

**F10
Brick/ block walling
Revision D****Section Revision History**

No.	Purpose	
-	Tender for Review	11th Sep 2014
A	Tender	20th Oct 2014
B	Tender	5th May 2015
C	For Construction	5th May 2015
D	For Construction	5th May 2016

Clauses amended in Revision D

No.	Clause	
111	CLAY FACING BRICKWORK	Revised
112	CLAY FACING BRICKWORK	Revised

F10 Brick/ block walling

To be read with Preliminaries/ General conditions.

SCOPE OF THE WORKS

20 NHBC REQUIREMENTS FOR EXTERNAL WALLS

- External wall generally:
 - The NHBC require that multiple elements of an external facade shall be construed as one homogeneous external wall.
 - Individual elements specified in different sections of the specification must be co-ordinated together and designed, built and tested as one element.
 - The Contractor must therefore liaise with the manufacturers of other elements of the external wall which, together, make up the total weathertight facade.
- The Contractor is entirely responsible for the detailed design, manufacturing, fixing, jointing, and installation of the facing brickwork shown on the drawings and specified in this work section, including all necessary or required accessories and ancillary work.
- The design and installation responsibility for junctions between the wall elements must be agreed between the relevant sub-contractors and the said responsibilities confirmed the Principal Contractor before work begins. Elements include:
 - Windows units described in section L10: Windows/rooflights/screens/louvres
 - External Doors described in section L20: Doors/shutters/hatches
 - Brickwork described in section F10 & F30: Brick/block work and accessories
 - Cladding panels described in section H11: Curtain Walling or H92: Rainscreen Cladding

TYPES OF WALLING

101 CAVITY WALLING TYPE

- Outer leaf: 102mm as F10:111 & F10:112.
- Cavity width: 150mm mm.
- Insulation: As clause F30:155.
- Inner Leaf: 100mm steel framing as G15:151.
- Other requirements: Refer to drawings 21-200 series, 600 series and 700 series.

111 CLAY FACING BRICKWORK EXTERNAL FACADE

- Bricks: To BS EN 771-1.
 - Manufacturer/Distributor: Wienerberger Ltd .
 - Product reference: Pagus Grey/Black.
- Compressive strength: 12 N/mm²
- Durability: F2
- Thermal Conductivity:
- Recycled content: Submit proposals .
- Special shapes: Cut units - Stretcher and soldier pistol bricks as shown on detail drawings 21-601 series 21-630 to 635 & 712 .
- Mortar: As section Z21.
 - Manufacturer: Cemex Ltd
 - Standard: To BS EN 998-2 .
 - Mix: Group 3 as clause F10:461. Below ground with sulfate resisting cement .
 - Additional requirements: Mortar colour: Natural
- Bond: Half lap stretcher .
- Joints: Bucket handle
- Other requirements:
 - Site sample panels as clause F10:740 for full review and planning agreement.
 - Recesses for rainwater pipes.
 - Return brick reveals
 - Alternate recessed bricks round selected window reveals.

112 CLAY FACING BRICKWORK COURTYARD FACADE

- Bricks: To BS EN 771-1.
 - Manufacturer/Distributor: Wienerberger Ltd .
 - Product reference: Forum Branco
- Compressive strength: 25 N/mm²
- Durability: F2
- Thermal Conductivity:
- Recycled content: Submit proposals .
- Special shapes: Cut units - Pistol bricks and cut/stuck corner bricks as shown on detail drawings 21-600 series 21-630 to 635 & 712 .
- Mortar: As section Z21.
 - Manufacturer: Cemex Ltd
 - Standard: To BS EN 998-2 .
 - Mix: Group 3 as clause F10:461. Below ground with sulfate resisting cement .
 - Additional requirements: Mortar colour: Natural
- Bond: Half lap stretcher .
- Staggered courses: Outer face of bricks staggered in each course, see drawings in the 21-600 series.
- Joints: Flush
- Other requirements:
 - Site sample panels as clause F10:740 for full review and planning agreement.

120 INSULATED BRICK CLADDING SYSTEM BALCONY SOFFITS

- Drawing reference: 21-634
- System Manufacturer: Gebrik by Isosystems AG
- UK Supplier: Aquarian Cladding Ltd
- Bricks:
 - Compliant with BS EN 771-1
 - Category: 1-HD
 - Size: 215mm x 65mm x 15-20mm thick
 - Bond: Half lap stretcher.
 - Colour & surface texture: To match facing brick described in clauses F10:111 & 112
 - Frost resistance: F2
 - Density: 1800 kg/m³
- Insulation:
 - Polyurethane hard foam.
 - Sustainability: CFC & HCFC free. Propellant: n-pentane
 - Thermal conductivity: 0.030 W/mK
 - Thickness: 40mm
 - Density: 35 kg/m³
 - Fire category: B-S1-D0
- Backing board:
 - Cementitious board on sub-frame as required by Brick manufacturer
- Fixings:
 - In accordance with manufacturers' instructions and BBA Certificated system.

123 CLAY FACING BRICKS BELOW DPC

- Bricks below DPC are required to have the following characteristics:
 - Compressive strength: Wienerberger's standard.
 - Water absorption: Minimum 7%
 - Freeze thaw resistance: F2
 - Active soluble salts: S2

316 CLAY COMMON BRICKWORK TO ELECTRICITY SUB-STATION

- Bricks: To BS EN 771-1.
 - Type: HD.
 - Size: 215 x 102 x 65 mm.
 - Mean compressive strength (minimum): 20 N/mm².
 - Durability designation: F0 S1.
 - Additional requirements: Reaction to fire class: A1.
- Bond: English bond, frogged bricks
- Joints: Neat struck. Flush finish internally.
- Mortar: As section Z21.
 - Standard: To BS EN 998-2.
 - Mix: Group 3 as clause F10:461 with sulfate resisting cement.
 - Additional requirements: Durability: Freeze/ thaw resistance: Frost resistant.

352 CONCRETE COMMON BLOCKWORK LOWER GROUND FLOOR PLANTROOMS & CYCLE STORES

- Blocks to BS EN 771 - 3:
 - Manufacturer and reference: Tarmac Building Products Ltd or equivalent.
 - Product reference: Hemelite Paint Quality.
 - Type: Lightweight aggregate.
 - Average compressive strength (minimum): 7.3N/mm².
 - Density: 1400 kg/m³.
 - Thermal conductivity (maximum) certified by UKAS accredited laboratory at 3% moisture content to BS EN 12664 0.46W/mK.
 - Work sizes (length x height x thickness): 100mm or 140mm wide x 440mm long x 215mm high.
 - Special shapes: Not required.
- Mortar: As Section Z21.
 - Standard: To BS EN 998-2.
 - Mix: Group 3 as clause F10:461.
 - Additional requirements: Wind posts as Structural Engineers' specification.
- Bond: Half lap stretcher.
- Applied finish: To receive paint as section M60 and finishes schedule

353 CONCRETE COMMON BLOCKWORK UPSTANDS & THRESHOLDS

- Blocks to BS EN 771 - 3:
 - Manufacturer and reference: Tarmac Building Products Ltd or equivalent.
 - Product reference: Hemelite Ultralite.
 - Type: Lightweight aggregate.
 - Average compressive strength (minimum): 3.6N/mm².
 - Density: 960 kg/m³.
 - Thermal conductivity (maximum) certified by UKAS accredited laboratory at 3% moisture content to BS EN 12664 0.33W/mK.
 - Work sizes (length x height x thickness): 100mm or 140mm wide x 440mm long x 215mm high.
 - Special shapes: Not required.
- Mortar: As Section Z21.
 - Standard: To BS EN 998-2.
 - Mix: Group 3 as clause F10:461.
- Bond: Half lap stretcher.
- Applied finish: To receive paint as section M60 and finishes schedule

TESTING**410 COMPRESSIVE STRENGTH OF MORTAR FOR EACH WALLING TYPE**

- Testing authority: A UKAS Accredited laboratory.
- Test method: BS 5628-1 Annex A and BS EN 1015-11.
- Preliminary tests procedure: As follows:
 - Specimens:
 - Number of specimens: 6.
 - Type: 40 x 40 x 100 mm prisms.
 - Preparation: At least six weeks before walling commences.
 - Specimen testing: Half of specimens at 7 days. Remainder at 28 days.
 - Retarded mixes: Extend curing periods to include retardation period.
 - Response to result: If mean compressive strength at 28 days is not within the range given below repeat tests with more suitable sand or next higher mortar class.
- Site tests procedure: As follows.
 - Number of specimens: Six per 150m² of walling or per storey whichever the more frequent.
 - Specimen types: As preliminary test, but prepared during construction.
 - Specimen testing: Half of specimens at 7 days. Remainder at 28 days.
 - Retarded mixes: Extend curing periods to include retardation period.
- Required test mean compressive strength at 28 days (N/mm²): To be within the following range:
 - Walling type: All specified.
 - Preliminary tests minimum (N/mm²): 4.
 - Preliminary tests maximum (N/mm²): 6.
 - Site tests minimum (N/mm²): 4.
 - Site tests maximum (N/mm²): 6.5.
- Results: Submit.

415 FRESH MORTAR CEMENT CONTENT

- Test method: BREMORTEST in accordance with Building Research Establishment Information Paper 8/89 .
- Test specimens: Test mortar for the following wall types: F10/ 110 .
- Results: Submit.

WORKMANSHIP GENERALLY**440 CONDITIONING OF CONCRETE BRICKS/ BLOCKS**

- Autoclaved concrete bricks/ blocks delivered warm from manufacturing process: Do not use.
- Age of nonautoclaved 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.

461 MORTAR GROUPS

- Where mortars are specified by constituents and proportions, the Contractor may, subject to the approval of the Architect, use alternative mortar mixes from the same Group as defined in BS 5628:Part 3, Table 15, or the same Class to BS EN 998-2.

500 LAYING GENERALLY

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

520 ACCURACY

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

535 HEIGHT OF LIFTS IN WALLING USING CEMENT GAUGED OR HYDRAULIC LIME MORTAR

- 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

- 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.

580 LAYING FROGGED BRICKS

- Single frogged bricks: Frog uppermost.
- Double frogged bricks: Larger frog uppermost.
- Frog cavity: Fill with mortar.

595 LINTELS

- Bearing: Ensure full length masonry units occur immediately under lintel ends.

635 JOINTING

- Profile: Consistent in appearance.

645 ACCESSIBLE JOINTS NOT EXPOSED TO VIEW

- Jointing: Struck flush as work proceeds.

665 POINTING TO BRICKWORK PANELS

- Joint preparation: Remove debris. Dampen surface.
- Mortar: As section Z21.
 - Standard: Not applicable.
 - Mix: 1:1:6 cement:lime:sand.
 - Additional requirements: White coloured mortar to match approved sample.
- Profile: Flush.

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 brick/ block walling finished fair.
 - Painted facework: The only requirement to be waived is that relating to colour.

720 SUSTAINABILITY CRITERIA

- All insulation, particularly wall, roof, floor, pipework and ductwork insulation, must be CFC, HFC and HCFC free, both in content and manufacture. All insulants should have an ODP of zero and GWP of less than 5. Where possible insulants are to have an A or A+ rating in BRE's The Green Guide to Specification. Insulation manufacturers to provide Chain of Custody, BES6001:2008 or EMS independent certification as required to comply with environmental rating system requirements.
- All material suppliers must have EMS (ISO14001) certification for process (bricks, metals, glass, plastics, pre-cast concrete etc.), extraction (stone, aggregates, sand etc) and supply chain, and are supplied with an environmental product declaration, written in accordance with ISO 14025 standards.
- All material suppliers to provide Chain of Custody, BES6001:2008 or EMS independent certification as appropriate to the product and in line with environmental rating system requirements.

730 BRICK/ CONCRETE BLOCK SAMPLES

- General: Before placing orders with suppliers submit for approval of appearance labelled samples of the following: Bricks .
- Selection of samples: Representative of the range in variation of appearance.

740 FINISHED MASONRY WORK REFERENCE PANELS

- General: Before proceeding to construct the following walling types, construct panels as specified. Give notice when panels are dry.
- Selection of masonry units: Reasonably representative of the average quality of the whole order to be delivered .
- Panel types:
 - Walling type: F10: 111, 112 .
 - Location: To be confirmed .
 - Size: 2.015 x 2.015 m .
 - Other requirements: Requirements for brick types, mortar and pointing as drawing SK-264 .

742 FACING BRICKWORK ACCURACY

- Notwithstanding any other specified requirements:
 - After approval of the appearance of the reference panel(s), survey the panel and measure a representative selection of the following dimensions:
 - Perpendicular joint widths.
 - Bed joint heights.
 - Vertical alignment of perpendicular joints.
 - Unless agreed otherwise, measure not less than 20% of the built joints for each of the three conditions specified.
- Submit survey results to Architect on a scaled drawing of the reference panel indicating the exact location of the dimensions measured.
- In addition, express results in the following format:
 - Perpendicular joints vary from 'x'mm to 'y'mm.
 - Bed joints vary from 'x'mm to 'y'mm.
 - Perpendicular joints are in alignment by +/- 'x'mm.
- After obtaining Architect's approval to the survey results, ensure that all completed facing brickwork is built to the same degree of accuracy as the reference panel(s).

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.

785 BRICKWORK BELOW DPC

- To be built using sulphate resisting cement.

790 PUTLOG SCAFFOLDING

- Use: Not permitted in facework.

831 CLEANLINESS

- Facework: Keep clean.
- Mortar on facework: Allow to dry before removing with stiff bristled brush.
- Removal of marks and stains: Rubbing not permitted.
- Clean cavities as work proceeds.