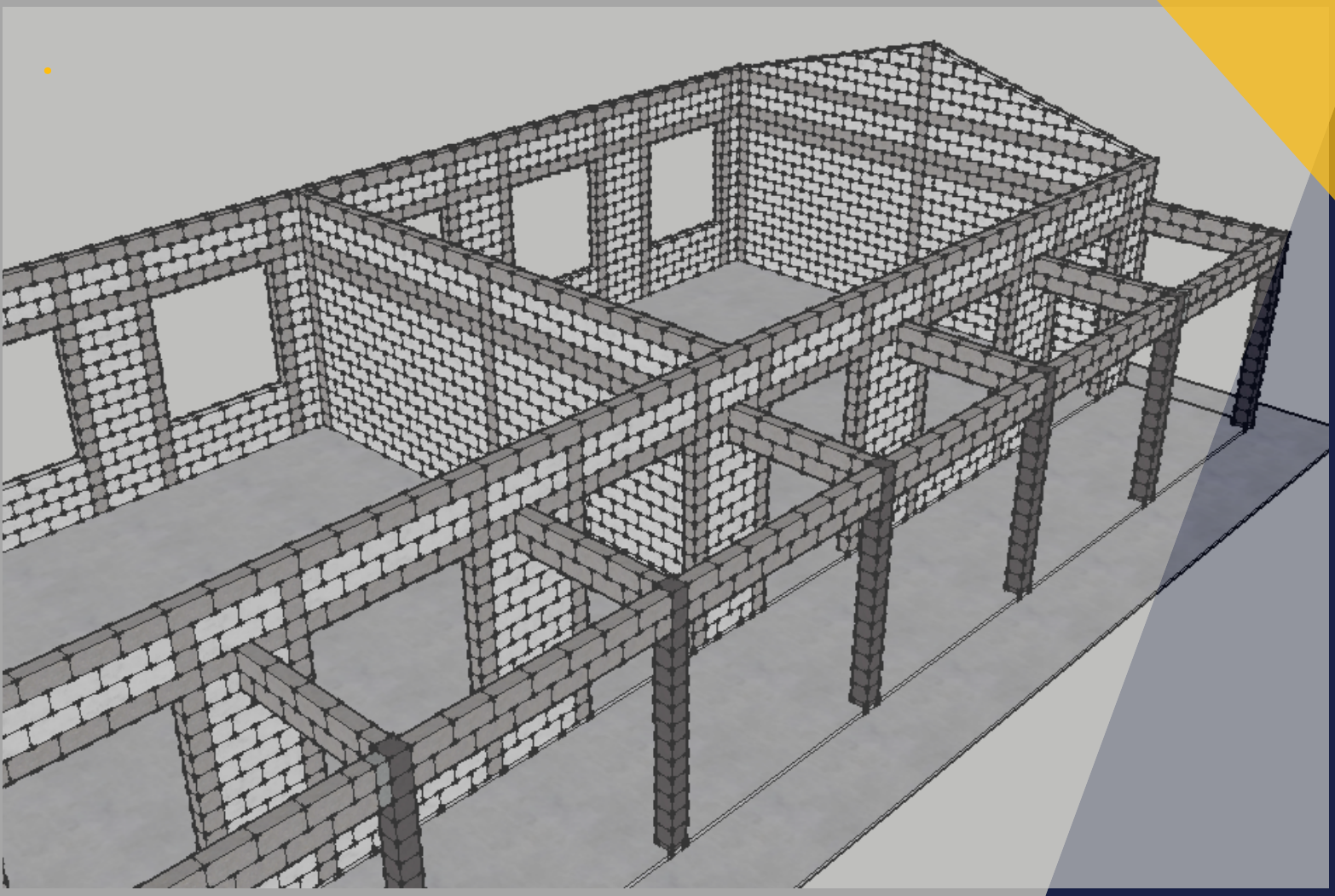
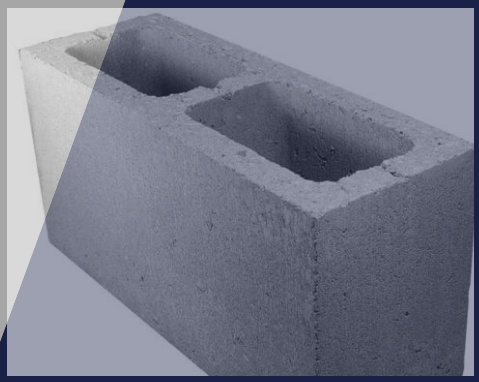
JKR 20601-0252-18

SPECIFICATION FOR LOAD BEARING BLOCKWORK SYSTEM





CAWANGAN KEJURUTERAAN AWAM & STRUKTUR

JABATAN KERJA RAYA MALAYSIA

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1.0 GENERAL

This section shall apply to the construction of all load bearing blockworks with or without steel reinforcement. All work shall be carried out in accordance with this specification. All lines, levels, grades, dimensions and cross-sections shall be as shown on the Drawings and/or directed by the S.O.

1.1 CODE OF PRACTICE

1.1.1 All blockwork is to be carried out in accordance with the latest amendments to BS EN 1996, MS 1933, MS 1934, MS 2282, MS 1064: Part 8 'Code of Practice for Use of Masonry' and other relevant standard.

1.2 DESIGN REQUIREMENTS

1.2.1 Design data

1.2.1.1 Unless specified otherwise, the value of loads selected for design shall reflect the expected imposed loads to be exerted on the floor area as well as the dead loads from all other building components including the respective precast and cast in-situ concrete components.

1.2.1.2 However, at no time shall these values be or less than the recommended values as stipulated in the following loading standards or any relevant standards;

a) Dead load

Dead load shall be specified as per requirement in MS EN 1991-1-1. However, it shall not be less than the requirements stipulated in the Malaysian Uniform Building By-Law (UBBL).

b) Imposed load

Imposed load shall be specified as per requirement in MS EN 1991-1-1. However, it shall be not less than the requirements stipulated in the Malaysian Uniform Building By-Law (UBBL).

c) Wind load

Wind load shall be specified as per MS 1553 or MS EN 1991-1-4 with a minimum basic wind speed of 35 m/s.

1.2.1.3 Loads associated with the installation of building services, such as the electrical lighting, air conditioning ducting, water tanks, fire fighting pipes, water supply pipes and others shall also be ascertained and incorporated in the analysis and design of the relevant supporting structures by the design engineer.

1.2.2 Design consideration

1.2.2.1 All structural design shall comply with architectural design requirements as stated in the architectural drawings.

1.2.2.2 The design of blockwork structures shall be discrete components and the continuity of the components shall be achieved through proper connection details.

1.2.2.3 The design of the structural element shall be in such a way enable the forming of all chases, holes and openings required for the installation of services.

1.2.3 IBS Score Requirement

1.2.3.1 All designs shall comply with the requirements of Industrialized Building System in accordance with the latest CIS 18: Manual For IBS Content Scoring System (IBS Score) by CIDB and the latest Pekeliling Perbendaharaan/ Perolehan Kerajaan.

2.0 MATERIALS

2.1 BLOCK UNITS

The block shall comply with the requirements of MS 2282 Part 3.

2.1.1 COMPRESSIVE STRENGTH

2.1.1.1 The characteristic compressive strength of the block, f_k shall be determined from results of tests on masonry specimens. The test method shall comply with the requirements to the latest MS 1933-1 and / or MS 1934-1.

2.1.1.2 For all block units intended to be used in elements subject to structural requirements, the mean compressive strength shall not be less than 7 N/mm^2. The manufacturer shall also declare the normalised compressive strength when relevant.

2.1.2 DENSITY

2.1.2.1 The net dry density of the units shall be declared in kilogram per cubic meters (kg/m^3) by the manufacturer in accordance with MS 1933: Part 13. The minimum dry density of unit shall not be less than 1500 kg/m^3.

2.1.3 FIRE RESISTANCE

2.1.3.1 Unless otherwise specified or shown on the Drawings, fire rated walls and partitions system shall be designed and constructed in accordance with the requirements of the Fire and Rescue Department and in compliance with the latest Uniform Building By-Law (UBBL). The contractor must submit fire resistance test report from an accredited laboratory and Sijil Pepasangan Keselamatan Kebakaran issued by Bomba for the S.O. approval.

2.1.4 INSULATION (ACOUSTICAL AND THERMAL)

2.1.4.1 Unless otherwise specified or shown on the Drawings, acoustic wall panel and/or systems shall be designed and constructed in accordance with the requirements of acoustic specialist and approved by the S.O.

2.1.4.2 Thermal insulation system shall comply with MS 1020. Samples of the insulation material shall be submitted to the S.O. for approval before they are used and subsequent delivery shall be up to the standard of samples approved.

2.1.4.3 Unless otherwise shown in the Drawings, glass wool insulation shall be 50 mm thick. It shall have a conductive value of maximum 0.035 W/m²K (tested at a mean temperature of 20°C based MS 1020. Glass wool insulation shall be fixed in accordance with the manufacturer's recommendation and to the approval of the S.O.

2.1.4.4 Where stone wool insulation is to be used, it shall be 50mm thick. It shall have a conductive value of maximum 0.035 W/m²K (tested at a mean temperature of 20°C based MS 1020). Stone wool insulation shall be fixed in accordance with

the manufacturer's recommendation and to the approval of the S.O.

2.1.4.5 The use of foam based insulation shall be prohibited due to a health hazard. Foam based insulation release toxic substances when heated and burned.

2.2 MORTAR

2.2.1 The use of mortars should be in accordance with the recommendations given in BS EN 1996. For site made mortars, the mixing of the mortar should be in accordance with BS EN 1996. For factory made, semi-finished factory made and pre-batched masonry mortars, MS 2506-2 applies.

Mortars should be designed or prescribed. For designed mortars, the compressive strength of the mortar provides the control of the hardened mortar quality. Prescribed mortar shall be as detailed in Table 2.

2.2.2 Factory made (pre-batched or pre-mixed) and semi-finished factory made masonry mortar shall be in accordance with MS 2506-2. Site made masonry mortar shall be in accordance with MS 2506-2 and BS EN 1996-2.

2.2.3 Mortar should be classified by their compressive strength, described by the letter M followed by the compressive strength (N/mm^2). Table 2 shows the relationship of compressive strength classes to strength.

2.2.4 Recommended minimum compressive strength for prescribed mortar shall be class M6. The proportion of materials by volume shall be referred to Table 2.

2.2.5 The compressive strength of masonry mortar shall be determined in accordance with BS EN 1015-11. The adhesion between the mortar and the masonry units shall be adequate for the intended use. The ingredients for mortar shall be measured in proper gauge boxes and shall be mixed on a clean boarded platform or in an approved mechanical batch mixer.

2.2.6 The characteristic compressive strength of masonry bonded with thin layer mortar shall be taken as the values given for mortar strength class M12 (mortar designation (i)) in Table 2. The contractor shall submit the manufacturer's specification and method statement to the S.O. for approval prior to the commencement of works.

Table 1 - Characteristic compressive strength of masonry, f_k, in N/mm^2

a)—Constructed with aggregate concrete blocks having a ratio of height to least horizontal dimension of 0.6							
Mortar strength Class/Designation	**Compressive strength of unit (N/mm^2)**[a]						
	5.2	**7.3**	**10.4**	**17.5**	**22.5**	**30**	**40 or greater**
M12/(i)	2.5	3.4	4.4	6.3	7.5	9.5	11.2
M6/(ii)	2.5	3.2	4.2	5.5	6.5	7.9	9.3
b)—Constructed with aggregate concrete blocks having not more than 25% of formed voids and a ratio of height to least horizontal dimension of between 2.0 and 4.5							
Mortar strength Class/Designation	**Compressive strength of unit (N/mm^2)**[a]						
	5.2	**7.3**	**10.4**	**17.5**	**22.5**	**30**	**40 or greater**
M12/(i)	5.0	6.8	8.8	12.5	15.0	18.7	22.1
M6/(ii)	5.0	6.4	8.4	11.1	13.0	15.9	18.7
[a] Measured in normal direction of test for units.							
c)—Constructed with aggregate concrete blocks having more than 25% but less than 60% of formed voids and a ratio of height to least horizontal dimension of between 2.0 and 4.5							
Mortar strength Class/Designation	**Compressive strength of unit (N/mm^2)**[a]						
	5.2	**7.3**	**10.4**	**17.5**	**22.5**	**30**	**40 or greater**
M12/(i)	5.0	6.6	8.1	11.2	13.1	16.0	19.4
M6/ (ii)	5.0	6.4	7.5	9.9	11.6	14.0	16.7
d)—Constructed with solid aggregate concrete blocks having a block height/wall thickness ratio of between 1.0 and 1.2 as a collar jointed wall							
Mortar strength Class/Designation	**Compressive strength of unit (N/mm^2)**[a]						
	5.2	**7.3**	**10.4**	**17.5**	**22.5**	**30**	**40 or greater**
M12/(i)	4.4	5.5	7.0	9.7	11.6	14.2	16.5
M6/(ii)	3.5	4.5	5.7	7.9	9.4	11.6	13.5
e)—Constructed with solid aggregate concrete blocks laid flat having an as laid height/wall thickness ratio of between 0.4 and less than 0.6							
Mortar strength Class/Designation	**Compressive strength of unit (N/mm^2)**[a]						
	5.2	**7.3**	**10.4**	**17.5**	**22.5**	**30**	**40 or greater**
M12/(i)	4.5	5.6	7.2	9.7	11.3	13.5	15.4
M6/(ii)	3.7	4.6	5.9	7.9	9.1	10.8	12.3
[a] Measured in normal direction of test for units.							

Table 2 – Masonry mortars

	Mortar designation	Compressive strength class	Prescribed mortars (proportion of materials by volume) (see notes 1 and 2)		Compressive strength at 28 days N/mm^2
			Cement **(a)**: sand with or without air entrainment	masonry cement **(b)**: sand	
↓ Increasing ability to accommodate movement, e.g. due to settlement, temperature and moisture changes	(i)	M12	-	-	12
	(ii)	M6	1 : 3 to 4	1 : 2½ to 3½	6

a. Cement , or combination of cements except masonry cements.

i) Combinations produced in the mortar mixer from Portland cement CEM I conforming to MS EN 197-1 and ground granulated blastfurnace slag conforming to MS EN 15167-1 where the proportions and properties conform to CEM II/A-S or CEM II/B-S of MS EN 197-1, except Clause 9 of that standard.

ii) Combinations produced in the mortar mixer from Portland cement CEM I conforming to MS EN 197-1 where the proportions and properties conform to CEM II/A-L or CEM II/A-LL of MS EN 197-1, except Clause 9 of that standard.

iii) Combinations produced in the mortar mixer from Portland cement CEM I conforming to MS EN 197-1 and pulverized fuel ash conforming to MS EN 450-1, where the proportions and properties conform to CEM II/A-V or CEM II/B-V of MS EN 197-1, except Clause 9 of that standard.

b. Masonry cement (inorganic filler other than lime)

NOTE 1 Proportioning by mass will give more accurate batching than proportioning by volume, provided that the bulk densities of the materials are checked on site.

NOTE 2 When the sand portion is given as, for example, 5 to 6, the lower figure should be used with sands containing a higher proportion of fines whilst the higher figure should be used with sands containing a lower proportion of fines.

2.2.7 Cement

2.2.7.1 Cement shall comply with MS EN 413-1 (Masonry cement – Part 1: Composition specifications and conformity criteria (Second revision)), Part 2: Test Methods, MS EN 197-1 (Cement – Part 1: Composition, specification and conformity

criteria for common cements) and as specified in the latest JKR Standard Specification for Building Works.

2.2.7.2 Manufacturers' certificates of the test shall, in general, be accepted as proof of soundness. Additional tests shall be carried out on any cement which appears to have deteriorated through age, damage to containers, improper storage, or any other reason. The test shall be carried out at any approved laboratory in accordance with MS EN 196 at the expense of the Contractor. Any batch of cement that has been sampled and tested and found not to have complied with the requirements shall be rejected and removed from the Site.

2.2.7.3 The S.O. may, without tests being made, order that any bag of cement, a portion of the contents of which has hardened, or which appears to be defective in any other way, be removed from the Site.

2.2.8 Sand

2.2.8.1 Sand for mortar shall comply with MS EN 12620 and as specified in latest JKR Standard Specification for Building Works. The sand shall be clean, sharp, and free from salt and organic contamination. Marine and estuarine sand shall not be used.

2.2.9 Water

2.2.9.1 Water for mortar shall comply with the latest JKR Standard Specification for Building Works.

2.2.10 Plasticizers

2.2.10.1 Plasticizers should conform to the requirements of MS EN 934-3. If plasticizers are used, it is important to ensure that the manufacturer's instructions about quantity and mixing time are carefully followed.

2.2.11 Pigments

2.2.11.1 Pigments should conform to the requirements of BS EN 12878. The pigments should not exceed 10 % by mass of the cement in the mortar. Care should be taken to ensure that the pigment is evenly distributed throughout the mortar and that the

strength of the mortar remains adequate. Carbon black should be limited to 3 % by mass of the cement.

2.3 MORTAR TESTING

2.3.1 The use of mortars shall be in accordance with the recommendation given in BS EN 1996. When samples are taken from a designed mortar in accordance with BS EN 1015-2 and tested in accordance with BS EN 1015-11, the compressive strength of the mortar shall not be less than the specified compressive strength. Table 2 shows the relationship of compressive strength classes and the compressive strength of mortar at 28 days.

2.3.2 PRELIMINARY TEST

2.3.2.1 Preliminary tests shall be carried out in ample time for the result to be approved before the commencement of laying process, and before any change is made in the mortar mix, materials of source or materials.

2.3.2.2 At least six weeks prior to the use of site mix mortar on site, the strength of the mortar designations proposed for use shall be verified in an accredited laboratory, with materials from the sources from which the site is to be supplied. Six 80 mm × 40 mm × 40 mm prisms made with mortar of a consistency corresponding to that required on site should be made, cured hydraulically and tested for compression strength, in accordance with the procedures given in BS EN 1015-11. The average value of the compressive strength at 7-days and 28-days are taken from the three prism samples respectively.

2.3.2.3 The mortar's compressive strength shall conform to the requirement as stated in Table 2. The mortar's compressive strength at 7-days can be taken as two-thirds of the values as stated in Table 2. The strength are based on the assumption that the type CEM I cement is used without any additive in the mortar.

2.3.3 CONFORMITY TEST

2.3.3.1 Mortar shall be sampled in accordance with BS EN 1015-2.

2.3.3.2 Six 80 mm × 40 mm × 40 mm prisms shall be prepared on site for every 150 m^2 of the wall, using any one designation of

mortar, or for every storey of the building, whichever is the more frequent. Specimens shall be stored and tested in accordance with BS EN 1015-11. Six prism samples shall be tested at 7-days. The average strength should exceed two-thirds of the appropriate 28-day strength given in Table 2.

2.3.3.3 The remaining three prism samples shall be tested at 28 days. The mortar are deemed acceptable of the average compressive strength at 28 days are equal or higher than the values shown in Table 2.

2.3.3.4 The contractor shall keep a record of the positions from which prisms have been taken.

2.3.3.5 In the event of 7-day strengths falling below those specified, the Contractor may elect to continue work at his own risk while awaiting the 28-day result, or immediately take down the work represented by the defective mortar prism.

2.3.3.6 In the event of the 28-day strength falls below the specified, the Contractor shall immediately investigate the non conformance and take preventive action to the satisfaction of the S.O.

2.3.3.7 Work built with mortar represented by the defective mortar prism shall be rejected by the S.O.

2.4 DAMP PROOF COURSE (DPC)

2.4.1 Damp proof course shall be specified in accordance with latest JKR Standard Specification for Building Works and BS 8215. The choice of DPC should be based on the required performance in relation to the known behaviour of the materials.

2.4.2 Damp Proof Courses shall be stored in the dry, undercover, and protected against damage. In addition, follow these recommendations for flexible materials:

a) Stand rolls on their ends to form a stable stack not more than three packs or more than 1m high.

b) Keep bitumen and other thermoplastic materials away from any direct heat source.

c) All labels shall be checked on adhesives for any particular storage recommendation.

2.4.3 Damp Proof Courses shall be applied in accordance with Clause 1.4, Section E: Non-Structural Wall System in the latest JKR Standard Specifications for Building Works. Where joints have to be made, they must be lapped at least 150 mm in the runs and for full width on corners and the meeting surfaces, sealed with an adequate application of black bituminous water-proofing paste.

2.4.3.1 Junction with Damp-Proof Membrane

Ensure that care is taken to follow the detail and specification to achieve continuity of the Damp Proof Courses at ground level with the damp-proof membrane.

2.4.3.2 Stepping DPC

Where a Damp Proof Courses is used in an external wall on a sloping site, ensure the Damp Proof Courses is never less than 150mm above the finished ground level (see Figure 1).

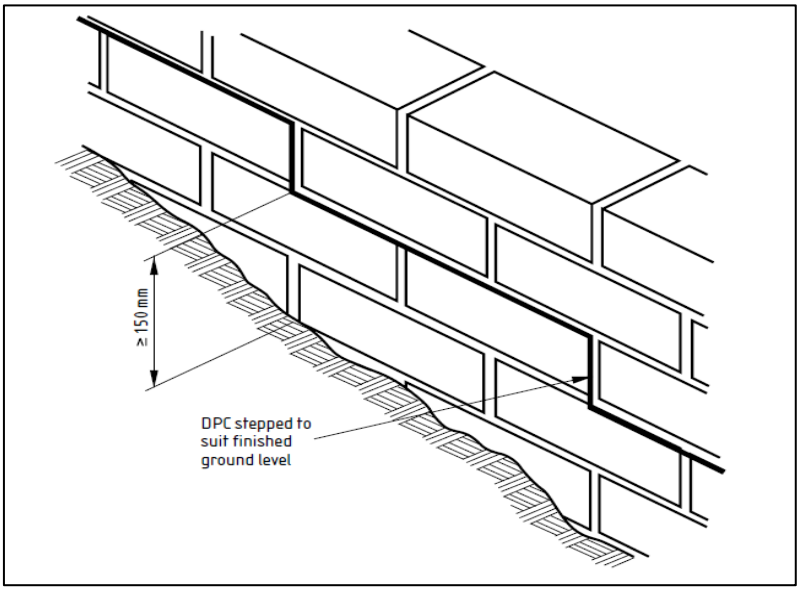

Figure 1 - Stepping DPC above ground

2.4.4 At ground floor levels, the Damp Proof Course for a wall shall extend to the full width on top of the first row of blocks. Exposed Damp Proof Course shall be protected from direct sun.

2.4.5 Horizontal, flexible damp proof courses should be sandwiched in a mortar bed and two courses of block sized units or one course of block sized units built immediately so that there is a minimum disturbance of the mortar joint between the units and the damp proof course until the mortar has set.

2.5 CONCRETE INFILL

2.5.1 Concrete infill for reinforced masonry shall be of minimum grade C25/30 (designed mix) or 30P (prescribed) with 10 mm nominal size aggregates and specified in accordance with MS 523-2. The minimum cement content, maximum free water/cement ratio and the concrete cover shall conform to the requirement in Table 3.

Table 3 - Minimum concrete cover for carbon steel reinforcement

Exposure situations	*Concrete grade in MS EN 206 and MS 523 - 2 & MS 523-3*				
	C25/30	C28/35	C32/40	C35/45	C40/50
	Minimum cement content (kg/m^3)				
	300	320	340	360	380
	Maximum free water/cement ratio				
	0.65	0.6	0.55	0.50	0.45
	Thickness of concrete cover				
	mm	mm	mm	mm	mm
E1[a]	20	20	20[b]	20[b]	20[b]
E2	—	35	30	25	20
E3	—	—	40	30	25
E4	—	—	—	60	50

Exposure situation E1. Internal work and the inner skin of ungrouted external cavity walls and behind surfaces protected by an impervious coating that can readily be inspected or external parts built.

Exposure situation E2. Buried masonry and masonry continually submerged in fresh water or external parts built.

Exposure situation E3. Masonry exposed to freezing whilst wet, subjected to heavy condensation oe exposed to cycles of wetting by fresh water and drying out or external parts built.

Exposure situation E4. Masonry exposed to salt or moorland water, corrosive fumes, abrasion or the salt used for de-icing.

[a] Alternatively, 1: 0 to ¼ : 3: 2 cement: lime : sand: 10 mm nominal aggregate mix may be used to meet exposure situation E1 when the cover to reinforcement is 15 mm minimum.

[b] These covers may be reduced to 15 mm minimum provided that the nominal maximum size of aggregate does not exceed 10mm.

2.6 REINFORCEMENT

2.6.1 Hot-rolled or cold-worked steel bars and fabric shall conform to the relevant Malaysia Standard and British Standard, MS 146, MS 145 and MS 144 as specified in latest JKR Standard Specification for Building Works.

2.7 WALL TIES AND ANCHORS

2.7.1 Wall ties, tension straps, joist hangers and brackets shall conform to BS EN 845-1 and shall be used in accordance with the recommendations in BS EN 1996.

3.0 WORKMANSHIP

3.1 SETTING OUT BLOCKWORK

All setting out shall conform to the measurement of the architect's drawings.

3.2 MORTAR

3.2.1 In-situ mortar must be mixed by machine except in the case of small quantities of mortars not containing plasticizers. All mixing platform or mixer must be clean out before changing mixes and at the end of every working period.

3.2.2 All materials must be measured accurately by volume to avoid variation in the colour, strength and durability of the mortar. Powdered plasticizer shall be mixed with water before it can be added to the mix.

3.2.3 After all the constituents have been added, a mixing time of 3 to 5 minutes should be sufficient. Mortar should be used within 45 minutes of the mixing and any unused mortar shall be discarded and not re-tempered unless it is within the manufacturer's stated retardation time. In hot weather, the prescribed retardation time may be shortened.

3.3 STABILITY DURING CONSTRUCTION

3.3.1 All block wall under construction shall be adequately restrained and laterally supported by the temporary support, able to resist forces as may be imposed by the wind and other loadings, until such time that the wall has been completed, achieved its full strength and permanently restrained.

3.4 BLOCKLAYING

3.4.1 Blockwork shall be laid strictly in accordance with the manufacturer's recommendations, which may vary with weather conditions, temperature, exposure, etc. Movement joints shall be formed where shown on the drawings in accordance with the details given and care is to be taken to ensure that the gap is free from debris. Vertical joints to accommodate horizontal movement should be provided at intervals of

between 6m and 9m. The ratio of length to the height of the panel should generally not exceed 3:1.

3.4.2 The rate of laying blocks must be such that it will prevent the squeezing of mortar joints. Units should be laid in true and regular courses with the adequate bond. All perpends are to be truly kept and all joints properly flushed up or pointed as shown on the drawings.

3.4.3 Unless otherwise specified, all blockworks shall be laid on a full bed of mortar, and vertical joints shall be filled up fully. The average thickness of the vertical and horizontal joints shall be 10mm, exclusive of any key in the jointing surfaces of the units.

3.4.4 Do not wet concrete masonry units before laying. Where necessary adjust the consistency of the mortar to suit the suction rate of the units.

3.4.5 No finishes or fixings shall be tied across movement joints. In addition, particular attention shall be paid to the manufacturer's recommendations for spacing and formation of contraction and expansion joints and in the reinforcement to prevent cracking around openings, joints in return walls and movement joints. Where the manufacturer's recommendations are not in accordance with the details, such variations shall be drawn to the Architect's attention.

3.4.6 Unless specified, as work proceeds do not rack back corners and other advanced work higher than 1.2m above the general level. For facing work complete the whole lift within one period of operation. Except where permitted by a proprietary system or by the designer, do not carry up any one leaf more than 1.5m height in one day.

3.5 BLOCK MASONRY BONDS

3.5.1 Running or stretcher bond

The running or stretcher bond of blocks are shown in Figure 2 and Figure 3

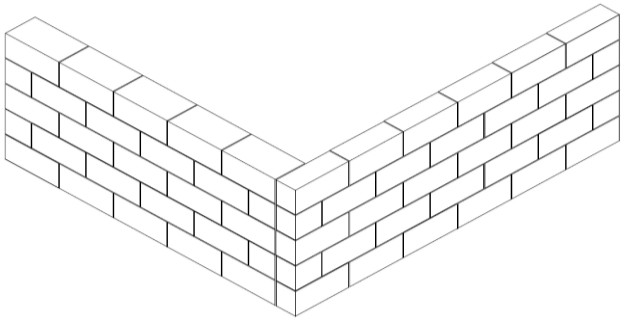

Figure 2

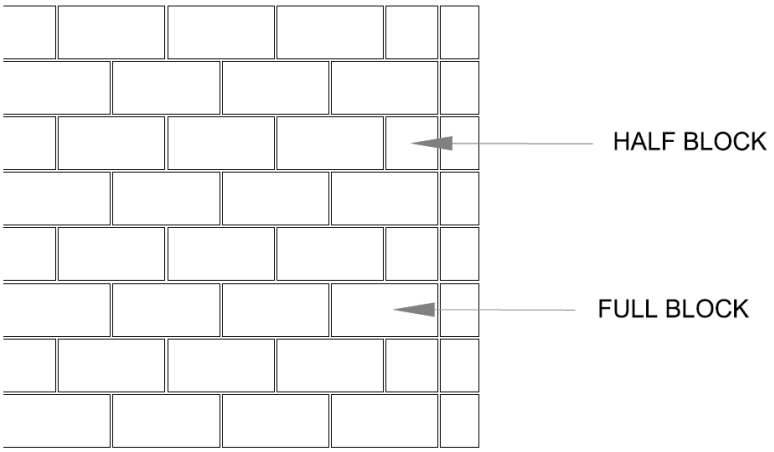

Figure 3

3.6 SERVICES HOLES AND CHASES

3.6.1 In order to eliminate unnecessary cutting away and making good, sleeves and chases should be provided during the erection of the masonry. In external walls, all sleeves and pipes should preferably be laid with a fall toward the outside. The installation of services should be completed before plastering or other finishing work is begun.

3.6.2 Where chases have to be cut, suitable power tools which do not operate by heavy impact should be used so that the recommended depth is not exceeded. Fixing units (blocks) where required, should be built into the wall or partition in the correct positions for skirting, rails and other items of joinery, fittings, etc.

3.6.3 In walls or leaves constructed of solid units, the depth of horizontal chases should not exceed one-sixth of the thickness of the single leaf at any point whilst the depth of the vertical chases should not normally exceed one-third of the thickness of the single leaf at any point.

3.6.4 The cutting of holes up to approximately 300mm square in the wall to accommodate items of equipment may be permitted.

3.6.5 Where heavy fittings are to be fixed to a wall, the effect on the stability of the masonry should be considered.

3.7 LINTELS AND STIFFENERS

3.7.1 Lintels should have an adequate bearing on the wall at the sides of the openings and in any case not less than 100mm in length and should be

bedded on mortar. They should not bear on a short length of the cut block. Where possible, the masonry shall be set out to provide a full block under a bearing.

3.7.2 Precast concrete lintels should have matured and dried before being built into the wall, to prevent cracking at the ends due to drying shrinkage of the lintels. Cast in situ lintels of reinforced concrete or of reinforced masonry should be propped and allowed sufficient time to develop adequate strength before they are made to carry superimposed loads.

3.7.3 Reinforced block lintels should be made from U-shaped blocks in which reinforcement is laid to the full length, including bearings. The blocks should be filled with concrete and the joints between them should be filled with mortar.

3.7.4 Lintels other than concrete must be approved by S.O.

3.7.5 Unless specified, stiffeners shall be provided at every minimum of 3m vertically and horizontally according to engineers detail.

3.8 JOINTING AND POINTING

3.8.1 JOINTING

Finish facing work and fair faced work joints to the specified profile as the work proceeds.

3.8.1.1 Unexposed joints

As the work proceeds, use a trowel to strike off any joints which are not to be exposed to view in the finished work, e.g. in roof spaces.

3.8.1.2 Masonry to be plastered or rendered

Unless units have a suitable texture or purpose-made key unit or metal-lathing is used, rake out joints approximately 15 mm deep, as work proceeds, on all those faces to be plastered or rendered.

3.8.2 POINTING

3.8.2.1 If pointing is specified do not use mortar stronger than that used when constructing the wall. Rake out the joints to a depth of between 10mm and 15mm as the work proceeds, to give an

adequate key. Brush out the joints to remove dust and loose material and then lightly wet using a brush. Carry out pointing from the top of the wall downwards.

3.8.3 JOINT FINISHES

A number of joint finishes, as shown in Figures 4.

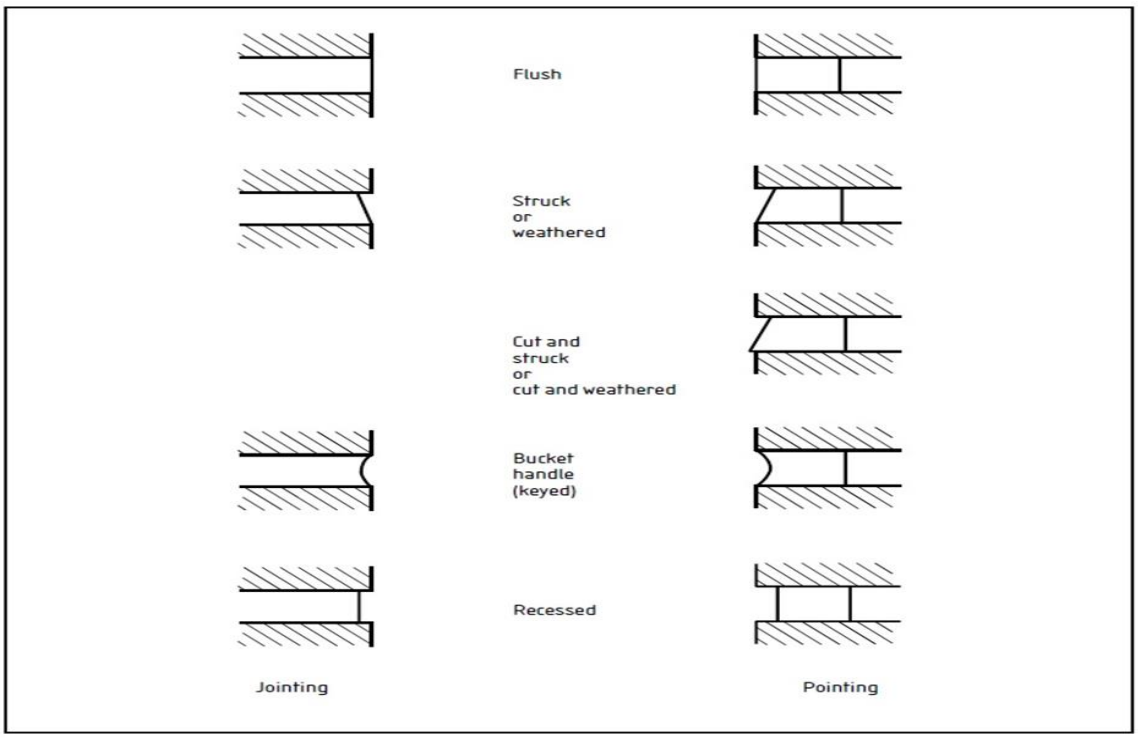

Figure 4 – Joint finishes

3.9 SAMPLE AND MOCK-UP PANELS

3.9.1 The contractor shall construct a mock-up panel for the project with total build-up area more than 100m^2 using load bearing blockworks system.

3.9.2 Sample panels shall be built on site in a protected position to provide an agreed standard for the work and treatment of joints before the commencement of the works subjected to the S.O. approval. Such panels shall be maintained throughout the contract and removed on completion.

3.9.3 The mock-up panel needs to be erected on a level firm foundation in a dry location, having good natural daylight. It needs to be so sited that it can be retained for further inspection and reference and needs to be, therefore, protected from damage and the weather. If necessary, provision needs to be made for ensuring lateral stability.

3.9.4 The mock-up panel needs to be constructed to expose not less than 2m length x 1m height, selected as follows:

a) supplied by the manufacturer or supplier so that they are reasonably representative of the average quality of the whole order to be delivered; or

b) randomly sampled in accordance with MS 2282-1, Annex B.

3.10 DELIVERY AND HANDLING

3.10.1 All blocks shall be carefully unloaded and stacked. They shall be unloaded with care by hand or machine onto a reasonably dry and level site and not tipped from vehicles to minimize soiling, chipping and breakage.

3.10.2 Proper lifting procedures shall be strictly followed to prevent damages to block units especially at edges of the lifted blocks in the package and to ensure the safety on site.

3.11 STORAGE

3.11.1 The stacks shall be protected from rain, moisture, soiling from the ground and passing traffic by covering up the stack or placed within covered storage. The bottom of the stack shall be protected from becoming wet from ground moisture. Unwrapped masonry units shall be stacked in such a manner as to allow free circulation of air.

3.11.2 All metal bands or strapping on packed block unit shall only be removed or cut after being off-loaded and placed in position on the prepared platform.

3.11.3 Block unit should not be stacked to excessive height. All stacked block units in packs stored in tiers should be well support on the solid ground, secured to prevent sliding, falling, overturning, or collapse.

3.11.4 Block unit should only be stacked on level ground or on solid supports to achieve level storage. All passageways should be kept clear to provide for the free and safe movement for manual or mechanical block unit handling. Block unit should not be stored on scaffolds or in passageways in excess of supplies.

3.11.5 The storage location of each delivery shall be pre-planned subjected to the required volumes or quantities during each construction stages.

3.12 CURING AND PROTECTION

3.12.1 The mortars shall be kept with proper curing for minimum three (3) days after laying. These shall be protected from direct exposure to sunlight and rain by suitable covering and from damage the execution of the work.

3.12.2 Suitable precautions shall be taken to avoid damage to newly constructed masonry. During mortar hydration, newly constructed work should be suitably protected against excessive moisture loss or uptake.

3.12.3 Protection Against Rain

3.12.3.1 Completed block panel with unmatured mortar must be protected from direct rain. This is to prevent any mortar wash-out and wet/dry cycles at the joints.

3.12.3.2 Sills, thresholds, gutters and provisional rainwater downpipes shall be installed as soon as practicable after finishing the block laying and pointing to protect the completed block panels. Block laying and pointing shall not be commenced during periods of heavy rain.

3.12.4 Protection against Mechanical Damage

3.12.4.1 Block panel surfaces, vulnerable arises at corners and openings, plinths and other projecting features should be protected as appropriate from damage and disturbance considering:

a) Other works in progress and subsequent construction operations.
b) Activities of construction traffic
c) Concrete being poured above
d) Use of scaffoldings and construction processes carried out from them.

3.12.4.2 Completed block panels should be protected from construction operations that would stain fair-faced block panels or affect bonding with future work such as rendering.

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