Partitions/ Wall linings: Fix securely and firmly at the following centres (maximum):
  - Single layer boarding: To all framing at 300 mm centres. Reduce to 200 mm centres at external angles.
  - Multi-layer boarding: Face layer at 300 mm centres, and previous layers around perimeters at 300 mm centres.
- Ceilings: 230 mm. Reduce to 150 mm at board ends and at lining perimeters.
- Position of screws from edges of boards (minimum): 10 mm.
  - Screw heads: Set in a depression. Do not break paper or gypsum core.

FIXING INSULATION BACKED PLASTERBOARD TO METAL FURRINGS
- Fixing to furrings: In addition to screw fixings apply continuous beads of adhesive sealant to furrings.

FIXING PLASTERBOARD TO TIMBER
- Fixing to timber: Securely at the following centres (maximum):
  - Nails: 150 mm.
  - Screws to partitions/ wall linings: 300 mm. Reduce to 200 mm at external angles.
  - Screws to ceilings: 230 mm.
- Position of nails/ screws from edges of boards (minimum):
  - Bound edges: 10 mm.
  - Cut/ unbound edges: 13 mm.
- Position of nails/ screws from edges of timber supports (minimum): 6 mm.

FIXING PLASTERBOARD WITH ADHESIVE DABS
- Setting out boards: Accurately aligned and plumb.
- Fixing to substrates: Securely using adhesive dabs.
- Adhesive dab spacings for each board:
  - Horizontally: One row along top edge and one continuous dab along bottom edge.
  - Vertically: One row along each edge and thereafter at intermediate spacings to suit size of board:

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Width (mm)</th>
<th>Dab centres (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.5</td>
<td>1200</td>
<td>400</td>
</tr>
<tr>
<td>9.5/12.5</td>
<td>900</td>
<td>450</td>
</tr>
<tr>
<td>12.5</td>
<td>1200</td>
<td>600</td>
</tr>
</tbody>
</table>
- Adhesive dab dimensions (width x length): At least 50-75 mm x 250 mm.
  - Position of dabs from edges/ ends of boards (minimum): 25 mm.
FIXING INSULATION BACKED PLASTERBOARD WITH ADHESIVE DABS
• Fixing to substrates: In addition to adhesive dab fixings, secure boards with nailable plugs in locations recommended by board manufacturer.

FIXING INSULATION BACKED PLASTERBOARD WITH ADHESIVE SPOTS
• Setting out boards: Accurately aligned and plumb.
• Fixing to substrates: Securely using adhesive spots and mechanical fastenings.
• Adhesive spot spacings to each board: Four vertical rows, at 400 mm centres in each row.
• Adhesive spot diameters (minimum): 25 mm.
• Mechanical fasteners: Nailable plugs in locations recommended by board manufacturer.

FINISHING

LEVEL OF DRY LINING ACROSS JOINTS
• Sudden irregularities: Not permitted.
• Joint deviations: Measure from faces of adjacent boards using methods and straightedges (450 mm long with feet/pads) to BS 8212, clause 3.3.5.
  - Tapered edge joints: Permissible deviation (maximum) across joints when measured with feet resting on boards: 3 mm.
  - External angles: Permissible deviation (maximum) for both faces: 4 mm.
  - Internal angles: Permissible deviation (maximum) for both faces: 5 mm.

SEAMLESS JOINTING TO PLASTERBOARDS
• Cut edges of boards: Lightly sand to remove paper burrs.
• Filling and taping: Fill joints, gaps and internal angles with jointing compound and cover with continuous lengths of paper tape, fully bedded.
• Protection of edges/ corners: Reinforce external angles, stop ends, etc. with specified edge/angle bead.
• Finishing: Apply jointing compound. Feather out each application beyond previous application to give a flush, smooth, seamless surface.
• Nail/ screw depressions: Fill with jointing compound to give a flush surface.
• Minor imperfections: Remove by light sanding.

SKIM COAT PLASTER FINISH
• Plaster type: Multi Finish.
  - Thickness: 2-3 mm.
• Joints: Fill and tape except where coincident with metal beads.
• Finish: Tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks.

INSTALLING BEADS/ STOPS
• Cutting: Neatly using mitres at return angles.
• Fixing: Securely using longest possible lengths, plumb, square and true to line and level, ensuring full contact of wings with substrate.
• Finishing: After joint compounds/plasters have been applied, remove surplus material while still wet from surfaces of beads exposed to view.
REPAIRS TO EXISTING PLASTERBOARD

- Filling small areas with broken cores: Cut away paper facing, remove loose core material and fill with jointing compound.
  - Finish: Flush, smooth surface suitable for redecoration.
- Large patch repairs: Cut out damaged area and form neat hole with rectangular sides. Replace with matching plasterboard.
  - Fixing: Use methods to suit type of dry lining, ensuring full support to all edges of existing and new plasterboard.
  - Finishing: Fill joints, tape and apply jointing compound to give a flush, smooth surface suitable for redecoration.
K32
Panel cubicles/ duct and wall linings/ screens
K32 Panel cubicles/ duct and wall linings/ screens

To be read with Preliminaries/General conditions.

250 INSTALLATION

• Programming: Do not install cubicles or duct/ wall panels before building is weathertight, wet trades have finished their work, wall and floor finishes are complete, and the building is well dried out.
• Accuracy: Set out to ensure frames and/ or panels and doors are plumb, level and accurately aligned.
• Modifications: Do not cut, plane or sand prefinished components except where shown on drawings.
• Fixing: Secure components using methods and fasteners recommended by the cubicle manufacturer. Prevent pulling away, bowing or other distortions to frames, panels and doors.
• Moisture and thermal movement: Make adequate allowance for future movement.
K40

Demountable suspended ceilings
K40 Demountable suspended ceilings

To be read with Preliminaries/General conditions.

TYPES OF CEILING SYSTEM

240 SAMPLES

- General: Submit representative samples of the following: Panels for ceiling systems K40.

245 STANDARDS

- Components: To BS 8290-2.
- Aluminium sheet, strip and plate: To BS EN 485.
- Aluminium bars, tubes and sections: To relevant parts of BS EN 515, BS EN 573, BS EN 755 and BS EN 12020.

270 BOARDS Ceiling

- Type: As drawings.
- Manufacturer: As drawings.
- Product reference: As drawings.
- Thickness: As drawings.
- Sizes: As drawings/ Schedule.
- Edge profile: As Schedule.
- Fillets/ Cover strips: As drawings/ Schedule.
- Finish: As drawings/ Schedule.
- Colour: White As drawings/ Schedule.
- Other requirements: None.

EXECUTION

305 SETTING OUT

- General: Completed ceiling should present, over the whole of its surface exposed to the room below, a continuous and even surface, jointed (where applicable) at regular intervals.
- Infill and access units, integrated services: Fitted correctly and aligned.
- Edge/ perimeter infill units size (minimum): Half standard width or length.
- Corner infill units size (minimum): Half standard width and length.
- Grid: Position to suit infill unit sizes. Allow for permitted deviations from nominal sizes of infill units.
- Infill joints and exposed suspension members: Straight, aligned and parallel to walls, unless specified otherwise.
- Suitability of construction: Give notice where building elements and features to which the ceiling systems relate are not square, straight or level.

315 PROTECTION

- Loading: Do not apply loads for which the suspension system is not designed.
- Ceiling materials: When necessary, remove and replace correctly using special tools and clean gloves, etc. as appropriate.
325 INSTALLING HANGERS
- Wire hangers: Straighten and tension before use.
- Installation: Install vertical or near vertical without bends or kinks. Do not allow hangers to press against fittings, services, or insulation covering ducts/pipes.
- Obstructions: Where obstructions prevent vertical installation, either brace diagonal hangers against lateral movement, or hang ceiling system on an appropriate rigid sub-grid bridging across obstructions and supported to prevent lateral movement.
- Extra hangers: Provide as necessary to carry additional loads.
- Fixing:
  - Wire hangers: Tie securely at top with tight bends to loops to prevent vertical movement.
  - Angle/ Strap hangers: Do not use rivets for top fixing.
- Spacings: As Manufacturer.

335 INSTALLING PERIMETER TRIMS
- Jointing: Neat and accurate, without lipping or twisting.
- External and internal corners: Mitre joints generally. Overlap joints at internal corners are not acceptable.
  - Intermediate butt joints: Minimize. Use longest available lengths of trim. Align adjacent lengths.
- Fixing: Fix firmly to perimeter wall, edge battens or other building structure.
  - Fasteners: As Manufacturer.
  - Fixing centres: As Manufacturer's spec.

375 BOARD CEILING SYSTEMS
- Cut boards: Neat and accurate.
- Fixing to grid:
  - Board edges: Fully support. Screw to grid members. Set heads of screws below surface of boards and fill flush with surface.
  - Boards applied in two or more layers: Stagger joints.
- Movement joints: Provide as appropriate for the area of ceiling system and/or to coincide with movement joints in surrounding structure.

390 OPENINGS IN CEILING MATERIALS
- General: Neat and accurate. To suit sizes and edge details of fittings. Do not distort ceiling system.

395 INTEGRATED SERVICES
- General: Position services accurately, support adequately. Align and level in relation to the ceiling and suspension system. Do not diminish performance of ceiling system.
- Small fittings: Support with rigid backing boards or other suitable means. Do not damage or distort the ceiling.
  - Surface spread of flame rating of additional supporting material: Not less than ceiling material.
- Services outlets:
  - Supported by ceiling system: Provide additional hangers.
  - Independently supported: Provide flanges to support ceiling system.
401 CEILING MOUNTED LUMINAIRES
• Support: As M & E Spec.
  - Independently supported luminaires: Suspension adjusted to line and level of ceiling.
  - Ceiling supported luminaires: Modifications and/ or extra support required: To each luminaire.
• Surface mounted luminaires: Units installed so that in event of a fire the designed grid expansion provision is not affected.
• Modular fluorescent recessed luminaires: Compatible with ceiling module. Extension boxes must not foul ceiling system.
• Recessed rows of luminaires: Provide flanges for support of grid and infill units, unless mounted above grid flanges. Retain in position with lateral restraint.
• Fire protecting/ resisting ceiling systems: Luminaires must not diminish protection integrity of ceiling system.
• Access: Provide access for maintenance of luminaires.

411 MECHANICAL SERVICES
• Fan coil units:
  - Inlet and outlet grilles: Trim ceiling grid and infill units to suit.
  - Space beneath: Sufficient for ceiling system components.
  - Suspension and connections: Permit accurate setting out and levelling of fan coil units.
• Air grilles and diffusers:
  - Setting out: Accurate and level.
  - Linear air diffusers: Retain in place with lateral restraint. Provide flanges for support of grid and infill units.
  - Grille/ diffuser ceiling joints: Provide smudge rings and edge seals.
• Smoke detectors and PA speakers:
  - Ceiling infill units: Scribe and trim to suit.
  - Independent suspension: As M & E spec.
  - Flexible connections: Required.
• Sprinkler heads: Carefully set out and level.

415 INSTALLING INSULATION
• Fitting: Fit accurately and firmly with butted joints and no gaps.
• Insulation within individual infill units: Fit closely. Secure to prevent displacement when infill units are installed or subsequently lifted.
  - Dustproof sleeving: Reseal, if cut.
• Width: Lay insulation in the widest practical widths to suit grid member spacings.
• Services: Do not cover electrical cables that have not been sized accordingly. Cut insulation carefully around electrical fittings, etc. Do not lay insulation over luminaires.
• Sloping and vertical areas of ceiling system: Fasten insulation to prevent displacement.

421 CEILING SYSTEMS INTENDED FOR FIRE PROTECTION
• Junctions of ceiling systems with perimeter abutments and service penetrations: Seal gaps with tightly packed mineral wool or intumescent sealant to prevent penetration of smoke and flame.
• Ceiling system/ wall junctions: Maintain protective value of ceiling system.
  - Fixings and grounds: Noncombustible.
  - Metal trim: Provide for thermal expansion.
• Access and access panels: Maintain continuity of fire protection.

COMPLETION

530 SPARES
• General: At Practical Completion supply the following: Min 50 standard and 25 WC tiles.
Suspended ceiling system alterations
K45 Suspended ceiling system alterations

To be read with Preliminaries/ General conditions.

GENERAL

110 DEFINITIONS
   • Ceiling: Items collectively constituting the ceiling surface, including infill units, boards, stretched fabric, access units and grid.
   • Ceiling system: Ceiling plus suspension components and integrated services fittings.

120 EXISTING SUSPENDED CEILING SYSTEM - Make good as required
   • Structure over: Determine on site.
   • Ceiling type: As Existing.
     - Manufacturer: As Existing.
     - Product reference: As Existing.
   - Ceiling height above floor: As Existing.
   - Ceiling void: Determine on site.

PRODUCTS

310 PRODUCTS GENERALLY
   • Ceiling systems and components: To BS EN 13964.

405 TIMBER EDGE BATTENS As drawings
   • Type: Planed softwood to BS EN 942, class J10.
     - Moisture content at time of fixing: 15% ± 2%.
   • Finished size: 21 x 44 mm.

410 AIR PLENUM BARRIERS
   • Manufacturer: Contractor's choice.
     - Product reference: Contractor's choice.
   • Material: Rigid or semi-rigid non-porous sheets with smooth non dusting surfaces.
   • Reaction to fire (minimum): Class 1 to BS 476-7.

EXECUTION

610 PREPARATION
   • Documentation: Obtain available documentation of the existing ceiling system and services, including record drawings and maintenance manual. Check on site.
   • Discrepancies: Give notice.
620 EXECUTION GENERALLY
- Workmanship: In accordance with BS EN 13964 Annex A.
- Designated ceiling system components: Remove carefully without affecting surrounding areas.
- Disposal of removed components: Remove from site.
- Retained components: Do not distort or damage retained components.
- Reuse of ceiling system components:
  - Condition: Undamaged, free from distortion, clean.
  - Units and boards: Match adjacent areas where appropriate.
- Cutting units, boards and components: Cut neatly and accurately. Maintain edge profiles.
  - Openings: Suit sizes and edge details of fittings.

650 SETTING OUT
- General: Maintain ceiling system accurately, continuous, even, and jointed at regular intervals. Provide level soffits free from undulations, lipping and distortions in grid members.
- Infill units, access units, integrated services: Fit and align correctly.
- Minimum size for edge and perimeter infill units half standard width or length where practicable.
- Grid: Position to suit infill unit sizes. Allow for permitted deviations from nominal sizes.
- Infill joints and exposed suspension members: Straight, aligned and parallel to walls or setting out lines. Where building elements and features to which the ceiling system relates are not square, straight or level, give notice.

670 INSTALLING SUSPENSION
- Fixing:
  - Angle or strap hangers: Do not rivet for top fixing.
  - Wire hangers: Tie securely with tight bends to loops to prevent vertical movement.
- Installation:
  - Alignment Vertical or near vertical.
  - Maintain straight, with suitable tension and without bends or kinks.
  - Do not allow hangers to press against fittings, services and insulation covering ducts and pipes.
- Obstructions: Where obstructions prevent vertical installation, either:
  - brace diagonal hangers against lateral movement; or
  - hang ceiling system on an appropriate rigid sub-grid bridging across obstructions and supported to prevent lateral movement.
- Extra hangers: Provide as required to carry additional loads.

675 INSTALLING PERIMETER TRIMS
- Jointing: Neat and accurate, without lipping or twisting.
  - External and internal corners: Mitre joints.
  - Intermediate butt joints: Minimize. Use longest available lengths of trim.Align adjacent lengths, with matching joints.
- Fixing: Fix firmly to perimeter wall or other building structure.
  - Fixing centres: As existing.
- Finish: Apply before ceiling grid is installed.
  - Prime new timber edge battens with undercoat and final coat to visible surfaces.
680 INSTALLING BOARDS
- Fixing boards to grids: Screw boards securely and firmly to grid members.
- Surface: Provide a flat surface free from bowing and lipping. Set heads of screws below surface of boards and fill flush with surface.
- Movement joints: Provide as appropriate for the area of ceiling and align with movement joints in surrounding structure.
- Boards applied in two or more layers: Stagger joints.
- Board edges: Fully support. Screw to grid members.

700 COORDINATION WITH SERVICES
- Preparation: Check existing position of services against proposed alterations.
- Clashes between services and ceiling system: Give notice.
- Coordination: Programme works to minimise impact.
- Services disconnection: Give notice.

710 INTEGRATED SERVICES
- General: Position services accurately, support adequately. Align and level in relation to the ceiling. Alterations must not diminish performance of ceiling system.
- Surface spread of flame rating of additional supporting material: Match ceiling material.
- Services outlets:
  - Supported by ceiling system: Provide additional hangers.
  - Independently supported: Provide flanges to support altered ceiling system.

715 LUMINAIRES
- Independently support luminaires: Adjust suspension to line and level of ceiling as necessary.
- Surface mounted luminaires: Do not inhibit designed grid expansion in fire.
- Modular fluorescent recessed luminaires: Compatible with ceiling module. Extension boxes must not foul ceiling system.
- Continuous recessed rows of luminaires: Provide flanges for support of grid and infill units, unless mounted above grid flanges. Retain in place with lateral restraint.
- Fire protecting and resisting ceiling systems: Luminaires must maintain protection integrity of ceiling system.
- Access: Provide access for maintenance of luminaires.

720 MECHANICAL SERVICES
- Fan coil units:
  - Inlet and outlet grilles: Trim ceiling grid and infill units to suit.
  - Void clearance beneath: Sufficient for ceiling system and fan coil components.
  - Suspension and connections: Permit accurate setting out and levelling of fan coil units.
- Air grilles and diffusers:
  - Linear air diffusers: Provide flanges for support of grid and infill units. Provide for displacement of ceiling grid. Retain in place with lateral restraint.
  - Grille and diffuser ceiling joints: Provide smudge rings and edge seals.

725 OTHER SERVICES
- Smoke detectors and PA speakers:
  - Infill units: Scribe to suit.
  - Flexible connections: Required.
- Sprinkler heads: Carefully set out and level.
730 INSTALLING INSULATION

- **Fitting**: Fit accurately and firmly with closely butted joints and no gaps.
- **Insulation within individual infill units**: Fit closely. Secure to prevent displacement when infill units are installed or subsequently lifted. Reseal cut dustproof sleeving.
- **Width**: Lay insulation in the widest practical widths to suit grid member spacings.
- **Services**: Do not cover electrical cables not sized accordingly. Cut insulation carefully around electrical fittings, etc. Do not lay insulation over luminaires.
- **Sloping and vertical areas of ceiling system**: Fasten insulation to prevent displacement.

735 INSTALLING CAVITY FIRE BARRIERS

- **Fixing**:
  - **General**: Fix firmly to channels or angles at abutments to building structure.
  - **At perimeters and joints**: Secure. Provide permanent stability and continuity with no gaps. Provide a complete barrier to smoke and flame.
- **Joints**: Form to preserve integrity in fire.
- **Service penetrations**: Cut and pack to maintain barrier integrity. Sleeve flexible materials. Adequately support services passing through the barrier.
  - **Ceiling systems intended for fire protection**: Do not impair fire resisting performance of ceiling system.
  - **Ceiling systems not intended for fire protection**: Do not mechanically interlink barriers with ceiling system.

805 ELECTRICAL CONTINUITY AND EARTH BONDING

- **Scope**: Retest area of alterations.
- **Substantial conductive parts of the ceiling system**: Maintain electrically continuous and fully earth bonded to carry prospective earth fault currents.
- **Standard**: In accordance with BS 7671.
- **Testing**: After completion of the ceiling system, associated services and fittings, test conductive parts of suspension required to carry earth fault current, or used as bonding connections. Give notice before testing.
  - **Electrical continuity**: Measure from various distant conductive points of ceiling system and to earth bar in distribution board serving the area.
  - **Test current**: Sufficient to indicate probable electrical performance under fault conditions.
  - **Test instrument**: Type providing a pulse of about 25 A at safe voltage for safe duration, and indicating resistance in ranges 0-2 ohm and 0-20 ohm.
  - **Resistance of measuring conductors**: Deduce from test instrument readings.
  - **Test readings**: Update records and certify. Add results to resistance of other parts of the path forming the earth fault loop.

**COMPLETION**

910 DOCUMENTATION

- **Building manual and records**: Update showing alterations made.
L
Windows/Doors/Stairs
L10
Windows/ Rooflights/ Screens/ Louvres
L10 Windows/ Rooflights/ Screens/ Louvres

To be read with Preliminaries/ General conditions.

GENERAL

110 EVIDENCE OF PERFORMANCE

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

PRODUCTS

330 ALUMINIUM WINDOWS

• Manufacturer: Total Glass Ltd
  Total Glass Limited,
  Total Complex,
  Overbrook Lane,
  Knowsley Business Park,
  Liverpool,
  Merseyside,
  L34 9FB.

0151-549-3128

• Finish as delivered: To be determined.
• Glazing details: To be determined.
• Ironmongery/ Accessories: To be determined.
• Fixing: To be determined.

330A ALUMINIUM WINDOWS

• Manufacturer: Total Glass Ltd
  Total Glass Limited,
  Total Complex,
  Overbrook Lane,
  Knowsley Business Park,
  Liverpool,
  Merseyside,
  L34 9FB.

0151-549-3128

• Size: As drawings.
• Opening lights: Top swing.
• Finish as delivered: Polyester powder coated – colour to match existing.
• Glazing: 24mm insulating glass units to BS EN 1279 and Kitemark certified as clause L40/371.
• Ironmongery: standard as supplied by manufacturer.
• Fixing: Screwed to masonry reveal.
GLAZED SCREEN SYSTEM

- Location: Refer to Drawings.
- Manufacturer: Contractor's choice.
  - Product reference: Refer to Drawings.
- Screen height: Refer to Drawings.
- Fire resistance rating of complete system: To BS 476-22, 30 minutes integrity only.
- Sound insulation rating: 30db.
- Materials:
  - Frames: Ash.
    - Finish: Refer to Drawings.
  - Panels: Refer to Drawings.
    - Finish: Refer to Drawings.
- Glazing details: Refer to Drawings.
- Incorporated features: Refer to Drawings.
- Accessories/ Other requirements: Refer to Drawings.
- Fixing: Screw fixed and pelleted as clause 780.

EXECUTION

PROTECTION OF COMPONENTS

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

PRIMING/ SEALING

- Wood surfaces inaccessible after installation: Prime or seal as specified before fixing components.

BUILDING IN

- General: Not permitted unless indicated on drawings.
  - Brace and protect components to prevent distortion and damage during construction of adjacent structure.

REPLACEMENT WINDOW INSTALLATION

- Standard: To BS 8213-4.

WINDOW INSTALLATION GENERALLY

- Installation: Into prepared openings.
- Gap between frame edge and surrounding construction:
  - Minimum: 3mm.
  - Maximum: 6mm.
- Distortion: Install windows without twist or diagonal racking.

FIXING OF WOOD FRAMES

- Standard: As section Z20.
- Fasteners: 10 mm phosphor bronze expanding bolts.
  - Spacing: When not predrilled 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

- Sealant:
  - Manufacturer: Adshead Ratcliffe.
  - Product reference: Arbokol 1000.
  - Colour: white.
  - Application: As section Z22 to prepared joints. Finish triangular fillets to a flat or slightly convex profile.

820 IRONMONGERY

- Fixing: Assemble and fix carefully and accurately using fasteners with matching finish supplied by ironmongery manufacturer. Do not damage ironmongery and adjacent surfaces.
- Checking/ Adjusting/ Lubricating: Carry out at completion and ensure correct functioning.
L20
Doors/ shutters/ hatches
L20 Doors/ shutters/ hatches

To be read with Preliminaries/ General conditions.

GENERAL

110 EVIDENCE OF PERFORMANCE
   • Certification: Provide independently certified evidence that all incorporated components comply with specified performance requirements.

115 FIRE RESISTING DOORS/ DOORSETS/ ASSEMBLIES
   • 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/ doorset/ assembly supplied will comply with the specified requirements for fire resistance if tested to BS 476-22, BS EN 1634-1 or BS EN 1634-3. Such certification must cover door and frame materials, glass and glazing materials and their installation, essential and ancillary ironmongery, hinges and seals.

PRODUCTS

230A WOOD FLUSH DOORS- FD30S FIRE RESISTING AND SMOKE CONTROL
   • Manufacturer: Contractor's choice.
   • Product reference: NA.
   • Facings: Ash Laminate.
   • Lippings: Concealed lippings to long edges.
   • Preservative treatment: Not required.
   • Finish as delivered: Full factory finish.
   • Glazing details: Clear fire-resisting glazing.
   • Other requirements: As Drawings .

330 WOOD DOOR FRAMES AND ARCHITRAVES
   • Materials: Generally to BS EN 942.
   • Species: Softwood as table NA1.
   • Appearance class: J10.
   • Assembly:
   • Adhesive: PVAC to BS EN 204, Class D4.
   • Joinery workmanship: As section Z12.
   • Preservative treatment: Organic solvent as section Z12 and BWPDA Commodity Specification C5; Desired service life: 30 years.
   • Moisture content on delivery: 13-19%.
   • Finish as delivered: Prepared and primed, as section M60.
   • Perimeter seals: Not required.
   • Fixing: Plugged and screwed as section Z20.
480A DOORSETS Aluminium External
- Manufacturer: Total Glass Ltd
  Total Glass Limited,
  Total Complex,
  Overbrook Lane,
  Knowsley Business Park,
  Liverpool,
  Merseyside,
  L34 9FB.
  0151-549-3128
- Type: Rebated open out.
- Finish: Polyester powder coating.
- Colour: to be agreed/match existing.
- Glazing/ Panels: Double glazed.
  - Thickness: 24mm insulating glass units to BS EN 1279 and Kitemark certified as clause L40/371.

545 SLIDING STACKING PANEL PARTITIONS Refer to Drawings & Schedule
- Manufacturer: Refer to Drawings & Schedule.
  - Product reference: Refer to Drawings & Schedule.
- Performance: Refer to Drawings & Schedule.
- Arrangement: TBC.
  - Track system: TBC.
- Door leaf: TBC.
  - Finish as delivered: Factory Finish.
- Ironmongery: As manufacturer.
- Other requirements: None.

610 ROLLER SHUTTERS Studio
- Manufacturer: TBC.
  - Product reference: TBC.
- Performance: Fire resistance 30 mins.
- Arrangement: Vertical, face fitted across opening.
- Shutter curtain: Galvanized steel.
  - Finish as delivered: Factory Finish.
- Frame/ Guides: As manufacturer spec.
  - Finish as delivered: As Manufacturer.
- Operation: Electrical, with key switch.
- Ironmongery: TBC.
- Other requirements: None.

EXECUTION

710 PROTECTION OF COMPONENTS
- General: Do not deliver to site components that cannot be installed immediately or placed in clean, dry, floored and covered storage.
- Stored components: Stacked on level bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.
730 PRIMING/ SEALING
- Wood surfaces inaccessible after installation: Primed or sealed as specified before fixing components.

760 BUILDING IN
- General: Not permitted unless indicated on drawings.

810 FIRE RESISTING SMOKE CONTROL DOORS/ DOORSETS
- Gaps between frames and supporting construction: Filled as necessary in accordance with requirements for certification and/or door/doorset manufacturer's instructions.

820 SEALANT JOINTS
- Sealant:
  - Manufacturer: Adshead Ratcliffe.
  - Product reference: Arbokol 1000.
  - Colour: White.
  - Application: As section Z22 to prepared joints. Triangular fillets finished to a flat or slightly convex profile.

830 FIXING IRONMONGERY GENERALLY
- Fasteners: Supplied by ironmongery manufacturer.
  - Finish/Corrosion resistance: To match ironmongery.
- Holes for components: No larger than required for satisfactory fit/operation.
- Adjacent surfaces: Undamaged.
- Moving parts: Adjusted, lubricated and functioning correctly at completion.

840 FIXING IRONMONGERY TO FIRE RESISTING DOOR ASSEMBLIES
- General: All items fixed in accordance with door leaf manufacturer's recommendations ensuring that integrity of the assembly, as established by testing, is not compromised.
- Holes for through fixings and components: Accurately cut.
  - Clearances: Not more than 8 mm unless protected by intumescent paste or similar.
- Lock/Latch cases for fire 60 doors requiring > 60 minutes integrity performance: Coated with intumescent paint or paste before installation.

850 LOCATION OF HINGES
- Primary hinges: Where not specified otherwise, positioned with centre lines 250 mm from top and bottom of door leaf.
- Third hinge: Where specified, positioned on centre line of door leaf.
- Hinges for fire resisting doors: Positioned in accordance with door leaf manufacturer's recommendations.
Stairs/ ladders/ walkways/ handrails/ balustrades
General glazing
L40 General glazing

To be read with Preliminaries/ General conditions.

GENERAL REQUIREMENTS

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

150 WORKMANSHIP GENERALLY
• Glazing generally: To BS 6262.
• Integrity: Glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
• Dimensional tolerances: Panes/ sheets to be within ± 2 mm of specified dimensions.
• Materials:
  - 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.
  - Protection: Keep materials dry until fixed. Protect insulating glass units and plastics glazing sheets from the sun and other heat sources.

152 PREPARATION
• Surrounds, rebates, grooves and beads: Clean and prepare before installing glazing.

155 GLASS GENERALLY
• Standards: To BS 952 and relevant parts of:
  - BS EN 572 for basic soda lime silicate glass.
  - BS EN 1096 for coated glass.
  - BS EN 1748-1 for borosilicate glass.
  - BS EN 1748-2 for ceramic glass.
  - BS EN 1863 for heat strengthened soda lime silicate glass.
  - BS EN 12150 for thermally toughened soda lime silicate safety glass
  - BS EN 12337 for chemically strengthened soda lime silicate glass.
  - BS EN 13024 for thermally toughened borosilicate safety glass.
  - BS EN ISO 12543 for laminated glass and laminated safety glass.
• Panes/ sheets: Clean and free from obvious scratches, bubbles, cracks, rippling, dimples and other defects.
  - 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.

180 BEAD FIXING WITH PINS
• Pin spacing: Regular at maximum 150 mm centres, and within 50 mm of each corner.
• Exposed pin heads: Punched just below wood surface.

181 BEAD FIXING WITH SCREWS
• Screw spacing: Regular at maximum 225 mm centres, and within 75 mm of each corner.
TYPES OF GLAZING

371 BEAD FIXED INSULATING GLASS UNITSGENERALLY
- Pane material: 24mm insulating glass units to BS EN 1279 and Kitemark certified.
  - Inner pane: 6mm low E.
  - Outer pane: 6mm clear float.
  - Spacer: anodized aluminium, colour: Black.
  - Perimeter taping: Do not use.
- Surround/ bead: Hardwood.
  - Preparation: Priming/ sealing not required.
  - Bead location: Outside.
  - Bead fixing: stainless steel woodscrews.
- Glazing system: Cellular adhesive sections/ strips.
- Glazing installation:
  - Insulating unit: Located centrally in surround using setting and location blocks.
  - Glazing sections/ strips/ tapes: Applied to rebate upstands and beads in positions recommended by manufacturer.
  - Beads: Installed using sufficient pressure to compress inner and outer sections/ strips/ tapes and fixed securely.
  - Drainage and ventilation holes: Unobstructed.

505 FIRE RESISTANT TAPE/ STRIP GLAZING TO KITCHEN DOOR
- Fire resistance rating: 30 minutes integrity.
- Pane material: 7MM PYRODUR.
  - Orientation: Not applicable.
- Frame/ Surround material: Hardwood frame.
- Beads:
  - Material: Hardwood with chamfer.
  - Location: Inside.
  - Fixing: 38 mm long No 8 stainless steel screws and cups at maximum 200 mm centres.
- Glazing system:
  - Tape/ Strip: Intumescent strip.
  - Pointing sealant: Silicone mastic.
- Installation: By a firm currently registered under a UKAS certified accreditation scheme for the installation of fire resistant glazing, in accordance with glazing manufacturer's recommendations.
Surface finishes
M40
Stone/ concrete/ quarry/ ceramic tiling/ mosaic
M40 Stone/ concrete/ quarry/ ceramic tiling/ mosaic

To be read with Preliminaries/ General conditions.

TYPES OF TILING/ MOSAIC

GENERAL

210 SUITABILITY OF BACKGROUNDS/ BASES
• Background/ base tolerances: To permit specified flatness/ regularity of finished surfaces given the permissible minimum and maximum thickness of bedding.
• New background drying times (minimum):
  - Concrete walls: 6 weeks.
  - Brick/ block walls: 6 weeks.
  - Rendering: 2 weeks.
  - Gypsum plaster: 4 weeks.
• New base drying times (minimum):
  - Concrete slabs: 6 weeks.
  - Cement:sand screeds: 3 weeks.

215 FALLS IN THE BASES
• General: Give notice if falls are inadequate.

250 SAMPLES
• General: Submit representative samples of the following: Each type of tile.

PREPARATION

310 EXISTING BACKGROUNDS/BASES GENERALLY
• Efflorescence, laitance, dirt and other loose material: Remove.
• Deposits of oil, grease and other materials incompatible with the bedding: Remove.
• Tile, paint and other nonporous surfaces: Clean.
• Wet backgrounds: Dry before tiling.

330 EXISTING PLASTER
• Defective areas: Remove plaster that is loose, soft, friable, badly cracked or affected by efflorescence. Cut back to straight horizontal and vertical edges.
• Making good: Use plaster or nonshrinking filler.

380 NEW PLASTER
• Plaster: Dry, solidly bedded, free from dust and friable matter.
• Plaster primer: Apply if recommended by adhesive manufacturer.

390 PLASTERBOARD BACKGROUNDS
• Boards: Dry, securely fixed and rigid with no protruding fixings and face to receive decorative finish exposed.

460 SMOOTHING UNDERLAYMENT
• Type: Recommended by adhesive manufacturer.
• Condition: Allow to dry before tiling.
FIXING

510 FIXING GENERALLY
• Colour/shade: Unintended variations within tiles for use in each area/room are not permitted.
  - Variegated tiles: Mix thoroughly.
• Adhesive: Compatible with background/base. Prime if recommended by adhesive manufacturer.
• Cut tiles: Neat and accurate.
• Fixing: Provide adhesion over entire background/base and tile backs.
• Final appearance: Before bedding material sets, make adjustments necessary to give true, regular appearance to tiles and joints when viewed under final lighting conditions.
• Surplus bedding material: Clean from joints and face of tiles without disturbing tiles.

550 FLATNESS/REGULARITY OF TILING
• Sudden irregularities: Not permitted.
• Deviation of surface: Measure from underside of a 2 m straightedge placed anywhere on surface. The straightedge should not be obstructed by the tiles and no gap should be greater than 3 mm.

560 LEVEL OF TILING ACROSS JOINTS
• Deviation (maximum) between tile surfaces either side of any type of joint:
  - 1 mm for joints less than 6 mm wide.
  - 2 mm for joints 6 mm or greater in width.

570 MORTAR FOR BEDDING
• Bedding mix:
  - Cement: Portland to BS EN 197-1 type CEM I/42.5.
• Sand for walls: To BS 1199, type A.
• Sand for floors: To BS EN 13139.
• Grading designation: 0/4 (MP) category 1 fines and between 20%–66% passing a 0.5 sieve.
• Batching: Select from:
  - Batch by weight.
  - Batch by volume: Permitted on the basis of previously established weight:volume relationships of the particular materials. Use accurate gauge boxes. Allow for bulking of damp sand.
• Mixing: Mix materials thoroughly to uniform consistence. Use a suitable forced action mechanical mixer. Do not use a free fall type mixer.
• Application: At normal temperatures use within two hours. Do not use after initial set. Do not retemper.

578 CRACK CONTROL REINFORCEMENT
• Type to BS 4483: Mesh: 2.5 mm diameter wire, 50 mm x 50 mm spacing.
• Installation: Place centrally in depth of bed. Lap not less than 100 mm and securely tie together with steel wire.
• Corners: Avoid a four layer build at corners.

590 COVED TILE SKIRTINGS
• Sequence: Bed solid to wall before laying floor tiles.
• Bedding: Cement based adhesive.

600 SIT-ON TILE SKIRTINGS
• Sequence: Bed solid to wall after laying floor tiles.
• Bedding: Cement based adhesive.
650  THIN BED ADHESIVE - RIBBED (WALLS)
- Application: Apply 3 mm floated coat of adhesive to dry background in areas of approximately 1 m². Trowel to ribbed profile.
- Tiling: Press tiles firmly onto float coat.

651  THIN BED ADHESIVE - SOLID (WALLS)
- Application: Apply floated coat of adhesive to dry background in areas of about 1 m². Comb surface.
- Tiling: Apply thin even coat of adhesive to backs of dry tiles. Press tiles firmly onto float coat.
- Finished adhesive thickness (maximum): 3 mm.

670  THICK BED ADHESIVE - SOLID (WALLS)
- Application: Apply floated coat of adhesive to dry background. Comb surface.
- Tiling: Apply thin even coat of adhesive to backs of dry tiles. Press tiles firmly onto float coat.
- Finished adhesive thickness: Within range recommended by manufacturer.

710  THICK BED ADHESIVE - SOLID (FLOORS)
- Application: Apply floated coat of adhesive to dry base and comb surface.
- Tiling: Apply coat of adhesive to backs of tiles filling depressions or keys. Press tiles firmly into position.
- Finished adhesive thickness: Within range recommended by manufacturer.

MOVEMENT JOINTS/ GROUTING/ COMPLETION

875  GROUTING
- Sequence: Grout when bed/adhesive has set sufficient to prevent disturbance of tiles.
- Joints: 6 mm deep (or depth of tile if less). Free from dust and debris.
- Grouting: Fill joints completely, tool to profile, clean off surface. Leave free from blemishes.
  - Profile: Slightly concave.
- Polishing: When grout is hard, polish tiling with a dry cloth.

885  COLOURED GROUT
- Staining of tiles: Not permitted.
- Evaluating risk of staining: Apply grout to a few tiles in a small trial area. If discoloration occurs apply a protective sealer to tiles and repeat trial.
M50
Rubber/ plastics/ cork/ lino/ carpet tiling/ sheeting
M50 Rubber/ plastics/ cork/ lino/ carpet tiling/ sheeting

To be read with Preliminaries/ General conditions.

GENERAL REQUIREMENTS

210 WORKMANSHIP GENERALLY
• Base condition after preparation: Rigid, dry, sound, smooth and free from grease, dirt and other contaminants.
• Finished coverings: Accurately fitted, tightly jointed, securely bonded, smooth and free from air bubbles, rippling, adhesive marks and stains.

250 LAYOUT - ROLL MATERIALS
• Setting out of seams: Agree setting out for sheeting types M50/ Seams should be unobtrusive, kept to a minimum and positioned so that where possible:
  " They run the length of an area.
  " Traffic runs along rather than across them.
  " Incident light does not strike across them.
  " They are away from areas subject to heavy or twisting wear, doorways, stair nosings, or areas of narrow access.

330 COMMENCEMENT
• Required condition of works prior to laying materials:
  - Building is weathertight and well dried out.
  - Wet trades have finished work.
  - Paintwork is finished and dry.
  - Conflicting overhead work is complete.
  - Floor service outlets, duct covers and other fixtures around which materials are to be cut are fixed.
• Notification: Submit not less than 48 hours before commencing laying.

340 CONDITIONING
• Prior to laying: Condition materials by unpacking and separating in spaces where they are to be laid. Maintain resilient flooring rolls in an upright position. Unroll carpet and keep flat on a supporting surface.
• Conditioning time and temperature (minimum): As recommended by manufacturer with time extended by a factor of two for materials stored or transported at a temperature of less than 10°C immediately prior to laying.

350 ENVIRONMENT
• Temperature and humidity: Before, during and after laying, maintain approximately at levels which will prevail after building is occupied.
• Ventilation: Before during and after laying, maintain adequate provision.

360 FLOORS WITH UNDERFLOOR HEATING
• Commencement of laying: Not before a period of 48 hours after heating has been turned off.
• Post laying start up of heating system: Slowly return heating to its operative temperature not less than 48 hours after completing laying.

PREPARING BASES

410 NEW BASES
• Suitability of bases and conditions within any area: Commencement of laying of coverings will be taken as acceptance of suitability.

420 EXISTING BASES
• Notification: Before commencing work, confirm that existing bases will, after preparation, be suitable to receive coverings.
• Suitability of bases and conditions within any area: Commencement of laying of coverings will be taken as acceptance of suitability.

430 NEW WET LAID BASES
• Base drying aids: Not used for at least four days prior to moisture content testing.
• Base moisture content test: Carry out in accordance with BS 5325, Annexe A or BS 8203, Annexe A.
  • Locations for readings: In all corners, along edges, and at various points over area being tested.
• Commencement of laying coverings: Not until all readings show 75% relative humidity or less.

440 SUBSTRATES TO RECEIVE THIN COVERINGS
• Trowelled finishes: Uniform, smooth surface free from trowel marks and other blemishes. Abrade suitably to receive specified floor covering material.
SMOOTHING/ LEVELLING UNDERLAYMENT COMPOUND
- Type: Latex cement.
- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.

BASES FROM WHICH EXISTING FLOOR COVERINGS HAVE BEEN REMOVED
- Substrate: Clear of covering and as much adhesive as possible. Skim with smoothing underlayment compound to give smooth, even surface.

EXISTING FLOOR COVERINGS TO BE OVERLAID
- Substrate: Make good by local resticking and patching or filling with smoothing underlayment compound to give smooth, even surface.

TIMBER BOARDING/ STRIP FLOORING
- Substrate: Boards/ strips securely fixed and acceptably level with no protruding fasteners. Plane, sand or apply smoothing underlayment compound to give a smooth, even surface.

PLYWOOD UNDERLAY
- Standard: An approved national standard.
- Bonding quality: To BS EN 314-2 class 1.
- Appearance: To BS EN 635 class IV.
- Finish: Unsanded.
- Thickness: 6 mm.
- Sheet size: 2400 x 1200 mm.
- Substrate: Existing floor boards securely fixed and acceptably level with no gross irregularities or protruding fasteners.
- Laying sheets: Stagger cross joints such that no joint within base and underlay is coincident and with a 0.5-1 mm gap between sheets.
- Fasteners: 25 mm ringed shank or twisted shank nails or divergent staples.
- Spacing: Commencing at centre of one side of each sheet, at 150 mm grid centres over area of each sheet and at 100 mm centres along perimeter, set in 12 mm from edge.
- Placement: Driven with heads set flush with surface, and not projecting through underside of base. Not deformed.

LAYING COVERINGS

SETTING OUT TILES
- Method: Set out from centre of area/ room, so that wherever possible:
  - Tiles along opposite edges are of equal size.
  - Edge tiles are more than 50% of full tile width.

ADHESIVE FIXING GENERALLY
- Adhesive type: As specified, as recommended by covering/ underlay manufacturer or as approved.
- Primer: Type and usage as recommended by adhesive manufacturer.
- Application: As necessary to achieve good bond.
- Finished surface: Free from trowel ridges, high spots caused by particles on the substrate, and other irregularities.

DOORWAYS
- Joint location: On centre line of door leaf.
740 EDGINGS AND COVER STRIPS
- Manufacturer: Contractor's choice.
- Material/ finish: brass.
- Fixing: Secure with edge of covering gripped. Use matching fasteners where exposed to view.

750 STAIR NOSINGS AND TRIMS
- Manufacturer: Contractor's choice.
- Material/ finish: brass.
- Fixing: Secure, level and with mitred joints. Adjusted to suit thickness of covering with continuous packing strips of hardboard or plywood. Nosings and packing strips bedded in gap-filling adhesive recommended by nosing manufacturer.
- Screw fixing with matching plugs: Required.

770 SKIRTINGS
- Types: PVC.
- Manufacturer: Marley.
- Product reference: cover former and capping strip.
- Fixing: Secure with top edge straight and parallel with floor.
- Corners: Mitre joints.

780 TRAFFICKING AFTER LAYING
- Covering types: all coverings.
- Traffic free period: 7 hours
- Until adhesive is set.

COMPLETION

820 FINISHING vinyl sheet flooring
- Cleaning operations:
  - Wash floor with water containing neutral (pH 6-9) detergent. If necessary, lightly scrub heavily soiled areas.
  - Rinse with clean water, removing surplus to prevent damage to adhesive. Allow to dry.
- Emulsion polish: Two coats of a type recommended by covering manufacturer.

880 WASTE
- Spare covering material: Retain suitable material for patching. On completion submit pieces for selection. Hand over selected pieces to Employer.
M51 Carpet

GENERAL/ PREPARATION

210 WORKMANSHIP GENERALLY
• Finished carpeting: Tightly seamed, accurately fitted, neatly and securely fixed, smooth and evenly tensioned.

250 CARPET LAYOUT - PRE-ORDER REQUIREMENTS
• Setting out: Agree seam locations and pattern.

290 CONDITIONING CARPET
• Requirements: As recommended by manufacturer.

310 CONDITION OF WORKS PRIOR TO LAYING
• General requirements:
  - Building weathertight and well dried out.
  - Wet trades complete.
  - Paintwork complete and dry.
  - Floor service outlets, duct covers and other fixtures around which carpet is to be cut, fixed.

315 NOTIFICATION OF COMMENCEMENT
• Give notice: Before laying is due to start.
  - Period of notice (minimum): 48 hours.
320 ENVIRONMENT
• Temperature and humidity: Before, during and after laying, maintain approximately at levels which will prevail after building is occupied.

330 SUITABILITY OF BASES
• General: Commencement of laying carpeting will be taken as acceptance of suitability of bases.

340 NEW WET LAID BASES
• Base drying aids: Not used for at least four days prior to moisture content testing.
• Base moisture content test: Carry out in accordance with BS 5325, Annexe A.
  - Locations for readings: In all corners, along edges, and at various points over area being tested.
• Commencement of laying carpeting: Not until all readings show 75% relative humidity or less.

350 TIMBER BOARDING/ STRIP FLOORING
• Substrate: Boards securely fixed and acceptably level with no protruding fasteners. Plane, sand or apply smoothing underlayment compound as necessary to give smooth, even surface.

360 EXISTING FLOOR COVERINGS TO BE OVERLAID
• Substrate: Make good by local rebedding, sanding or applying smoothing underlayment compound to give a secure, smooth, even surface. Allow to dry before laying carpeting.

371 PLYWOOD UNDERLAY
• Standard: Manufactured to an approved national standard.
• Bonding quality: To BS EN 314-2 class 3.
• Appearance: To BS EN 635 class IV.
• Finish: Unsanded.
• Thickness: 6 mm.
• Sheet size: 2400 x 1200
• Substrate: Existing floor boards securely fixed and acceptably level with no gross irregularities or protruding fasteners.
• Laying sheets:
  - Cross joints: Staggered with none coincident with joints in base.
  - Joint width: 0.5-1 mm.
• Fasteners: 25 mm ring shank or twisted shank nails or divergent staples.
  - Location: Commencing at the centre of one side of each sheet, at 150 mm grid centres over the area of each sheet and at 100 mm centres along perimeter, set in 12 mm from edge.
  - Placement: Driven with heads set flush with surface and not projecting through the underside of base. Not deformed.

LAYING CARPETING

470 LAYING CARPET GENERALLY
• Appearance of laid carpet: Pieces of the same carpet type capable of being seen together to be of consistent appearance with pile lying in the same direction.
• Carpet perimeter: Accurately and closely fitted leaving no gaps. Edges turned down and secured to grippers.
• Carpet tension: Even, and such that carpet lies flat and will not ruck, ripple or become slack.
• Doorways and recesses: Cut carpet in. Do not piece in without prior approval.
480 POWER STRETCHING
- General: Power stretch carpets greater than 5 metres in any dimension.

490 DOORWAYS
- Carpet joint: On centre line of door leaf.

510 EDGINGS AND COVER STRIPS
- Manufacturer: Contractor's choice.
- Material/ finish: brass.
- Fixing: Secure with edge of carpet firmly gripped. Use matching fasteners where exposed to view.

530 LAYING STAIR CARPET WITH GRIPPER
- Shifting allowance: Provide a minimum additional length of carpet equivalent to one tread and riser. Conceal by substituting for underlay at top or bottom of stairs.
- Gripper locations:
  - One on each tread and each riser, close to intersection.
  - To edge of each winder over 300 mm deep and abutting a wall.
  - Along a landing over 300 mm deep and abutting a wall.
- Pile direction: Towards bottom of stairs and perpendicular to nosings.

550 STAIR NOSINGS AND TRIMS
- Manufacturer: Contractor's choice.
- Material/ finish: brass.
- Fixing: Secure, level and, where required, with mitred joints. Adjusted to suit thickness of carpet with continuous packing strips of hardboard or plywood. Nosings and packing strips bedded in gap-filling adhesive recommended by the manufacturer.
  - Screw fixing with matching plugs: Not required.

570 COMPLETION
- Debris: Remove stay tacks and cut away partly loose warp and face yarns.
- Surface irregularities and tension: Check and make necessary tension adjustments.

580 WASTE
- Spare covering material: Retain suitable material for patching. On completion submit pieces for selection. Hand over selected pieces to Employer.
M60
Painting/ clear finishing
M60 Painting/ clear finishing

To be read with Preliminaries/ General conditions.

COATING SYSTEMS

110A EMULSION PAINT

- Manufacturer: as schedule.
- Product reference: as schedule.
- Surfaces: Walls and ceilings.
  - Preparation: Ensure surfaces are sound, clean, dry and free from all defective or poorly adhering material, dirt, grease and paint. Carefully scrape back to a firm edge all areas of blistered, poorly adhering or defective coatings. Where necessary wash the surface to remove dirt, grease and powdery or dusty residues. Rinse with clean water and allow to dry. Powdery and friable surface coatings such as soft distempers etc. should be completely removed by scraping, brushing and washing. Allow the surface to fully dry before proceeding. Where appropriate, rub down sound areas to produce the necessary key for good adhesion (this is particularly important when applying water-based systems to previous coatings that are known, or suspected to be, solvent-based) and feather broken edges of existing coatings. Wipe off with a damp, lint free cloth, to avoid dust. Dust off.
  - Number of coats: three.

130 GLOSS PAINT TO NEW WOODWORK

- Manufacturer: as schedule.
- Product reference: as schedule.
- Surfaces: Preprimed and sealed.
  - Preparation: Ensure surfaces are sound, dry and free from all defective or poorly adhering material, dirt, grease, wax or oil. Avoid damaging factory applied coatings. Carefully scrape back to a firm edge all areas of poorly adhering or defective coatings and rub down to feather broken edges. Do not use wire brushes on external wall or ceiling surfaces. Wash down with a suitable detergent solution to remove dirt, chalking paint, corrosion products and other contaminants. Rinse off with clean water and allow to dry. Rub down sound paintwork with a suitable abrasive to remove nibs and to provide a mechanical key (not applicable to external wall or ceiling textured surfaces), taking care to avoid exposing timber on sharp edges. Dust off.
  - Initial coats: Primer to new woodwork as recommended by manufacturer.
    - Number of coats: 1.
  - Undercoats: Dulux Trade undercoat.
    - Number of coats: 2.
  - Finishing coats: Dulux trade High gloss.
    - Number of coats: 2.
GENERAL

215 HANDLING AND STORAGE
- Coating materials: Deliver in sealed containers, labelled clearly with brand name, type of material and manufacturer's batch number.
- Materials from more than one batch: Store separately.

240 SURFACES NOT TO BE COATED
None.

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

PREPARATION

400 PREPARATION GENERALLY
- Standard: In accordance with BS 6150.
- Suspected existing hazardous materials: Prepare risk assessments and method statements covering operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
- Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Substrates: Sufficiently dry in depth to suit coating.
- Efflorescence salts: Remove.
- Dirt, grease and oil: Remove. Give notice if contamination of surfaces/ substrates has occurred.
- Surface irregularities: Remove.
- Joints, cracks, holes and other depressions: Fill flush with surface, provide smooth finish.
- Dust, particles and residues from preparation: Remove and dispose of safely.
- Water based stoppers and fillers:
  - Apply before priming unless recommended otherwise by manufacturer.
  - If applied after priming: Patch prime.
- Oil based stoppers and fillers: Apply after priming.
- Doors, opening windows and other moving parts:
  - Ease, if necessary, before coating.
  - Prime resulting bare areas.

420 FIXTURES AND FITTINGS
- Removal: Before commencing work remove: Coverplates, grilles, wall clocks, and other surface mounted fixtures.
- Replacement: Refurbishment as necessary, refit when coating is dry.
IRONMONGERY
- Removal: Before commencing work remove ironmongery from surfaces to be coated.
- Hinges: Do not remove.
- Replacement: Refurbish as necessary; refit when coating is dry.

EXISTING IRONMONGERY
- Refurbishment: Remove old coating marks. Clean and polish.

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

PREVIOUSLY COATED SURFACES - BURNING OFF
- Risk assessment and method statement: Prepare, and obtain approval before commencing work.
- Adjacent areas: Protect from excessive heat and falling, scrapings.
- Exposed resinous areas and knots: Apply two coats of knotting.
- Removed coatings: Dispose of safely.

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

PREPRIMED WOOD
- Areas of defective primer: Take back to bare timber.

UNCOATED WOOD
- General: Provide smooth, even finish with arrises and moulding edges lightly rounded or eased.
- Heads of fasteners: Countersink sufficient to hold stoppers/fillers.
- Resinous areas and knots: Apply two coats of knotting.
PREVIOUSLY COATED STEEL
- Defective paintwork: Remove to leave a firm edge and clean bright metal.
- Sound paintwork: Provide key for subsequent coats.
- Corrosion and loose scale: Take back to bare metal.
- Residual rust: Treat with a proprietary removal solution.
- Bare metal: Apply primer as soon as possible.
- Remaining areas: Degrease.

PREPRIMED STEEL
- Areas of defective primer, corrosion and loose scale: Take back to bare metal. Reprime as soon as possible.

GALVANIZED, SHERARDIZED AND ELECTROPLATED STEEL
- White rust: Remove.
- Pretreatment: Apply one of the following:
  - 'T wash' mordant solution to blacken whole surface.
  - Etching primer recommended by coating system manufacturer.

UNCOATED STEEL - MANUAL CLEANING
- Oil and grease: Remove.
- Corrosion, loose scale, welding slag and spatter: Remove.
- Residual rust: Treat with a proprietary removal solution.
- Primer: Apply as soon as possible.

UNCOATED ALUMINIUM/ COPPER/ LEAD
- Surface corrosion: Remove and lightly key surface.
- Pretreatment: Etching primer if recommended by coating system manufacturer.

UNCOATED MASONRY/ RENDERING
- Loose and flaking material: Remove.

UNCOATED PLASTER
- Nibs, trowel marks and plaster splashes: Scrape off.
- Overtrowelled 'polished' areas: Key lightly.

UNCOATED PLASTERBOARD
- Depressions around fixings: Fill with stoppers/ fillers.

UNCOATED PLASTERBOARD - TO RECEIVE TEXTURED COATING
- Joints: Fill, tape and feather out with materials recommended by textured coating manufacturer.

WALL COVERINGS
- Retained wall coverings: Check that they are in good condition and well adhered to substrate.
- Previously covered walls: Wash down to remove paper residues, adhesive and size.

ORGANIC GROWTHS
- Dead and loose growths and infected coatings: Scrape off and remove from site
- Treatment biocide: Apply appropriate solution to growth areas and surrounding surfaces.
- Residual effect biocide: Apply appropriate solution to inhibit re-establishment of growths.
631 PREVIOUSLY PAINTED WINDOW FRAMES
- Paint encroaching beyond glass sight line: Remove.
- Loose and defective putty: Remove.
- Putty cavities and junctions between previously painted surfaces and glass: Clean thoroughly.
- Finishing:
  - Patch prime, repute as necessary, and allow to harden.
  - Seal and coat as soon as sufficiently hard.

651 EXISTING GUTTERS
- Dirt and debris: Remove from inside of gutters.
- Defective joints: Clean and seal with suitable jointing material.

APPLICATION

711 COATING GENERALLY
- Application standard: In accordance with BS 6150, clause 9.
- Conditions: Maintain suitable temperature, humidity and air quality during application and drying.
- Surfaces: Clean and dry at time of application.
- Thinning and intermixing of coatings: Not permitted unless recommended by manufacturer.
- Overpainting: Do not paint over intumescent strips or silicone mastics.
- Priming coats:
  - Thickness: To suit surface porosity.
  - Application: As soon as possible on same day as preparation is completed.
- Finish:
  - Even, smooth and of uniform colour.
  - Free from brush marks, sags, runs and other defects.
  - Cut in neatly.
- Doors, opening windows and other moving parts: Ease before coating and between coats.

730 WORKSHOP COATING OF CONCEALED JOINERY SURFACES
- General: Apply coatings to all surfaces of components.

731 SITE COATING OF CONCEALED JOINERY SURFACES
- General: After priming, apply additional coatings to surfaces that will be concealed when fixed in place.
  - Components: External door frames.
  - Additional coatings: One undercoat.

770 EXTERNAL DOORS
- Bottom edges: Prime and coat before hanging doors.

780 BEAD GLAZING TO COATED WOOD
- Before glazing: Apply first two coats to rebates and beads.

790 PUTTY GLAZING
- Setting: Allow putty to set for seven days.
- Sealing:
  - Within a further 14 days, seal with an oil based primer.
  - Fully protect putty with coating system as soon as it is sufficiently hard.
  - Extend finishing coats on to glass up to sight line.
Building fabric sundries
Sundry insulation/ proofing work/ fire stops
SUNDARY INSULATION/ PROOFING WORK

To be read with Preliminaries/ General conditions

TYPES OF INSULATION

125 INSULATION LAID BETWEEN CEILING TIES/ JOISTS
- Material: Mineral wool.
- Standard: None applicable.
- Manufacturer: Rockwool Limited, Pencoed, Bridgend, CF35 6NY. Tel: 01656 862 621. Fax: 0871 222 1784. Email: info@rockwool.co.uk Web: www.rockwool.co.uk.
- Thickness: 150 mm.
- Installation requirements:
  - Installation standard: To BS 5803-5.
  - Joints: Butted, no gaps.
  - Insulation at perimeter: Carried over wall plates.
  - Service holes: Sealed, and debris removed before laying insulation.
  - Eaves ventilation: Unobstructed.
  - Water cistern platforms: Not applicable.

135 INSULATION LAID ACROSS CEILING TIES/ JOISTS
- Material: Mineral wool
- Standard: None applicable.
- Manufacturer: Rockwool Limited, Pencoed, Bridgend, CF35 6NY. Tel: 01656 862 621. Fax: 0871 222 1784. Email: info@rockwool.co.uk Web: www.rockwool.co.uk.
- Thickness: 200mm laid.
- Installation requirements:
  - Installation standard: To BS 5803-5.
  - Insulation widths: Widest practical.
  - Laid direction: At right angles to ties/ joists.
  - Joints: Butted, no gaps.
  - Insulation: Fitted neatly around rafter ends and extended over wall plates.
  - Eaves ventilation: Unobstructed.
  - Service holes: Sealed, debris removed before laying insulation.
  - Water cistern platforms: Not applicable.

140 INSULATION FITTED BETWEEN RAFTERS
- Material: Extruded polyurethane foam.
- Standard: None applicable.
- Manufacturer: Kingspan Insulations Ltd. 0870 761 7770.
- Thickness: 100 mm.
- Installation requirements:
  - Joints: Butted, no gaps.
  - Fasteners: Used where necessary to retain insulation and/ or prevent slumping.
  - Air space above insulation: Not restricted.
  - Eaves ventilation: Unobstructed.
170  INSULATION TO LOFT ACCESS HATCHES
- Insulation: Mineral wool mat to BS 13162
  - Thickness: Same as loft insulation
  - Laying: Cut to fit, with no gaps and securely fixed.
- Edges of hatch: Sealed with an approved compressible draught excluder.

210  INSULATION FITTED BETWEEN STUDS
- Material: EPS.
- Manufacturer: Jablite.
  - Product reference: Jablite board.
- Thickness: 125mm.
- Installation requirements:
  - Joints: Butted, no gaps.
  - Fasteners: Used to prevent slumping/displacement.

310  VAPOUR CONTROL LAYER FIXED TO TIMBER STUDS/ JOISTS/ FRAMING
- Material: 1000 gauge virgin polyethylene.
- Manufacturer: Visqueen Building Products
  www.visqueenbuilding.co.uk
  riba@visqueenbuilding.co.uk
  T: +44 (0)1685 840672
  F: +44 (0)1685 842580
  Maerdy Industrial Estate, Rhymney, Tredegar. NP22 5PY.
  - Product reference: Vapour Barrier.
- Minimum vapour resistance: 266 MNsg.
- Moisture content of timber at time of fixing (maximum): 20%.
- Installation requirements:
  - Setting out: Joints minimized.
  - Method of fixing: Staples at 250 mm centres maximum along all supports. Membrane not sagging.
  - Joints: At supports only, lapped 150 mm minimum.
  - Openings: Membrane fixed to reveals.
  - Joints and edges: Sealed with double sided tape with vapour resistivity not less than the vapour control layer.
- Penetrations: Sealed.
P20

Unframed isolated trims/ skirtings/ sundry items
P20 Unframed isolated trims/ skirtings/ sundry items

To be read with Preliminaries/General conditions

120 HARDWOODSKIRTINGS AND ARCHITRAVES

- Quality of wood and fixing: To BS 1186-3.
  - Species: CONTRACTORS CHOICE.
  - Class: 2.
- Moisture content at time of fixing: 9-13%.
- Preservative treatment: Not required.
- Fire rating: Not applicable.
- Profile: To match existing.
  - Finished size: to match existing.
- Finish as delivered: Prepared and primed as section M60.
- Fixing: Plugged, screwed and pelleted at 300mm centres.

510 INSTALLATION GENERALLY

- Joinery workmanship: As section Z10.
- Metal workmanship: As section Z11.
- Methods of fixing and fasteners: As section Z20 where not specified.
- Straight runs: To be in one piece, or in long lengths with as few joints as possible.
- Running joints: Location and method of forming to be agreed where not detailed.
- Joints at angles: Mitre, unless shown otherwise.
- Position and level: To be agreed where not detailed.
Holes, chases, covers and supports for services
P31 Holes, chases, covers and supports for services

To be read with Preliminaries/General conditions.

EXECUTION

620 HOLES AND CHASES IN IN SITU CONCRETE
• Cast in: Holes larger than 10 mm diameter and chases.
• Cutting and drilling:
  - Permitted for holes not larger than 10 mm diameter.
  - Not permitted for holes larger than 10 mm diameter except as indicated on drawings.

640 HOLES IN STRUCTURAL STEELWORK
• Cutting and drilling: Not permitted except as indicated on drawings.

650 HOLES, RECESSES AND CHASES IN MASONRY
• Locations: To maintain integrity of strength, stability and sound resistance of construction.
• Sizes: Minimum needed to accommodate services.
  - Holes (maximum): 300 x 300 mm.
• Walls of hollow or cellular blocks: Do not chase.
• Walls of other materials:
  - Vertical chases: No deeper than one third of single leaf thickness, excluding finishes.
  - Horizontal or raking chases: No longer than 1 m. No deeper than one sixth of the single leaf thickness, excluding finishes.
• Chases and recesses: Do not set back to back. Offset by a clear distance at least equal to the wall thickness.
• Cutting: Do not cut until mortar is fully set. Cut carefully and neatly. Avoid spalling, cracking and other damage to surrounding structure.

670 NOTCHES AND HOLES IN STRUCTURAL TIMBER
• General: Avoid if possible.
• Sizes: Minimum needed to accommodate services.
• Position: Do not locate near knots or other defects.
• Notches and holes in the same joist: Minimum 100 mm apart horizontally.
• Notches in joists: Locate at top. Form by sawing down to a drilled hole.
  - Depth (maximum): 0.125 x joist depth.
  - Distance from supports: Between 0.07 and 0.25 x span.
• Holes in joists: Locate on neutral axis.
  - Diameter (maximum): 0.25 x joist depth.
  - Centres (minimum): 3 x diameter of largest hole.
  - Distance from supports: Between 0.25 and 0.4 of span.
• Notches in roof rafters, struts and truss members: Not permitted.
• Holes in struts and columns: Locate on neutral axis.
  - Diameter (maximum): 0.25 x minimum width of member.
  - Centres (minimum): 3 x diameter of largest hole.
  - Distance from ends: Between 0.25 and 0.4 of span.
INSTALLING PIPE SLEEVES

- Sleeves: Fit to pipes passing through building fabric.
- Material: Match pipeline.
- Size: One or two sizes larger than pipe to allow clearance.
- Finish: Install sleeves flush with building finish. In areas where floors are washed down, install protruding 100 mm above floor finish.
- Masking plates: Fit at visible penetrations, including through false ceilings of occupied rooms.
Paving/Planting/Fencing/Site furniture
Q10
Kerbs/ edgings/ channels/ paving accessories
Q10 Kerbs/edgings/channels/paving accessories

To be read with Preliminaries/General conditions.

TYPES OF KERBS/EDGINGS/CHANNELS

110 PROPRIETARY PRECAST CONCRETE EDGINGS

- Standard: To BS EN 1340.
- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.
- Designations: CS1 Channel, square and EF Edging, flat top.
- Size (width x height x length): 50 x 250 x 915 mm.
- Special shapes: None.
- Finish: As cast.
- Colour: Charcoal.
- Bedding: Fresh concrete races.
- Joints generally: Dry, 2-3 mm gap.
  - Sealant movement joints: Not required.

LAYING

510 LAYING KERBS, EDGINGS AND CHANNELS

- Cutting: Neat, accurate and without spalling. Form neat junctions.
  - Long units (450 mm and over) minimum length after cutting: 300 mm.
  - Short units minimum length after cutting: The lower of one third of their original length or 50 mm.
- Bedding of units: Positioned true to line and levelled along top and front faces, in a mortar bed on accurately cast foundations or on a race of fresh concrete.
- Securing of units: After bedding has set, secured with a continuous haunching of concrete or on a race of fresh concrete with backing concrete cast monolithically.

530 CONCRETE FOR FOUNDATIONS, RACES AND HAUNCHING

- Standard: To BS 8500-2.
- Designated mix: Not less than GEN0 or Standard mix ST1.
- Workability: Very low.

540 CEMENT MORTAR BEDDING

- General: To section Z21.
  - Portland cement: Class CEM I 42.5 to BS EN 197-1.
  - Sand: to BS EN 12620, grade 0/4 or 0/2 (MP).
- Bed thickness: 12-40 mm.

547 BEDDING/BACKING OF UNITS ON FRESH CONCRETE RACES

- Standard: To BS 7533-6.

620 ACCURACY

- Deviations (maximum):
  - Level: ± 6 mm.
  - Horizontal and vertical alignment: 3 mm in 3 m.
Q20
Granular sub-bases to roads/ pavings
Q20 Granular sub-bases to roads/ pavings

To be read with Preliminaries/ General conditions.

**110 THICKNESSES OF SUB-BASE/ SUBGRADE IMPROVEMENT LAYERS**
- Thicknesses: See sections:
  - Q25 Slab/ brick/ sett/ cobble pavings.

**130 HERBICIDES**
- Type: Contractor’s choice.
- Application: To subgrade of cobbled area.

**140 EXCAVATION OF SUBGRADES**
- Final excavation to formation/ subformation level: Carry out immediately before compaction of subgrade.
- Soft spots and voids: Give notice.
- Old drainage and service trenches: Excavate to remove soft or degraded material, then backfill with specified granular sub-base material and compact.
- Wet conditions: Do not excavate or compact when the subgrade may be damaged or destabilized.

**145 PREPARATION AND COMPACTION OF SUBGRADES**
- Timing: Immediately before placing sub-base.
- Soft or damaged areas: Excavate and replace with sub-base material, compacted in layers 300 mm (maximum) thick.
- Compaction: Thoroughly, by roller or other suitable means, adequate to resist subsidence or deformation of the subgrade during construction and of the completed roads/ pavings when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.

**150 SUBGRADES FOR VEHICULAR AREAS**
- Preparation and treatment: To Highways Agency ‘Specification for highway works’, clauses 616 and 617.

**180 NOTICE**
- Give notice: On completion of compaction.
  - Period of notice: 2 working days.

**210 HIGHWAYS AGENCY TYPE 1 GRANULAR MATERIAL**
- Material: Type 1 unbound mixture to Highways Agency ‘Specification for highway works’, clause 801.
  - Recycled aggregate: Permitted.
211 GRANULAR MATERIAL
- Quality: Free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111 and BS EN 1097-2, and in any one layer only one of the following:
  - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
  - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
  - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
    - Natural gravel.
    - Natural sand.
- Filling: Spread and levelled in 150 mm maximum layers, each layer thoroughly compacted.

230 PLACING GRANULAR MATERIAL GENERALLY
- Preparation: Loose soil, rubbish and standing water removed.
- Structures, membranes and buried services: Ensure stability and avoid damage.

240 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS
- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
- Standard: To Highways Agency ‘Specification for highway works’ clause 802.
- At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.

241 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS
- Proposals: Well in advance of starting work submit details of:
  - Maximum depth of each compacted layer.
  - Type of plant.
  - Minimum number of passes per layer.
- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
- At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.
- Sub-base surface after compaction and immediately before overlaying: Uniformly well closed and free from loose material, cracks, ruts or hollows.

250 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS
- General: Spread and levelled.
- Compaction:
  - Timing: As soon as possible after laying.
  - Method: By roller or other suitable means, adequate to resist subsidence or deformation of the sub-base during construction and of the completed paving when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.

310 ACCURACY
- Permissible deviation from required levels, falls and cambers (maximum):
  - Subgrades:
    - Roads and parking areas: +20 -30 mm.
    - Footways and recreation areas: ± 20 mm.
  - Sub-bases:
    - Roads and parking areas: +10 -30 mm.
    - Footways and recreation areas: +10 -30 mm.
320  **BLINDING**
- Locations: Surfaces to receive sand bedded interlocking brick or block paving to sections Q24 and Q25.
- Material: Sand, fine gravel or PFA.
- Finish: Close, smooth, compacted surface.

330  **COLD WEATHER WORKING**
- Frozen materials: Do not use.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.

340  **PROTECTION**
- Sub-bases: As soon as practicable, cover with subsequent layers, specified elsewhere.
- Subgrades and sub-bases: Prevent degradation by construction traffic, construction operations and inclement weather.
Q22
Asphalt roads/ pavings
Q22 Asphalt roads/pavings

To be read with Preliminaries/ General conditions.

TYPES OF PAVING

LAYING

310 LAYING GENERALLY

- Preparation: Remove all loose material, rubbish and standing water.
- Adjacent work: Form neat junctions. Do not damage.
- Channels, kerbs, inspection covers etc: Keep clean.
- New paving:
  - Keep traffic free until it has cooled to prevailing atmospheric temperature.
  - Do not allow rollers to stand at any time.
  - Prevent damage.
  - Lines and levels: With regular falls to prevent ponding.
  - Overall texture: Smooth, even and free from dragging, tearing or segregation.
  - State on completion: Clean.

330 LEVELS

- Permissible deviation from the required levels, falls and cambers (maximum): In accordance with BS 594987, Table 7.
Disposal systems
R10
Rainwater drainage systems
R10 Rainwater drainage systems

To be read with Preliminaries/General conditions.

110 GRAVITY RAINWATER DRAINAGE SYSTEM
• Rainwater outlets: Proprietary.
• Gutters: PVC-U.
• Pipework: PVC-U, external.
• Below ground drainage: Submit proposals.
• Disposal: Submit proposals.
• Controls: Not applicable.
• Accessories: Anticlimb rainwater pipe covers.

SYSTEM PERFORMANCE

210 DESIGN
• Design: Complete the design of the rainwater drainage system.
• Standard: To BS EN 12056-3, clauses 3-7 and National Annexes.
• Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

221 COLLECTION AND DISTRIBUTION OF RAINWATER
• General: Complete, and without leakage or noise nuisance.

PRODUCTS

350 PVC-U GUTTERS
• Standard: To the relevant parts of BS 4576-1, BS EN 607 and BS EN 1462, Kitemark certified.
• Manufacturer: Refer to Spec.
• Profile: Refer to Spec.
• Nominal size: Refer to Spec.
• Colour: Refer to Spec.
• Brackets: Refer to Spec.
• Fixings: Refer to Spec.
• Size: Refer to Spec.
• Accessories: Refer to Spec.

365 PROPRIETARY RAINWATER OUTLETS
• Manufacturer: Confirm With CA.
• Roof construction: Confirm with CA.
• Roof insulation thickness: TBC.
• Type of grate/ Fittings: Domed grating.
• Outlet: Type and direction to suit pipework with suitable adaptors and connections.
• Accessories: TBC.
INSULATION TO INTERNAL PIPELINES
- Material: Preformed flexible closed cell split tube.
- Thermal conductivity (maximum): 0.045 W/m°C.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Thickness: 20 mm.
- Fire performance: Not required.

EXECUTION

PREPARATION
- Work to be completed before commencing work specified in this section:
  - Below ground drainage. Alternatively, make temporary arrangements for dispersal of rainwater without damage or disfigurement of the building fabric and surroundings.
  - Painting of surfaces which will be concealed or inaccessible.

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

FIXING AND JOINTING GUTTERS
- Joints: Watertight
- Brackets: Securely fixed.
  - Fixings: Screwed into softwood fascia board.
    - Fixing centres: 900 mm.
  - Additional brackets: Where necessary to maintain support and stability, provide at joints in gutters and near angles and outlets.
- Roofing underlay: Dressed into gutter.

SETTING OUT EAVES GUTTERS - TO FALLS
- 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.
- Outlets: Align with connections to below ground drainage.

SETTING OUT EAVES GUTTERS - LEVEL
- Setting out: Level and as close as practical to the roof.
- Outlets: Aligned with connections to below ground drainage.
635  FIXING PIPEWORK
• Pipework: Fix securely, plumb and/or true to line.
• Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.
• Externally socketed pipes and fittings: Fix with sockets facing upstream.
• Additional supports: Provide as necessary to support junctions and changes in direction.
• Vertical pipes:
  - Provide a loadbearing support at least at every storey level.
  - Tighten fixings as work proceeds so that every storey is self supporting.
  - Wedge joints in unsealed metal pipes to prevent rattling.
• Wall and floor penetrations: Isolate pipework from structure.
  - Pipe sleeves: As section P31.
  - Masking plates: Fix at penetrations if visible in the finished work.
• Expansion joint pipe sockets: Fix rigidly to buildings. Elsewhere, provide brackets and fixings that allow pipes to slide.

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

690  ELECTRICAL CONTINUITY - PIPEWORK
• Joints in metal pipes with flexible couplings: Clips (or suitable standard pipe couplings) supplied for earth bonding by pipework manufacturer to ensure electrical continuity.

COMPLETION

905  INTERNAL PIPEWORK TEST - ENGLAND, WALES, IRELAND AND NORTHERN IRELAND
• Preparation: Temporarily seal open ends of pipework with plugs.
• Test apparatus: Connect a 'U' tube water gauge and air pump to pipework via a plug.
• Testing: Pump air into pipework until gauge registers 38 mm.
• Required performance:
  - Allow a period for temperature stabilization, after which the pressure of 38 mm is to be maintained without loss for at least 3 minutes.

910  GUTTER TEST
• Preparation: Temporarily block all outlets.
• Testing: Fill gutters to overflow level and after 5 minutes closely inspect for leakage.
R11

Above ground foul drainage systems
R11 Above ground foul drainage systems

To be read with Preliminaries/ General conditions.

GENERAL

SYSTEM PERFORMANCE

210 DESIGN
• Design: Complete the design of the above ground foul drainage system.
• Standards: To BS EN 12056-1 and BS EN 12056-2, and in accordance with BS EN 12056-2 National Annexes NA-NG.
  - System type to BS EN 12056-2: System III.
• Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

PRODUCTS

375 AIR ADMITTANCE VALVES
• Standard: To BS EN 12380 or Agrément certified.
• Minimum air flow rate: To BS EN 12056-2.
• Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.

EXECUTION

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

605 PIPE ROUTES
• General: The shortest practical, with as few bends as possible.
  - Bends in wet portion of soil stacks: Not permitted.
  - Routes not shown on drawings: Submit proposals before commencing work.
610 FIXING PIPEWORK
- Pipework: Fix securely plumb and/or true to line. Fix discharge stack pipes at or close below socket collar or coupling.
- Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.
- Externally socketed pipes and fittings: Fix with sockets facing upstream.
- Additional supports: Provide as necessary to support junctions and changes in direction.
- 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.
- Wall and floor penetrations: Isolate pipework from structure, e.g. with pipe sleeves.
  - Masking plates: Fix at penetrations if visible in the finished work.
- Expansion joint sockets: Fix rigidly to the building.
- Fixings: Allow the pipe to slide.

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

680 ELECTRICAL CONTINUITY
- Joints in metal pipes with flexible couplings: Make with clips (or suitable standard pipe couplings) supplied for earth bonding by pipework manufacturer to ensure electrical continuity.

690 IDENTIFICATION OF INTERNAL GREY WATER DRAINAGE PIPEWORK
- Grey water: As defined in BS EN 12056-1, clause 3.1.
- Markings: To BS 1710:
  - Type: Black bands, with arrows to indicate direction of flow.
  - Wording: Black lettering 'GREY WATER' on a light grey background.
- Type: Integral lettering on pipe wall, self-adhesive bands or identification clips.
- Locations: At 500 mm centres, junctions and both sides of slabs, valves, appliances, bulkheads and wall penetrations.

695 DISCHARGE AND VENTILATING STACKS
- Terminations: Perforated cover or cage that does not restrict airflow.
  - Material: Plastics, as discharge stack.

700 INSTALLING AIR ADMITTANCE VALVES
- Position: Vertical, above flood level of highest appliance served and clear of insulation materials (other than the manufacturer's insulating cover).
- Connection to discharge stack: Allow removal for rodding, e.g. ring seal.
- Roof spaces and other unheated locations: Fit manufacturer's insulating cover.
COMPLETION

905 PIPEWORK AIRTIGHTNESS TEST
• Preparation:
  - Open ends of pipework: Temporarily seal using plugs.
  - Test apparatus: Connect a 'U' tube water gauge and air pump to pipework via a plug or
    through trap of an appliance.
• Testing: Pump air into pipework until gauge registers 38 mm.
• Required performance: Pressure of 38 mm is to be maintained without loss for at least
  three minutes.

915 PREHANDOVER CHECKS
• Temporary caps: Remove.
• Permanent blanking caps, access covers, rodding eyes, floor gratings and the like: Secure
  complete with fixings.

920 SUBMITTALS
• Manufacturer's instructions for grease traps: Handover at completion.
R12

Below ground drainage systems
R12 Below ground drainage systems

To be read with Preliminaries/ General conditions.

GENERAL

110 BELOW GROUND DRAINAGE SYSTEMS GENERALLY
• Surface water and rainwater drainage sources: One piece gullies and covers.
• Foul drainage sources: Connectors.
• Land drainage sources: None.
• Pressure relief drainage sources: Submit proposals.
• Pipes, bends and junctions: Clay - flexible joints.
  - Accessories: Connectors - saddle.
• Manholes, inspection chambers, traps, and separators: Manholes and inspection chambers - concrete.
  - Accessories: Manhole steps.
• Disposal: To sewers.
• Accessories - general: Access covers and frames - precast concrete seatings.

SYSTEM PERFORMANCE

211 DESIGN - BELOW GROUND DRAINAGE SYSTEMS
• Design: Complete the design of the below ground drainage system in accordance with BS EN 752-1, -2, -3 and -4, BS EN 1295-1 and BS EN 1610.
• Ground conditions: UNKNOWN.
• Performance criteria: Levels, including pipe inverts and ground water level.
• Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

PRODUCTS

311 CONNECTORS - RAINWATER PIPES TO CLAY DRAINAGE
• Material and standard: Plastics to BS 4660 and Kitemark certified.
• Type: DN 100 discharge stacks to DN 100 clay.
• Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
317 COMPOSITE GULLIES - BACK INLET
- Standards:
  - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
  - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
  - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
  - Polypropylene: To BS EN 1852-1.
- Material: Clay.
- Manufacturer: Contractor's choice.
- Traps:
  - Product reference: Contractor's choice.
- Raising pieces:
  - Product reference: Contractor's choice.
  - Heights: 150 mm.
- Hoppers:
  - Product reference: Contractor's choice.
- Covers:
  - Product reference: Contractor's choice.
  - Type: Bolted grating.
  - Material: Ductile cast iron.
  - Sizes: 360 x 310 mm.
  - Loading grades to BS EN 124: B125.
- Silt buckets: Galvanized steel.
  - Product reference: Contractor's choice.

329 PIPES, BENDS AND JUNCTIONS - SUPPLY
- Pipes and fittings: From same manufacturer for each pipeline.

336 PIPES, BENDS AND JUNCTIONS - CLAY - FLEXIBLE JOINTS GENERALLY
- Material and standard: Vitrified clay to BS EN 295-1, Kitemark certified.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Sizes: DN 100.
- Crushing strength (minimum): FN 40.
- Jointing type: Spigot and socket joints with sealing ring.

357 CONNECTORS - SADDLE
- Standards:
  - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
  - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
  - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
  - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
- Material: Clay.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
- Sizes: TO SUIT APPLICATION.

359 FLEXIBLE COUPLINGS
- Standard: To BS EN 295-4 or WIS 04-41-01 and Kitemark certified, or Agrément certified.
- Manufacturer: Contractor's choice.
  - Product reference: Contractor's choice.
371  RODDING POINTS  GENERALLY

- **Standards:**
  - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
  - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
  - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
  - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
- **Material:** Clay.
- **Manufacturer:** Contractor's choice.
- **Product reference:** Contractor's choice.
- **Sizes:** DN 100.

401  INSPECTION CHAMBERS - PLASTICS GENERALLY

- **Standard:** To BS 7158 or BS EN 13598-1, or Agrément certified.
- **Diameter:** 450 mm.
- **Manufacturer:** Contractor's choice.
- **Bases:**
  - Product reference: Contractor's choice.
- **Shaft units:**
  - Product reference: Contractor's choice.
- **Access covers and frames:**
  - Product reference: Submit proposals.
  - Loading grades to BS EN 124: B125.

407  MANHOLES AND INSPECTION CHAMBERS - CONCRETE GENERALLY

- **Standards:**
  - To BS 5911-3 and BS EN 1917 and Kitemark certified; or
  - To BS 5911-4 and BS EN 1917.
- **Manufacturer:** Contractor's choice.
- **Shape:** Circular.
- **Sizes:** DN 1500.
- **Cement type and content:** To BS 5911-3 and BS EN 1917 and Kitemark certified; or to BS 5911-4 and BS EN 1917.
- **Chamber sections:**
  - Product reference: Contractor's choice.
  - Jointing type: Proprietary sealant.
- **Cover slabs:**
  - Product reference: Contractor's choice.
  - Thickness: 250 mm.
  - Loading grades to BS EN 124: C250.
  - Openings: To suit access covers.
- **Steps:** Required in chambers over 900 mm deep.

433  MANHOLE CHANNELS AND BRANCHES - CONVENTIONAL

- **Material:** Clay.
- **Manufacturer:** Contractor's choice.
- **Product reference:** Contractor's choice.

435  MANHOLE CHANNELS AND BRANCHES - PREFORMED PLASTICS

- **Manufacturer:** Contractor's choice.
- **Product reference:** Contractor's choice.
MANHOLE STEPS GENERALLY
- Standard: To BS EN 13101.
- Type: C.
- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.
- Material: Galvanized steel.

SEALING FOR CONCRETE MANHOLES - SEALANT
- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.

ACCESS COVERS AND FRAMES - FOUL MANHOLES
- Standard: To BS EN 124.
- Types: Single seal screw down cover.
- Manufacturer: Contractor's choice.
- Product reference: Contractor's choice.
- Materials: Ductile cast iron.
- Finishes: Self finish.
- Sizes: 750 x 600 mm.
- Loading grades to BS EN 124: C250.
- Edging trims: Not required.
- Accessories: NONE.

CONCRETE (GENERAL)
- Standard: To BS 8500-2.
- Concrete: Designated, GEN1.

GRANULAR MATERIAL
- Standard: To BS EN 12620.
- Recycled content: Contractor's choice.
  - Size: Dependent on location - see Execution clauses in this section, and in sections R16, R17 and R18, if used.

GRANULAR SUB-BASE MATERIAL
- Standard: To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.
- Recycled content: Contractor's choice.

EXECUTION

STRIPPING OUT
- Extent of stripping out: Grub up existing drains as indicated on drawings.
- Exposed ends of existing drainage to be abandoned: Seal with concrete (general).

EXISTING DRAINS
- Setting out: Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
- Protection: Protect existing drains to be retained and maintain normal operation if in use.

EXCAVATED MATERIAL
- Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.
616 SELECTED FILL FOR BACKFILLING
- Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve.
  - Compaction: By hand in 100 mm layers.

623 LOWER PART OF TRENCH - GENERAL
- Trench up to 300 mm above crown of pipe: Vertical sides, width as small as practicable.
  - Width (minimum): External diameter of pipe plus 300 mm.

631 TYPE OF SUBSOIL
- General: Where type of subsoil at level of crown of pipe differs from that stated for the type of bedding, surround or support, give notice.

635 FORMATION FOR BEDDINGS
- Timing: Excavate to formation immediately before laying beddings or pipes.
- Mud, rock projections, boulders and hard spots: Remove. Replace with consolidated bedding material.
- Local soft spots: Harden by tamping in bedding material.
- Inspection of excavated formations: Give notice.

661 CLASS O SUPPORT TO ALL DRAINAGE CHANNELS EXTERNALLY
- Type of subsoil: NOT KNOWN.
- Granular material:
  - Pipe sizes DN 100 and DN 150: Size 4/10.
  - Pipe sizes DN 225 and DN 300: Size 4/10 or 10/20.
- Bedding:
  - Material: Granular, compacted over full width of trench.
  - Thickness (minimum): 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before placing support: Required.
- Support:
  - Material: Granular.
  - Depth: To slightly above crown of pipe.
  - Compaction: By hand.
- Backfilling:
  - Material and depth: Protective cushion of selected fill to 300 mm above crown of pipe; or
  - Additional granular material, to 100 mm above crown of pipe.
  - Compaction: By hand in 100 mm layers.
CLASS W SURROUND FOR DRAINAGE A MIN 300MM BELOW SLAB

- Type of subsoil: Clay, sandy clay - stiff.
- Timing: Excavate trench after hardcore has been laid and compacted.
- Granular material:
  - Pipe sizes DN 100 and DN 150: Size 4/10.
  - Pipe sizes DN 225 and DN 300: Size 4/10 or 10/20.
- Bedding:
  - Material: Granular, compacted over full width of trench.
  - Thickness (minimum): 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before placing surround: Required.
- Surround:
  - Material: Granular.
  - Depth: To 100 mm above crown of pipe.
  - Compaction: By hand.
- Backfilling:
  - Material: Hardcore as section D20, or granular.
  - Depth: Up to slab formation.
  - Compaction: In 300 mm (maximum) thick layers.

CLASS Y SURROUND FOR PIPES CAST INTEGRAL WITH SLAB

- Type of subsoil: Clay, sandy clay - firm.
- Timing: Excavate trench after hardcore has been laid and compacted.
- Blinding:
  - Material: Concrete (general).
  - Thickness (minimum): 25 mm.
  - Width: Full width of trench.
  - Allow to set before proceeding.
- Pipes:
  - Temporary support: Folding wedges of compressible board. Prevent flotation.
  - Clearance under pipes (minimum): 100 mm.
  - Adjust pipes to line and gradient.
- Initial testing before placing surround: Required.
- Surround, cast integrally with slab:
  - Material: Concrete of same mix as slab.
  - Width (minimum): External diameter of pipe plus 200 mm.
- Extent of surround: To within 150 mm of nearest flexible joint.
678 CLASS Z SURROUND FOR PIPES BENEATH BUILDING
- Type of subsoil: Clay, sandy clay - firm.
- Blinding:
  - Material: Concrete (general).
  - Thickness (minimum): 25 mm.
  - Width: Full width of trench.
  - Allow to set before proceeding.
- Pipes:
  - Temporary support: Folding wedges of compressible board. Prevent flotation.
  - Clearance under pipes (minimum): 100 mm.
  - Adjust pipes to line and gradient.
- Initial testing before placing surround: Required.
- Surround:
  - Material: Concrete (general).
  - Depth: To 150 mm above crown of pipe.
  - Width: Full width of trench.
- Vertical construction joints:
  - Location: At face of flexible pipe joints.
  - Material: 18 mm thick compressible board precut to profile of pipe.
  - Socketed pipes: Fill gaps between spigots and sockets with resilient material to prevent entry of concrete.

680 CONCRETE SURROUND FOR PIPE RUNS NEAR FOUNDATIONS
- Class Z surround: Provide in locations where bottom of trench is lower than bottom of foundation and as follows (horizontal clear distance between nearest edges of foundations and pipe trenches):
  - Trenches less than 1 m from foundations: Top of concrete surround not lower than bottom of foundation.
  - Trenches more than 1 m from foundations: Top of concrete surround not lower than D mm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150 mm.

683 LAYING PIPELINES
- Laying pipes: To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
- Ingress of debris: Seal exposed ends during construction.
- Timing: Minimize time between laying and testing.

685 JOINTING PIPELINES
- Connections: Durable, effective and free from leakage.
- Junctions, including to differing pipework systems: With adaptors intended for the purpose.
- Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
- Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
- Allowance for movement: Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
- Jointing material: Do not allow to project into bore of pipes and fittings.
689 PIPELINES PASSING THROUGH STRUCTURES
- Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers): Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.
  - Distance to rocker pipe from structure (maximum): 150 mm.
- Provision for movement for pipelines that need not be cast in or fixed to structures (e.g. walls to footings):
  - Rocker pipes as specified above; or
  - Openings in the structures to give 50 mm minimum clearance around the pipeline.
    Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

691 BENDS AT BASE OF SOIL STACKS
- Type: Nominal 90° rest bends.
  - Radius to centreline of pipe (minimum): 800 mm.
- Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 450 mm.
- Bedding: Do not impair flexibility of pipe couplings.
  - Material: Concrete (general).

693 DIRECT CONNECTION OF GROUND FLOOR WCS TO DRAINS
- Drop from crown of WC trap to invert of drain (maximum): 1.5 m.
- Horizontal distance from the drop to a ventilated drain (maximum): 6 m.

695 BACKDROP PIPES OUTSIDE MANHOLE WALLS
- Excavation beneath backdrop pipe: Backfill.
  - Material: Concrete (general).
- Pipe encasement:
  - Material: Concrete (general).
  - Thickness (minimum): 150 mm.

697 INSTALLING FLEXIBLE COUPLINGS
- Ends of pipes to be joined: Cut cleanly and square.
- Outer surfaces of pipes to be joined: Clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines and/or apply a cement grout over the sealing area.
- Clamping bands: Tighten carefully to make gastight and watertight seals.

705 INITIAL TESTING OF PIPELINES
- Before testing:
  - Cement mortar jointing: Leave 24 h.
  - Solvent welded pipelines: Leave 1 h.
- Method: Block open ends of pipelines to be tested and pressurise. Air test short lengths to BS EN 1610.

715 BACKFILLING TO PIPELINES
- Backfilling above top of surround or protective cushion: Material excavated from trench, compacted in layers 300 mm (maximum) thick.
- Heavy compactors: Do not use before there is 600 mm (total) of material over pipes.

720 BACKFILLING UNDER ROADS AND PAVINGS
- Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.
722 PUBLIC ROADS AND PAVINGS - E & W, SCOT
• Excavating and backfilling of trenches: To Department for Transport ‘Specification for the reinstatement of openings in highways’.

728 LAYING WARNING MARKER TAPES
• Installation: During backfilling, lay continuously over pipelines.
• Depth: 300-400 mm.
  - Pipelines deeper than 2 m: Lay an additional tape 600 mm above the top of the pipeline.

734 INSTALLING ACCESS POINTS AND GULLIES
• Bedding:
  - Material: Concrete (general).
  - Thickness (minimum): 150 mm.
• Surround:
  - Material: Concrete (general).
  - Thickness (minimum): 150 mm.
  - Height: Full height.
• Backfilling: ..
  - Material: Granular material, size 4/10, to 100 mm above crown of pipes, then selected fill.
  - Compaction: By hand in 100 mm layers.
• Setting out relative to adjacent construction features: Square and tightly jointed.
• Permissible deviation in level of external covers and gratings: +0 to -6 mm.
• Raising pieces (clay and concrete units): Joint with 1:3 cement:sand mortar.
• Exposed openings: Fit purpose made temporary caps. Protect from site traffic.

741 INSTALLING INSPECTION CHAMBERS - PLASTICS
• Bedding:
  - Material: Concrete (general).
  - Thickness (minimum): 150 mm.
• Surround:
  - Material: Concrete (general).
  - Thickness (minimum): 150 mm.
• Backfilling: Granular material, size 4/10, to 100 mm above crown of pipes, then selected fill.
  - Compaction: By hand in 100 mm layers.
• Concrete collar:
  - Material: Concrete (general).
  - Thickness (minimum): 200 mm.
  - Width (minimum): 300 mm.
• Seating: Not required.

743 INSTALLING CONCRETE MANHOLES
• Bases:
  - Material: Concrete (general).
  - Thickness (minimum): 225 mm.
• Surround:
  - Material: Concrete (general).
  - Thickness (minimum): 150 mm.
  - Height: Full height.
• Backfilling:
  - Material: Granular material, size 4/10, to 100 mm above crown of pipes, then selected fill.
  - Compaction: By hand in 100 mm layers.
753 FIXING MANHOLE STEPS
• Fixing: Bed in joints.
• Positioning: 300 mm vertical centres staggered 300 mm horizontally, with lowest step 300 mm (maximum) above benching and top step 450 mm (maximum) below top of cover.

755 JOINTING CONCRETE MANHOLE CHAMBER SECTIONS
• Jointing and sealing: Proprietary sealant.
• Inner joint surface: Trim surplus jointing material extruded into chamber and point neatly.

757 LAYING CONVENTIONAL CHANNELS, BRANCHES AND BENCHING
• Main channel: Bed solid in 1:3 cement:sand mortar.
  - Branches: Connect to channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow.
  - Branches greater than nominal size 150 mm: Connect the branch soffit level with the main drain soffit.
  - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
• Benching:
  - Material: Concrete (general).
  - Profile: Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.
  - Topping:
    - Material: 1:3 Cement:sand mortar.
    - Application: Before benching concrete has set, and with dense smooth uniform finish.

759 LAYING PREFORMED PLASTICS CHANNELS, BRANCHES AND BENCHING
• Main channel: Bed solid in 1:3 cement:sand mortar.
  - Branches: Connect to channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow.
  - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
• Bedding: 1:3 cement:sand mortar. Use clips or ensure adequate mechanical key.
• Benching:
  - Material: Concrete (general).
  - Profile: Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.
  - Topping:
    - Material: 1:3 Cement:sand mortar.
    - Application: Before benching concrete has set, and with dense smooth uniform finish.

773 INSTALLING ACCESS COVERS AND FRAMES
• Seating: Precast concrete.
• Bedding and haunching of frames: Continuously.
  - Material: 1:3 cement:sand mortar.
  - Top of haunching: 30 mm below surrounding surfaces.
• Horizontal positioning of frames:
  - Centred over openings.
  - Square with joints in surrounding paving.
• Vertical positioning of frames:
  - Level; or
  - Marry in with levels of surrounding paving.
• Permissible deviation in level of external covers and frames: +0 to -6 mm.
776 EXPOSED OPENINGS IN INSPECTION CHAMBERS, ACCESS POINTS, FITTINGS AND
EQUIPMENT
• General: Fit purpose made temporary caps. Protect from site traffic.

COMPLETION

901 REMOVAL OF DEBRIS AND CLEANING
• Preparation: Lift covers to manholes, inspection chambers and access points. Remove
mortar droppings, debris and loose wrappings.
  - Timing: Before cleaning, final testing, CCTV inspection if specified, and immediately
before handover.
• Cleaning: Thoroughly flush pipelines with water to remove silt and check for blockages.
  Rod pipelines between access points if there is any indication that they may be obstructed.
• Washings and detritus: Do not discharge into sewers or watercourses.
• Covers: Securely replace after cleaning and testing.

903 TEMPORARY MEASURES
• Water used to stabilize tanks and the like during installation: Drain.

911 TESTING AND INSPECTION
• Dates for testing and inspection: Give notice.
  - Period of notice: 1 WEEK.

921 FINAL TESTING OF PRIVATE GRAVITY DRAINS AND SEWERS UP TO DN 300
• Before testing:
  - Cement mortar jointing: Leave 24 h.
  - Solvent welded pipelines: Leave 1 h.
• Standard: To Building Regulations.
• Method: Air.

941 WATER TESTING OF MANHOLES AND INSPECTION CHAMBERS
• Timing: Before backfilling.
• Standard:
  - Exfiltration: To BS EN 1610.
    Method: Testing with water (method W).
  - Infiltration: No identifiable flow of water penetrating the chamber.
Z

Building fabric reference specification
Z10
Purpose made joinery
Z10 Purpose made joinery

To be read with Preliminaries/ General conditions.

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

120 CROSS SECTION DIMENSIONS OF TIMBER
• General: Dimensions on drawings are finished sizes.
• Maximum permitted deviations from finished sizes:
  - Softwood sections: To BS EN 1313-1:-
    Clause 6 for sawn sections.
    Clause NA.2 for further processed sections.
  - Hardwood sections: To BS EN 1313-2:-
    Clause 6 for sawn sections.
    Clause NA.3 for further processed sections.

130 PRESERVATIVE TREATED WOOD
• Cutting and machining: Completed as far as possible before treatment.
• Extensively processed timber: Retreat timber sawn lengthways, thicknessed, planed, ploughed, etc.
• Surfaces exposed by minor cutting and/ or drilling: Treat with two flood coats of a solution recommended by main treatment solution manufacturer.

140 MOISTURE CONTENT
• Wood and wood based products: Maintained within range specified for the component during manufacture and storage.

250 FINISHING
• Surfaces: Smooth, even and suitable to receive finishes.
  - Arrises: Eased unless shown otherwise on drawings.
• End grain in external components: Sealed with primer or sealer as section M60 and allowed to dry before assembly.
Z11
Purpose made metalwork
Z11 Purpose made metalwork

To be read with Preliminaries/ General conditions.

310 METAL PRODUCTS
- Standards: Generally, as specified in the following clauses.
- Fasteners: Generally, same metal as component, with matching coating and finish.

510 PREPARATION FOR APPLICATION OF COATINGS
- General: Complete fabrication, and drill fixing holes before applying coatings.
- Paint, grease, flux, rust, burrs and sharp arrises: Remove.

515 FABRICATION GENERALLY
- Contact between dissimilar metals in components: Avoid.
- Finished components: Rigid and free from distortion, cracks, burrs and sharp arrises.
  - Moving parts: Free moving without binding.
- Corner junctions of identical sections: Mitre.
- Prefinished metals: Do not damage or alter appearance of finish.

520 COLD FORMED WORK
- Profiles: Accurate, with straight arrises.

535 WELDING AND BRAZING GENERALLY
- Surfaces to be joined: Clean thoroughly.
- Tack welds: Use only for temporary attachment.
- Joints: Fully bond parent and filler metal throughout with no inclusions, holes, porosity or cracks.
- Surfaces of materials that will be self-finished and visible in completed work: Protect from weld spatter.
- Flux residue, slag and weld spatter: Remove.

540 WELDING OF STEEL
- Method: Metal arc welding to BS EN 1011-1 and -2.

545 WELDING OF STAINLESS STEEL
- Method: TIG welding to BS EN 1011-3.
- Butt welds: Double bevel.

565 FINISHING WELDED AND BRAZED JOINTS VISIBLE IN COMPLETE WORK
- Butt joints: Smooth, and flush with adjacent surfaces.
- Fillet joints: Neat.
- Grinding: Grind smooth where indicated on drawings.

585 GALVANIZING
- Standard: To BS EN ISO 1461.
- Vent and drain holes:
  - Location: Submit proposals.
  - Sealing after galvanizing: Required. Submit proposals.
Z20
Fixings and adhesives
Z20 Fixings and adhesives

To be read with Preliminaries/ General conditions.

PRODUCTS

310 FASTENERS GENERALLY
  • Materials: To have:
    - Bimetallic corrosion resistance appropriate to items being fixed.
    - Atmospheric corrosion resistance appropriate to fixing location.
  • Appearance: Submit samples on request.

320 PACKINGS
  • Materials: Noncompressible, corrosion proof.
  • Area of packings: Sufficient to transfer loads.

340 MASONRY FIXINGS
  • Light duty: Plugs and screws.
  • Heavy duty: Expansion anchors or chemical anchors.

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

390 ADHESIVES GENERALLY
  • Standards:
    - Hot-setting phenolic and aminoplastic: To BS 1203.
    - Thermosetting wood adhesives: To BS EN 12765.
    - Polyvinyl acetate thermoplastic adhesive: To BS 4071.

410 POWDER ACTUATED FIXING SYSTEMS
  • Types of fastener, accessories and consumables: As recommended by tool manufacturer.

EXECUTION

610 FIXING GENERALLY
  • 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.
  • Components, substrates, fixings and fasteners of dissimilar metals: Isolate with washers/ sleeves to avoid bimetallic corrosion.
  • Appearance: Fixings to be in straight lines at regular centres.

620 FIXING THROUGH FINISHES
  • Penetration of fasteners and plugs into substrate: To achieve a secure fixing.

630 FIXING PACKINGS
  • Function: To take up tolerances and prevent distortion of materials and components.
  • Limits: Do not use packings beyond thicknesses recommended by fixings and fasteners manufacturer.
  • Locations: Not within zones to be filled with sealant.
640  FIXING CRAMPS
  • Cramp positions: Maximum 150 mm from each end of frame sections and at 600 mm maximum centres.
  • Fasteners: Fix cramps to frames with screws of same material as cramps.
  • Fixings in masonry work: Fully bed in mortar.

670  PELLETED COUNTERSUNK SCREW FIXING
  • Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
  • Pellets: Cut from matching timber, match grain and glue in to full depth of hole.
  • Finished level of pellets: Flush with surface.

680  PLUGGED COUNTERSUNK SCREW FIXING
  • Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
  • Plugs: Glue in to full depth of hole.
  • Finished level of plugs: Projecting above surface.

690  USING POWDER ACTUATED FIXING SYSTEMS
  • Powder actuated fixing tools: To BS 4078-2 and Kitemark certified.
  • Operatives: Trained and certified as competent by tool manufacturer.

700  APPLYING ADHESIVES
  • Surfaces: Clean. Adjust regularity and texture to suit bonding and gap filling characteristics of adhesive.
  • Support and clamping during setting: Provide as necessary. Do not mark surfaces of or distort components being fixed.
  • Finished adhesive joints: Fully bonded. Free of surplus adhesive.
Z21
Mortars
Z21 Mortars

To be read with Preliminaries/ General conditions.

CEMENT GAUGED MORTARS

110 CEMENT GAUGED MORTAR MIXES
• Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

120 SAND FOR SITE MADE CEMENT GAUGED MASONRY MORTARS
• Standard: To BS EN 13139.
• Grading: 0/2 (FP or MP).
  - Fines content where the proportion of sand in a mortar mix is specified as a range (e.g. 1:1: 5-6):
    Lower proportion of sand: Use category 3 fines.
    Higher proportion of sand: Use category 2 fines.
• Sand for facework mortar: Maintain consistent colour and texture. Obtain from one source.

131 READY-MIXED LIME:SAND FOR CEMENT GAUGED MASONRY MORTARS
• Standard: To BS EN 998-2.
• Lime: Nonhydraulic to BS EN 459-1.
  - Type: CL 90S.
• Pigments for coloured mortars: To BS EN 12878.

135 SITE MADE LIME:SAND FOR CEMENT GAUGED MASONRY MORTARS
• Permitted use: Where a special colour is not required and in lieu of factory made ready-mixed material.
• Lime: Nonhydraulic to BS EN 459-1.
  - Type: CL 90S.
• Mixing: Thoroughly mix lime with sand, in the dry state. Add water and mix again. Allow to stand, without drying out, for at least 16 hours before using.

160 CEMENTS FOR MORTARS
• Cement: To BS EN 197-1 and CE marked.
  - Types: Portland cement, CEM I.
  - Portland limestone cement, CEM II/A-L or CEM II/A-LL.
  - Portland slag cement, CEM II/B-S.
  - Portland fly ash cement, CEM II/B-V.
  - Strength class: 32.5, 42.5 or 52.5.
• White cement: To BS EN 197-1 and CE marked.
  - Type: Portland cement, CEM I.
  - Strength class: 52.5.
• Sulfate resisting Portland cement:
  - Types: To BS 4027 and Kitemarked.
  - To BS EN 197-1 fly ash cement, CEM II/B-V and CE marked.
  - Strength class: 32.5, 42.5 or 52.5.
• Masonry cement: To BS EN 413-1 and CE marked.
  - Class: MC 12.5.
ADMIXTURES FOR SITE MADE CEMENT GAUGED MORTARS
• Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents.
• Other admixtures: Submit proposals.
• Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.

RETARDED READY TO USE CEMENT GAUGED MASONRY MORTARS
• Standard: BS EN 998-2.
• Lime for cement:lime:sand mortars: Nonhydraulic to BS EN 459-1.
  - Type: CL 90S.
• Pigments for coloured mortars: To BS EN 12878.
• Time and temperature limitations: Use within limits prescribed by mortar manufacturer.
  - Retempering: Restore workability with water only within prescribed time limits.

MAKING CEMENT GAUGED MORTARS
• Batching: By volume. Use clean and accurate gauge boxes or buckets.
  - Mix proportions: Based on dry sand. Allow for bulking of damp sand.
• Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
  - Mortars containing air entraining admixtures: Mix mechanically. Do not overmix.
• Working time (maximum): Two hours at normal temperatures.
• Contamination: Prevent intermixing with other materials.

LIME:SAND MORTARS

LIME:SAND MORTAR MIXES
• Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

SAND FOR LIME:SAND MASONRY MORTARS
• Type: Sharp, well graded.
  - Quality, sampling and testing: To BS EN 13139.
  - Grading/ Source: As specified elsewhere in relevant mortar mix items.

READY PREPARED LIME PUTTY
• Type: Slaked directly from CL 90 quicklime to BS EN 459-1, using an excess of water.
  - Maturation: In pits/ containers that allow excess water to drain away.
  - Density of matured lime putty: 1.3-1.4 kg/litre.
• Maturation period before use (minimum): 30 days.

ADMIXTURES FOR HYDRAULIC LIME:SAND MORTARS
• Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents.
• Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.

MAKING LIME:SAND MORTARS GENERALLY
• Batching: By volume. Use clean and accurate gauge boxes or buckets.
• Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
• Contamination: Prevent intermixing with other materials, including cement.
370 SITE PREPARED NONHYDRAULIC LIME:SAND MORTARS
- Mixing: Mix materials thoroughly by compressing, beating and chopping. Do not add water.
- Equipment: Roller pan mixer or submit proposals.
- Maturation period before use (maximum): Seven days.

390 KNOCKING UP NONHYDRAULIC LIME:SAND MORTARS
- Knocking up before and during use: Achieve and maintain a workable consistency by compressing, beating and chopping. Do not add water.
- Equipment: Roller pan mixer or submit proposals.

400 MAKING HYDRAULIC LIME:SAND MORTARS
- Mixing hydrated hydraulic lime:sand: Follow the lime manufacturer’s recommendations for each stage of the mix.
- Water quantity: Only sufficient to produce a workable mix.
- Working time: Within limits recommended by the hydraulic lime manufacturer.
Z22
Sealants
Z22 Sealants

To be read with Preliminaries/General conditions.

PRODUCTS

310 JOINTS AROUND WINDOWS AND DOORS - ARBOKOL 1000
• Primer, backing strip, bond breaker: Types recommended by sealant manufacturer.

EXECUTION

610 SUITABILITY OF JOINTS
• Presealing checks:
  - Joint dimensions: Within limits specified for the sealant.
  - Substrate quality: Surfaces regular, undamaged and stable.
• Joints not fit to receive sealant: Submit proposals for rectification.

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

630 APPLYING SEALANTS
• Substrate: Dry (unless recommended otherwise) and unaffected by frost, ice or snow.
• Environmental conditions: Do not dry or raise temperature of joints by heating.
• Sealant application: Fill joints completely and neatly, ensuring firm adhesion to substrates.
• Sealant profiles:
  - Butt and lap joints: Slightly concave.
  - Fillet joints: Flat or slightly convex.
• Protection: Protect finished joints from contamination or damage until sealant has cured.
Z31
Powder coatings
Z31 Powder coatings

To be read with Preliminaries/ General conditions.

120 POWDER COATING MATERIALS
• Manufacturer: Obtain from one only of the following: Contractor's choice.
• Selected manufacturer: Submit details before commencement of powder coating including:
  - Name and contact details.
  - Details of accreditation schemes.
  - Technical data of product including current Agrément certificates.

210 WORKING PROCEDURES
• Comply with the following standards.
  - Aluminium components: To BS 6496 or BS EN 12206-1.
  - Steel components: To BS EN 13438.
  - Safety standards: To British Coatings Federation 'Code of safe practice - Application of thermosetting powder coatings by electrostatic spraying'.

220 POWDER COATING APPLICATORS
• Applicator requirements:
  - Approved by powder coating manufacturer.
  - Currently certified to BS EN ISO 9001.
  - Comply with quality procedures, guarantee conditions, standards and tests required by powder coating manufacturer.
  - Applicator to use only one plant.
• Selected applicator: Submit details before commencement of powder coating including:
  - Name and contact details.
  - Details of accreditation schemes.

225 GUARANTEES
• Powder coating manufacturer and applicator guarantees:
  - Submit sample copies before commencement of powder coating.
  - Submit signed project specific copies on completion of work.

310 PRETREATMENT OF ALUMINIUM COMPONENTS
• Condition of components to be pretreated:
  - Free from corrosion and damage.
  - All welding and jointing completed and finish off as specified.
  - Free from impurities including soil, grease, oil.
  - Suitable for and compatible with the pretreatment process.
• Conversion coating requirements:
  - Chromate system: To BS 6496 or BS EN 12206-1.
  - Chromate-free system: To BS EN 12206-1. Submit details before using.
• Rinsing requirements: Use demineralized water. Drain and dry.
320  PRETREATMENT OF STEEL COMPONENTS

- Condition of components to be pretreated:
  - Free from corrosion and damage.
  - All welding and jointing completed and finish off as specified.
  - Free from impurities including soil, grease, oil.
  - Suitable for and compatible with the pretreatment process.
- Conversion coating requirements: To BS EN 13438.
- Rinsing requirements: Use demineralized water. Drain and dry.

430  EXTENT OF POWDER COATINGS

- Application: To visible component surfaces, and concealed surfaces requiring protection. Coated surfaces will be deemed ‘significant surfaces’ for relevant BS 6496/ BS EN 13438 performance requirements.

435  APPLICATION OF POWDER COATINGS

- Surfaces to receive powder coatings: Free from dust or powder deposits.
- Powder colours: Obtain from one batch of one manufacturer.
- Commencement of powder coatings: To be continuous from pretreatment.
- Jig points: Not visible on coated components.
- Curing: Controlled to attain metal temperatures and hold periods recommended by powder coating manufacturer.
- Stripping and recoating of components: Only acceptable by prior agreement of powder coating manufacturer. Stripping, pretreatment and powder coating are to be in accordance with manufacturer’s requirements.
- Overcoating of components: Not acceptable.

440  PERFORMANCE AND APPEARANCE OF POWDER COATINGS

- For aluminium components:
  - Standard: To BS 6496 or BS EN 12206-1.
- For steel components:
  - Standard: To BS EN 13438.
- Visual inspection after powder coating: Significant surface viewing distances to be as specified in the relevant Standard, unless specified otherwise.
- Colour and gloss levels: To conform with approved samples.

450  ALUMINIUM ALLOY FABRICATIONS

- Units may be assembled:
  - Before powder coating.
  - From components powder coated after cutting to size.
  - Where approved, from components powder coated before cutting to size.
- Exposure of uncoated background metal: Not acceptable.
- Assembly sealants: Compatible with powder coatings. Obtain approval of colour if sealants are visible after fabrication.

460  STEEL FABRICATIONS

- Unit assembly: Wherever practical, before powder coating.
- Exposure of uncoated background metal: Not acceptable.
- Assembly sealants: Compatible with powder coatings. Obtain approval of colour if sealants are visible after fabrication.

470  FIXINGS

- Exposed metal fixings: Powder coat together with components, or coat with matching repair paint system applied in accordance with the powder coating manufacturer’s recommendations.
480  DAMAGED COMPONENTS - REPAIR/ REPLACEMENT
- Before delivery to site: Check all components for damage to powder coatings. Replace damaged components.
- Site damage: Submit proposals for repair or replacement.

510  PROTECTION
- Powder coated surfaces of components: Protect from damage during handling and installation, or by subsequent site operations.
- Protective coverings: Must be:
  - Resistant to weather conditions.
  - Partially removable to suit building in and access to fixing points.
- Protective tapes in contact with powder coatings: Must be:
  - Low tack, self adhesive and light in colour.
  - Applied and removed in accordance with tape and powder coating manufacturers' recommendations. Do not use solvents to remove residues as these are detrimental to the coating.
- Inspection of protection: Carry out monthly. Promptly repair any deterioration or deficiency.

535  DOCUMENTATION
- Submit the following information for each batch of powder coated components:
  - Supplier.
  - Trade name.
  - Colour.
  - Type of powder.
  - Method of application.
  - Batch and reference number.
  - Statutory requirements.
  - Test certificates.
  - Maintenance instructions.

540  COMPLETION
- Protection: Remove
- Cleaning and maintenance of powder coatings: Carry out in accordance with procedures detailed in powder coating manufacturer and applicator guarantees.