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ARAB ENGINEERING BUREAU

2 LATH AND PLASTER

2.1 GENERAL

2.1.1 Scope

- 1 This Part specifies requirements for lath and plaster finishes for buildings and related structures.
- 2 Related Parts and Sections are as follows:

This Section

Part 1 General

Part 3 Dry Lining (Wallboard)

Part 5 Tiles

Section 1 General

Section 15 Insulation of Buildings

Section 17 Metalwork

Section 18 Carpentry, Joinery and Ironmongery

2.1.2 References

- 1 The following standards are approved and/ or referred to in this Part:
 - ASTM C150/C150M ... Standard Specification for Portland Cement
 - ASTM C472 Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete
 - ASTM C514 Standard Specification for Nails for the Application of Gypsum Board
 - ASTM C842 Standard Specification for Application of Interior Gypsum Plaster
 - ASTM C897 Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters
 - ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster
 - ASTM C1063 Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
 - BS 405 Specification for uncoated expanded metal carbon steel sheets for general purposes
 - BS 476 Fire tests on building materials and structures
 - BS 882 Specification for aggregates from natural sources for concrete; (EN 12620 Aggregates for concrete; BSI PD 6682-1 Aggregates - Aggregates for concrete. Guidance on the use of BS EN 12620; EN 13139 Aggregates for mortar; EN 13242 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction; BSI PD 6682-6 Aggregates - Aggregates for unbound and hydraulically bound materials for use in civil engineering works and road construction. Guidance on the use of BS EN 13242; EN 13055 Lightweight aggregates; BSI PD 6682-4 Aggregates - Lightweight aggregates for concrete, mortar and grout. Guidance on the use of BS EN 13055-1)
 - BS 1191 Specification for gypsum building plasters.

- BS 1199Specifications for building sands from natural sources; (EN 13139
Aggregates for mortar)
- BS 1202Specification for nails
- BS 1369Specification for metal lathing (steel) for plastering; (EN 13658-1Metal
lath and beads. Definitions, requirements and test methods - Internal
plastering; EN 13658-2 Metal lath and beads. Definitions, requirements
and test methods - External rendering)
- BS 1449Steel plate, sheet and strip.
- BS 1494Specification for fixing accessories for building purposes
- BS 1706Method for specifying electroplated coatings of zinc and cadmium on
iron and steel; (ISO 2081 Metallic and other inorganic coatings —
Electroplated coatings of zinc with supplementary treatments on iron or
steel; ISO 2082 Metallic and other inorganic coatings — Electroplated
coatings of cadmium with supplementary treatments on iron or steel)
- BS 4551Mortar. Methods of test for mortar and screed. Chemical analysis and
physical testing.
- BS 5270-1Bonding agents for use with gypsum plasters and cement -
Specification for polyvinyl acetate (PVAC) emulsion bonding agents for
indoor use with gypsum building plasters
- BS 5492Code of practice for internal plastering; (BS 8481 Design, preparation
and application of internal gypsum, cement, cement and lime plastering
systems. Specification; EN 13914-2 Design, preparation and
application of external rendering and internal plastering - Internal
plastering; CEN/TR 15123 Design, preparation and application of
internal polymer plastering systems)
- BS 8000Workmanship on construction sites
- BS 8000-10Workmanship on building sites - Code of practice for plastering and
rendering
- BS 8481Design, preparation and application of internal gypsum, cement,
cement and lime plastering systems. Specification
- CEN/TR 15123Design, preparation and application of internal polymer plastering
systems
- EN 197-1Cement - Part 1: Composition, specifications and conformity criteria for
common cements
- EN 459-1Building lime - Part 1: Definitions, specifications and conformity criteria
- EN 998-1Specification for mortar for masonry. Rendering and plastering mortar
- EN 1008.Mixing water for concrete - Specification for sampling, testing and
assessing the suitability of water, including water recovered from
processes in the concrete industry, as mixing water for concrete
- EN 1745Masonry and masonry products - Methods for determining thermal
properties
- EN 10142Continuously hot-dip zinc coated low carbon steels strip and sheet for
cold forming - Technical delivery conditions; (EN 10346 Continuously
hot-dip coated steel flat products for cold forming - Technical delivery
conditions)

- EN 10143Continuously hot-dip coated steel sheet and strip - Tolerances on dimensions and shape
- EN 12878Pigments for the colouring of building materials based on cement and/or lime - Specifications and methods of test
- EN 13139Aggregates for mortar
- EN 13279-1Gypsum binders and gypsum plasters - Part 1: Definitions and requirements
- EN 13279-2Gypsum binders and gypsum plasters - Part 2: Test methods
- EN 13658-1Metal lath and beads - Definitions, requirements and test methods - Part 1: Internal plastering
- EN 13658-2Metal lath and beads - Definitions, requirements and test methods - Part 2: External rendering
- EN 13914-1Design, preparation and application of external rendering and internal plastering - Part 1: External rendering
- EN 13914-2Design, preparation and application of external rendering and internal plastering - Part 2: Internal plastering
- ISO 2081Metallic and other inorganic coatings — Electroplated coatings of zinc with supplementary treatments on iron or steel
- ISO 2082Metallic and other inorganic coatings — Electroplated coatings of cadmium with supplementary treatments on iron or steel
- ISO 11890-2Paints and varnishes — Determination of volatile organic compounds (VOC) and/or semi volatile organic compounds (SVOC) content — Part 2: Gas-chromatographic method

2.2 NON-LOAD BEARING WALL FRAMING SYSTEMS

2.2.1 General Description

- 1 Steel stud wall systems, shaft wall systems, ceiling or soffit suspended or furred framing, wall furring, fasteners, and accessories for the screw attachment of gypsum board, plaster bases or other building boards are to be as described herein.
- 2 The following requirements are applicable for wall framing members of 1 mm thick material or lighter with the exception of rolled steel channels of 1.5 mm thick material.

2.2.2 Terminology

- 1 Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead is to be the underside of the floor or roof construction supported by beams, trusses, or bar joists. In mezzanine spaces, the underside of the walk-on floor is the underside of structure overhead.
- 2 Thickness of steel is specified in millimeters and is the minimum bare (uncoated) steel thickness.

2.2.3 Submittals

- 1 In accordance with the relevant provisions of Section 1, General, the Contractor is to provide the manufacturer's literature and data on the following:
 - (a) studs, runners and accessories
 - (b) hanger inserts

- (c) channels (rolled steel)
 - (d) furring channels
 - (e) screws, clips and other fasteners.
- 2 In accordance with the relevant provisions of Section 1, General, the Contractor is to provide the shop drawings showing the following:
- (a) typical ceiling suspension system
 - (b) typical metal stud and furring construction system including details around openings and corner details
 - (c) typical shaft wall assembly
 - (d) typical fire rated assembly and column fireproofing showing details of construction as used in fire rating test.
- 3 In accordance with the relevant provisions of Section 1, General, the Contractor is to provide the literature test results indicating the fire rating test designation, for each framing system.

2.2.4 Protection

- 1 Steel studs, runners, rigid furring channels, "Z" shaped furring channels and resilient furring channels shall be galvanized in accordance with the relevant provisions of BS 1369.

2.2.5 Steel Studs and Runners

- 1 Not less than two cutouts shall be provided in the web of each stud, approximately 300 mm from each end, and intermediate cutouts on approximately 600 mm centres.
- 2 Doubled studs for openings and studs for supporting concrete backer-board shall be not less than 850 mm thick.
- 3 Studs 3.5 m or less in length shall be in one piece.

2.2.6 Fasteners, Clips, and Other Metal Accessories

- 1 Fasteners, clips, and other metal accessories for fire rated construction shall be of the type and size used in fire rating test.
- 2 Fasteners for steel studs thicker than 8 mm are to be steel drill screws of size and type recommended by the manufacturer of the material being fastened.
- 3 Clips used in lieu of tie wire are to have a holding power equivalent to that provided by the tie wire for the specific application.
- 4 Concrete ceiling hanger inserts (anchorage for hanger wire and hanger straps) shall be galvanized steel, designed to support twice the hanger loads imposed.

2.2.7 Execution of Work

- 1 Where fire rated construction is required for walls, partitions, columns, beams and floor-ceiling assemblies, the construction shall be the same as that used in any fire rating tests undertaken. Construction requirements for fire rated assemblies and materials shall conform to BS 476.
- 2 Installing studs shall be carried out as follows:
- (a) studs spaced at not more than 400 mm centres
 - (b) when studs are to be extended to underside of structure overhead, they shall be cut 6 mm to 9 mm less than floor to underside of structure overhead

- (c) where studs are shown to terminate above suspended ceilings, bracing shall be provided as indicated in the Project Documentation. Alternatively, the studs shall be extended to the underside of the structure overhead.
 - (d) studs shall be extended to the underside of the structure overhead for fire partitions, smoke partitions, shafts, and sound rated partitions or insulated exterior wall furring.
 - (e) at existing plaster ceilings, studs may terminate at the ceiling
 - (f) at openings:
 - (i) frame the jambs of openings in stud partitions with two steel studs placed back to back.
 - (ii) fasten back to back studs together with 9 mm long "S" type panhead screws at not less than 600 mm centres, staggered along webs
 - (iii) studs fastened flange to flange are to have splice plates on both sides. The splice plates shall be approximately 600 mm x 75 mm in size. They shall be screwed to each stud with two screws. The splice plates shall be located at 600 mm centres, between the runner tracks.
- 3 Fastening studs shall be carried out as follows:
- (a) studs located adjacent to partition intersections, corners and studs at jambs of openings to shall be fastened to the flange of runner tracks with either two screws through each end of each stud and the flange of runner; alternatively, by use of a metal lock fastener tool
 - (b) studs shall not be fastened to the top runner track when studs extend to underside of structure overhead
 - (c) at chase wall partitions, locate cross braces for the chase wall partitions to permit the installation of pipes, conduits, carriers and similar items; studs or runners used as cross bracing are to be not less than 60 mm wide.
 - (d) building seismic or expansion joints shall be formed with double studs, back to back, spaced 75 mm apart plus the width of the joint
 - (e) control joint shall be formed with double studs spaced 12.5 mm apart.

2.2.8 Installing Supports Required by Other Trades

- 1 Provide for the attachment and support of electrical outlets, plumbing, laboratory or heating fixtures, recessed type plumbing fixture accessories, access panel frames, wall bumpers, wood seats, toilet stall partitions, dressing booth partitions, urinal screens, chalkboards, tackboards, wall-hung casework, handrail brackets, recessed fire extinguisher cabinets and other items supported by stud construction.

2.3 NAILS, SCREWS AND WASHERS

2.3.1 General Requirements

- 1 Nails, screws and washers are to be galvanized or of stainless steel as indicated in the Project Documentation or directed by the Engineer. Pins for shot-firing to be of steel with a tight coating of cadmium or zinc complying with ISO 2081 or ISO 2082 or equivalent.
- 2 Clout nails shall be galvanized steel and shall comply with BS 1202, Part 1 or equivalent.
- 3 Staples shall be galvanized steel and shall comply with BS 1494, Part 1 or equivalent.

2.4 GYPSUM LATH AND PLASTER

2.4.1 General Requirements

- 1 Proprietary spray-on plaster systems may be substituted for plaster system specified herein if approved by Engineer upon submission of complete details of materials and methods of the spray-on system.

2.4.2 Terminology

- 1 Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead is to be the underside of the floor or roof construction supported by beams, trusses, and bar joists.
- 2 Self-furring Lath: Metal plastering bases having dimples or crimps designed to hold the plane of the back of the lath 6 mm to 9 mm away from the plane of the solid backing.
- 3 Solid Backing or Solid Bases: Concrete, masonry, sheathing, rigid insulation, and similar materials to which plaster is directly applied.
- 4 Wet Areas: Areas of a building where cyclic or continuous exposure to very humid or wet conditions occurs, or in which a dew point condition may occur in the plaster.

2.4.3 Submittals

- 1 In accordance with procedures of Section 1, General, the Contractor is to submit Shop drawings showing:
 - (a) Details of floating interior angle, unrestrained construction.
 - (b) Details of assembly and anchorage of lath and accessories.
 - (c) Locations and installation of expansion joints, including plans, details and attachments to other works.
- 2 In accordance with procedures of Section 1, General, the Contractor is to submit manufacturers' literature and data of the following:
 - (a) accessories for plaster, each type
 - (b) metal plaster bases, each type
 - (c) fasteners
 - (d) bonding compounds, including application instructions & method of statement
 - (e) Mixture components including mixing instructions.
- 3 In accordance with procedures of Section 1, General, the Contractor is to submit manufacturers certificates for details of gypsum plaster cement to be used in the Works.
- 4 In accordance with procedures of Section 1, General, the Contractor is to submit samples of each type of plaster accessory. The samples shall be of a size approved by the Engineer.

2.4.4 Project Conditions

- 1 Comply with ASTM C842 requirements or gypsum plaster manufacturer's written recommendations, whichever are more stringent.
- 2 Avoid conditions that result in gypsum plaster drying out too quickly.
 - (a) Distribute heat evenly; prevent concentrated or uneven heat on plaster.
 - (b) Maintain relative humidity levels for prevailing ambient temperature that produces normal drying conditions.

- (c) Ventilate building spaces in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

2.4.5 Plastering Bases (Lath)

- 1 Expanded Metal used for plastering shall be to BS 405.
- 2 Gypsum Lath used for plastering shall be to BS 1369.

2.4.6 Gypsum Plasters

- 1 Base Coat premix Gypsum Plaster Material
 - (a) Grain size: 0 to 1mm
 - (b) Setting time: around 2hours 30 minutes.
 - (c) Density of hardened product: 1.3
 - (d) Compressive strength: > 3 MPa at 28 days
 - (e) Composition: Gypsum, selected sand and fillers, additives.
 - (f) Coat Thickness: up to 15 mm in one coat.
 - (g) Consumption: 1.3kg/m²/1 mm thickness.
 - (h) Mixing ratio: 40 kg bag with 12 to14 liters of water.
 - (i) VOC and Formaldehyde: None (<10µg/l) according to ISO 11890-2 GC-MS.
- 2 Finish Coat Premix Gypsum Plaster Material.
 - (a) Grain size: 0 to 0.5mm.
 - (b) Setting time: around 2 hours 30 minutes.
 - (c) Dried density: 1.2
 - (d) Composition: Gypsum, selected fillers, additives.
 - (e) Coat Thickness: up to 3mm.
 - (f) Consumption: 1.3kg/m²/1mm thickness.
 - (g) Mixing ratio: 40 kg bag with 20 liters water.
- 3 Thermal conductivity according to EN 1745 or as required by the engineer.

2.4.7 Fasteners

- 1 Tie, wire, screws, clips, and other fasteners shall conform to BS 1706, BS 1202 and BS 1494 or equivalent..
- 2 Fasteners for securing metal plastering bases are to have heads, or be through washers large enough to engage two strands of the metal plastering base.
- 3 For fire rated construction, the type and size of fastener shall be as used in the fire rated tests.

2.4.8 Fixing Lath Bases

- 1 Fixing lath bases shall be carried out in accordance with BS 1369 unless otherwise indicated in the Project Documentation.
- 2 Metal plastering bases shall be used where the plaster is required on partitions, ceilings and furring. Where required, metal plastering bases shall also be used for setting ceramic tiles in adhesive on gypsum plaster and for lighting troughs, beams and other curved or irregular surfaces.
- 3 Gypsum plaster or gypsum board may be used for adhesive applied ceramic tile in areas not considered wet. Portland cement plaster is required for walls and ceilings above ceramic wall tile in showers and similar wet areas.

- 4 Where plaster is required on solid bases, metal plastering bases are not required, unless otherwise indicated in the Project Documentation.
- 5 Form true surfaces in plaster board, straight or in fair curves where shown, without sags or buckles and with long dimension of lath at right angles to direction of supports.
- 6 Shape lathing to within 19 mm of the finished profiles of irregular surfaces.
- 7 Lath for ceiling construction should terminate at a casing bead where butting into or penetrated by walls, columns, beams, and similar elements.
- 8 Gypsum lath may be used in lieu of metal lath for gypsum plaster only on straight flat surface of partitions and walls, and on furring, except for lathing in wet areas and as a base for marble finishes.
- 9 Installation of metal plastering bases shall be undertaken in accordance with the following:
 - (a) where metal plastering bases are required over solid backing, self-furring, galvanized metal plastering base with vapour permeable backing shall be used
 - (b) self-furring metal lath shall be attached directly to masonry and concrete with hardened nails, power actuated drive pins or other approved fasteners; fasteners shall be located at the dimples or crimps only
 - (c) where metal plastering bases are required over steel columns, self-furring, diamond mesh, expanded metal lath shall be used
 - (d) with the exception of 9 mm rib lath used above ceramic tile wainscots where the finish above the wainscot is required to finish flush with the tile face, rib lath should not be used
 - (e) metal plastering bases should not be continuous through expansion and control joints, but shall terminate at each side of the joint.

2.4.9 Gypsum Plaster Application

- 1 Gypsum plaster application shall be undertaken in accordance with BS 8000, Part 10 or ASTM C842.
- 2 The thickness of plaster to shall be in accordance with BS 5492, BS 1191 and BS 8000 except as follows:
 - (a) where greater thickness is indicated in the Project Documentation
 - (b) where thickness is required to match existing
 - (c) where greater thickness is required for fire rated construction
 - (d) finish coats shall be applied at a uniform thickness of approximately 1.5 mm with not more than 3 mm thickness at any point.
- 3 A 1.5 mm deep V-joint shall be cut in the finish coat of plaster adjacent to metal doorframes and wherever plaster finishes flush with other materials, except where casing beads are required. The 1.5 mm deep V- joint shall be omitted on walls and partitions where the plaster is recessed back from face of doorframes and other such similar conditions.
- 4 Plaster is to have a smooth-trowel finish unless indicated otherwise in the Project Documentation.
- 5 Cleaning and patching upon application of gypsum plastering shall be as follows:
 - (a) remove plaster droppings from property, materials and all other surfaces of others before it sets

- (b) cut off beads, screeds and metal trim, and leave plaster and accessory surfaces ready for specified finishing
 - (c) cut-out and patch defective plaster and cracks, prior to decorating to match adjacent surfaces in texture and finish and with no visible joint lines.
- 6 Concealed plaster application behind built-in cabinets, similar furnishings, and equipment, apply finish coat, where concealed above suspended ceilings and in similar locations, finish coat may be omitted.
- 7 Plaster application will be used as a base for adhesive application of tile and similar finishes, finish coat may be omitted.

2.5 METAL LATH

2.5.1 General

- 1 Expanded mesh lath is to be manufactured from galvanized steel as per EN 10346:2009, minimum zinc coating of 225 g/m². It shall have a minimum aperture of 5 mm measured the short way of the mesh, minimum thickness of base metal is to be 0.3 mm as per EN 13658-1 for internal plastering.
- 2 Welded wire lath or mesh can be used with a minimum weight of 1.22 kg/m² where used as reinforcement over different backgrounds, and with a minimum weight of 1.90 kg/m² where used as a background for plastering or rendering as per EN 13658-2:2005
- 3 Where shown on the drawings for external rendering or as directed by Engineer, stainless steel expanded metal lath can be used in the works. Minimum thickness shall be 0.3 mm as per EN 13658-2 for external rendering.
- 4 Wire ties are to be galvanized with a minimum diameter of 1.20 mm.

2.5.2 Fixing Plain Expanded Metal Lath Backgrounds

- 1 Hangers, runners and bearers are to be spaced at intervals recommended by the manufacturer of the lath.
- 2 The lath is to be fixed with the long way of the mesh at right angles to the supports and with all strands sloping in the same direction. In vertical work the strands are to slope inwards and downwards from the face of the coating.
- 3 The side edges of the lath are to be lapped not less than 25 mm and secured with wire ties at not more than 150 mm centres.
- 4 The ends of the lath are to be lapped not less than 50 mm at supports and 75 mm between supports and secured with wire ties at not less than 150 mm centres.
- 5 The lath is to be fixed to timber supports with 40 mm clout nails or staples at not more than 100 mm centres along each support, driven at an angle to tighten the mesh. Hardwood or galvanised metal distance pieces are to be placed between the timber supports and the lath to permit the render to be forced through the openings completely encasing the lath.
- 6 The lath is to be fixed to metal supports with wire ties at not more than 100 mm centres along each support.
- 7 The ends of wire ties are to be twisted tightly together, the surplus cut off and bent away from the face of the coating.
- 8 The lath is to be fixed tightly from the centre outwards in such a manner that the lath and support system create a rigid background to receive the render or other coating.

- 9 After fixing, staples, nail heads, all cut edges and breaks in the coating to the lathing is to be treated with one coat of black bitumen.

2.5.3 Fixing Ribbed Lathing Backgrounds

- 1 Hangers, runners and bearers are to be spaced at intervals recommended by the manufacturer of the lath.
- 2 The lath is to be fixed with all strands sloping in the same direction and with the ribs towards and at right angles to the supports. In vertical work the strands should slope inwards and downwards from the face of the coating.
- 3 The side ribs of adjacent sheets are to be lapped, pressed well together and secured with wire ties at not more than 150 mm centres.
- 4 The ends of the lath are to be lapped at supports wherever possible. The lap should not be less than 50 mm and are to be secured with a wire tie at each rib. Between supports the lap must not be less than 100mm and are to be secured with two wire ties at each rib.
- 5 The lath is to be fixed to timber supports with one 40 mm clout nail driven through each rib at a slight angle.
- 6 The lath is to be fixed to metal supports with two wire ties at each intersection of rib and support.
- 7 The ends of wire ties are to be twisted tightly together, the surplus cut off and bent away from the face of the coating.
- 8 The lath is to be fixed tightly from the centre outwards in such a manner that the lath and support system create a rigid background to receive the render or other coating.
- 9 After fixing, staples, nail heads, all cut edges and breaks in the coating to the lathing are to be treated with one coat of black bitumen solution.

2.5.4 Expanded Metal Lath at Junctions of Differing Backgrounds

- 1 Where a rendering or plaster is to be continuous across backgrounds of different types, a strip of metal lath with a minimum width of 300 mm and an isolating membrane of polythene sheet or building paper behind, is to be fixed across the junction. Where small widths of one material less than 300 mm wide are, the width is to be bridged completely and for a distance of 150 mm on both sides.
- 2 The metal lath should be stretched taut and fixed along each edge at 100 mm centres using washers and shot fired pins, nails or screws. The screws shall be fixed into plugs in pre-drilled holes.
- 3 All cut edges of the metal lath and the fastenings are to receive a coating of bitumen solution.
- 4 Zinc coatings only partially surrounded by cement plaster or rendering are particularly liable to corrosion and care should be taken to ensure that the metal lath is completely embedded.
- 5 Metal lath should not be provided where the drawings show a groove in the rendering or plaster.

2.6 SKIM COAT PLASTER BASE AND PLASTER

2.6.1 General

- 1 The location and type of skim coats and plaster bases shall be defined in a finishing schedule included in the Project Documentation.

2.6.2 Terminology

- 1 Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead is the underside of the floor or roof construction supported by the trusses or bar joists.

2.6.3 Submittals

- 1 In accordance with procedures in Section 1, General, the Contractor is to furnish manufacturer's literature and data on the following:
 - (a) gypsum skim coat plaster
 - (b) gypsum base for skim coat plaster
 - (c) accessories
 - (d) joint reinforcing materials
 - (e) laminating adhesive.
- 2 In accordance with procedures in Section 1, General, the Contractor is to furnish shop drawings for typical skim coat plaster installation, showing corner details, casing details, control joint details and other similar details.

2.6.4 Skim Coat Base

- 1 Skim coat base when used shall be 15 mm thick unless otherwise approved by the Engineer.

2.6.5 Gypsum Skim Coat Plaster

- 1 The minimum compressive strength of finish coat plaster is to be 17.25 MPa.

2.6.6 Accessories

- 1 Corner bead, edge trim and control joints shall comply with the relevant provisions of EN 13658-1 unless otherwise indicated in the Project Documentation.
- 2 Corner bead and edge trim shall be a minimum of 4 mm thick, galvanized or stainless steel sheet or rigid PVC plastic as indicated in the project Documentation or directed by the Engineer.
- 3 Flanges of the bead or trim not less than 22 mm wide with punch-outs are to provide a plaster bond.
- 4 Joint reinforcing tape shall be as required or recommended by the skim coat plaster manufacturer.
- 5 Laminating adhesive shall be as recommended by skim coat base manufacturer.
- 6 Screws shall comply with the relevant provisions of BS 1706 and BS 1202 or equivalent.
- 7 Staples shall be flattened zinc-coated steel wire, with a minimum 15 mm leg for securing corner beads or casing and a minimum 10 mm leg for securing joint reinforcement to BS 1494.
- 8 Bonding compounds shall comply with the relevant provisions of BS 5270.

2.6.7 Installation Criteria

- 1 Where fire rated construction is required for walls, partitions, columns, beams and floor-ceiling assemblies, the construction is to be the same as that used in fire rating test.

2.6.8 Application of Skim Coat Base

- 1 Unless otherwise indicated in the Project Documentation, gypsum board shall be extended from the floor to the underside of structure overhead on partitions and furring as follows:

- (a) two sides of the wall for
 - (i) fire rated partitions
 - (ii) smoke partitions including cross corridor smoke partitions
 - (iii) sound rated partitions
 - (iv) full height partitions
 - (v) corridor partitions
 - (b) one side of the wall for
 - (i) the inside of exterior walls and furring
 - (ii) the room side of rooms without suspended ceilings
 - (iii) furring for pipe and duct shafts except where fire rated construction is shown.
- 2 All layers of gypsum board construction used for fireproofing of columns shall be extended from the floor to underside of structure overhead, unless otherwise indicated in the Project Documentation.
- 3 In locations other than those specified above, extend gypsum board as follows:
- (a) not less than 100 mm above suspended acoustical ceilings
 - (b) to ceiling of suspended gypsum board ceilings.
 - (c) to existing ceilings.
- 4 A skim coat base of maximum practical length shall be used.
- 5 Skim coat base shall be installed with the long dimension direction as follows:
- (a) on ceilings, at 90° to the framing to which it is applied.
 - (b) on partitions, horizontally or vertically, except when the partition is fire rated apply base as designed in the fire rating test.
- 6 In the vertical application of a skim coat base, panels of length required to reach the full height of vertical surfaces in one continuous piece shall be used.
- 7 The skim coat base shall be erected so that the leading edge of the base is first attached to the open end of the metal stud flange.
- 8 A space approximately 6 mm shall be left at the bottom of the skim coat base for caulking or sealant.
- 9 At edge and end joints:
- (a) locate edge joints over framing in fire rated partitions
 - (b) locate end joints over furring or framing in all cases
 - (c) stagger end joints of adjoining boards or multiple layer boards
- 10 At control joints:
- (a) are not required for wall length less than 10 m
 - (b) do not extend the skim coat base across control joints
 - (c) extend control joints the full width and height of the wall or length of soffit/ceiling skim coat plaster membrane.
- 11 For two-ply construction:
- (a) joints between layers to be staggered or off-set and falling over framing member
 - (b) use screws to hold skim coat base in place

- 12 Accessories and casings beads to be installed where required or shown.

2.6.9 Sealant Application

- 1 Sealants should be applied to the skim coat plaster base and to all cut outs, penetrations, and intersections with adjoining materials prior to application of skim coat plaster for acoustic partitions.
- 2 Refer to part 10 of this Section for application of sealants.

2.6.10 Skim Coat Plaster Application Over Gypsum Board Base

- 1 Skim coat plaster for one-component plasters shall be mixed and applied in accordance with BS 1191 unless otherwise indicated in the Project Documentation.
- 2 Joint reinforcement shall be as recommended by the skim coat plaster manufacturer for plaster systems applied over steel framing.
- 3 A smooth-trowel finish shall be applied to skim coat plaster over gypsum board base.
- 4 On fire rated, smoke barrier, sound barrier and other partitions, which are shown to extend to the underside of structure overhead or full height (floor to floor), the skim coat plaster finish may terminate 100 mm above the suspended ceiling.
- 5 All joints and fastener heads shall be sealed and reinforced above ceilings.

2.6.11 Repairs

- 1 After accessories and joint reinforcement have been installed and before application of skim coat plaster, all damaged and defective skim coat base work including non-plastered areas shall be repaired as follows to the satisfaction of the Engineer.
- (a) holes or openings 12.5 mm or less in diameter (or equivalent size) shall be patched with a setting type joint adhesive or patching plaster
 - (b) holes or openings over 12.5 mm diameter (or equivalent size) shall be repaired with a 16 mm thick skim coat base secured in such a manner as to provide solid tight construction of skim coat base
 - (c) any water damaged skim coat base shall be removed and replaced
 - (d) paper face that is loose or stripped shall be removed and replaced.
- 2 Damaged skim coat plaster:
- (a) at crumbly areas, remove loose material, brush, clean, apply bonding agent and refinish
 - (b) for blistering, cut and remove unbonded paper face, apply bonding compound if gypsum core is exposed and refinish
 - (c) repair, as recommended by manufacturer of skim coat plaster, other defects such as:
 - (i) joint ridging and beading
 - (ii) craze and map cracking
 - (iii) field cracking
 - (iv) spalling
 - (v) stain
 - (vi) soft, weak surfacing
 - (vii) dryouts.

2.7 BEADS AND STOPS

2.7.1 Materials

- 1 Beads and stops for internal plastering are to be manufactured from galvanized steel with minimum zinc coating of 225 g/m² and 0.40 mm minimum thickness in accordance with EN 13658-1, or from stainless steel with 0.30 mm minimum thickness in accordance with EN 13658-1, beads and stops to be profiled to suit the depth of plaster to be applied.
- 2 Stainless steel beads and stops shall be used for external rendering, minimum thickness is to be 0.30mm in accordance with EN 13658-2, beads and stops to be profiled to suit the depth of plaster or render to be applied.

2.7.2 Fixing Beads and Stops

- 1 Beads, stops and the like are to be fixed plumb, square and true-to-line with 40 mm galvanized clout nails or plaster dabs at not more than 600 mm centres to each mesh wing.
- 2 Cut edges are to be treated with one coat bituminous solution.

2.8 WELDED-FABRIC MESH FOR REINFORCED RENDERING

2.8.1 Materials

- 1 Reinforcement for rendering is to consist of galvanised welded-fabric mesh in accordance with EN 13658-2 having wires not less than 3.0 mm diameter spaced at distances 50 mm. Wires spacing can be greater than 50 mm but shall not be greater than 150 mm if approved by the Engineer or project drawings and in accordance with EN 13658-2.

2.9 PREPARATION OF SUBSTRATA

2.9.1 Preparation of Background to be Rendered

- 1 Surfaces to be rendered are to be thoroughly cleaned of all mould oil, dust and loose particles.
- 2 If dubbing out is required it should be done well in advance of the undercoat, using a mix at least as strong as the undercoat but not stronger than the background. If the thickness needed is greater than 16 mm, it is to be built-up in two coats; no coat is to exceed 13 mm thick.
- 3 Concrete surfaces are to receive one of the following treatments before the application of the undercoat:
 - (a) hacking by hand or mechanical means to remove all laitance and to roughen the whole of the surface to a depth of at least 3 mm to expose the aggregate.
 - (b) a spatterdash treatment of one part of cement and two parts of coarse sand, mixed with sufficient water to give a consistency of a thick slurry is to be dashed on to the dampened background with either a trowel or a scoop to give a thin coating with a roughcast uneven appearance. To prevent rapid loss of moisture the spatterdash is to be dampened periodically and then be permitted to dry out slowly and harden before the application of the rendering.
- 4 Blockwork surfaces are to have the joints raked out during construction. Where the joints have not been raked out or where in the opinion of the Engineer high strength concrete blocks with smooth surfaces will provide insufficient key, a spatterdash treatment is to be applied in accordance with Clause 2.9.1-3.
- 5 Junctions of differing backgrounds are to be treated in accordance with Clause 2.5.4. A strip of metal lath minimum 200 mm wide should also be provided over all electrical conduits and service pipework running within chases, fixed in accordance with Clause 2.5.4.

2.10 PREPARATION OF MIXES FOR RENDERING

2.10.1 Preparation Procedures and Selection of Materials

- 1 Unless specified elsewhere in the Project Documentation the mixes for rendering are to be selected from Table 2.1 and will vary in accordance with the types of background to which the render is to be applied. Backgrounds are subdivided as follows:
 - (a) dense, strong and smooth materials - which include high density concrete and concrete blocks providing low porosity, little suction and having smooth surfaces
 - (b) moderately strong and porous materials - which include medium density concrete and concrete blocks providing some suction and mechanical key
 - (c) moderately weak and porous materials - which include medium density concrete and concrete blocks providing some suction and mechanical key
 - (d) metal lathing

Table 2.1
Rendering Mixes

Background Material	Undercoats Cement : Lime : Sand	Final Coat Cement : Lime : Sand
Dense, strong, smooth	1 : ½ : 4½	1 : 1 : 6
Moderately strong, porous	1 : 1 : 6	1 : 2 : 9
Moderately weak, porous	1 : 2 : 9	1 : 2 : 9
Metal lathing (first coat)	1 : ¼ : 3	1 : 1 : 6
Metal lathing	1 : ½ : 4½	1 : 1 : 6

- 2 The selection of the mixes is to take account of the following:
 - (a) strong mixes rich in cement have a relatively high drying shrinkage and are liable to cracking and crazing
 - (b) the high drying shrinkage of strong mixes applied to weak backgrounds may cause shearing at the surface of the background
 - (c) the mix for each successive coat must never be richer in cement than the mix used for the coat to which it is applied
 - (d) two coats having the same mix proportions can only be applied successively if the second coat is appreciated thinner than the first. A 10 to 12 mm first coat should only receive a 5 to 6 mm final coat of the same mix.
- 3 The mixes for rendering below ground level are to be made with sulphate resisting cement.
- 4 Cement, lime and sand for each batch are to be accurately measured by volume using properly constructed gauge boxes or, wherever possible, whole bags of cement or hydrated lime. Lime shall comply with the relevant provisions of BS 890.
- 5 Mixing should preferably be by machine. Where, however, small quantities are required, mixing may be carried out on a board or platform which should be cleaned after each batch has been removed.
- 6 The hydrated lime is first to be thoroughly mixed with the sand. Cement shall then added and mixing continued until the material is uniform in appearance. Water should then be added while continuing mixing until the materials are workable and of a uniform colour and consistency.

- 7 To improve workability of the mix, the hydrated lime, sand and water may first be mixed in the required proportions and then allowed to stand undisturbed for at least 16 hours before mixing with the cement. If allowed to stand for a longer period it must be protected from drying out.
- 8 Proprietary plasticisers may not be used as a substitute for lime without the approval of the Engineer. Amongst other considerations, the Engineer will not give approval unless:
 - (a) the manufacturer, brand and chemical composition of the admixture is disclosed
 - (b) the Engineer is satisfied that correctly calibrated equipment is available to control the amounts used.
- 9 The whole of each batch is to be used within an hour of being mixed.

2.10.2 Application of the Various Render Coats

- 1 The work is not to be started until the background has been properly prepared in accordance with Clause 2.9 of this Part.
- 2 The render shall generally be applied in two coats except where the background is metal lathing where three coats shall be applied.
- 3 Before applying any coat the background or preceding coat is to be brushed down to remove any loose particles and is to be dampened sufficiently to ensure uniform absorption.
- 4 The undercoat is to be applied either by laying on with, or throwing from, a trowel or float. It should be as uniformly thick as possible, and not less than 8 mm or more than 13 mm thick in any part.
- 5 The undercoat is to be left rough and open from the edge of the trowel, and after it has been left long enough to set firm, it should be combed with evenly spaced wavy horizontal lines. The lines are to be approximately 20 mm apart and 5 mm deep (less in the case of a first coat on metal lathing). The surface should not be scratched, however, when it is to receive a Tyrolean finish.
- 6 The first undercoat applied to metal lathing is to be well worked into the lath to ensure that the material is completely embedded.
- 7 The finishing coat should not be less than 5 mm or more than 10 mm thick and is to be laid on with a trowel and finished with a wood float, care being taken not to over-work the surface.
- 8 All coats are to be applied with firm pressure to exclude air and to ensure a good bond.
- 9 All coats are to be prevented from drying out too quickly. Between the hot months of April and November the work should only be carried out in the shade. All external rendering is to be protected by properly constructed hessian or similar screens during this period.
- 10 Each coat is to be kept damp by means of a fog spray of water for a minimum of three days to allow the render to cure and then be allowed to dry out for at least a further three days before a subsequent coat is applied or, in the case of the finish coat, before the protective screens are removed.
- 11 The surface of the finish coat is to be smooth, true and free from waviness, irregularities or blemishes with straight, level or plumb angles. External angles are to be pencil rounded.
- 12 Care is to be taken when rendering up to plaster beads or stops to avoid excessive polishing at the arris and damage to the galvanizing, or stainless steel.

2.11 CEMENT PLASTER

2.11.1 Materials

- 1 Cement shall comply with the requirements of EN 197-1.
- 2 If premix Portland cement plasters are used they shall be polymer modified premixed cementitious base, complying with ASTM C150, ASTM C897 or equivalent, and application standard ASTM C926 or EN 13914 or equivalent.
- 3 Aggregate shall comply with the requirements of EN 13139 and the relevant provisions of section 5, concrete,
- 4 Mixing ratio: 50 kg bag with 10 to 12 liters of clean cool water (water part 4 sec. 5).
- 5 VOC and formaldehyde: None (<10µg/l) when tested according to ISO 11890- 2/GC-MS
- 6 Thermal conductivity according to EN 1745 or as required by the engineer.

2.11.2 Application of Cement Plaster.

- 1 Application shall comply with ASTM C926 or EN 13914
- 2 Do not deviate more than plus or minus (3.1 mm in 3 m) from a true plane in finished plaster surfaces, as measured by a (3-m) straightedge placed on surface.
- 3 Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least (152 mm) at each jamb anchor.
- 4 Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
- 5 Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- 6 Concealed plaster application behind built-in cabinets, similar furnishings, and equipment, apply finish coat, where concealed above suspended ceilings and in similar locations, finish coat may be omitted. Plaster application will be used as a base for adhesive application of tile and similar finishes, finish coat may be omitted.
- 7 Water shall comply with the requirements of part 4 of section 5
- 8

2.12 POLYMER PLASTERING

2.12.1 Materials and Application of Plaster

- 1 Materials and Application shall comply with the requirements of PD CEN/TR 15123

2.13 TABLE PIGMENTS FOR CEMENT

2.13.1 Materials

- 1 Any pigments used to colour cement or cement products shall meet the requirements of EN 12878 or relevant ASTM standards.

2.14 TEST FOR DRYNESS

2.14.1 Procedures

- 1 Moisture content is to be ascertained by use of a hygrometer or similar approved instrument. A substrate will be considered "dry" when all readings taken in the corners, along edges and at various points over the area being tested show 75 % relative humidity or less.

END OF PART

ARAB ENGINEERING BUREAU