LOCAL GOVERNMENT ORDINANCE 1961
(No. 11 of 1961)

UNIFORM BUILDING BY-LAWS 2022
(G.N.L 15 of 2022)

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LOCAL GOVERNMENT ORDINANCE 1961
(No. 11 of 1961)

UNIFORM BUILDING BY-LAWS 2022
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In exercise of the power conferred by section 50A of the Local Government Ordinance 1961, the Minister of Local Government and Housing makes the following By-laws:

PART 1

PRELIMINARY

Citation, commencement and application

1. (1) These By-laws may be cited as the Uniform Building By-Laws 2022.

(2) These By-laws shall come into operation on the date of its publication in the gazette. *[29 December 2022]*

(2) These By-laws shall be applicable to the whole area under the jurisdiction of the local authority.

Interpretation

2. In these By-laws, unless the context otherwise requires

"advertisement hoarding" means any frame, hoarding, board, wall, bar, pillar, post, wire, or any combination of these, or any erection of any kind, or any surface or space used for the display of trade, business or professional advertisements;

"aggregate" means any material other than cement and water used in the making of concrete which does not contain additions or admixtures;

"alterations" includes additions and extensions;

"approved" means approved by the local authority;

"approved plan" means a plan for a building approved by the local authority in accordance with these By-laws;

"architect" means a person who is registered as an Architect under the Architects Act 1967 [*Act 117*] and who under the Act is allowed to practise or carry on business as an architect;

"ASHRAE" means the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.;

"balcony" means any stage, platform, oriel window or other similar structure projecting outwards from the wall of a building and supported by brackets and cantilevered;

"base" in relation to a wall or pier means —

(i) the underside of the course immediately above the footings, if any, or in the case of wall carried by a beam, above the beam; and

(ii) in any other case the bottom of such wall or pier;

"basement" means any storey or storeys of a building which is or are at a level lower than the ground storey;

"brick" means hard sound bricks, true in shape with sharp arrises, of uniform quality and texture and (except in the case of cement bricks) well burnt;

"building draughtsman" for the purpose of these By-laws means any building draughtsman who is registered under the Architects Act 1967 [*Act 117*];

"building" includes any house, hut, shed, or roofed enclosure, whether or not used for the purpose of human habitation, and also any structure, wall, fence, platform, staging, gate, post, pillar, paling, frame, hoarding, slip, dock, wharf, pier, jetty, landing-stage, or bridge, and any structural support or foundation connected to the foregoing;

"building line" means the line prescribed by either the competent planning authority or the local authority beyond which no part of a building may project, except as otherwise permitted by these By-laws;

"building operations" includes any works preliminary or incidental to the erection of a building;

"building plans" means plans that include site plans, key plans, floor plans, sections and elevations of buildings and are as stipulated in by-laws 9, 10 and 11;

"BS" means the latest published edition of the British Standard Specification;

"BSCP" means the latest published edition of the British Standard Code of Practice;

"ceiling" means the covering to the underside of floor joist or ceiling joist or floor slabs excluding in all cases any supporting beams, and where no such covering exists means the underside of floor joists or roof cellars or ties excluding any supporting beams;

"certificate of completion and compliance" means a certificate issued under by-law 216;

"column" means any part of construction which will by its resistance to compression in the direction of its length and to the bending actions induced by such compression, support and transmit loading;

"communication" means any communication, whether between persons and persons, things and things, or persons and things, in the form of sound, data, text, visual images, signals or any other form or any combination of those forms;

"communication structure" includes any tower, pole, mast and also any installation for the purpose of communication;

"contractor" means a person who carries out or completes or undertakes to carry out or complete any construction works and registered with the Lembaga Pembangunan Industri Pembinaan Malaysia;

"dead load" means that static weight of all walls, partitions, floors, roofs and finishes, including all other permanent construction;

"depth" in respect of a building, means the measured distance between the front line of the building and the back line of the rear main wall which separates the main building from the open space;

"detached building" means any building not attached to any other buildings;

"Director General" has the same meaning assigned to it in the Fire Services Act 1988 [*Act 341*];

"disabled persons" means people with a physical, hearing or sight impairment which affects their mobility or their use of the buildings as referred to under by-law 85;

"external wall" means an outer wall of a building not being a party wall notwithstanding that it may immediately adjoin a wall of another building;

"factory" means any building or part thereof designed, adapted or used for —

(a) the making of any article or part of any article, commodity or product; or

(b) the altering, repairing, ornamenting, finishing, cleaning, washing or the breaking up or demolition of any article, commodity or product; or

(c) the adapting for sale or assembly of any article, commodity or product; and

(d) any other building as defined in the Factories and Machinery Act 1967;

"fire wall" means any wall, not being a party wall or external wall, of materials having the fire resistance as required under Part XII of these By-laws and either used or constructed to be used for the separation of adjoining buildings or the separation of parts of a building in such manner as to prevent or reduce the spreading of fire from one building to another or from one part of a building to another part of that building and includes a proscenium wall, compartment wall, separating wall and a protecting structure;

"Fire and Rescue Department" means the department established under section 3(1) of the Fire Services Act 1988 [*Act 341*];

"flat" means any separate dwelling used or constructed or adapted to be used wholly or principally for human habitation for a single family, where the kitchen, lavatory and bathroom or water-closet are contained in a building comprising two or more such dwellings joined vertically;

"flat roof" means any roof having no inclination or having an inclination of not more than seven and one-half degrees with the horizontal;

"flood level" means such flood level as may be prescribed for any area by the Drainage and Irrigation Department;

"floor" includes any horizontal platform forming the surface of any storey and any joist, board, timber, stone, concrete, steel or other substance connected with or forming part of such platform;

"footing" means the construction whereby the weight of the structure of building is transferred from the base structure to the foundations;

"foundation" means a system or arrangement of foundation units such as footing, raft or pile through which the loads from a building or structure are transferred to the supporting soil or rock;

"footway" includes footpaths and verandah-ways at the sides of streets;

"garage" for the purpose of these By-laws, means a building or part thereof designed, adapted or used for the housing of motor vehicles;

"ground storey" means the lowest storey of a building to which there is an entrance from the outside on or above the level of the ground at the front of the building;

"habitable room" means any room not less than 8 square metres in area but does not include any bathroom, water-closet, open verandah, terrace or garage;

"hardwood timber" for the purpose of these By-laws means any timber specified by Malaysian Timber Industry Board and shall be in accordance with MS 1714 – Specification for visual strength grading of tropical hardwood timber;

"headroom" means the clear vertical distance between the finished floor level and the soffit of the lowest projecting member or surface above that point;

"height" in relation to —

a room means the vertical distance measured between the finished floor level and the underside of the ceiling excluding the thickness of the plaster;

any storey means the vertical distance measured between the upper surface of its floor to the upper surface of the floor immediately above it;

a wall means the vertical distance measured from the base of the wall to its highest part or, in the case of a gable, to half the height of the gable;

"hospital" means any building or part thereof designed, adapted or used for the care, accommodation or treatment of the sick, infirm, aged, convalescent or pregnant;

"hotel" means any building specifically designed and constructed or substantially adapted to be used to accommodate persons for the purpose of gain or profit, with or without arrangements for communal feeding, and includes a boarding house, lodging house or guest house;

"house" includes dwelling-house, warehouse, office, shop, school, and any other building in which persons are employed;

"imposed load" means the load assumed to be produced by the intended occupancy or use including distributed, concentrated impact and inertia loads but excluding wind loads and seismic loads;

"Industrial building" means a building used or intended to be used as a factory, workshop or warehouse;

"inspector of works" means a person who is registered as an inspector of works under the Architects Act 1967 [*Act 117*] or Registration of Engineers Act 1967 [*Act 138*];

"latrine" means a latrine the type of which is approved by the local authority;

"layout plan" means a plan approved by the local authority under the Town and Country Planning Ordinance [*Sabah Cap. 141*];

"lintel" means a beam supporting walling over an opening or recess;

"load bearing" in relation to any part of a building or its foundations, means that part of the building which bears a load other than due to its own weight and to wind pressure on its own surface;

"local authority" means an Authority as defined under section 2 in Local Government Ordinance 1961 [*No. 11 of 1961*];

"low lying land" means any land of which the surface is below flood level or which is so situated that it cannot at all times be efficiently drained by gravitation into an existing public surface water drain or water course;

"mesh" in relation to the measurement of materials, means the mesh of a sieve complying with BS 410 – Test Sieves;

"mezzanine floor" means any floor interposed between the main floors of a building and includes any platform or landing of greater than 2.5 metres width;

"MS" means that latest published edition of the Malaysian Standard;

"MS EN" means the latest published edition of the Malaysian Standard which is identical to the European Standard;

"MSCP" means the latest published edition of the Malaysian Standard Code of Practice;

"occupier" means the person in actual occupation of the land or building in respect of which the word is used, or having the charge, management or control thereof either on his own account or as agent of another person, but does not include a lodger;

"owner" means —

in relation to any land or building, the registered proprietor of the land as defined in the Land Ordinance [*Sabah Cap. 68*];

in the case of subdivided buildings, includes the management corporation and any subsidiary proprietor: the expressions "management corporation" and "subsidiary proprietor" shall have the meanings assigned to them in the Land (Subsidiary Title) Enactment, 1972 [*Sabah No. 9 of 1972*]; and

the agent or trustee of any of the owners described in paragraphs *(a)* and (*b*) of this definition or, if any of those persons has died, his legal personal representative;

"panel wall" means a non-load bearing wall set within a structural frame;

"partition" means a non-load bearing wall of any internal wall, not being a party wall, compartment wall, separating wall or an external wall;

"party-wall" means a wall forming part of a building and used or constructed to be used for separation of adjoining building to different owners or occupied or constructed or adapted to be occupied by different persons either constructed over or abutting a common boundary;

"pitched roof" means a roof having an inclination of more than seven and a-half degrees with the horizontal;

"prestressed concrete" means concrete in which predetermined stresses are induced to counteract the stresses due to permanent and superimposed loading for the purpose of elimination or decreasing the tensile stresses due to bending and shear;

"principal submitting person" means a qualified person who submits building plans to the local authority for approval in accordance with these By-laws and includes any other qualified person who takes over the duties and responsibilities of or acts for the first-mentioned qualified person in accordance with by-law 8;

"Professional Engineer with Practising Certificate" has the meaning assigned to it in section 2 of the Registration of Engineers Act 1967 [*Act 138*];

"public resort" means a building, or a defined or enclosed place used or constructed or adapted to be used either ordinarily or occasionally as a church, chapel, mosque, temple or other place where public worship is or religious ceremonies are performed, not being merely a dwelling house so used, or as a cinema, theatre, public hall, public concert room, public ballroom, public lecture room, or public exhibition room, restaurant, night club, terminus, or shopping arcade, or as a public place of assembly for persons admitted thereto by ticket or otherwise, or used or constructed or adapted to be used either ordinarily or occasionally for any other public purpose;

"qualified person" means an Architect, Professional Engineer with Practising Certificate or building draughtsman registered under any written law relating to the registration thereof;

"residential building" means a building designed, adapted or used for human habitation;

"room" means any portion of a building enclosed by walls or partitions;

"school" means any building or part thereof designed, adapted or used for the dissemination of knowledge and include a crèche;

"self-closing door" means a door fitted with a device which is free from any means of holding it in an open position and which will close automatically unless held open by other approved means;

"semi-detached building" means any building designed to be built as one pair having a party wall as one of its walls;

"shop" means a building used or adapted to be used either wholly or partly for the purpose of carrying on retail trade;

"shophouse" means any building, part of which is designed, adapted or used partly for business purposes and partly for human habitation;

"site supervisory staff" means any employee of the principal submitting person or submitting person engaged for a particular project and reports to the principal submitting person or submitting person, and may constitute inspector of works or registered engineer or registered building draughtsman or graduate Architect or Architect for the purpose of supervising all construction works at site;

"SPAH" means a Rainwater Harvesting and Utilisation System where rainwater is collected from a roof, conveyed to a rainwater tank and stored for use;

"street" has the meaning assigned to it in section 3 of the Interpretation And General Clauses Enactment 1963 [*Sabah No. 34 of 1963*] and shall further include a catwalk and a private street;

"storey" means the space between the upper surface of every floor and the surface of the floor next above it, or if there be no such floor then the underside of the tie or collar beam of the roof covering or if there be neither tie nor collar beam then the level of half the vertical height of the underside of the rafters or other support of the roof;

"submitting engineer" means a Professional Engineer with Practising Certificate registered under the Registration of Engineers Act 1967 [*Act 138*] and who under the Act is allowed to practise or carry on business as a submitting engineer;

"submitting person" means a qualified person who submits plans, other than building plans, to the local authority or relevant statutory authority in accordance with these By-laws and includes any other qualified person who takes over the duties and responsibilities of or acts for the first mentioned qualified person in accordance with by-law 8;

"Surveyors Board" means the Surveyors Board established under section 3 of the Surveyors Ordinance, 1960 [*No. 22 of 1960*];

"swimming pool" means any pool or bath for the purpose of swimming;

"technical conditions" means conditions pertaining to health and safety issues relating to buildings and essential services serving the buildings;

"temporary building" means any building constructed wholly or in part of materials which are, in the absence of special care, liable to rapid deterioration, or are otherwise unsuitable for use in the construction of permanent buildings, and may include any house or building the erection of which is permitted under permit issued by the local authority for a limited period to be specified upon the expiration of which the building shall be demolished;

"terrace house" means any residential building designed as a single dwelling unit and forming part of a row or terrace of not less than three such residential buildings;

"verandah-way" means a covered footway fronting a street;

"warehouse" means any building or part thereof designed, adapted or used for storage purposes but does not include any garage ancillary to a residential building;

"wind load" means all loads due to the effect of wind pressure or suction;

PART II

SUBMISSION AND APPROVAL OF PLANS

Prohibition against erection of building without the prior written approval

3. (1) No person shall erect any building without the prior written approval of the local authority.

(2) Any person who intends to erect any building shall cause to be submitted by a principal submitting person or submitting person —

(a) to the local authority a written application together with such building plans, drawings and specifications as may be required under these By-laws; and

(b) to the relevant statutory authority such plans and specifications as may be required by any other written law.

(3) The local authority may after receiving the written application, grant an approval subject to such conditions as it thinks fit to impose or refuse to grant an approval.

(4) Where the local authority refuses to grant an approval, it shall notify the principal submitting person or submitting person, as the case may be, the grounds of such refusal.

(5) The local authority may give written directions to the principal submitting person or submitting person in respect of any matter concerning the plans as the local authority considers necessary.

(6) The principal submitting person or submitting person to whom the directions are given under paragraph (5) shall comply with such directions by amending the plans accordingly, and resubmit the plans within such period or extended period as the local authority may specify.

(7) If the plans are not resubmitted within the specified period or extended period, the application shall be deemed to have been withdrawn but the applicant may submit a fresh application.

(8) The approval granted by the local authority under these By-laws shall lapse if the building operations are not commenced within twelve months from the date of such approval.

Deemed to erect a building

4. (1) For the purposes of these By-laws a person who —

(a) begins work on the site thereof for or in respect of a new building;

(b) adds to or alters any existing building in such a manner as to involve —

i. new or partly new structures or foundations; or

ii. new or partly new super-structure or roof on existing walls or existing foundations; or

(c) converts or adapt any building to a purpose other than which it was originally approved,

shall be deemed to erect a building.

(2) Where the erection of any building is commenced or carried out, it shall be presumed, until proved to the contrary, to have been erected by the owner of the land where on such building is erected and he shall be liable therefor.

(3) Where a building is erected on vacant land and the person who actually erected the building is not known or cannot be found in Malaysia, the building shall be deemed to have been erected by the owner of such land who shall be liable therefor.

Submission of plans

5. (1) All plans submitted to the local authority for approval shall —

(a) be deposited at the office of the local authority together with the fees prescribed for the submission of such plans in accordance with the First Schedule of these By-laws;

(b) bear a statement specifying the purpose of the building for which the plans are submitted, is to be erected and used; and

(c) bear the certification of the principal submitting persons or submitting persons in the forms as set out in the Second Schedule of these By-laws for which they are respectively responsible;

(2) Every plan, drawing or calculation in respect of any building shall be submitted by a principal submitting person or submitting person.

Plan to be signed

6. All plans submitted shall be signed by the principal submitting person or submitting person and by the owner and shall bear the full address of the owner.

Return of plan

7. (1) A local authority may if it is of the view that any plan, drawing or calculation is beyond the competence of such principal submitting person or submitting person submitting the same, return such plan, drawing or calculation.

(2) A local authority shall accept any returned plan, drawing or calculation if the same were re-submitted together with a certificate from the relevant competent authority responsible for registering such principal submitting person or submitting person, certifying that such plan, drawing or calculation is within the competence of such principal submitting person or submitting person submitting the same.

Withdrawal or change of principal submitting person or submitting person

8. (1) The principal submitting person or submitting person submitting the plans shall be responsible for the proper execution of the works and shall continue to be so responsible until the completion of the works unless he has entered into an agreement for termination of his consultancy services with the owner and given consent for another principal submitting person or submitting person to be appointed as replacement.

(2) The owner shall notify the local authority in writing of the same and cease all works immediately until another principal submitting person or submitting person is appointed to take over.

(3) Where the local authority agrees to accept a principal submitting person's or submitting person's withdrawal or replacement under paragraph (1) the works shall not resume until another principal submitting person or submitting person is appointed to take over.

(4) Where any principal submitting person or submitting person who has submitted any plan, drawing or calculation in respect of any building has died or become bankrupt or cannot be found or has been deregistered from the register or for any other reason ceased to practise, the owner shall as soon as practicable appoint another principal submitting person or submitting person to act for him and to submit adequate evidence to the local authority of the circumstances.

Copies of plans to be submitted

9. (1) All building plans shall be submitted in as many copies and in such manner as may be determined by the local authority and bear the certification of the principal submitting persons as in Form A set out in the Second Schedule of these By-laws.

(2) One copy of the building plans shall be retained by the local authority after approval.

(3) Any plan is deemed to have been deposited and furnished at the time the plan is received by the local authority.

(4) If the plans are disapproved, one copy of such plans shall be returned.

(5) Nothing in this by-law shall prohibit the depositing of additional copies of plans if it is considered that by so doing the work of the local authority may be expedited.

Scale of plans

10. (1) All building plans shall be drawn to the following scales:

(a) site plans	not less than 1 : 2000
(b) key or location plans	any convenient scale.
(c) all other general building plans	not less than 1 : 100 except in special cases where the size of the building renders drawings of this scale to be impracticable to accommodate within the limitations of paper sizes or when the drawings are of unwieldy dimensions, the local authority may use its discretion to permit plans to be submitted to a smaller scale but in no case shall the scale be less than 1 : 200.

(2) Notwithstanding paragraph (1), all plans may be drawn in International System of Units.

Plans required

11. (1) All building plans in respect of any building shall, unless inapplicable, contain the following:

(a) a site plan showing —

(i) the site of the proposed building lot together with the number of the lot and the title number;

(ii) the means of access to the site from the street and the name of the street;

(iii) the distance from the centre and side of roadway distinctly figured on one of such plans;

(iv) where required by the local authority the dimensions of the lot;

(v) the complete lines of surface water and foul water drainage and the point of discharge of the proposed drains;

(vi) the scale, North point and the numbers of adjoining lots or buildings;

(vii) the dimensions of clearances between the proposed building and the boundaries;

(viii) all lines of proposed adjustments of land or buildings for street, river or drainage improvements and such like where applicable showing the width of such private street or proposed private street and its connection with the nearest public street;

(ix) existing and proposed ground level of the site;

(x) the location of the rainwater tank;

(xi) SPAH elements such as piping system, rainwater tank, water pump and other related equipments (as required to install SPAH) shall be clearly shown on the plan for the following category buildings:

(a) in respect of residential building, SPAH is required to be installed only for bungalows and semi-detached houses with a roof area equivalent to or more than 100 m^2; and

(b) all detached buildings with a roof area equivalent to or more than 100 m^2;

(b) A floor plan of each floor except when other floors are repetitive or are identical floors, containing the following information —

(i) figured dimensions of the lengths and widths of the building and rooms and thickness of walls thereof;

(ii) figured dimensions of all door and window openings, the clear day-light area of air-wells, back areas and open spaces of the building;

(iii) figured dimensions between walls, piers and stanchions on the foundation plan of the building;

(iv) lines of permanent drainage of the site with arrows indicating the direction of flow, the drains into which they will discharge and their sizes;

(v) the names and uses of rooms.

(c) Cross, longitudinal and other sections to clearly delineate the construction of the building and showing —

(i) the existing ground level and proposed new ground level if the level of the site is to be raised or lowered;

(ii) the level of street, roadside drain and verandah-way (if the building abuts a street);

(iii) the width and depth of foundations and thickness of walls, partitions and floors thereof;

a. the height of storeys, staircases, doors, windows and ventilating openings there of;

b. the sizes, position and direction of floor joists and beams and the construction of the roof thereof; and

c. the materials to be used in the construction of the structure.

(d) Front, rear and side elevations showing —

(i) the levels of adjoining footways, verandah-ways, roads and the levels of the proposed counterparts;

(ii) part elevations of existing adjoining buildings showing their floor levels, main coping, parapets and verandah heights; and

(iii) the materials proposed for the walls, windows and roof, if applicable and visible.

(2) All plans submitted in respect of a building intended for subdivision in accordance with Land (Subsidiary Title Enactment) 1972 shall in addition to the requirements specified in paragraph (1), be in conformity with the layout plan and accompanied by —

a. a written certification by the principal submitting person that the plans submitted are in conformity with the layout plan;

b. a provisional index and storey plan containing the following information —

i. the number of parcels on each floor and the approximate floor area of the parcels; and

ii. where accessory parcels are provided, the number and the approximate floor area of such accessory parcels.

(3) Every parcel and accessory parcel if any, shall be clearly indicated and marked out and assigned a parcel lot number in the plans.

(4) The principal submitting person or owner as the case may be shall provide the local authority with such further information as the local authority may require.

(5) All plans shall be clearly drawn in black with differences of material shown in distinct colours and all existing structures in neutral tints.

Amendment to an approved plan

12. (1) Any amendment to an approved plan shall be submitted in accordance with these By-laws and shall be accompanied by a declaration in Form B as prescribed in the Second Schedule signed by the principal submitting person containing the details of such amendment together with the fee as prescribed in the First Schedule.

(2) Every amendment shall be indicated in the amended plans in such manner as may be determined by the local authority.

(3) The local authority may after receiving the submission, grant an approval subject to such conditions as it thinks fit to impose or refuse to grant an approval.

(4) Where the local authority refuses to grant an approval, it shall notify the principal submitting person or submitting person, as the case may be, the grounds of such refusal.

(5) Any principal submitting person who fails to declare such amendments in Form B as prescribed in the Second Schedule or indicate the same in the amended building plans submitted, commits an offence.

Plans of alterations

13. (1) In plans submitted for alterations or additions, including partitioning or subdivision of rooms, to a building, the parts, if any, of the building to be removed shall be shown in dotted lines and new work shall be either in red or in black fully coloured.

(2) All existing surface water and foul water drains, stairs, windows and doors and all openings for light and ventilation of the building shall be shown on such plans.

Specifications

14. The local authority may require all plans submitted for approval to be accompanied by a specification of all materials proposed to be used.

Inspection of plans

15. (1) An approved plan may be inspected at the office of the local authority subject to the payment of the fee as prescribed in the First Schedule.

(2) An approved plan may be copied at the office of the local authority subject to the applicant submitting with his application to copy such plan the written consent of the owner of the building subject to the payment of the fee as prescribed in the First Schedule.

PART III

STRUCTURAL PLANS

Details and calculations of structural plans

16. (1) Two copies of the detailed structural plans of the proposed building together with the structural calculations for the same shall be deposited with the local authority prior to the commencement of construction.

(2) Every copy of the detailed structural plans and structural calculations shall bear a certificate signed by the submitting person as in Form C of the Second Schedule of these By-laws to the effect that the details are in accordance with these By-laws and that the submitting person accepts full responsibility.

(3) All structural plans shall be clearly marked to indicate the dead and imposed loads for each floor system or each part which has been designed.

Particulars to be shown on detailed structural plans

17. (1) Without prejudice to By-law 16, all detailed structural plans shall where applicable contain details and calculations in respect of the following matters —

(a) dead and imposed loads;

(b) dead loads calculated from weights of materials used;

(c) weight of partitions;

(d) contents for tanks and other receptacles;

(e) imposed floor loads;

(f) mechanical stacking;

(g) reductions in total imposed floor loads;

(h) imposed roof loads;

(i) curved roofs;

(j) roof coverings;

(k) internal suspended loads on primary structural members;

(l) amount of suspended load;

(m) dynamic loading;

(n) crane gantry girders;

(o) parapets and balustrades;

(p) vehicle barriers for car-parks;

(q) basement walls and floors;

(r) foundations;

(s) structures above foundations;

(t) seismic loading;

(u) wind load;

(v) any other matters deemed necessary by the local authority.

(2) All calculations in respect of the matters specified in paragraph (1) of by-law 17 shall be in accordance with the BSCP or MSCP or any other standards currently applicable.

Power of local authority to reject structural plans and calculations

18. (1) Notwithstanding paragraph (2) of by-law 16, the local authority may examine and in so doing may reject any structural plans or calculations which are not in accordance with these By-laws and if it rejects such plans or calculations it may require such submitting person to resubmit new structural plans or calculations in respect of the rejected portion.

(2) Where the local authority rejects any structural plans or calculations it shall notify the submitting person the grounds of rejection as soon as practicable.

PART IV

MECHANICAL AND ELECTRICAL INSTALLATION PLANS

Mechanical and electrical installation plans

19. No person shall carry out any mechanical or electrical installation works unless plans relating to such installation works have been deposited with the local authority by the submitting person.

Certification of plans

20. Every mechanical or electrical installation plan submitted under this part shall bear a certificate signed by the submitting person as in Form D of the Second Schedule of these By-laws, certifying that the proposed installation works are in compliance with —

(a) any written law relating to mechanical or electrical installation works for the time being in force; and

(b) the requirements imposed by the authority for the time being in charge such mechanical or electrical installation works.

PART V

PERMITS

Permits

21. (1) An application for a permit shall be made to the local authority in such form and manner as the local authority may determine and such permit shall be issued for the following purposes —

(a) the depositing of building materials on streets; or

(b) the erection of a temporary building or structure including but not limited to the following —

(i) the erection of a builders' working shed or a store or other shed to be used in connection with building works;

(ii) the erection of a temporary shed for shows or place of worship;

(iii) the erection of scaffolding on streets or footways;

(iv) the erection of staging, framework, platform or structure of any kind on a roof abutting a street; or

(v) the erection of protective hoardings on streets or footways.

(2) The applicant shall made payment of the processing fee as prescribed in the First Schedule upon submission of the application for a permit and the fee shall not be refundable irrespective of whether or not the application is approved by the local authority.

(3) Upon approval of the application, the local authority may issue a permit subject to -

(a) any conditions and restrictions as may be specified therein;

(b) such period as the Local Authority may determine;

(c) payment of the fee as prescribed in the First Schedule; and

(d) payment of a deposit of such sum as the Local Authority may determine to ensure that the conditions and restrictions of the permit are duly observed.

(4) The local authority may extend the period of a permit subject to payment of the permit fee as prescribed in the First Schedule.

Failure to comply with permit conditions

22. (1) The local authority shall issue a notice to the permit holder to mitigate or rectify any damage caused or to demolish or otherwise remove the materials, shed, store, scaffolding, staging, framework, platform, hoarding, guardhouse, boom gate, temporary building or structure, or whatever erection, as the case may be, or for rectifying any damage as a consequence of any breach of the conditions of the permit.

(2) If the permit holder fails to comply with paragraph (1), the local authority shall have access to the deposit referred to in paragraph 21(3)*(d)* to give effect to paragraph (1).

(3) The local authority may by notice in writing require the permit holder to replenish the deposit.

Cancellation of permit

23. (1) The local authority shall cancel a permit if the permit holder has failed to comply with any of the conditions of the permit.

(2) The local authority may by a written notice require a permit holder whose permit has been cancelled to remove all structures and materials on the site and to restore the site to the satisfaction of the local authority within one month from the date of such notice.

(3) If the local authority is satisfied that the permit holder has complied with paragraph (2), the local authority shall cause the deposit paid by the permit holder to be refunded.

(4) If a permit holder fails to comply with paragraph (2), the local authority may cause the removal of any structure and materials on the site and for the site to be restored, and any expenses incurred shall be deducted from the deposit paid by the permit holder.

(5) If the expenses incurred by the local authority under paragraph (4) exceed the deposit paid by the permit holder, any outstanding balance shall be recovered from the permit holder as if such sum were a civil debt.

Advertisements hoardings

24. (1) The erection of hoardings or any framing for the display of advertisements or sign-boards shall be subject to an annual permit issued at the discretion of and subject to any conditions that may be imposed by the local authority.

(2) Plans of such hoardings or framing shall be submitted in accordance with the requirements of the local authority.

(3) The plans shall be certified by the submitting person to the effect that the proposed hoarding can be safely supported by the structure onto which it is to be constructed and that he accepts full responsibility.

Materials deposited on a street

25. (1) No person shall deposit any building materials on any street without a permit issued under by-law 21.

(2) The person to whom such permit is issued shall at his own expense cause such materials to be sufficiently fenced up and enclosed until the materials is removed or otherwise made secure to the satisfaction of the local authority.

(3) Lighting and warning signs shall be sufficiently provided on site and switched on during the hours of darkness.

PART VI

COMMUNICATION STRUCTURES

Prohibition against erecting communication structure without approval

26. No person shall erect any communication structure except with the approval of the local authority.

Submission of plans

27. (1) Any person who intends to erect a communication structure shall cause to be submitted by a qualified person to the local authority a written application together with such plans, drawings and specifications as may be required by the local authority under these By-laws for its approval.

(2) Payment of a processing fee as prescribed in the First Schedule shall be made upon submission of the application and it shall not be refundable irrespective of whether or not the application is approved by the local authority.

(3) The local authority may after receiving the written application, grant an approval subject to such conditions as it thinks fit to impose or refuse to grant an approval.

(4) Where an approval is granted by the local authority under this Part, the detailed structural plans and calculations shall be submitted in accordance with the provisions of the by-laws in Part III.

Permit for communication structure

28. Upon issuance of certificate of completion and compliance for the communication structure the local authority shall issue a permit for such period as determined by the local authority subject to payment of a fee as prescribed in the First Schedule.

Restriction against erection of communication structure

29. Notwithstanding anything contained in this Part, no communication structure shall be erected on —

(i) any building that is less than five storeys in height;

(ii) any building including the land appurtenant thereto constructed for the purpose of dwelling;

(iii) any land which has been subdivided pursuant to a planning permission granted for the purpose of erecting thereon a residential building.

PART VII

PROJECTION OVER FOOTWAY AND STREET

Projections over street and over the building line

30. (1) Where buildings abut a street, maximum projection of 1.80 metres over the street for verandah-way, balconies, sun-shades or similar projections may be permitted provided the width of the street is not less than 10 metres.

(2) Projections in the form of canopies over entrances in excess of 1.80 metres may be permitted at the discretion of the local authority.

(3) All such projections shall be at least 5 metres above the level of the road. Between the levels of 2.5 metres and 5 metres, projections not exceeding 500 millimetres may be permitted.

(4) Where a building line is set back from the regular line of a street, projections above the ground floor over such building line may be permitted provided that such projection shall not exceed one half of the building frontage to the street line.

Width of footway

31. (1) The width of any verandah-way or uncovered-footway shall not be less than 2.1 metres, but piers or columns to a maximum depth of 600 millimetres from the boundary of the street may be permitted on such verandah-way or uncovered-footway. The width of the verandah-way or uncovered footway shall be measured from the boundary of the street to the wall or other part (not being an outside verandah pier) of the building nearest the street, and all dimensions referred to in this by-law shall be measured at the pavement level of the verandah or uncovered footway.

(2) For the purpose of this by-law any step, threshold or other structure appurtenant to a building shall be deemed to be a part of the building though not directly connected therewith.

(3) Where there is a change in levels along the footway between adjoining lots there shall be provided steps with risers not exceeding 150 millimetres and treads not less than 275 millimetres or a pedestrian ramp of gradient not exceeding one in twelve (1:12).

(4) Where a service road is provided the footway required to be provided and constructed shall follow the line of the street.

Projections over verandah-way

32. Projection in the form of —

(a) beams;

(b) stairways and landings;

(c) screens;

(d) blinds; and

(e) signboards or advertisements;

which are not less than 2.5 metres above the verandah-way paving may be permitted subject to such conditions as may be specified by the local authority.

PART VIII

OPEN SPACES

Open space to be provided

33. Every building which is erected shall, unless the local authority is of the opinion that in any particular case air space is otherwise sufficiently and permanently provided for, have directly attached thereto an open space exclusively belonging thereto of such dimensions as may be prescribed hereafter.

Open space not to be altered or roofed

34. (1) Whenever any open space has been provided in connection with any building pursuant to these By-laws, no person shall, without the approval in writing of the local authority —

(a) make or maintain or permit to be made or maintained any alteration in such open space; or

(b) construct or maintain or permit to be constructed or maintained a roof over any portion thereof so as to diminish the space of such open space:

Provided that the local authority in its discretion may issue such a permit if it is satisfied that the free movement of air is not impeded or hindered.

(2) Every roof constructed or maintained over such open space pursuant to an approval granted by the local authority under subparagraph (1)(b) shall be set back by a

approval granted by the local authority under subparagraph (1)(b) shall be set back by a minimum of one metre from the boundary of the land.

(3) The local authority may by notice in writing require the owner or any person acting in contravention of this Part to remove any such alteration or roof or otherwise to do such works as will restore such open space.

Boundary wall and fences

35. (1) No open space of any building may be enclosed by a boundary wall, railing or fence of a height exceeding 1.8 meters from the ground floor level except with the written permission of the local authority.

(2) In granting permission for such an erection exceeding 1.8 meters, the local authority may specify the materials and mode of construction which shall be such as to permit satisfactory ventilation and free passage of light.

(3) Where a back lane exists, any such boundary wall, railing or fence may have a doorway at least 0.76 meters wide.

PART IX

LIGHT AND VENTILATION

Natural lighting and ventilation

36. (1) Every room designed, adapted or used for residential, business or other purposes except hospitals and schools shall be provided with natural lighting and natural ventilation by means of one or more windows having a total area of not less than 10% of the clear floor area of such room and not less than 5% of such floor area shall have openings capable of allowing a free uninterrupted passage of air.

(2) Every room used for the accommodation of patients in a hospital shall be provided with natural lighting and natural ventilation by means of one or more windows having a total area of not less than 15 % of clear floor area of such room and shall have openings capable of allowing a free uninterrupted passage of air or not less than 10% of such floor area.

(3) Every room used for the purpose of conducting classes in a school shall be provided with natural lighting and natural ventilation by means of one or more windows having a total area of not less than 20% of clear floor area of such rooms and shall have openings capable of allowing a free uninterrupted passage of air of not less than 10% of such floor area.

(4) Every water-closet, latrine, urinal or bathroom shall be provided with natural lighting and natural ventilation by means of one or more openings having a total area of not less than 0.2 square metre per water-closet, urinal latrine or bathroom and such openings shall be capable of allowing a free uninterrupted passage of air.

Air-wells

37. (1) *(a)* The minimum size of each air-well where provided in all buildings shall be as follows:

(i) for buildings up to 2 storeys in height, 7 square metres;

(ii) for buildings up to 4 storeys in height, 9 square metres;

(iii) for buildings up to 6 storeys in height, 11 square metres;

(iv) for buildings up to 8 storeys in height, 13 square metres;

(v) for buildings more than 8 storeys in height, 15 square metres;

(b) The minimum width of such air-wells in any direction shall be 2.5 metres.

(2) *(a)* The minimum size of each air-wells for lavatories, water-closets and bathrooms shall be as follows:

(i) for buildings up to 2 storeys in height, 3.5 square metres;

(ii) for buildings up to 4 storeys in height 4 square metres;

(iii) for buildings up to 6 storeys in height 4.5 square metres;

(iv) for buildings up to 8 storeys in height, 5 square metres;

(v) for buildings more than 8 storey in height, 5.5 square metres;

(b) The minimum width of such air-wells in any direction shall be 1.75 metres.

Mechanical ventilation and air-conditioning

38. (1) Where permanent mechanical ventilation or air-conditioning is intended, the relevant building by-laws relating to natural ventilation and natural lighting may be waived at the discretion of the local authority.

(2) The provisions of the Third Schedule of these By-laws shall apply to buildings which are mechanically ventilated or air-conditioned.

(3) Where permanent mechanical ventilation in respect of lavatories, water-closets, bathroom or corridors is provided for and maintained in accordance with the requirements of the Third Schedule of these By-laws, the provisions of these By-laws relating to natural ventilation and natural lighting shall not apply to such lavatories, water-closets, bathrooms or corridors.

Minimum area of rooms in residential buildings

39. (1) The area of the first habitable room in a residential building shall not be less than 11 square metres, the second habitable room shall not be less than 9.5 square metres and all other habitable rooms shall not be less than 8 square metres in area.

(2) The width of every habitable room in a residential building shall not be less than 2.5 metres.

(3) The area and width of a kitchen in a residential building shall not be less than 5 square metres and 1.5 metres respectively.

Height of rooms in residential buildings, shophouses, schools, *etc.*

40. (1) The height of any rooms in residential buildings including a dwelling unit comprised in a shophouse shall be:

(a) for living rooms, dining rooms, bedrooms and kitchen not less than 3.3 metres;

(b) for bathrooms, water-closets, latrines not less than 2.5 metres;

(c) for porch, garage, verandah, balcony, sheds and the like, not less than 2.5 metres;

(2) The average height of rooms with sloping ceilings in residential buildings including a dwelling unit comprised in a shophouse shall be:

(a) for living rooms, dining rooms, study room, bedrooms and kitchen not less than 3.3 metres;

(b) for bathrooms, water-closets, latrines not less than 2.5 metres;

(c) for porch, garage, verandah, balcony, sheds and the like, not less than 2.5 metres;

Provided that no part of any room shall be less than 2.5 metres in height.

(3) In shophouses, the height of rooms in the ground floor shops shall not be less than 3.6 metres and the height of rooms in upper floor shops shall not be less than 3.3 metres.

(4) In schools, the height of rooms used for the dissemination of knowledge shall not be less than 3 metres.

(5) In hospitals the height of rooms used for the accommodation of patients shall not be less than 3 metres.

(6) The clear height of any room in a factory in which any person works shall not be less than 5.4 metres and shall be provided with mechanical ventilation or airwell if more than 12 metres in depth.

Height of rooms in places of public resort

41. (1) The height of rooms, other than water-closets, lavatories, cloakrooms, corridors and rooms to which the public does not have access in places of public resort shall not be less than 3.5 metres. Where a balcony is provided for in places of public resort, the heights between the level of the topmost tier of the balcony and the ceiling over such topmost tier, and between the floor immediately under the balcony and the underside of the balcony, shall not be less than 3 metres in each case.

(2) In places of public resort the provisions of the paragraph (1) of by-law 42 shall apply to water-closets, lavatories, cloakrooms, corridors and rooms to which the public do not have access.

Heights of rooms in other buildings

42. (1) In buildings other than those specified in the preceding provision of by-laws 40 and 41 the height of rooms on any floor shall not be less than 3.3 metres.

(2) The clear height of any basement and multi-storey car park shall not be less than 2.5 and 2.3 metres respectively from structural and services projections.

(3) Where the greater part of the ground floor is left open for use as car-park or covered garden or similar purpose, the height of such ground floor shall not be less than 2.5 metres.

(4) The clear height of any habitable room or space inside any building shall not be less than 3.3 metres.

(5) The clear height of any verandah-way shall not be less than 3.3 metres.

PART X

CONSTRUCTIONAL REQUIREMENTS

Building site

43. (1) No building shall be erected on any site which has been filled up with any matter impregnated with faecal, animal or vegetable matter or upon which any such matter has been deposited unless and until such matter has been properly removed by excavation or otherwise has been rendered or become innocuous.

(2) The ground to be built upon by any building shall be effectively cleared of turf and other vegetable matter.

Building materials

44. (1) Any materials used —

(a) in the erection of a building.

(b) in the structural alteration or extension of a building;

(c) in the execution of works or the installation of fittings, being works or fittings to which any provision of these By-laws applies; or

(d) for the backfilling of any excavations on a site in connection with any building or works or fittings to which any provision of these By-laws applies, shall be —

(i) of a suitable nature and quality in relation to the purpose for and conditions in which they are used;

(ii) adequately mixed or prepared; and

(iii) applied, used or fixed so as to adequately perform the functions for which they are designed.

(2) The use of any material or any method of mixing or preparing materials or applying, using or fixing materials, which conforms to a Standard Specification or Code of Practice prescribing the quality of material or standards of workmanship shall be deemed to be sufficient compliance with the requirements of paragraph (1) if the use of the material or method is appropriate for the purpose and conditions in which it is used.

Drainage of subsoil

45. (1) Wherever the dampness or position of the site of a building renders it necessary, the subsoil of the site shall be effectively drained or such other steps shall be taken as will effectively protect the building against damage from moisture.

(2) Where, during excavation works, existing subsoil drains are discovered, such drains shall either be diverted or replaced by pipes of approved material to ensure the continual passage of subsoil water through such drains in such a manner as not to cause dampness to the site of the building.

Protection against soil erosion *etc*.

46. (1) All slopes and open spaces around the building shall be adequately protected against soil erosion.

(2) All ground under raised buildings shall be suitably finished and graded to prevent the accumulation of water or the growth of unwanted vegetation or the breeding of vermin.

Prevention of dampness

47. (1) Suitable measures shall be taken to prevent the penetration of dampness and moisture into a building.

(2) Damp proof courses where provided shall comply with BS 743 (Material for Damp Proof Course).

(3) Every brick or masonry wall of a building founded on a foundation shall be provided with a damp proof course which shall be —

(a) at a height not less than 150 millimetres above the surface of the ground adjoining the wall: and

(b) beneath the level of the underside of the lowest timber of the ground floor resting on the wall, or where the ground floor is a solid floor, not higher than the level of the upper surface of the concrete or other similar solid material forming the structure of the floor.

(4) Where any part of a floor of the lowest or only storey of a building is below the surface of the adjoining ground and a wall or part of a wall of the storey is in contact with the ground —

(a) the wall or part of the wall shall be constructed or provided with a vertical damp proof course so as to be impervious to moisture from its base to a

height of not less than 150 millimetres above the surface of the ground; and

(b) an additional damp proof course shall be inserted in the wall or part of the wall at its base.

(5) Where the floor or any part of the walls of a building is subject to water pressure, that portion of the floor or wall below ground level shall be waterproof.

Nominal thickness of walls

48. For the purposes of this Part where references are made to the thickness of any brick wall, the maximum or minimum thickness of such wall shall not exceed the nominal thickness plus or minus the maximum tolerance permissible under any standard specification.

Party walls

49. (1) All party walls shall generally be of not less than 200 millimetres total thickness provided they comply with Parts X and XII of these By-laws and have an acoustic performance of not less than 50 dB of sound transmission loss attenuation (Sound Transmission Classrating).

(2) Such walls may be made up of two separate skins, each of not less than 100 millimetres thickness if constructed at different times.

(3) In multi-storey residential buildings of reinforced concrete or other framed construction constructed to the requirements of these By-laws, the party wall thereof shall not be less than 100 millimetres in total thickness at any point on the wall.

(4) No combustible material shall be built into the thickness of any party wall unless not less than 100 millimetres of masonry or a fire stop with equivalent FRP is provided between such material.

Openings in party walls

50. (1) Openings may be made or left in a party wall if —

(a) such openings are made with the consent of and in accordance with the requirements of the local authority; and

(b) the owners of the properties concerned give written permission.

(2) Every opening in a party wall shall be solidly built up with brick or stonework to the full thickness of the party wall and property bonded therewith when the use of such opening is discontinued.

Recess

51. Where a recess is made in an external wall or a party wall —

(a) the wall at the back of the recess shall not be less than 100 millimetres thick in an external wall;

(b) a sufficient arch or lintel of incombustible material shall be built in every storey over the recess;

(c) in each storey the total area of recesses causing the wall at the back of the recesses to be of less thickness than that prescribed by these By-laws shall not exceed one-half of the superficial area of the wall; and

(d) the side of the recess nearest to the inner face of a return external wall, shall not be less than 300 millimetres therefrom.

Underpinning

52. If underpinning is required the submitting person shall —

(a) give written notice to the local authority informing of the fact and stating the method of underpinning proposed to be used;

(b) obtain the written permission of the local authority thereof before proceeding with work; and

(c) comply with the requirements as set out in these By-laws.

Coping, *etc.*, to be impervious

53. (1) Every coping, cornice or other like projection shall be of brick, tile, stone concrete, cement render or other impervious material.

(2) Every parapet wall, free-standing wall or boundary wall shall be finished on top with an impervious material.

Projections in brickwork

54. All projections in brickwork shall be corbelled gradually and no projection in brickwork shall extend more than 230 millimetres from the face of any wall unless sufficiently reinforced.

Measurement of the length of a wall

55. For the purpose of these By-laws —

(a) walls shall be deemed to be divided into distinct lengths by return walls when bonded to each other;

(b) the length of a wall shall be measured from centre to centre of —

(i) cross walls bonded to it; or

(ii) a column therein having a dimension measured parallel to the length of the wall of not less than twice the thickness of the wall and a dimension measured at right angles to the wall of not less than three times the thickness of the wall.

External panel walls

56. In all cases where masonry or other materials and components are used for external panel walls, such walls shall be properly secured to the structural framework in accordance with Part X of these By-laws.

Non load-bearing partition

57. Every non load-bearing partition shall be adequately restrained or buttressed.

Timber built into party walls

58. No timber such as joists, beams, wall plates, file battens and ties shall be built into the thickness of any party wall unless there is not less than 100 millimetres of brickwork or cement between such timbers.

Cooking facilities in residential buildings

59. (1) Every residential building and every floor of a residential building which is or may be separately let for dwelling purposes shall be provided with a kitchen.

(2) Where a common vertical kitchen exhaust riser is provided, the riser shall be continued up to a mechanical floor or roof for discharge to the open, and shall be constructed with fire resisting material of at least 2 hours rating in accordance with BS 476: Part 3.

(3) Where no common vertical kitchen exhaust riser is provided, an exhaust system with filter shall be installed.

Boilers places, forges and incinerators in factories

60. Boilers, fireplaces, furnaces, forges, incinerator and other similar heat generating appliances used in buildings other than residential buildings shall be provided with adequate means for conveying the heat and fumes generated by such appliances so as to discharge into the open by means of properly constructed flues or ducts of fire resisting material of at least two hours rating in accordance with BS 476 Part 3.

Combustible materials adjoining smoke flues

61. Combustible materials used in the construction of the building shall be at least 80 millimetres clear of any casing to any flue required for the conveyance of smoke or other products of combustion.

Timber floors

62. (1) Where structural timber floors are permissible under these By-laws they shall be designed of hardwood or species of timber treated with a suitable wood preservative.

(2) All timber floors joists shall be designed in accordance with these By-laws.

(3) All timber trimming joists shall be at least 25 millimetres thicker than the joist of the adjoining floor.

Bearing for joists

63. (1) All joists shall have at least 100 millimetres bearing on the walls and where supported on corbelled brickwork, such corbelling shall be continuous over-sailing courses. Separate corbels shall not be allowed.

(2) No joists shall be built into the thickness of any party wall unless there is at least 100 millimetres of fire resisting material between the sides and end of such timbers.

(3) All ends of joists built into walls shall be treated with wood preservative.

Dimensions of staircases

64. (1) In any staircase, the rise of any staircase shall not be more than 180 millimetres and the tread shall not be less than 275 millimetres and the dimensions of the rise and the tread of the staircase so chosen shall be uniform and consistent throughout.

(2) The widths of staircases shall be in accordance with by-law 128.

(3) The depths of landings shall not be less than the width of the staircases.

Handrails

65. (1) Except for staircases having fewer than 4 risers, all staircases shall be provided with at least one handrail.

(2) Staircases exceeding 2200 millimetres in width shall be provided with intermediate handrail for each 2200 millimetres of required width spaced approximately equally.

(3) In buildings other than residential buildings, a handrail shall be provided on each side of the staircase when the width of the staircase is 1200 millimetres or more.

(4) All handrails shall not project more than 100 millimetres from the face of the finished wall surface and shall be located not less than 825 millimetres and not more than 900 millimetres measured from the nosing of the treads provided that handrails to landings shall not be less than 900 millimetres from the level of the landing.

Maximum flights

66. (1) In a residential buildings, a landing of not less than 1.80 metres in depth shall be provided in staircases at vertical intervals of not more than 4.25 metres and in staircases in all other buildings there shall not be more than sixteen risers between each such landing.

(2) No part in any flight of any staircase shall have less than two risers.

Winders

67. Winding and spiral staircase shall not form part of the exit route.

No obstruction in staircases

68. (1) There shall be no obstruction in any staircase between the topmost landing thereof and the exit discharge on the ground floor.

(2) There shall be no projection, other than handrails in staircases, in any corridor, passage or staircase at a level lower than 2 metres above the floor or above any stair.

Lighting and ventilation of staircases

69. All staircases shall be properly lighted at an average illuminance level of not less than 100 lux and ventilated according to the requirements as stipulated under by-laws 160 to 162 of Part XII.

Enclosure of staircase in a shop

70. (1) In a shop, the flight of stairs which has access directly from the street shall be enclosed with walls constructed of incombustible material.

(2) The use of other materials for the construction of such walls shall be subject to approval from Director General.

Use of timber staircases

71. (1) Timber staircases may be permitted for the following types of buildings which are not more than three storeys in height:

(i) detached residential buildings;

(ii) semi-detached residential buildings;

(iii) terrace houses;

(iv) in the upper floors of shophouses other than from the ground floor to the first floor provided that it is located within the protected area for its full height; and

(v) other similar types of buildings of limited fire risk at the discretion of the local authority.

(2) All other staircases shall have a fire-resistance rating of not less than two hours.

Roof coverings and drainage

72. All roofs of buildings shall be so constructed as to drain effectually to suitable and sufficient channels, gutters, chutes or troughs which shall be provided in accordance with the requirements of these By-laws for receiving and conveying all water which may fall on and from the roof.

Accessible flat roofs, balconies, *etc.*

73. Every flat roof, balcony or other elevated areas 1.8 metres or more above the adjacent area where normal access is provided shall be protected along the edges with suitable railings, parapets or similar devices of not less than 1 metre in height or by other suitable means.

Access to roof space

74. Where the space beneath a roof is enclosed by a ceiling, access to such space shall be provided by means of a trap door at least 0.6 metre in any direction.

Change of use of building

75. When the use of a building is changed, a refuse disposal system shall be provided to the satisfaction of the local authority.

Lifts

76. For all non-residential buildings exceeding 4 storeys above or below the main access level at least one lift shall be provided.

Swimming pools

77. (1) The floor and wall surfaces of swimming pools shall be smooth and free from cracks.

(2) Swimming pools shall be completely surrounded by an overflow channel constructed in such a manner so that —

(a) the overflow and any matter floating therein cannot return directly to the swimming pool;

(b) the arms or legs of swimmers cannot be trapped by the overflow channel; and

(c) swimmers can take hold of the edge of the overflow channel but so that the depth of the overflow channel does not enable the bottom of the overflow channel to be touched with the fingers.

Steps and footway

78. (1) Steps shall be situated at the side walls near the ends of the swimming pool and shall be so arranged that they are not higher than the internal facing of the walls of the swimming pool, such steps being constructed of non-ferrous material with a non-slip suface and provided with a handrail.

(2) A footway with a non-slip surface shall be provided around every swimming pool.

Openings into swimming pool

79. The opening by which the water enters a swimming pool shall be distributed in such a manner that circulation of the water in the swimming pool is uniform and dead points of stagnant place avoided.

Depth of water

80. (1) Swimming pools shall have lines marked on the side walls of a swimming pool to indicate —

(a) the depth of the water at the shallow and deep ends of the swimming pool;

(b) the part of the swimming pool where the depth of the water is between 1.3 metres and 1.8 metres; and

(c) the depth of the water shown in figure over the lines marked on the side of the swimming pool above the overflow channel of the swimming pool.

(2) The water in swimming pools with diving boards or platform shall have the following minimum depths as measured at any point within the swimming pool 1.53 metres from the free end of the diving boards or platforms —

(a) for diving boards up to 3 metres above the level of the water, such minimum depth shall be 3.3 metres; and

(b) for platform up 9.7 metres above the level of the water, such minimum depth shall be 4.5 metres.

Location of boards

81. Diving boards, platform and water chutes in the swimming pool shall be situated not less than 1.8 metres from the sides of the swimming pool or from any other diving board, platform or water chute in the swimming pool.

Changing rooms

82. (1) Swimming pools shall have separate male and female changing rooms.

(2) The flooring of such changing rooms shall be of a non-slip impermeable material, easy to clean, and graded to drainage outlets sufficient to enable water used therein for cleaning purposes to be rapidly drained.

(3) The walls of such changing rooms shall be smooth, impermeable, and easy to clean up to a height of 1.8 metres.

Foot-baths and shower

83. There shall be provided around the swimming pool sufficient numbers of footbaths of not less than 0.9 metres each in any dimension with a shower situated over the entrance thereto and such foot-bath shall be provided with running water.

Private, residential swimming pool

84. By-laws 77 and 83 shall apply to public and commercial swimming pools and not to private, residential or special purpose swimming pools, the approval of which shall be at the discretion of the local authority.

Building requirements for disabled persons

85. (1) Any building or part thereof to which this by-law applies shall —

(a) be provided with access to enable disabled person to get into, out of and to move within the building except for any part of the building for which access is provided wholly or mainly for the inspection, maintenance or repair of the building, its services or fixed plant or machinery; and

(b) be designed with facilities for the use of the disabled person.

(2) The requirement of this by-law shall be deemed to be satisfied by compliance with Malaysian Standard MS1183 and MS1184.

Energy efficiency in buildings

86. The local authority may require —

(a) any new or redevelopment of non-residential buildings with air-conditioned space exceeding 4,000 square meters to be designed to meet the requirements of MS 1525 with regards to the Overall Thermal Transfer Value (OTTV) and the Roof Thermal Transfer Value (RTTV); and

(b) the roof for any buildings (residential and non residential) to have a thermal transmittance (U-value) not greater than —

(i) 0.4 W/m2K for Light (under 50 kg/m2) weight roof; and

(ii) 0.6 W/m2K for Heavy (above 50 kg/m2) weight roof, unless provided with other shading or cooling means.

unless provided with order shading or cooling means.

PART XI

BUILDING OPERATIONS

Prohibition against commencement of building operations

87. No person shall commence any building operation unless —

(a) the building operation is commenced within twelve months from the date on which the plans in respect of such building were approved by the local authority; and

(b) the qualified person has given the local authority seven days' notice in writing of his intention to commence such work.

Prohibition against resumption of building operations

88. No person shall resume any building operation in the case where the building operation has been suspended for a continuous period exceeding twelve months unless —

(1) the qualified person has given the local authority seven days' notice in writing of his intention to resume such work; and

(2) the qualified person certifies that the resumption of building operation will not involve any departure or deviations from the plans approved by the local authority.

Commencement of building operation

89. (1) When any building operation is commenced, the person responsible for the building operation shall display a board giving the names, address and telephone numbers of the submitting person and building contractor.

(2) Construction of any building shall not commence unless a protective hoarding in accordance with the requirements of the local authority is erected to separate the building from the public street or footway.

(3) Where a protective hoarding is required, a permit shall be obtained in accordance with by-law 21 and the protective hoarding shall be constructed in accordance with the approved protective hoarding plan and shall during the demolition or erection of any buildings be maintained in good condition to the satisfaction of the local authority.

(4) Upon commencement of building operation, the local authority may give written directions to the qualified person in respect of any matter concerning the building operation as the local authority considers necessary.

(5) Any person who fails to comply with the direction given under paragraph (4) commits an offence.

Responsibility of person carrying out building operations

90. The person carrying out building operation shall —

(a) take such measures as are necessary to keep the roadside drain clear of obstruction and to the satisfaction of the local authority;

(b) make adjustments to existing cables, pipes and other services or utility or equipment and for their reinstatement on completion of the works in accordance with the requirements of the relevant authorities;

(c) paint the ends of the hoardings with reflective paint and for having the ends of hoardings and railings suitably marked by red warning lights throughout the night;

(d) be responsible for any accident and damage to property or persons, directly attributable to the hoardings or railings;

(e) ensure that hydrant points and any other existing utility service installations are not obstructed by such hoardings or materials;

(f) provide suitable openings with hand-rails at the ends of the hoarding to permit easy means of access and egress over the roadside drain, to and from the adjoining verandah-ways;

(g) be responsible for the maintenance of the protective hoarding to the satisfaction of the local authority;

(h) exercise due care so as not to damage any existing service mains by overloading the ground or by temporary construction;

(i) maintain and upkeep the construction site in a clean and tidy condition at all times;

(j) repair any damage to roads, drain and footway leaving the site and drains in a clean and tidy condition;

(k) remove the hoarding together with all materials and debris on completion of the works;

(l) take measures to secure the safety of the neighbouring land;

(m) comply with the building operation hours as determined by the local authority; and

(n) such other directions and conditions as may be given or imposed by the local authority from time to time.

Vehicular access to site

91. The local authority may restrict vehicular access to the site to such hours as it thinks fit in order to avoid obstructing the flow of traffic.

Supervision of building operations

92. (1) Where under these By-laws any plan, drawing or calculation in relation to any building is required to be submitted by a principal submitting person or submitting person, no erection or continued erection of that building shall take place unless that principal submitting person or submitting person or any person duly authorised by him undertakes the supervision of the erection and the setting out, where applicable, of that building.

(2) The principal submitting person or submitting person shall notify the local authority of any deviation from the plan, drawing or calculation submitted by him or non-compliance with any provision of these By-laws which he may observe during the erection of the building.

(3) Site supervisory staff shall be appointed to supervise the works of the contractor to ensure compliance with site safety measures, erection quality, plans and specifications of the building.

(4) The local authority shall, if satisfied of the existence of any deviation or non-compliance, by notice in writing require the owner to rectify such deviation or non-compliance within such time as may be specified in the notice.

(5) Any owner who fails to comply with any of the requirements of the notice within the time specified therein commits an offence.

(6) The submitting person shall be responsible for the supervision of the building operations and shall ensure structural elements of the building works, including the geotechnical and foundation works are carried out in accordance with the approved plans and the deposited plans of the building works, the project specifications and requirements, and the provisions of these By-laws.

(7) A copy of the site construction record in respect of foundation works, piling works, concreting works, structural steel works, material and construction testing shall be kept and maintained.

(8) Upon completion of building operation, two sets of as-built building and structural drawings in hardcopy and digital copy shall be submitted by the Principal Submitting Person to the local authority for record purposes.

Order to review safety and stability in the course of erection of building

93. (1) Where the local authority reasonably suspects there is a defect, deformation or deterioration in the structure of a building under erection which may likely result in the failure of the building, the local authority may issue to the owner of the building an order to review the safety and stability of —

(a) the building;

(b) the foundation of the building; and

(c) the surroundings on which the erection of building is in progress.

(2) The review shall be undertaken by a qualified person other than the submitting person who prepared and certified the plans, calculations, particulars, documents or reports submitted to the local authority before the commencement of erection of building.

(3) The report of the review shall be submitted to the local authority within the period specified by the local authority.

(4) The local authority may, after evaluating the report of the review, issue to the owner of the building an order for the cessation of building operations, provided it is satisfied that the public safety or property is adversely affected or is likely to be adversely affected by the erection of building.

(5) Without prejudice to its power under paragraph (4) the local authority may, after evaluating the report of the review, give to any person written directions requiring —

(i) the submission of a fresh or an amended plan in respect of the following:

(a) the stabilization of slope;

(b) the provision of additional drainage facilities;

(c) the strengthening of existing retaining walls and the construction of new walls;

(d) the provision of other additional features to support existing construction works; and

(e) rectification works to be undertaken to remedy any defect, deformation or deterioration in the structure of the building, the removal of any danger to life or property and ensuring safety and stability of the building, its foundation and surroundings and such directions shall be complied with within the period specified therein.

(6) Where an order for cessation of building operation is not complied with, the local authority may summarily eject any person or remove any equipment, vehicle, machinery or article from the site where the building is being erected to secure the cessation of the building operations.

(7) Notwithstanding anything in this Part, the local authority may execute any work, take any measure or demolish a building under construction —

(a) if it considers such work, measure or demolition is necessary to prevent an imminent danger to life or property; or

(b) if there is non-compliance with any directions given under this by-law,

and such work, measure or demolation may be in addition to or in place of such anything required to be done under such directions and the local authority may recover all expenses reasonably incurred by it in doing so from the owner of the building.

(8) The local authority or any authorized person may enter the site of a building under construction at any time without notice to the owner thereof to carry out an inspection or for any other purposes under this by-law.

(9) Where —

(a) the cessation of the building operations has been secured;

(b) the directions given under this by-law have been complied with; and

(c) the rectification works as directed have been executed,

the local authority may allow the resumption of building operation subject to compliance with such directions and conditions as it may specify.

(10) The local authority may, without prejudice to its right to recover the expenses under these By-laws, refuse to allow the resumption of building operations until all expenses reasonably incurred by it in securing the cessation of the erection of building, executing the work or taking the measure have been reimbursed by the owner of the building.

(11) Any person who —

(a) fails to comply with any order, direction or condition given under these By-laws; or

(b) does any act to obstruct in any manner whatsoever the local authority or any authorized person in the execution of its or his powers under these By-laws,

commits an offence.

PART XII

FIRE SAFETY INSTALLATION REQUIREMENTS

Interpretations

94. In this Part and Part XIII unless the context otherwise requires —

"automatic" means a device or system providing an emergency function without the necessity of human intervention;

"balcony approach" means a balcony being an external approach to a common staircase serving one or more occupancies;

"boundary" in relation to building, means the boundary of the land belonging to the building (such land being deemed to include any abutting part of a street, canal or river but only up to the centre line thereof); and boundary of the premises shall be construed so as to include any such part to the same extent;

"circulation space" means any space which is solely or predominantly used as a means of access between a room and a protected shaft or between either a room or a protected shaft and exit from the building or compartment;

"compartment" means any part of a building which is separated from all other parts by one or more compartment walls or compartment floors or by both such walls and floors; and for the purposes of this Part, if any part of the top storey of a building is within a compartment, the compartment shall also include any room space above such part of the top storey;

"compartment walls" and "compartment floor" mean respectively a wall and a floor which comply with by-law 111, and which are provided as such for the purposes of by-law 97 to divide a building into compartments for any purpose in connection with by-law 176 or 110;

"Director General" has the same meaning assigned to it in the Fire Services Act 1988 [*Act 341*];

"dead-end" means an area from which escape is possible in one direction only and in an open plan includes any point from which the direct routes to alternative exists subtend an angle of less than 45o;

"designated floor" means the floor level at which the fire brigade has access to the fire lifts and will normally be the floor level closest to the fire appliance access level;

"direct distance" means the shortest distance from any point within the floor area measured within the external enclosures of the building to the relevant exit disregarding walls, partitions of fitting other than the enclosing walls or partitions to protected staircases;

"door" includes any shutter, cover or cover form of protection to an opening in any wall or floor of a building, or in the structure surrounding a protected shaft, whether the door is constructed of one or more leaves;

"element of structure" means —

(a) any member forming part of the structural frame of a building or any other beam or column (not being a member forming part of a roof structure only);

(b) a floor, including a compartment floor, other than the lowest floor of a building;

(c) an external wall;

(d) a separating wall;

(e) a compartment wall;

(f) structure enclosing a protected shaft;

(g) a load-bearing wall or load-bearing part of a wall; and

(h) a gallery

"emergency lighting" means the illumination obtained through either an independant or secondary source of electricity supply such as trickle charged accumulators or separate generators to the normal or duplicate lighting;

"exit discharge" means a door from a storey, flat, or room which door gives access from such storey, flat or room on to an exit route;

"exit route" means a route by which persons in any storey of a building may reach a place of safety outside the building and may include a room, doorway corridor, stairway or other means of passage not being a revolving door, lift or escalator;

"exit staircase" means a staircase separated from the building it serves by partitions having a FRP of not less than half hour and which has all openings in such partitions fitted with fixed lights and self-closing doors each having a FRP of not less than half hour;

"externally non-combustible" means external faces with, or otherwise externally consisting of non-combustible material;

"external staircase" means a staircase which is completely open to the external air on at least two sides from the level of the top of the balustrade to the underside of the flight of stairs immediately above;

"final exit" means a point of discharge for the escape route from a building providing direct access to the street, passage-way or open steps sited to enable the evacuation of persons from the vicinity of a building so that they are safe from fire or smoke;

"fire appliance access level" means the level at which fire appliances can approach the building for purposes of fire fighting or evacuation of occupants;

"fire fighting access level" means the highest level at a fire appliance ladder may be brought against a building for purposes of fire fighting and evacuation;

"fire fighting access lobby" means a lobby separated from the storey it serves by construction of a FRP of at least half hour, directly accessible from a fire fighting staircase and a fire lift and containing a dry or wet riser;

"fire fighting shaft" means a protected enclosure that contains a fire fighting staircase and a fire fighting access lobby with or without a fire lift;

"fire fighting staircase" means a staircase designated as a recognised means of access into the building for firemen in the event of a fire;

"fire lifts" means lift capable of being commandeered for exclusive use of firemen in emergency;

"firemen's switch" means a switch located adjacent to the fire lift by the designated floor to enable the fire brigade to gain control of the fire lifts;

"fire resistance" has the meaning ascribed to it in by-law 184;

"fire resistance period" means the period for which an element will meet the requirements in respect of transmission of heat or resistance to collapse with passage of flame when tested in accordance with MS 1073;

"fire resisting" means the construction so designated, including doors, has a minimum standard of fire-resistance of not less than half hour in accordance with the relevant Schedules of these By-laws or which achieves such standard when tested in accordance with BS 476 except that, in the case of the doors —

(a) the rabbets to the door frame or the door stops whichever may be are not less than 18 millimetres deep;

(b) the door is hung on metal hinges having a melting point of not less than 800°C and

(c) the door is rendered self-closing;

"fire stop" means a barrier or seal which would prevent or retard the passage of smoke or flame within a cavity or around a pipe or duct where it passes through a wall or floor or at a junction between elements of structure;

"FRP" means fire resistance period;

"height of a building" has the meaning ascribed to it in by-law 96;

"horizontal exit" is a means of egress from a compartment or building to an adjacent compartment or building on approximately the same level and thence to a protected staircase or final exit either direct or via a protected corridor;

"interior finish" means the exposed interior surface of buildings including, but not limited to fixed or movable walls, partitions, columns and ceilings;

"non-combustible" shall apply to materials as specified under BS 476;

"open corridor" means a corridor that has wall openings open to the atmosphere primarily for the adequate dissipation of smoke;

"open structure" means a structure that, at each level, has wall openings open to the atmosphere;

"permitted limit of unprotected areas" means the maximum aggregate area of unprotected areas in any side or external wall of a building or compartment, which complies with the requirements as set out in the Fifth Schedule of these By-laws for such building or compartment;

"protected corridor" means a corridor separated from the building it serves by partitions having a FRP of not less than half hour and which partitions have all openings therein fitted with fixed lights and self-closing doors each having a FRP of not less than half hour;

"protected lobby" means a lobby enclosed throughout by partitions having a FRP of not less than half hour and has all openings therein fitted with fixed lights and self-closing doors having a FRP of not less than half hour;

"protected shaft" means a stairway, lift, escalator, chute, duct or other shaft which enables persons, things or air to pass between different compartments; and which complies with the requirements of by-law 113;

"protecting structure" means any wall or floor or other structure which encloses a protected shaft other than —

(a) a wall which also forms part of an external wall, separating wall or compartment wall; or

(b) a floor which is also a compartment floor or a floor laid directly on the ground; or

(c) a roof;

"relevant boundary " in relation to a side or external wall of a building or compartment, means that part of the boundary of the premises or the notional boundary as prescribed in by-law 109 which is adjacent to that side or wall and either coincides with, is parallel to or is at an angle of not more than 80 with that side or wall;

"separating wall" means a wall or part of a wall which is common to two adjoining buildings;

"smoke lobby" means a protected lobby being the approach to a staircase and which acts as a fire and smoke check between a storey and the staircase;

"internal staircase" means a staircase enclosed on all sides by partitions of walls and which has all openings in the internal walls glazed or otherwise protected from the weather;

"storey exit" means a fire rated door to a protected staircase or a corridor protected with a fire resisting structure in accordance with the Eighth Schedule of these By-laws and in the case of ground floor accommodation storey exit means a door leading directly to a place of safety outside the building;

"travel distance" means the distance required to be traversed from any point in a storey of a building to either —

(a) the fire-resisting door in the staircase enclosure; or

(b) if there is no such door, the first stair tread of the staircase;

"unprotected area" in relation to an external wall or side of a building, means —

(a) a window, door or other opening;

(b) any part of the external wall which has fire resistance less than that specified by this Part for the wall; and

(c) any part of the external wall which has combustible material more than 1.5 millimetres thick attached or applied to its external face, whether for cladding or any other purpose.

Designation of purpose groups

95. For the purpose of this Part every building or compartment shall be regarded according to its use or intended use as falling within one of the purpose groups set out in the Fourth Schedule of these By-laws and, where a building is divided into compartments, used or intended to be used for different purposes, the purpose group of each compartment shall be determined separately:

Provided that where the whole or part of a building or compartment, as the case may be, is used or intended to be used for more than one purpose, only the main purpose of use of that building or compartment shall be taken into account in determining into which purpose group it falls.

Rules of measurement

96. In this Part —

(a) the height of a building, or part of such building as described in by-law 178 means the height of such building or that part of the building, measured from the mean level of the ground adjoining the outside of the external walls of the building to the level of half the vertical height of the roof of the building or that part of the building, or to the top of the walls of the parapet (if any), whichever is the higher;

(b) the area of —

(i) any storey of a building or compartment shall be taken to be the total area in that storey bounded by the finished inner surfaces of the enclosing walls or, of any side where there is no enclosing wall, by the outermost edge of the floor on that side;

(ii) any room or garage shall be taken to be the total area of its floor bounded by the inner finished surfaces of the walls forming the room or garage;

(iii) any part of a roof shall be taken to be the actual visible area of such part measured on a plane parallel to the pitch of the roof;

(c) the cubic capacity of a building or compartment shall be ascertained by measuring the volume of space contained within —

(i) the finished inner surfaces of the enclosing walls or, on any side where there is no enclosing wall, a plane extending vertically above the outer most edge of the floor on that side;

(ii) the upper surface of its lowest floor; and

(iii) in the case of a building or of a compartment which extends to a roof, the under surface of the roof or, in the case of any other compartments, the under surface of the ceiling of the highest storey within the compartment, including the space occupied by any other walls, or any shafts, ducts or structure within the space to be so measured.

Provisions of compartment walls and compartment floors

97. Any building, other than a single storey building, of a purpose group specified in the Fourth Schedule of these By-laws and which has —

(a) any storey the floor area of which exceeds that specified as relevant to a building of that purpose group and height; or

(b) a cubic capacity which exceeds that specified as so relevant shall be so divided into compartments, by means of compartment walls or compartment floors or both, that —

(i) no such compartment has any storey the floor area of which exceeds the area specified as relevant to that building; and

(ii) no such compartment has a cubic capacity which exceeds that specified as so relevant to that building;

Provided that if any building is provided with an automatic sprinkler installation which complies with MS1910, this by-law has effect in relation to that building as if the limits of dimensions specified are doubled except patient accommodation ward according to by-law 188.

Use of fire shutters

98. (1) A fire shutter may be permitted to be used as a compartment wall, except for the fire compartmentation of Fire Command Centre (FCC) or means of escape including an exit staircase, fire fighting access lobby, smoke lobby and internal exit passageway.

(2) A shutter, may be used to protect an opening in the compartment wall or floor and the shutter shall have the necessary fire resistance including a thermal insulation, which shall not be less than the fire resistance of the compartment wall or floor.

(3) However, the fire shutter, which may be installed to any area without any intended fire load such as the edge of atria or voids such as escalators voids areas, car park driveways and between the floors or door-ways, may not have the thermal insulation.

(4) The commonly used shutters such as vertical fire shutters, horizontal fire shutters and lateral fire shutters shall comply with MS 1073: Part 3 or BS 476: Part 22 and the following requirements:

(a) for a vertical fire shutter operated by gravity during a fire, upon activation by a fire alarm system or fusible link, the operating mechanism of a curtain or leaf of the vertical fire shutter shall be released; and the curtain or leaf shall descend under gravity at a con trolled rate; and

(b) for an electrically operated vertical fire shutter, lateral fire shutter or horizontal fire shutter (a fusible link is not required), upon activation by a fire alarm system, the electrical motor shall drive the curtain or leaf to descend and shall be backed up by an emergency power supply; and the power and signal cables shall be fire-rated.

(5) The mode of activation for fire shutters at different locations shall be as follows:

(a) where the fire shutter is used as a separating wall between two buildings —

(i) if two buildings are separated by a common fire shutter, both gravity-operated and electrically operated fire shutters shall be linked to the fire alarm systems of both buildings and shall be activated by the fire alarm system of either building, and the activation solely by a fusible link shall not be permitted; and

(ii) if two buildings are separated by two separate fire shutters, both gravity-operated and electrically operated fire shutters shall be activated by the fire alarm system of its own building and the activation solely by a fusible link shall not be permitted;

(b) where the fire shutter is used as a compartment wall or floor for limiting a compartment area and cubical extent, as compartmentation between different purpose groups and as compartmentation of a passenger lift lobby or goods lift lobby which is situated at the basement:

(i) for a gravity-operated vertical fire shutter, the activation by a fusible link is acceptable; and

(ii) for an electrically operated fire shutter, the activation shall be by local smoke detector or other fire alarm;

(c) where the fire shutter is used as a compartmentation at atria or voids or between floors (being part of the engineered smoke control design), only an electrically operated fire shutter shall be permitted, and the signal to operate the respective fire shutter shall be from a dedicated smoke detector installed at the respective smoke zone.

(6) An exit directional signage marks with an arrow and the word "KELUAR" shall be prominently painted or pasted on a fire shutter or smoke curtain to redirect the building occupants to the nearest exits if the activated shutter visually obscure the building exit or directional sign.

(7) The signage shall be reflective and the letter in the signage shall be at least 100 millimetres in height.

Compartmentation by height

99. (1) In any buildings not exceeding 30 metres in height, any floor which is more than 9 metres above ground floor level which separates one storey from another storey, other than a floor which is either within a maisonette or a mezzanine floor shall be constructed as a compartment floor.

(2) In any building exceeding 30 metres in height, all floors shall be constructed as compartment floors, other than a compartment which is within a residential maisonette which may comprise two storey levels.

(3) An atrium shall comply with the requirements of by-law 211.

Other walls and floors to be constructed as compartment walls or compartment floor

100. The following walls and floors in building shall be constructed as compartment walls or compartment floors —

(a) any floor in a building of Purpose Group II (Institutional);

(b) any wall or floor separating a flat or maisonette from any other part of the same building;

(c) any wall or floor separating part of a building from any other part of the same building which is used or intended to be used mainly for a purpose falling within a different purpose group as set out in the Fourth Schedule of these By-laws; and

(d) any floor immediately over a basement storey if such basement storey has an area exceeding 100 square metres.

Partition

101. Every partition in a building shall comply with Eighth Schedule-Part IX of these By-laws and the materials for surface finish of the partition shall not be treated as part of the wall and shall comply with the relevant provisions of by-law 168.

Separation of fire risk area

102. (1) The following areas of uses shall be separated from the other areas of the occupancy in which they are located by fire resisting elements of structure constructed in accordance with the FRP specified in the Eighth Schedule based on the degree of fire risk —

(a) boiler rooms and associated fuel storage areas;

(b) repair shops involving hazardous processes and materials;

(c) storage areas of hazardous materials;

(d) liquefied petroleum gas storage areas;

(e) transformer rooms and substations;

(f) flammable liquids stores;

(g) shafts for electrical risers excluding shafts for extra low voltage systems; and

(h) cold room.

(2) For hospital and nursing home of Purpose Group II (Institutional) laboratories and kitchens shall not have sleeping accommodation above them and shall form separate compartments from in-patient treatment areas, public areas, staircase and lift discharge areas.

Fire appliance access

103. (1) Fire appliance access shall be provided within the site of a building to enable fire appliances to gain access to the building.

(2) An access opening shall also be provided along the external walls of buildings fronting the fire appliance access to provide access into the building for firefighting and rescue operation.

(3) The requirements of fire appliance access shall be as follows —

(a) the fire appliance access shall have a minimum width of 6 metres throughout its entire length and shall be able to accommodate the entry and manoeuvring of fire appliances, extended ladders pumping appliances, turntable and hydraulic platforms;

(b) the fire appliances access shall be metalled or paved or laid with strengthened perforated slabs to withstand the loading capacity of a stationary 30 tonnes fire appliance;

(c) the fire appliances access shall be positioned so that the nearer edge shall not be less than 2 metres or more than 10 metres from the centre position of the access opening, measured horizontally;

(d) the fire appliance access shall be laid on a level platform or if on an incline, the gradient shall not exceed 1:15. The access road shall be laid on an incline not exceeding a gradient of 1:9;

(e) the dead-end of a fire appliance access road shall not exceed 46 metres in length or if it exceeds 46 metres, be provided with turning facilities;

(f) the outer radius for turning of the fire appliance access road shall comply with the requirements of the Fire and Rescue Department;

(g) the overhead clearance of fire appliances access road shall be at least 4.5 metres for passage of fire appliance;

(h) a public road may serve as fire appliances access provided that the location of such a public road is in compliance with the requirements of distance from access opening as the Fire and Rescue Department may specify; and

(i) the fire appliance access road shall be kept clear of obstruction and any other part of the building, plant, tree or any other fixture which obstructs the path between the access way and the access openings.

(3) All corners of the fire appliance access shall be marked as follows —

(a) the marking of corners shall be in contrasting colour to the ground surfaces or finishes;

(b) the fire appliance access provided on turfed area shall be marked with contrasting object (preferably reflective) that shall be visible at night. The markings are to be at an interval not more than 3 metres apart and shall be provided on both sides of the access way; and

(c) a sign post displaying the wordings "Fire Appliances Access – Keep Clear" shall be provided at the entrance of the access way and the size of wordings shall not be less than 50 millimetres.

(4) For the proportion of the building in excess of 7000 cubic metres, fire appliance access fronting the building shall be provided in accordance with the following scale:

Volume of building in cubic metre	Minimum proportions of perimeter of building
7,001 to 28000	one-sixth
28,001 to 56000	one-fourth
56,001 to 84000	one-half
84,001 to 112000	three-fourths
112,001 and above	island site

Separating walls

104. (1) Subject to the exceptions specified in paragraph (2) no openings shall be made in any separating wall which forms a complete vertical wall separating any buildings.

(2) Nothing in this by-law shall prohibit —

(a) the passage through a separating wall of a pipe, if the pipe —

(i) is not a flue pipe;

(ii) has a diameter not exceeding 25 millimetres if it is made of combustible material or 150 millimetres, if it is made of non-combustible material; and

(iii) is fire-stopped where it passes through the wall; or

(b) an opening in a separating wall which is necessary as a means of escape from fire, if the opening is fitted with a door which has in respect of separating walls a FRP of not less than that required in this Part.

(3) Any separating wall, which forms a junction with a roof shall be carried above the upper surface of the roof to a distance of not less then 225 millimetres measured at right angle to such upper surface.

External walls

105. (1) If any external wall is carried across the end of a separating wall, such external wall and separating wall shall be bonded together or the junction of such walls shall be fire-stopped.

(2) Subject to the provisions relating to small garages and open car parks, any side of a building shall comply with any relevant requirements relating to the permitted limits of unprotected areas specified in the Fifth Schedule of these By-laws unless the building is so situated that such side might consist entirely of any unprotected area.

(3) Any external wall which constitutes, or is situated within a distance of 2 metres from any point on the relevant boundary or is a wall of a building which exceeds 18 metres in height shall —

(a) be constructed wholly of non-combustible materials apart from any external cladding which complies with by-law 107; and

(b) be so constructed as to attain any FRP required by this Part without assistance from any combustible material permitted by this Part —

Provided that the requirements of this Part shall not apply to —

(i) an external wall of a building which is within the limits of size indicated by the letter "x" in Part 1 of the Eighth Schedule of these By-laws or an external wall of a building which is not divided into compartments and is within the limits of size indicated by the letter "z" in Part 2 of the Eighth Schedule if, in either case, that building does not exceed 18 metres in height; and

(ii) an external wall of a building or part of Purpose Group III which consists of flats or maisonettes if that building does not exceed three storeys or that part is separated as described in by-law 96 and does not exceed 18 metres in height.

Beam or column

106. Any beam or column forming part of, and any structure carrying an external wall which is required to be constructed of non-combustible materials shall comply with the provisions of paragraph (3) of by-law 105 as to non-combustibility.

Cladding on external wall

107. (1) Any cladding on any external wall situated less than 2 metres from any point on the relevant boundary or if the building is more than 18 metres in height, the cladding hall

be constructed entirely of non-combustible materials and when tested, shall demonstrate the compliance in accordance with BS 8414.

(2) Any cladding on any external wall, if such cladding is situated more than 2 metres from any point on the relevant boundary and the building is less than 18 metres in height, the cladding shall have a surface complying with the requirements for Class O when tested and in accordance with by-law 166.

Reference to Fifth Schedule

108. For the purpose of by-law 105 to 109 —

(a) any part of a roof shall be deemed to be part of an external wall or side of a building if it is pitched to an angle of 70° or more to the horizontal and adjoins a space within the building to which persons have access not limited to the purposes of maintenance or repair; and

(b) any reference to the Fifth Schedule of these By-laws shall be construed as referring to the provisions of Part 1 of the Schedule together with, at the option of the persons intending to erect the building, either the provisions of Part II, Part III or Part IV of the Schedule.

Relevant boundary

109. If any building is to be erected on land occupied with any other building, or two or more detached buildings are to be erected on land in common occupation and either of those buildings is within Purpose Group I or III, other than a detached building which consists only of a garage or of an open car park, in the application of the provisions of this Part to any external wall of any building to be erected which faces an external wall of such other building —

(a) the relevant boundary shall be a notional boundary passing between those buildings and such boundary must be capable of being situated in such a position as to enable the external walls of those buildings to comply with the requirements of this Part; and

(b) if such other building is an existing building it shall be deemed to be (a building to be) erected on the site which it occupies, being of the same purpose and having the same unprotected areas and fire resistance as the existing building.

Construction of separating wall

110. (1) Any separating wall, other than a wall separating buildings not divided into compartments within the limits of size indicated by the letter "x" in Part I of the Eighth

Schedule of these By-laws, shall be constructed wholly of non-combustible materials, excluding any surface finish to a wall which complies with the requirements of these By-laws and the required FRP for the wall shall be obtained without assistance from such non-combustible material.

(2) Any beam or column forming part of, and any structure carrying, a separating wall which is required to be constructed of non-combustible materials shall itself comply with the requirements of paragraph (1) as to non-combustibility.

Special requirements as to compartment walls and compartment floors

111. (1) No opening shall be made in any compartment wall or compartment floor with the exception of any one or more of the following:

(a) an opening fitted with a door which complies with the requirements of by-law 123 and has a FRP which is not less than —

(i) in the case of a wall separating a flat or maisonette from any space in common use giving access to that flat or maisonette, half hour; or

(ii) in any other case, the FRP required by the provisions of these By-laws in respect of the wall or floor;

(b) an opening for a protected shaft;

(c) an opening for a ventilation duct, other than a duct in, or consisting of, a protected shaft, if any space surrounding the duct is fire-stopped and the duct is fitted with an automatic fire damper in accordance with Australian Standard 1682 and 1668 Part I-1974 or its equivalent where it passes through the wall or floor which fire damper shall not have less than the required FRP of the material of the compartment wall or floor through which it passes;

(d) an opening for a pipe which complies with the requirements of paragraph (2) of by-law 104; and

(e) having a close-fitting door situated in an external wall of the chamber having a FRP of half-hour.

(2) Where a compartment wall or compartment floor forms a junction with any structure comprising any other compartment walls, or any external wall, separating wall or structure enclosing a protected shaft, such structures shall be bonded together at the junction or the junction shall be fire-stopped.

(3) Where any compartment wall forms a junction with a roof, such wall shall be carried to the under surface of the roof covering.

(4) Where any chimney, appliance ventilation duct or duct encasing one or more flue pipes passes through a compartment floor or compartment wall —

(a) any flue in the chimney; or

(b) the passage in the appliance ventilation duct; or

(c) the space within the duct encasing the flue pipe or pipe,

shall be separated from that compartment floor or that compartment wall and from each compartment adjoining that wall or floor by non-combustible construction having a FRP of not less than half the minimum FRP required by these By-laws in respect of that compartment wall or compartment floor through which such chimney, duct or pipe passes.

(5) If any chimney, appliance ventilation duct or duct encasing one or more flue pipes forms part of a compartment wall —

(a) any flue in the chimney; or

(b) the passage in the appliance ventilation duct; or

(c) the space within the duct encasing the flue pipe or pipes;

shall be separated from any compartment adjoining that wall by non-combustible construction which will, at any level, have a FRP of not less than half the minimum FRP required by these By-laws in respect of the compartment wall at that level.

(6) Any compartment wall or compartment floor which is required by these By-laws to have a FRP of one hour or more shall, excluding —

(a) any floor finish;

(b) any surface finish to a wall or ceiling which complies with the requirements of by-law 166; or

(c) any ceiling which complies with the descriptions specified in the Eighth Schedule of these By-laws,

be constructed wholly of non-combustible materials and, apart from any ceiling, the required FRP of the wall or floor shall be obtained without assistance from any non-combustible material.

(7) Any beam or column forming part of, and structure carrying, any compartment wall or compartment floor which is required to be constructed of non-combustible materials, shall itself comply with the provisions of paragraph (6) as to non-combustibility.

Horizontal and vertical barriers of the external walls

112. Openings in external walls located vertically above one another shall be protected by approved flame barriers either extending 750 millimetres beyond the exterior wall in the plane of the floor or by vertical panels not less than 900 millimetres in height.

Protected shafts

113. (1) No protected shaft shall be constructed for use for any purposes additional to those specified in this Part other than for the accommodation of any pipe or duct, or as sanitary accommodation or washrooms, or both.

(2) Subject to the provisions of this Part any protected shaft shall be completely enclosed.

(3) Any protecting structure which is required to have a FRP of one hour or more, and any beam or column forming part of that structure and any structure carrying such protecting structure shall be constructed of non-combustible materials throughout, with the exception of any external surface finish which complies with the requirements of by-law 166 relating to wall surfaces.

(4) Any wall, floor or other structure enclosing a protected shaft but not being a protecting structure may contain such openings as shall be in accordance with other provisions of these By-laws.

(5) There shall be no opening in any protecting structure other than any one or more of the following —

(a) an opening for a pipe;

(b) an opening fitted with a fire-resisting door which complies with the provisions of by-law 124;

(c) if the protected shaft contains a lift, an opening which complies with the provisions of by-law 115; and

(d) if the protected shaft serves as, or contains a ventilating duct, an inlet to or outlet from the duct or an opening for the duct.

(6) Any opening for pipe shall be effectively fire-stopped.

Ventilation to lift shafts

114. Where openings to lift shafts are not connected to protected lobbies, such lift shafts shall be provided with vents of not less than 0.09 square metre per lift located at the top of the shafts. Where the vent does not discharge directly to the open air the lift shafts shall be vented to the interior through a duct of the required FRP as for the lift shafts.

Openings in lift shafts

115. (1) Every opening in a lift shaft or lift entrance shall open into protected lobby unless other suitable means of protection to the opening to the satisfaction of the Fire and Rescue Department is provided. These requirements shall not apply to open type industrial and other special buildings as may be approved by the Director General.

(2) Landing doors shall have a FRP of not less than half the FRP of the hoistway structure with a minimum FRP of half hour.

(3) No glass shall be used for or in landing doors except for vision in which case any vision panel shall be glazed with wired safety glass, and shall not be more than 0.0161 square metre and the total area of one of more vision panels in any landing door shall not be more than 0.0156 square metre.

(a) Each clear panel opening shall reject a sphere 150 millimetres in diameter.

(b) Provision shall be made for the opening of all landing doors by means of an emergency key irrespective of the position of the lift car.

Smoke detectors for lift lobbies

116. (1) All lift lobbies shall be provided with smoke detectors except lift lobbies in an open building.

(2) Lift not opening into a smoke lobby shall not use door reopening devices controlled by light beam or photo-detectors unless incorporated with a force close feature which after thirty seconds of any interruption of the beam causes the door to close within a preset time.

Protected shafts as ventilating duct

117. (1) If a protected shaft serves as, or contains, a ventilating duct —

(a) the duct shall be fitted with automatic fire dampers together with or without subducts as specified in Australian Standard 1668: Pt.1: 1974, so constructed at such intervals and in such positions as may be necessary to reduce, as far as practicable, the risk of fire spreading from a compartment to any other

compartment, or such other provision shall be made as will reduce such risk as far as practicable; and

(b) the duct shall not be constructed of, or lined with, any material which substantially increases such risk.

(2) In addition, in the case of a protected shaft containing a ventilating duct, the shaft be so constructed with additional barriers to fire between the duct and the shaft as may be necessary to reduce as far as practicable the risk of fire spreading from a compartment to any other compartment.

Protected shafts consisting of staircase

118. A protected staircase or a protected shaft containing a staircase shall not contain any pipe conveying gas or oil or any ventilating duct other than a duct serving only that staircase or shaft.

Stages in places of assembly

119. (1) In places of assembly, other than school halls or other similar halls where stage scenery is infrequently used, capable of seating more than 400 persons and in which stage scenery may be used, the stage shall be separated from the auditorium by a proscenium wall of not less than 225 millimetres brickwork or other material of equivalent FRP, carried down to a solid foundation and up to at least 0.90 metres above the roof level unless the roof is constructed of materials having the FRP as specified in the Eighth Schedule of these
By-laws.

(2) No more than three openings inclusive of the proscenium opening shall be provided in the proscenium wall.

(3) No opening additional to the proscenium opening shall be more than 0.60 metres above the level of the stage nor shall such additional opening have an area exceeding 2.0 square metres and each such additional opening shall be fitted with a door constructed of materials having the FRP as specified in the Eighth Schedule of these By-laws.

Open stages

120. Open stages without proscenium walls may be permitted provided suitable protection devices to the satisfaction of the Director General are installed.

Fire precautions in air conditioning systems

121. (1) All air conditioning ducts, including framing therefor, except ducts in detached and semi-detached residential buildings shall be constructed entirely of non-combustible materials and shall be adequately supported throughout their lengths.

(2) No air-conditioning ducts shall pass through fire walls unless as provided for in by-laws 111 and 117.

(3) The air intake of any air-conditioning apparatus shall be situated such that air shall not be recirculated from any space in which objectionable quantities of inflammable vapours or dust are given off and shall be so situated as to minimise the drawing in of any combustible material.

Fire-stopping

122. (1) Any fire stop required by the provisions of this Part shall be so formed and positioned as to prevent or retard the passage of flame.

(2) Any fire stop shall —

(a) if provided around a pipe or duct or in a cavity, be made of non-combustible material or, if it is in a floor or wall constructed of combustible material, of timber not less than 37 millimetres thick; and

(b) if provided around a pipe or duct, be so constructed as not to restrict essential thermal movement.

(3) Any fire stop formed as a seal at the junction of two or more elements of structure shall be made of non-combustible material.

(4) Any cavity in an element of structure which —

(a) is continuous through the whole or part of such element; and

(b) has a surface of combustible material exposed within the cavity which is of a class lower than Class O in by-law 166 shall be firestopped —

(i) at any junction with another element of structure or with a ceiling under a roof; and

(ii) in such a position that there is no continuous cavity without a firestop which in one plane exceeds either 7.625 metres in a single dimension or 23.225 square metres in area;

but nothing in this by-law shall prohibit the insertion of combustible filling in a cavity.

Fire doors in compartment walls and separating walls

123. (1) Fire doors of the appropriate FRP shall be provided.

(2) Openings in compartment walls and separating walls shall be protected by a fire door having a FRP in accordance with the requirements for that wall specified in the Eighth Schedule of these By-laws.

(3) Openings in protecting structures shall be protected by fire doors having a FRP of not less than half the requirement for the surrounding wall specified in the Eighth Schedule of these By-laws but in no case less than half hour.

(4) Openings in partition enclosing a protected corridor or lobby shall be protected by fire doors having a FRP of half hour.

Fire door assembly

124. Fire door assembly shall be constructed in accordance with MS 1073.

Door closers for fire doors

125. (1) All fire doors shall be fitted with automatic door closers of the hydraulically spring operated type in the case of swing doors and of wire rope and weight type in the case of sliding doors.

(2) Double doors with rabbeted meeting stiles shall be provided with co-ordinating device to ensure that leafs close in the proper sequence.

(3) Fire doors may be held open provided the hold open device incorporates a heat actuated device to release the door. Heat actuated devices shall not be permitted on fire doors protecting openings to protected corridors or protected staircases.

Measurement of travel distance to exits

126. (1) The travel distance to an exit shall be measured on the floor or other walking surface along the centre line of the natural path of travel, starting 0.300 metre from the most remote point of occupancy, curving around any corners or obstructions with 0.300 metre clearance therefrom and ending at the storey exit. Where measurement includes stairs, it shall be taken in the plane of the tread nosing.

(2) In the case of open spaces the distance to exits shall be measured from the most remote point of occupancy provided that the direct distance shall not exceed two-thirds the permitted travel distance.

(3) In the case of individual room which is subject to occupancy of not more than six persons, the travel distance shall be measured from the door of such room:

Provided that the travel distance from the most remote point in the room to the room door does not exceed 9 metres.

(4) The maximum travel distances to exits and dead end limits shall be as specified in the Sixth Schedule of these By-laws.

Exits to be accessible at all times

127. (1) Except as permitted by by-law 134 not less than two separate exits shall be provided from each storey together with such additional exits as may be necessary.

(2) The exits shall be so sited and the exit access shall be so arranged that the exits are within the limits of travel distance as specified in the Sixth Schedule of these By-laws and are readily accessible at all times.

Staircases

128. (1) Except as provided for in by-law 154 every upper floor shall have means of egress via at least two separate staircases.

(2) Staircases shall be of such width that in the event of any one staircase not being available for escape purposes the remaining staircase shall accommodate the highest occupancy load of any one floor discharging into it calculated in accordance with provisions in the Sixth Schedule of these By-laws.

(3) The required width of a staircase shall be the clear width between walls but handrails may be permitted to encroach on this width to a maximum of 80 millimetres.

(4) The required width of a staircase shall be maintained throughout its length including at landings.

(5) Doors giving access to staircases shall be so positioned that their swing shall at no point encroach on the required width of the staircase or landing.

Exit route

129. No exit route may be reduced in width along its path of travel from the storey exit to the final exit.

Egress through unenclosed openings

130. Where unenclosed openings are permitted between floors and for a mezzanine floor, egress may be by way of an open staircase to an adjacent floor and thence to a story exit —

(a) the layout is such that a fire originating anywhere within the compartment will be obvious to the occupants of all communicating levels or areas;

(b) the travel distances specified in the Sixth Schedule of these By-laws are not exceeded;

(c) only 50% of the occupants of a floor are assumed to use the open staircase and storey exits are provided at every level to accommodate the other 50% of the occupants of that level in accordance with the provisions of the Sixth Schedule of these By-laws; and

(d) the storey exits on the principal floor through which other levels discharge are designed to handle the occupants of that floor plus 50% of the occupants from the adjacent levels discharging through it.

Horizontal exits

131. (1) Where appropriate, horizontal exits may be provided in lieu of other exits.

(2) Where horizontal exits are provided protected staircases and final exits need only be of a width to accommodate the occupancy load of the larger compartment or building discharging into it as long as the total number of exit widths provided is not reduced to less than half that would otherwise be required for the whole building.

(3) For institutional occupancies the total exit capacity other than horizontal exits shall not be reduced by more than one-third that would otherwise be required for the entire area of the building in accordance with Table B of the Sixth Schedule.

Emergency exit signs

132. (1) Storey exits and access to such exits shall be marked by readily visible signs and shall not be obscured by any decorations, furnishings or other equipment.

(2) A sign reading "KELUAR" with an arrow indicating the direction shall be placed in every location where the direction of travel to reach the nearest exit is not immediately apparent.

(3) The design and installation of every emergency exit sign shall be in compliance with MS 2687 and MS 619.

(4) All exit signs shall be illuminated continuously during periods of occupancy.

Exit doors

133. (1) All exit doors shall be openable from the inside without the use of a key or any special knowledge or effort.

(2) Exit doors shall close automatically when released and all door devices including magnetic door holders, shall release the doors upon power failure or actuation of the fire alarm.

Arrangement of storey exits

134. (1) Except as provided for in by-law 154, every compartment shall be provided with at least two storey exits located as far as practical from each other and shall not be less than 5.0 metres apart measured between the nearest edges of the openings and in such position that the travel distances specified in the Sixth Schedule of these By-laws are not exceeded.

(2) The width of storey exits shall be in accordance with the provisions in the Sixth Schedule of these By-laws.

(3) Basements and roof structures used solely for services need not be provided with alternative means of escape.

(4) Where a central core has more than one exit, storey exits shall be remote from one another and no two exits shall be approached from the same lift hall, common lobby or undivided corridor.

Final exit

135. (1) Each exit shall give access to —

(a) a final exit;

(b) a protected corridor leading to a final exit, where protected shall not exceed travel distance and dead end for corridor according to Sixth Schedule;

(c) an exit staircase leading to a final exit;

(d) an external route leading to a final exit which may comprise an open sided external corridor with no commercial activity and shall not be more than 5 metres from the building eave line; or

(e) an opening to sky corridor having a minimum width of 1.2 metres and two way escape paths leading to a place of safety outside the building and any unprotected opening along the corridor shall not be located lower than 1.8 metres from the floor level.

(2) In a sprinkler-protected building, a maximum of 50% of the total number of exit staircases may be discharged directly to the ground level covered circulation space provided that all of the following are complied with —

(a) the discharge point of the exit staircase into the ground level circulation space shall be within sight of and with direct access to a place of safety outside the building;

(b) the maximum distance between the discharge point of an exit staircase to a place of safety outside the building shall not exceed 10 metres;

(c) where there are commercial activities such as shops, kiosks or carts located along one side or both sides of the designated escape passageway leading to a place of safety outside the building, a minimum separation distance of 10 metres shall be maintained between the commercial activities and the designated escape passageway. The circulation space shall also be installed with
engineered smoke control system and alternatively, the commercial activities shall be fire compartmented with walls and doors of a minimum 1 hour fire resistance period; and

(d) the clear width of the exit doors leading to a place of safety outside the building shall be adequate to receive the occupant load of the discharge floor and the total number of persons discharging from the internal exit staircases.

(3) There shall be no unprotected opening of an occupancy area or combustible material or construction within 3 metres from a discharge point of the exit staircase (both internal and external) and this distance may be reduced to 1.5 metres if the unprotected opening is along the same plane of the staircase exit.

Calculation of occupancy loads

136. Calculation of occupancy loads and capacity of exits shall be in accordance with the provisions of the Sixth Schedule of these By-laws.

Computing storey exit width

137. To compute the required exit width from individual floors of a building —

(a) calculate the net or gross floor area whichever is applicable;

(b) determine the allowable occupancy load factor as prescribed in the Table of the Sixth Schedule;

(c) divide the floor area by the number of square metre per person to deter mine the number of persons for which exits must be provided for that floor;

(d) determine from the Sixth Schedule the capacity of the type of exit to be used for the purpose group being designed; and

(e) calculate the number of units of exit width for each type of exit used based upon the capacity.

Computing number of staircases and staircase width

138. The following factors shall be used in computing the exit widths specified in Table B of the Sixth Schedule —

(a) in a multi-storeyed building if "X" units of exit width are required from each floor the staircases serving those floors do not need to be "X" times the number of floors served in units of exit width. The staircases need to be only wide enough to serve each floor but not less than the minimum width allowed and in every case one of the protected staircases shall be assumed to be inaccessible and the remaining protected staircase shall be of sufficient width and number to accommodate the relevant occupancy;

(b) depending on the occupancy, street floor exits have to be sized to handle not only the occupancy load of the street floor but also a percentage of the load of the exits discharging to the street floor from floors above and below;

(c) exits shall never decrease in width along their length of travel and, if two or more exits converge into a common exit, the common exit shall never be narrower than the sum of the width of the exits converging into it;

(d) except as provided in these By-laws, the minimum number of exits is two;

(e) at least one of the staircases shall be minimum of two units width except that 900 millimetres may be allowed where total occupancy of all floors served by staircases is less than 50; and

(f) there shall be no decrease in width along the path of travel of a staircase leading to a final exit.

Exits for institutional buildings and places of assembly

139. (1) In buildings classified as institutional or places of assembly, exits to a street or large open space, together with staircases, corridors and passages leading to such exits shall be located, separated or protected as to avoid any undue danger to the occupants of the place of assembly from fire originating in the other occupancy or smoke therefrom.

(2) In any places of assembly, the main exit shall be 50% of the total required exit width.

Classification of places of assembly

140. Each place of assembly shall be classified according to its capacity as follows:

Class A Capacity	1,000 persons or more
Class B Capacity	300 to 1,000 persons
Class C Capacity	100 to 300 persons

Space standards for calculating occupancy loads

141. The occupancy load permitted in any place of assembly shall be determined by dividing the net floor area or space assigned to the use by the square metre per occupant as follows —

(a) assembly area of concentrated use without fixed seats such as an auditorium, places of worship, dance floor and lodge room 0.65 square metre per person;

(b) assembly area of less concentrated use such as a conference room, dining room, drinking establishment, exhibit room, gymnasium, or lounge 1.35 square metres per person;

(c) standing room or waiting space 3 square metres per person;

(d) the occupancy load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupancy load.

Width of means of egress

142. Means of egress shall be measured in units of exit width of 550 millimetres in accordance with Table B of Sixth Schedule. Fractions of a unit shall not be counted, except that 300 millimetres added to one or more full units shall be counted as one half of a unit exit width and no individual access to exit shall be less than 700 millimetres.

Rate of discharge

143. The rate of travel per floor of persons shall be sixty persons per minute through doors or along level passage ways and forty-five persons per minute down stairs.

Exit details for places of assembly

144. Every place of assembly, every tier or balcony and every individual room used as a place of assembly shall have exits sufficient to provide for the total capacity thereof as determined in accordance with by-law 141 and as follows —

(a) no individual unit of exit width shall serve more than one hundred persons;

(b) doors leading to the outside of the building at ground level or not more than three risers above or below ground one hundred persons per exit unit;

(c) staircases or other types of exit not specified in by-law 138 above seventy-five persons per exit unit;

(d) every Class A place of assembly (capacity one thousand persons or more) shall have at least four separate exits as remote from each other as practicable;

(e) every Class B place of assembly (capacity) three hundred to one thousand persons) shall have at least two separate exits as remote from each other as practicable, and if of a capacity of over six hundred at least three such exits;

(f) every Class C place of assembly (capacity one hundred to three hundred persons) shall have at least two means of exit, consisting of separate exits or doors leading to a corridor or other space giving access to separate exits in different direction.

Seating

145. (1) *(a)* The spacing of rows of seats from back to back shall not be less than 825 millimetres, nor less than 675 millimetres plus the sum of the thickness of the back and inclination of the back.

(b) There shall be a space of not less than 300 millimetres between the back of one seat and the front of the seat immediately behind it as measured between plumb-lines.

(c) Rows of seats between gangways shall have not more than fourteen seats.

(d) Rows of seats opening on to a gangway at one end only shall have not more than seven seats.

(e) Seats without dividing arms shall have their capacity determined by allowing 450 millimetres per person.

(2) *(a)* With Continental seating the spacing of rows of unoccupied seats shall provide a clear width between rows measured horizontally as fol lows (automatic or self-rising seats shall be measured in the seat-up position, other seats shall be measured in the seat-down position) —

(i) 450 millimetres clear width between rows of 18 seats or less;

(ii) 500 millimetres clear width between rows of 35 seats or less;

(iii) 525 millimetres clear width between rows of 45 seats or less;

(iv) 550 millimetres clear width between rows of 46 seats or more.

(b) With continental seating, the number of intervening seats between any seat and a gangway may be increased to 49 where exit doors are provided along each side gangway of the row of seats at the rate of 1 pair of exit doors for each 5 rows of seat. Such exit doors shall provide a minimum clear width of 1680 millimetres.

Gangway in places of assembly

146. (1) A clear gangway not less than 1200 millimetres in width shall be provided around the stalls and balcony in a place of assembly leading to exit doors therein:

Provided that if the gangways in the balcony lead to exit doors not less than 1200 millimetre in width the rear gangway may be omitted.

(2) Gangways not less than 1200 millimetres wide running parallel to the rows of seating in a place of assembly shall be provided where required by the local authority.

(3) All floors of balconies or tiers in a place of assembly shall be constructed entirely of reinforced concrete.

(4) Steps shall not be used to overcome differences in level in a gangway in a place of assembly unless the slope of such gangway exceeds one in ten.

(5) Where steps of a pitch exceeding 30º or ramps of a slope exceeding one in ten are provided in gangways flanking the seating in place of assembly, suitable handrails shall be provided.

(6) The treads of steps in gangways in a place of assembly shall have a non-slip surface and the edges of such steps shall be illuminated at step level.

(7) In circles and galleries or areas where the incline exceeds 15º, guard rails not less than 1050 millimetres above floor level shall be provided at the foot of gangways in places of assembly.

Exit doors in a places of assembly

147. (1) All doors used by the public as exit doors from any part of the place of assembly or leading to the open air shall open only in the direction of exit.

(2) In a place of assembly all exit doors and doors through which the public pass on the way to the open air shall be without lock, bolts or other fastenings while the public are in the building:

Provided that doors used for exit only may be fitted with panic bolts.

(3) Panic bolts fitted to doors in a place of assembly shall not be less than 750 millimetres or more than 1100 millimetres above the floor.

(4) Turnstiles, if installed in a place of assembly, shall be arranged clear of the line of exit, and shall not be included in the calculation of exit width.

(5) In a place of assembly every external door used by the public and every collapsible gate shall be capable of being locked in the fully open position in such a way that a key is required to release such door or gate from such open position.

Notice affixed to door or gate

148. A notice or notices so arranged as to be visible from both sides of the door, gate or shutter whether the door, gate or shutter is in the open or in the closed position shall be affixed to, or in position adjacent to every door and gate referred to above, such notice bearing the words "This gate/door is required to be kept open and locked in that position during the whole time the audience/gathering is in the building". The height of the lettering for such notice shall not be less than 75 millimetres.

Travel distance in place of assembly

149. Exits in any place of assembly shall be arranged so that the travel distance from any point to reach an exit shall not exceed 45 metres for unsprinklered buildings and 60 metres for sprinklered buildings.

Enclosing means of escape in certain buildings

150. (1) Every staircase provided under these By-laws in a building of four storeys or more, or in a building where the highest floor level is more than12 metres above the ground level, or in any place of assembly, or in any school when such staircase is to be used as an alternative means of escape shall be enclosed throughout its length with fire resisting materials.

(2) In a building of Purpose Group IV (OFFICE), an open corridor design may have an unenclosed staircase if provided with an extended landing which shall not be less than twice the staircase width and a wall separating the staircase from the occupancy shall be returned for a distance of not less than 1 metre along the frontage of adjacent occupancy.

External exit staircase

151. (1) An exit staircase may qualify as an external exit staircase if no part of it is recessed more than 3 metres from the building façade and has:

(a) a minimum of two adjacent sides abutting to a place of safety outside the building; or

(b) one of its longest sides abutting to a place of safety outside the building.

(2) An external exit staircase can be used as required exit in-lieu of internal exit staircase if:

(a) it complies with the requirements for an exit staircase; and

(b) there is no unprotected opening, combustible material and construction within 2 metres horizontally or within 9 metres vertically below, adjacent or facing it;

with the exception of a building designed with external corridor access, the access to the external exit staircase may be by means of the open-sided external corridor adjoining the occupancy areas, subject to the following —

(i) the external corridor shall be served by at least two exit staircases; and

(ii) unobstructed ventilation openings shall be provided along the long side of the external corridor above the parapet or balus trade; and

(c) its final discharge leads directly to a place of safety outside the building.

(3) Any ventilation opening to a toilet or any other protected area is however exempted from this restriction.

(4) Where a window or any other glazed opening is required within these dimension, they shall be fitted with wired glass and be kept permanently in a closed position.

(5) A fire door to the external exit staircase shall be provided.

Moving walks

152. (1) An inclined moving walk exit shall comply with the applicable requirements of ramps.

(2) No moving walk capable of being operated in the direction contrary to normal exit travel shall be used as a means of egress.

Power operated doors as means of egress

153. A power operated door shall only be regarded as a means of egress if it is possible to be swung in the direction of exit travel by manual means.

Building with single staircase

154. A single staircase may be permitted in the following premises —

(a) any dwelling at a height of 12 metres measured from the fire appliance access level to the highest and lowest habitable floor; and

(b) any building not exceeding two (2) storeys and the first floor not exceeding 6 metres from the ground floor.

Staircases to reach roof level

155. In building exceeding 30 metres in height all staircases intended to be used as means of egress shall be carried to the roof level to give access thereto.

Smoke lobbies

156. (1) Access to a staircase smoke lobby shall be by means of fire doors opening in the direction of escape.

(2) The width of the smoke lobby shall at no point be less than the required exit width.

(3) Smoke lobbies shall be provided at the basement levels where an escape staircase serving an upper storey is extended to a basement.

(4) Where practical smoke lobbies shall have permanent openings or openable windows of not less than 1 square metre giving direct access to the open air from an external wall or internal light well.

(5) Where natural ventilation is impractical smoke lobbies may be ventilated by means of a vertical shaft or mechanically pressurized.

Protected lobbies

157. (1) Protected lobbies shall be provided to serve staircase in buildings exceeding 18 metres above ground level where the staircase enclosures are not ventilated through external walls.

(2) In buildings where the topmost occupied floor exceeds 45 metres above ground level, such protected lobbies shall be pressurised to meet the requirements of the Malaysian Standard MS 1472 or any other system meeting the functional requirements of the Director General.

(3) Protected lobbies may be omitted if the staircase enclosures are pressurised to meet the requirements of by-law 162.

Provision of firefighting shafts

158. (1) A building with the topmost occupied floor at more than 18 metres above fire appliance access level shall have one or more fire fighting shafts.

(2) A building with basement storeys more than 9 metres below the fire appliance access level shall be provided with one or more fire fighting shafts.

(3) A firefighting access lobby shall be directly accessible from a fire fighting staircase, a fire lift and containing a dry riser or wet riser which shall be provided at every floor level and shall be within 45 metres coverage from the fire fighting access lobby door.

(4) A firefighting access lobby may be omitted if the fire fighting staircase is pressurised to meet the requirements of by-law 162 and all fire fighting installations within the pressurised staircase enclosure shall not intrude into the clear space required for means of access.

(5) A firefighting staircase shall be provided to give direct access to each fire fighting access lobby and shall be directly accessible from outside the building at fire appliance access level and the staircase may be one of the staircases required as a means of escape from the building.

(6) A fire lift, subject to paragraph (7) of this by-law, shall be provided to give access to each fire fighting access lobby or in the absence of a lobby, subject to paragraph (3) of this by-law, be connected by a protected corridor to the fire fighting staircase at each floor level.

(7) A fire lift shall be provided at the rate of one lift in every group of lifts which discharge into the fire fighting access lobby provided that the fire lift is located not more than 60 metres travel distance from the fire lift door to the furthermost point of the floor and in an open plan, the direct distance shall be two third of the travel distance.

(8) All lifts serving upper floors shall not extend to basement floors except where the basement floors only contain low fire loads or are used solely for car parks, and in all the permitted situations, protected lobbies shall be provided which shall be interposed between the lift openings and the areas served.

Firefighting access lobbies

159. A firefighting access lobbies shall conform to the following requirements —

(a) each lobby shall have a floor area of not less than 6 square metres; and

(b) the openable area of a window or area of permanent ventilation shall not be less than 25% of the floor area of the lobby and, if ventilation is by means of an openable window, additional permanent ventilation having a free opening of 500 square centimetres shall be provided except when a mechanical pressurisation is provided as an alternative.

Ventilation of staircase enclosures

160. (1) All staircase enclosures shall be ventilated at each floor or landing level by either permanent openings or openable windows to the open air having a free area of not less than 1 square metre per floor.

(2) Openable windows shall meet the operational requirements of the Director General.

Ventilation of staircase enclosures in buildings not exceeding 18 metres

161. In buildings not exceeding 18 metres above ground level, staircase enclosures may be unventilated provided that access to them at all levels except the top floor is through ventilated lobbies and the staircase enclosures are permanently ventilated at the top with at least 5% of the area of the enclosures.

Ventilation of staircase enclosures in buildings exceeding 18 metres

162. For staircases in buildings exceeding 18 metres above ground level that are not ventilated in accordance with by-law 160, two alternative methods of preventing the infiltration of smoke into the staircase enclosures may be permitted by providing —

(a) permanent ventilation at the top of the staircase enclosure of not less than 5% of the area of the enclosure and in addition at suitable intervals in the height

of the staircase a mechanically ventilated shaft to achieve not less than 20 air changes per hour to be automatically activated by a signal from the fire alarm panel; or

(b) a mechanical pressurisation of the staircase enclosure which is designed and installed in accordance with MS 1472.

Staircase enclosures below ground level

163. All staircase enclosures below ground level shall be provided with suitable means of preventing the ingress of smoke.

Pressurized system for staircases

164. Where there is no adequate ventilation as required, all staircases serving a building of more than 45 metres in height shall be provided with a staircase pressurisation system designed and installed in accordance with MS 1472.

Restriction of spread of flame

165. (1) A finished floor or floor covering may be exempted from the requirements of this Part:
Provided that in any case where the authority having jurisdiction finds a floor surface of unusual hazard, the floor surface shall be considered a part of the interior finish for the purposes of this Part.

(2) The classification of interior finish materials specified shall be that of the basic material used, without regard to subsequently applied paint or wall-paper, except that the Fire and Rescue Department having jurisdiction shall include such finishes in the determination of classification in any case where in the opinion of the Fire and Rescue Department having jurisdiction they are of such character or thickness or so applied as to affect materially flame spread characteristics.

Classification of restriction of flame over surfaces of walls and ceilings

166. For the purpose of this Part and Table A of the Seventh Schedule of these By-laws any reference to a surface being of a specified class shall be construed as a requirement that the material of which the wall, ceiling or soffit is constructed, shall comply with the following requirements:

Class O. Surface of no flame spread.

(a) Any reference to a surface being Class O shall be construed as a requirement that —

(i) the material of which the wall or ceiling is constructed shall be non-combustible throughout; or

(ii) the surface material, or if it is bonded throughout to a substrate, the surface material in conjunction with the substrate, shall when tested in accordance with BS 476: Part 6 and Part 7, have an index of performance not exceeding 6.

(b) Any reference to a surface being of a class other than Class O shall be construed as a requirement that the material of which the wall or ceiling is constructed shall comply with the relevant test criteria as to surface spread of flame specified in relation to that class in BS 476: Part 1: Clause 7.

(c) In relation to a requirement that a surface shall be of a class not lower than a specified class, Class O shall be regarded as the highest class followed in descending order by Class 1, Class 2, Class 3 and Class 4 —

(i) Class 1. Surface of Very Low Flame Spread.

Those surfaces on which not more than 150 millimetres mean spread of flame occurs.

(ii) Class 2. Surfaces of Low Flame Spread.

Those surfaces on which during the first 1 1/2 minutes of test, the mean spread of flame is not more than 375 millimetres and the final spread does not exceed 450 millimetres.

(iii) Class 3. Surfaces of Medium Flame Spread.

Those surfaces of which, during the first 1 1/2 minutes of test, the mean spread of flame is not more than 375 millimetres and during the first 10 minutes of test is not more than 825 millimetres.

(iv) Class 4. Surfaces of Rapid Flame Spread.

Those surfaces on which during the first 1 1/2 minutes of test, the mean spread of flame is not more than 375 millimetres and during the first 10 minutes of test is more than 825 millimetres.

Classification of interior finish materials

167. (1) Any material shown by test to have a life hazard greater than that indicated by the flame spread classification owing to the amount or character of smoke generated shall be included in the group shown in by-law 166 appropriate to its actual hazard as determined by the Fire and Rescue Department.

(2) Classification of interior finish materials shall be in accordance with tests made under conditions simulating actual installations.

(3) Where a complete standard system of automatic sprinklers is installed, interior finish with flame spread rating not over Class 3 may be used in any location where Class 2 is normally specified, and with rating of Class 2 in any location where Class 1 is normally specified and with rating of Class 1 where Class O is specified.

(4) In all buildings other than private residences Class O or Class 1 interior finish shall be used in all basements or other underground spaces from which there is no direct exit to the outside of the building if subject to occupancy for any purpose other than storage or service facilities.

Classification of surface of wall and ceiling

168. (1) The surface of a wall or ceiling in a room, circulation space or protected shaft shall be of a class not lower than that specified as relevant in Table A of the Seventh Schedule of these By-laws —

Provided that:

(a) a wall may have a surface of any class not lower than Class 3 to the extent permitted by paragraph (3); and

(b) a ceiling may either have a surface of any class not lower than Class 3 to the extent permitted by paragraph (3).

(2) Any part of the surface of a wall in a room may be of any class not lower than Class 3 if the area of the part, or, if there are two or more such parts, the total area of those parts does not exceed the lesser of the following —

(a) half the floor area of the room; or

(b) in the case of a building or compartment of Purpose Group I, II, III, 2.2 square metres or in any other case 6.5 square metres.

(3) Any part or the surface of a ceiling may be of any class not lower than Class 3 if that part of the surface is the face of a layer of material the other face of which is exposed to the external air and

(a) (i) the ceiling is that of a room in a building or compartment of Purpose Group II, III, IV, V or VII or that of a circulation space in a building or compartment of any purpose group;

(ii) the area of that part does not exceed 2.5 square metres; and

(iii) the distance between that part and any other such part is not less than 4 square metres; or

(b) (i) the ceiling is that of a room in a building or compartment of Purpose Group VI or VIII;

(ii) the area of that part does not exceed 5 square metres;

(iii) the distance between that part and other such part is not less than 150 millimetres; and

(iv) the part and all other such parts are evenly distributed over the whole area of the ceiling and together have an area which does not exceed 15% of the floor area of the room; or

(c) the ceiling is that of a balcony, verandah, open car park, covered way or loading way which, irrespective of its floor area, has at least one of its longer sides wholly and permanently open; or

(d) the ceiling is that of a garage, conservatory or outbuilding which, irrespective of whether it forms part of a building or is a building which is attached to another building or wholly detached, has a floor area not exceeding 44 square metres.

Exception relating to ceilings

169. Walls and ceiling finishes in the form of thin sheet of not more than 1 millimetre thickness mounted on a non combustible substrate shall not be subject to the requirement of surface spread of flame provisions provided that this exception shall not apply to smoke stop or firefighting lobbies, and exit staircase and passageway.

Reference to roofs

170. Any reference in this Part to a roof or part of a roof of a specified designation shall be construed as meaning a roof or part of a roof so constructed as to be capable of satisfying the relevant test criteria specified in respect of that designation of roof in BS 476. Part 3:

Provided that any roof or part of a roof shall be deemed to be of such a designation if —

(a) it conforms with one of the specification set out against the designation in Table B of the Seventh Schedule of these By-laws; or

(b) a similar part made to the same specification as that roof is proved to satisfy the relevant test criteria.

Reference to buildings

171. Any reference in this Part to a building shall, in any case where two or more houses adjoin, be construed as a reference to one of those houses.

Construction of roofs

172. (1) No part of the roof of a building which —

(a) has a cubic capacity exceeding 1,420 cubic metres;

(b) is wholly or partly of Purpose Group VI or VII; or

(c) is a house in a continuous terrace of more than two houses;

shall be so constructed as to be designated in accordance with by-law 175 BD, CA, CB, CC, CD, DA, DB, DC or DD, or be covered with wood shingles.

(2) Any part of a roof which is so designated BA, BB, or BC, shall not be less than 2.30 metres from any point on a boundary.

(3) Any part of a roof which is so designated AD, BD, CA, CB, CC, or CD or is covered with wood shingles, shall not be less than 4.60 metres from any point on a boundary unless such part is —

(a) of an area not exceeding 3 square metres; and

(b) separated from any other part of the same roof which is so designated or covered with wood shingles by an area of roof which is at least 1.50 metres wide and which is covered by non-combustible material,

in which case such designated part or parts covered with wood shingles shall not be less than 2.30 metres from any such point.

Roofing materials

173. (1) A surface or materials for a roof covering or roof construction shall have a surface spread of flame rating not lower than Class 1, except in the case of Purpose Groups I or III shown in the Fourth Schedule of these By-laws and in buildings that are protected throughout with an automatic sprinkler system.

(2) The Director General may approve the use of combustible material for roof construction for buildings of Purpose Groups II, IV, V or VI as shown in the Fourth Schedule of these By-laws if the following requirements are satisfied —

(a) the building shall not exceed four storeys;

(b) the roof space between the roof and the ceiling shall have a cavity barrier wherever required, which complies with the relevant provisions, and an opening in cavity barriers shall be fire-stopped; and

(c) if the underside of the roof serves as ceiling to a room or space, the element of the underside or the roof shall comply with the relevant provision of by-law 166.

(3) At the junction with a separating wall or compartment wall, the roof construction shall comply with the requirements as may be specified by the Fire and Rescue Department.

Materials for construction

174. (1) Materials used in the construction of a building element shall comply with the requirements stated under this Part in addition to the performance requirements such as for fire resistance or limits to spread of flame.

(2) Intumescent paint is allowed to be used for protection of structural steel member of all buildings provided that —

(a) the paint is of a proprietary system that has been tested to achieve the fire resistance performance as required in BS 476; and

(b) a coating of intumescent paint onto structural steel, and subsequent maintenance of the coating conforms to BS 8202.

(3) In a building which is protected by an automatic sprinkler system, a fire rated glass may be used for the construction of a compartment wall, compartment floor, enclosure to smoke stop lobby, fire fighting lobby or protected shaft without an exit staircase or fire lift, subject to the following —

(a) the wall and door shall have necessary fire resistance, including insulation, when subject to test under BS 476 for the wall and MS 1073 for the door; and

(b) the wall and door shall meet the Class A of impact performance requirements when subject to test under BS 6206 or AS 2208.

(4) The wall, ceiling, roof covering and finishes shall not contain any plastic material.

(5) For the purpose of this by-law, "AS" means the latest published edition of the "Australian Standard".

Category designation for the fire penetration and spread of flame on roof surface

175. Each category designation for roofing material shall consist of two letters, the first letter referring to the fire penetration and the second letter to spread of flame on the roof surface, these being determined as follows:

(a) First letter

(i) A - Those specimens which have not been penetrated within 1 hour;

(ii) B - Those specimens which are penetrated in not less than 1/2 hour;

(iii) C - Those specimens which are penetrated in less than 1/2 hour;

(iv) D - Those specimens which are penetrated in the preliminary test.

(b) Second letter

(i) A - Those specimens on which there is no spread of flame;

(ii) B - Those specimens on which there is not more than 525 millimetres spread of flame;

(iii) C - Those specimens on which there is more than 525 millimetres spread of flame;

(iv) D - Those specimens which continue to burn for 5 minutes after the withdrawal of the test flame or spread more than 375 millimetres across the region of burning in the preliminary test.

Fire resistance

176. Except as otherwise provided by this Part every element of structure shall be so constructed as to have fire resistance for not less than whichever of the periods specified in the Eighth Schedule of these By-laws is relevant, having regard to the purpose group of the building of which it forms part and the dimensions specified in that Schedule.

Additional requirements

177. (1) In addition to any relevant requirements under by-law 176 —

(a) any external wall shall have fire resistance of not less than half-hour; and

(b) any separating wall shall have fire resistance of not less than one hour.

(2) Nothing in by-law 176 or paragraph (1) above shall apply to any part of an external wall which is non-load bearing and such external wall may, in accordance with by-law 105, be an unprotected area.

Height of buildings

178. (1) Subject to the provisions of paragraph (2) and any other express provision to the contrary, any reference to a building of which an element of structure forms part of such building means the building or if a building is divided into compartments any compartment of the building of which the element of structure forms part of such building.

(2) Any reference to height means the height of a building, not of any compartment in the building, but if any part of the building is completely separated throughout its height both above and below ground from all other parts by a compartment wall or compartment walls in the same continuous vertical plane, any reference to height in relation to the part means the height solely of that part.

Single storey buildings

179. (1) In the case of a single storey building nothing in by-law 176 or in by-law 177 shall apply to any element of structure in a ground storey which consists of —

(a) a structural frame or a beam or column, provided that any beam or column, whether or not it forms part of a structural frame, which is within or forms part of a wall, and any column which gives support to a wall or gallery, shall have fire resistance of not less than the minimum period, if any, required by these By-laws for the wall or that gallery;

(b) an internal load-bearing part of a wall, unless that wall or part is, or forms part of, a compartment wall or a separating wall, or forms part of the structure enclosing a protected shaft or support a gallery; or

(c) part of an external wall which does not support a gallery and which may, in accordance with by-law 105 be an unprotected area.

(2) If any element of structure forms part of more than one building or compartment and requirements for fire resistance specified in the Eighth Schedule of these By-laws in respect of one building or compartment differ from those specified in respect of any other building or compartment of which the element of structure forms part, such element of structure shall be so constructed as to comply with the greater or greatest of the requirements specified.

Fire resistance of structural member

180. Any structural member of overloading wall shall have fire resistance of not less than the minimum period required by these By-laws for any element which it carries.

Compartment wall separating flat and maisonette

181. Any compartment wall separating a flat or maisonette from any other part of the same building shall not be required to have fire resistance exceeding one hour unless —

(a) the wall is load-bearing wall or a wall forming part of a protected shaft; or

(b) the part of the building from which the wall separates the flat or maisonette is of a different purpose group and the minimum period of fire resistance required by this Part for any element of structure in that part is one and a half hours or more.

Application of these By-laws to floors

182. In the application of these By-laws to floors, no account shall be taken of any fire resistance attributable to any suspended ceiling other than a suspended ceiling constructed as described in the Eighth Schedule of these By-laws.

Floor area and capacity of buildings and compartments

183. Where reference is made in this Part to floor areas and capacity of buildings or compartments, the maximum floor area or cubic capacity or the maximum floor area and cubic capacity of the building or compartment may be doubled where the building or compartment is fitted throughout with an automatic sprinkler system, or with such other means of fire protection of not less efficiency in relation to the nature of the building or compartment and its contents, which the fire extinguishing system is required to protect.

Test of fire resistance

184. (1) For the purposes of this Part requirements as to fire resistance shall be construed as meaning that an element of structure shall be capable of resisting the action of fire for

the specified period under the conditions of test appropriate to such element in accordance with BS 476: subject to such modifications or applications of such conditions of test as are prescribed in these By-laws.

(2) A compartment floor shall have the fire resistance for not less than a minimum period as required under this Part for an element of structure forming part of a compartment immediately below such a floor if the underside of such a floor is exposed to the test by fire.

Fire resistance for walls

185. (1) Any structure, other than an external wall, enclosing a protected shaft shall, if each side of the wall is separately exposed to test by fire, have fire resistance for not less than the minimum period required by this Part.

(2) Any compartment wall or separating wall shall, if each side of the wall is separately exposed to test by fire, have fire resistance for not less than the minimum period required by this Part.

(3) Any part of an external wall which constitutes, or is situated less than 0.90 metre from any point on the relevant boundary shall, if each side of the wall is separately exposed to test by fire, have fire resistance for not less than the minimum period required by this
Part.

(4) Any part of an external wall which is situated 0.90 metre or more from the relevant boundary and which is required by these By-laws to have fire resistance, shall, if the inside of the wall is exposed to test by fire, have fire resistance for not less than the minimum period required by this Part:

Provided that, for the purposes of these By-laws, the wall shall be capable of satisfying the requirements of clause 11c of section 3 of BS 476 relating to insulation, for a period of not less than fifteen minutes.

Fire resistance for floors above ground floor

186. Any floor above the ground storey of a house falling within Purpose Group 1 shall, if the underside of such floor is exposed to test by fire in accordance with BS 476 be capable of satisfying the requirements of that test as to freedom from collapse for a period of not less than half an hour and as to insulation and resistance to passage of flame for not less than fifteen minutes.

Fire resistance for any element of structure

187. Any element of structure shall be deemed to have the requisite fire resistance if —

(a) it is constructed in accordance with the specifications given in the Eighth Schedule of these By-laws and the notional period of fire resistance given in that Schedule as being appropriate to that type of construction and other relevant factors is not less than the requisite fire resistance; or

(b) a similar part made to the same specification as the element is proved to have the requisite fire resistance under the conditions of test prescribed in the foregoing By-laws.

Hospital

188. Every hospital shall comply with the following additional requirements:

(1) A patient accommodation area containing beds shall not be located in basement storeys.

(2) The minimum clear width of an exit door opening shall not be less than 1.2 metres.

(3) Every upper storey used for the accommodation of patients shall be provided with at least two areas of refuge and the size of the areas of refuge shall be sized adequately to accommodate the number of beds for at least 50 percent of the total beds patients from the floor concerned —

(a) for area of refuge not adjacent to the patient ward, the route leading to the area of refuge shall be through:

(i) an external corridor; or

(ii) a protected lobby separated from the adjoining area of the building by a wall and door of at least 1 hour fire resistance period, and the protected lobby shall have a minimum size of 4 metres (length) by 2 metres (width) and be ventilated;

(b) for an area of refuge immediately adjacent to a patient ward, the routes leading to the area of refuge need not be through an external corridor provided that both the area of refuge and the adjacent patient ward are —

(i) fire compartmented from each other by a wall and door of at least 1 hour fire resistance period;

(ii) provided with engineered smoke control and the design smoke layer height shall be at least 2.5 metres above the finished floor; and

(iii) provided with minimum of 2 remotely located exit access between them.

(4) The provision of fire escape bed lifts shall be as follows —

(a) at least two fire escape bed lifts shall be provided for premises with more than one storey;

(b) fire escape bed lifts shall be located remotely from each other and sited adjacent to a protected staircase;

(c) each area of refuge shall also be served by at least one fire escape bed lift;

(d) fire lifts may double-up as fire escape bed lifts provided that there are more than one fire lift and at least one shall remain as a dedicated fire lift, and where the fire lifts double up as the fire escape bed lifts, its dimensions shall be as specified in subparagraph 188(4)*(c)*;

(e) the fire escape bed lift shall be contained within a fire fighting shaft;

(f) the entry into the fire escape bed lift and the exit staircase shall be through a common protected lobby and the fire escape bed lift shall have the minimum clear platform size of 2.7 metres (depth) by 1.8 metres (width);

(g) the signage shall be displayed outside the fire escape bed lift stating "FIRE ESCAPE BED LIFT";

(h) the exit route for the fire escape bed lift at the designated floor shall be protected from other occupancy areas by 1 hour fire resistance separation and shall discharge directly into a safe area;

(i) a fire escape bed lift that opens directly into an external corridor and which is sited adjacent to a protected staircase does not require a protected lobby, provided that there is no unprotected opening within 3 metres horizontally from the fire escape bed lift door opening, and the fire escape bed lift provided in this situation may be treated as a common bed lift that may serve multiple compartments located on the same floor; and

(j) a fire escape bed lift shall be provided with the following features:

(i) a secondary power supply from an emergency generating plant; and

(ii) a switch labelled as "Fire Escape Bed Lift", which is situated next to the lift landing door at the final exit storey;

(5) A patient accommodation ward with access through an internal corridor shall comply with the following requirements —

(a) each ward shall be separated from the internal corridor by a wall having at least 1 hour fire resistance period;

(b) doors opening into an internal corridor shall have at least half hour fire resistance period and be fitted with an automatic self-closing device;

(c) an internal corridor shall be naturally ventilated with a fixed opening in an external wall and such ventilation opening shall not be less than 15 percent of the floor area of the internal corridor;

(d) the ventilation opening in the external wall shall not be less than 3.5 square metres, with at least 1.75 square metres on each side and shall be unobstructed by any parapet wall or balustrade level upwards and be positioned on opposite side of the internal corridor such that it provides effective cross ventilation throughout the entire space of the corridor;

(e) the ventilation opening in the external wall shall not be more than 12 metres from any part of the internal corridor;

(f) an internal corridor may be provided with mechanical ventilation and pressurisation in lieu of natural ventilation; and

(g) other non-patient accommodation areas or spaces which open into or form part of the internal corridor, or which may jeopardise the means of escape provision, shall be compartmented by one hour fire-rated enclosure and half hour fire door.

(6) External access to a patient accommodation ward shall be through external corridor.

(7) For a smoke lobby to the escape staircase:

(a) an entry into an exit staircase from any part of a building of more than four storeys above ground level shall comply with the requirements of smoke lobby under by-law 156; and

(b) where the smoke lobby is provided to an exit staircase to serve a patient accommodation floor, or any area where a patient may need to be evacuated on a bed or stretcher, the smoke lobby shall have a minimum clear space of 6 square metres which is unobstructed by a door swing.

(8) For the staircase landing width or depth —

(a) an exit staircase that serves a patient accommodation floor to be used by a patient in an emergency fire situation shall be designed to allow the evacuation of the patient on a bed or stretcher.

(b) the width of a staircase, and staircase landing width and depth shall comply with Tenth Schedule.

(9) For outpatient clinic without a ward that does not fall under the above categories, the fire safety requirements under this by-law are not applicable.

PART XIII

FIRE ALARM SYSTEM AND FIRE EXTINGUISHMENT SYSTEM

Fire alarm system and extinguishing system

189. (1) Every building shall be provided with means of detection in the form of a fire alarm system or extinguishing system as specified in the Ninth Schedule.

(2) Every building shall be served by at least one fire hydrant located not more than 30 metres from an entry to any building or breeching inlet and be designed and installed in accordance with MS 1489, and in any case, the fire hydrants shall be located not more than 90 metres apart.

(3) Depending on the size and location of the building and the provision of access for fire appliances, additional fire hydrants shall be provided as may be required by the Director General.

Hose reel systems

190. A hose reel system shall be provided in accordance with the Ninth Schedule, and MS 1489.

Portable extinguishers

191. A portable extinguisher shall be provided in all buildings in accordance with MS 1539.

Sprinkler systems

192. A sprinkler system shall be provided in accordance with the Ninth Schedule and MS 1910.

Automatic fire monitoring system

193. An automatic fire monitoring system shall be provided in accordance with the Ninth Schedule.

Dry riser systems

194. (1) A dry riser system shall be provided in every building in which the top most occupied floor is more than 18 metres but less than 30 metres above fire appliance access level.

(2) The dry riser system shall be designed and installed in accordance with MS 1489.

(3) A hose connection shall be provided in each fire fighting access lobby or adjacent to a fire fighting staircase on every floor.

Wet riser systems

195. (1) A wet riser system shall be provided in every building in which the topmost occupied floor is more than 30 metres above fire appliance access level.

(2) The wet riser system shall be designed and installed in accordance with MS 1489.

(3) Hose connection shall be provided in each fire fighting access lobby or adjacent to a fire fighting staircase on every floor.

(4) Each stage of the wet riser shall not exceed 150 metres in height and the pressure for each stage shall not exceed 20 bar and in each stage of the wet riser, the height between the topmost and lowest landing valves shall not exceed 75 metres and be provided with its own pump set.

Wet or dry riser system for buildings under construction

196. (1) Where either wet or dry riser system is required, at least one riser shall be installed when the building under construction has reached a height of above the level of the fire brigade pumping inlet with connections thereto adjacent to a useable staircase.

(2) Such riser shall be extended as construction progresses to within two floors of the topmost floor under construction and where the designed height of the building requires the installation of a wet riser system fire pumps, water storage tanks and water main connections shall be provided to serve the riser.

Fixed extinguishing systems

197. A fixed extinguishing system shall either be a total flooding system, local application system or unit protection system depending upon the nature of a hazard process and occupancy as may be required by the Director General, and such system shall be approved by the Director General.

Special hazards

198. Places constituting special hazards or risk due to the nature of storage, trade, occupancy or size shall be required to be protected by fixed installations, protective devices, systems and special extinguishers as may be required by the Director General.

Fire alarms systems

199. Fire alarm systems shall be provided in accordance with the Ninth Schedule, and MS 1745.

Fire command centre

200. (1) A fire command centre shall be provided in accordance with the Ninth Schedule, located on the fire appliance access level and shall contain a panel to monitor a public address system, fireman intercom, sprinkler system, water flow detector, fire detection and alarm system and with an automatic fire monitoring system connected to the appropriate fire station by-passing the switchboard or other relevant automatic systems.

(2) A fire command centre shall be separated from other parts of the same building by a compartment wall or compartment floor having at least two hours fire resistance period, is readily accessible, preferably directly from the open air, and unless inapplicable, a route to the fire command centre shall be protected.

Voice communication system

201. There shall be two separate approved continuously electrically supervised voice communication systems including a fireman intercom system and a public address system in the following areas:

(a) the fireman intercom shall be provided in every fire fighting access lobby or adjacent to a fire fighting staircase and shall also be provided in a refuge area, lift motor room, fire pump room, generator room and fire command centre in accordance with the Ninth Schedule; and

(b) the public address system shall be provided in accordance with the Ninth Schedule.

Electrical isolation switch

202. (1) Any building which is having a floor area of exceeding 1,000 square metres per floor shall be provided with an electrical isolation switch complying with IEC 60947-3 to permit the disconnection of an electrical power supply to the relevant floor.

(2) The electrical isolation switch shall be located in a fire fighting access lobby, adjacent to a fire fighting staircase or at the exit door.

(3) For the purpose of this by-law, "IEC" means the latest published edition of the International Electrotechnical Commission Standard.

Special requirements for fire alarm systems

203. In places where there are deaf persons and in places where by nature of the occupancy audible alarm systems is undesirable, special requirement for fire alarm systems shall be installed in accordance with MS 1745.

Fire lift

204. (1) In a building where the topmost occupied floor is over 18 metres above or a basement storey is more than 9 metres below the fire appliance access level, a fire lift shall be provided.

(2) A penthouse occupying not more than 50 percent of the area of the floor immediately below shall be exempted from this measurement to provide the fire lift.

(3) The fire lift shall be located within a separate protected shaft if it opens into a separate lobby.

(4) The fire lift shall be provided at the rate of one lift in every group of lifts which discharge into the fire fighting access lobby.

Emergency mode of operation in the event of mains power failure

205. (1) In the event of mains power failure, all lifts shall return in sequence directly to the designated floor, commencing with the fire lifts, without answering any car or landing call and park with doors open.

(2) After all lifts are parked, all lifts on emergency power shall resume normal operation:

Provided that where sufficient emergency power is available for operation of all lifts, this mode of operation is not applicable.

Fire mode of operation

206. (1) A fire mode of operation shall be initiated by a signal from the fire alarm panel which may be activated automatically by one of the alarm devices in the building or manually.

(2) If mains power is available all lifts shall return in sequence directly to the designated floor, commencing with the fire lifts, without answering any car or landing calls, overriding the emergency stop button inside the car, but not overriding any other emergency or safety devices, and park with doors open.

(3) The fire lift shall then be available for use by the fire brigade on operation of the fireman's switch.

(4) Under this mode of operation, the fire lifts shall only operate in response to car calls but not to landing calls in a mode of operation in accordance with by-law 205.

(5) In the event of mains power failure, all lifts shall return in sequence directly to the designated floor and operate under emergency power as described under paragraphs (2) to (4).

(6) A fireman intercom system shall be provided in a lift car for the communication between a lift operator at each lift landing and a fire command centre.

Approval of Director General

207. (1) Any construction, development or installation of firefighting equipment or fire safety installation other than those conforming to the requirements provided in Parts XII and XIII of these By-laws shall be submitted to and approved by the Director General before the commencement of work.

(2) The plans, drawings and calculations of all fire fighting installations shall be submitted to the Fire and Rescue Department in a manner specified by the Director General and be approved before the commencement of work.

Markings on wet riser, etc

208. (1) Wet riser, dry riser, sprinkler and other fire installation pipes and fittings shall be identified in red colour.

(2) All cabinets and areas recessed in walls for location of fire installations and extinguishers shall be clearly identified to the satisfaction of the Director General.

Smoke control system

209. A smoke control system shall be provided where —

(a) the requirement for compartmentation relates to the conditions in by-law 211 ;

(b) any compartment in a building or part of the building exceeds 2,000 square metres; or

(c) any basement where the total area exceeds 1,000 square metres, except in any of the following situations —

(i) where the basement or a portion of the basement is used as a car park, the car park shall comply with the requirement of a smoke purging system if it is compartmented from the rest of the basement;

(ii) where a plant or equipment room with a floor area not exceeding 250 square metres is compartmented from rest of the basement, two doors remotely located from each other for better reach in fire appliance access shall be provided and the provision of a single door opening for this room is permitted provided that the most remote part of the room is less than 8 metres from the door, and the equipment found inside this room, does not obstruct the throw of a water jet from a fire fighting hose;

(iii) where a plant or equipment room with a floor area exceeds 250 square metres but does not exceed 1,000 square metres, and for which a smoke vent or smoke purging system of at least 10 air changes per hour is provided; or

(iv) where a service area comprising a storeroom or workshop (restricted to staff only) is compartmented and provided with a smoke venting or a smoke purging system of at least 10 air changes per hour in lieu of an engineered smoke control system.

Smoke vent

210. A smoke vent shall be provided if the total aggregate floor area of all basement storeys exceeds 200 square metres but does not exceed 1,000 square metres, and in lieu of the smoke vent, a smoke purging system or an engineered smoke control system shall be provided for car parks or other occupancies respectively.

Atriums in buildings

211. An atrium may be permitted in a building provided that —

(a) the horizontal dimension is not less than 6 metres and the area of opening is not less than 95 square metres;

(b) the exits are separately enclosed from the atrium though exit access may be within the atrium;

(c) the atrium is open and unobstructed;

(d) the building is fully protected by automatic sprinklers;

(e) the automatic sprinkler system is omitted for a ceiling of the atrium if it is more than 17 metres above the floor and for the atrium with ceiling height of exceeding 17 metres (in whole or in part), a water monitor, deluge or extended-throw sprinkler system shall be provided to cover the entire atrium space;

(f) a smoke control or smoke exhaust system of the atrium and adjacent spaces be provided as per Table 1 below or other approved standards:

Height of Atrium in M	Volume of Atrium Cubic M	Smoke Exhaust System (whichever is greater)		Air Supply (Lowest Level)
		Cubic M/Sec or	Air Change/ Hour	
17 or less	17,000 or less	19	6	Gravity - natural flow due to difference in density. 75% of exhaust
17 or less	17,000 or less	19	4	Gravity 17% of Exhaust
17 or more	-	-	4	Mechanical 75% of Exhaust

(g) the smoke control or smoke exhaust system shall be activated by —

(i) a smoke detector located at the top of the atrium and adjacent to each return air intake from the atrium;

(ii) the automatic sprinkler system;

(iii) the automatic detector system (but not the manual break glass system); and

(iv) a manual control readily accessible to the Fire and Rescue Department; and

(h) the atrium shall be separated from adjacent spaces by one hour fire resistance fire barrier except that —

(i) any three levels of the building may open directly to the atrium without enclosure; and

(ii) a glass wall may be used in lieu of fire barrier where the automatic sprinkler is spaced 1.8 metres or less apart along both sides of the glass wall, not more than 0.3 metres from the glass so that the surface of the glass is wet upon operation of the sprinkler and the glass shall be tempered, wired or laminated glass held in place by a gasket system allowing the frame to deflect without the glass breaking before the sprinkler operates.

Emergency power system

212. (1) Emergency power system shall be provided to supply illumination and power automatically in the event of failure of the normal supply or in the event of accident to elements of the system supplying power and illumination essential for safety to life and property.

(2) Emergency power systems shall provide power for smoke control systems, illumination, fire alarm systems, fire pumps, public address systems, fire lifts and other emergency systems.

(3) Emergency systems shall have adequate capacity and rating for the emergency operation of all equipment connected to the system including the simultaneous operation of all fire lifts and one other lift.

(4) All wiring for emergency systems shall be in metal conduit or of fire resisting mineral insulated cables, laid along areas of least fire risk.

(5) Current supply shall be such that in the event of failure of the normal supply to or within the building or group of buildings concerned, the emergency lighting or emergency power, or both emergency lighting and power will be available within 60 seconds immediately after the interruption of the normal supply. The supply system for emergency purposes shall comprise one or more of the following approved types —

(a) Storage Battery

Storage battery of suitable rating and capacity to supply and maintain at not less than 87 1/2 percent of the system voltage the total load of the circuits supplying emergency lighting and emergency power for a period of at least 1 1/2 hours;

(b) Generator Set

A generator set driven by some form of prime mover and of sufficient capacity and proper rating to supply circuit carrying emergency lighting or lighting and power with suitable means for automatically starting the prime mover on failure of the normal sevice.

Emergency lighting

213. (1) Emergency lighting shall be installed to provide sufficient illumination for escape purposes.

(2) Such lighting shall be of the self-contained type or supplied with emergency power from an emergency power system or central battery bank and shall comply with MS 619 and MS 2687.

(3) In all cases, the duration of emergency illumination in the event of failure of normal supply shall not be less than three hours.

Buildings to which Parts XII and XIII apply

214. Buildings which on the date of commencement of these By-laws have been erected, or in the course of being erected or have not been erected but plans have been submitted and approved, and which according to by-law 95 fall within the classification of Place of assembly, Shop, Office, Other Residential and buildings exceeding 18 metres and buildings which are classified as hazardous or special risks shall be modified or altered to comply with Parts XII and XIII of these By-laws within —

(a) three years from the date of commencement of these By-laws in the case of buildings up to three storeys; and

(b) five years from the date of commencement of these By-laws in the case of buildings exceeding three storeys.

Power of local authority to extend period, *etc*.

215. (1) Notwithstanding by-law 214, the local authority may where it is satisfied that it is justifiable to do so —

(a) allow an extension or further extensions of the period within which the requirements under Parts XII and XIII of these By-laws are to be complied with; or

(b) allow variations, deviations or exemptions as it may specify from any provision of Parts XII and XIII of these By-laws.

(2) Any person aggrieved by the decision of the local authority under paragraph (1) may within thirty days of the receipt of the decision appeal in writing to the Minister, whose decision shall be final.

PART XIV

COMPLETION AND OCCUPATION OF BUILDING

Certificate of completion and compliance

216. (1) A certificate of completion and compliance in Form E as set out in the Second Schedule shall be issued by the principal submitting person —

(a) when all the technical conditions as imposed by the local authority have been duly complied with;

(b) when Forms F1 to F22 in respect of certifications as set out in the Second Schedule have been duly certified and received by him together with the following —

(i) letter of clearance from the Fire and Rescue Department Malaysia (except for residential buildings not exceeding 18 metres in height) shall be attached to Form F8 and F9;

(ii) certificate of fitness from the Department of Occupational Safety and Health shall be attached to Form F11;

(iii) letter of confirmation from the State Water Authority that the water supply is ready for connection shall be attached to Form F13;

(iv) letter of clearance in respect of sewerage services from the relevant authority shall be attached to Form F14 and F15;

(v) letter of confirmation from Sabah Electricity Sdn. Bhd. that the electrical power supply is ready for connection shall be attached to Form F16; and

(vi) letter of confirmation from the relevant local authority or Public Works Department shall be attached to Form F17.

(c) when all the essential services, including access roads, landscape, car parks, drains, sanitation, water, electricity installations and communication, firefighting system, sewerage and refuse disposal requirements and, lifts where required, have been provided;

(d) when he certifies in Form E that he has supervised the erection and completion of the building and that to the best of his knowledge and belief the building has been constructed and completed in accordance with these By-laws and the plans approved by the local authority; and

(e) where the erection of building involves —

(i) the subdivision of building; or

(ii) the amalgamation or subdivision of land or both,

when the Surveyors Board issues a certificate confirming the deposit of survey fees in respect of subparagraph 1*(e)* (i) or (ii) as the case may be, together with evidence of payment of all outstanding premium.

(2) If the principal submitting person or submitting person does not receive the letter of confirmation as required under sub-paragraphs *(b)*(i), (ii), (iii), (iv), (v) and (vi) of this by-law within 14 days from the date of application, the letter of confirmation shall be deemed to have been given.

(3) Upon the issuance of the certificate of completion and compliance, the principal submitting person accepts full responsibility for the issuance of the certificate of completion and compliance and he certifies that the building is safe and fit for occupation.

(4) Nothing contained in these By-laws shall prevent the local authority or any person authorised by it from inspecting any building for the purpose of ensuring that the erection of such building is in compliance with the approved plans and the provisions of these by-laws and calling attention to any failure, deficiency or shortcoming in respect of the building or non-compliance with the approved plans or the provisions of these By-laws in which the local authority or any person authorised by it may observe .

(5) If it appears to the local authority that any failure, deficiency or shortcoming in respect of the building or non-compliance with the approved plans or the provisions of these by-laws has occurred in the erection of the building, the local authority shall issue to the principal submitting person a notice in Form G of the Second Schedule ordering —

(a) such failure, deficiency or shortcoming,or non-compliance to be rectified by the owner of the building within the period specified in the notice; and

(b) in the case where certificate of completion and compliance has not been issued, the issuance of such certificate of completion and compliance be withheld until the same has been rectified.

(6) Subject to paragraph (5), the principal submitting person shall not issue the certificate of completion and compliance until such failure, deficiency or shortcoming, or non-compliance is rectified.

(7) The owner of the building shall within the period specified in the notice or such further period as may be approved by the local authority, rectify the failure, deficiency or shortcoming, or non-compliance .

(8) Any principal submitting person or owner of the building who fails to comply with the notice issued under paragraph (5) commits an offence.

(9) Where the failure, deficiency or shortcoming, or non-compliance has been rectified in accordance with the notice issued under paragraph (5) the principal submitting person shall issue a notice together with a declaration in Form H as set out in the Second Schedule to the local authority confirming that such rectification works have been satisfactorily completed.

(10) The principal submitting person shall within seven days from the date of issuing the notice and the declaration as mentioned in paragraph 9 issue a Certificate of Completion and Compliance.

Partial certificate of completion and compliance

217. (1) The principal submitting person may issue a partial certificate of completion and compliance in Form E1 as set out in the Second Schedule in respect of any part of a building partially completed subject to any condition imposed by the local authority which it deems necessary for reasons of public health and safety :

Provided that no such certificate shall be issued unless —

(a) all the essential services including access roads, landscape, car parks, drains, sanitary installations, water, electricity and communication installations, firefighting system, sewerage and refuse disposal requirements and, lifts where required, serving the partially completed portion of the building have been provided;

(b) Forms F1 to F22 in respect of certifications as set out in the Second Schedule have been duly certified and received by him together with the following —

(i) the letter of clearance from the Fire and Rescue Department Malaysia (except for residential buildings not exceeding 18 metres in height) shall be attached to Form F8 and F9;

(ii) the certificate of fitness from the Department of Occupational Safety and Health shall be attached to Form F11;

(iii) the letter of confirmation from the State Water Authority that the water supply is ready for connection shall be attached to Form F13;

(iv) the letter of clearance in respect of sewerage services from the relevant authority shall be attached to Form F14 and F15;

(v) the letter of confirmation from Sabah Electricity Sdn. Bhd. that the electrical power supply is ready for connection shall be attached to Form F16; and

(vi) the letter of confirmation from the relevant local authority or Public Works Department shall be attached to Form F17.

(2) If the principal submitting person or submitting person does not receive the letter of confirmation as required under sub-paragraphs *(b)*(i), (ii), (iii), (iv), (v) and (vi) of this by-law within fourteen days from the date of application, the letter of confirmation shall be deemed to have been given.

(3) A partial certificate of completion and compliance once issued shall remain effective until the whole building is completed and a certificate of completion and compliance is issued in accordance with by-law 216.

(4) The provisions of paragraphs 216(4), (5), (6), (7), (8), (9) and (10) shall apply in respect of the issuance of the partial certificate of completion and compliance.

Deposit of a copy of certificate of completion and compliance or partial certificate of completion and compliance

218. (1) The principal submitting person shall within fourteen days from the issuance of the certificate of completion and compliance or partial certificate of completion and compliance, as the case may be, deposit a copy of the said certificate and the Forms F1 to F22 with the local authority and the Board of Architects Malaysia or Board of Engineers Malaysia, as the case may be.

(2) Where the principal submitting person fails to deposit a copy of the certificate of completion and compliance or partial certificate of completion and compliance, as the case may be, and the Forms F1 to F22 within the period as stipulated in paragraph (1) with the local authority and the Board of Architects Malaysia or Board of Engineers Malaysia, as the case may be, he commits an offence.

Prohibition against issuance of certificate of completion and compliance or partial certificate of completion and compliance

219. (1) The certificate of completion and compliance or partial certificate of completion and compliance, as the case may be, shall not be issued by the principal submitting person until all the failures, deficiencies or shortcomings, deviation or non-compliance in respect of the building have been satisfactorily rectified.

(2) Any principal submitting person who issues certificate of completion and compliance or partial certificate of completion and compliance, as the case may be in contravention of paragraph (1) commits an offence.

Offence to occupy building without a certificate of completion and compliance or partial certificate of completion and compliance

220. (1) No person shall occupy or permit to be occupied any building or any part thereof unless a certificate of completion and compliance or partial certificate of completion and compliance, as the case may be, has been issued under these By-laws in respect of such building.

(2) Any person who fails to comply with paragraph (1) commits an offence.

PART XV

DEMOLITION OF BUILDINGS

Demolition plan

221. (1) Before the demolition is commenced, one copy of the detailed demolition plan together with a copy of the stability report prepared in accordance with MS 2318:2010 (P) shall be deposited with the local authority.

(2) The detailed demolition plan shall bear a certificate by the submitting person as in Form I of the Second Schedule to the effect that the details are in accordance with MS 2318:2010 (P) and that the submitting person accepts full responsibility.

Power of local authority to reject demolition plan and stability report

222. Notwithstanding paragraph (2) of by-law 221, the local authority may examine and in so doing may reject any demolition plan or stability report which is not in accordance with MS 2318:2010 (P) and if it rejects such plan or report it may require such submitting person to resubmit a new demolition plan or stability report in respect of the rejected portion.

Notice of commencement or resumption of demolition works

223. (1) No person shall commence or resume the demolition of a building in any case where the demolition work has been suspended for a continuous period exceeding three months unless he has given the local authority seven days' notice in writing of his intention to commence or resume such work, as the case may be.

(2) If the work is not commenced or resumed on the date given in such notice, a further notice shall be given before the work may be commenced or resumed.

Methods of demolition

224. The demolition works shall conform to MS 2318:2010 (P).

Duties of submitting person

225. (1) The submitting person certifying the plan under paragraph (2) of by-law 221 shall be responsible for the proper execution of the demolition works and shall continue to be so responsible until the completion of the demolition works unless —

(a) with the agreement of the local authority, another submitting person is appointed to take over; or

(b) the local authority agrees to accept his withdrawal or replacement at the request of the owner provided that the demolition works has not commenced.

(2) Where the local authority agrees to accept the submitting person's withdrawal or replacement under subparagraph (1)(b), the demolition works shall not commence until another submitting person is appointed to take over.

(3) Where any submitting person who has submitted the demolition plan has died or become bankrupt or cannot be found or has been deregistered from the register or for any other reason ceased to practice, the owner shall as soon as practicable appoint another submitting person to act for him and to submit adequate evidence to the local authority of the circumstances.

Exemption from this Part

226. The local authority may if it deems fit exempt any minor demolition work in respect of any structure not exceeding 4.5 metres in height from the requirements of this Part.

PART XVI

PERIODICAL INSPECTION OF BUILDINGS

Power to require periodical inspection of buildings

227. (1) The local authority may, by a notice in writing served on the owner of a building, require the building to be inspected —

(a) after the tenth year commencing from the date the certificate of completion and compliance or occupation certificate, as the case may be, in respect of the building was issued; and

(b) thereafter at intervals of not more than ten years from the date of the completion of the last inspection of the building under this Part.

(2) The owner of a building shall, upon receipt of a notice under paragraph (1), cause the building to be inspected within the time specified in the notice by an submitting engineer to be appointed by him.

(3) If the notice under paragraph (1) is not complied with, the local authority may inspect the building or cause the building to be inspected by a submitting engineer appointed by it and recover all expenses reasonably incurred by it in doing so from the owner of the building.

(4) A submitting engineer carrying out an inspection shall inspect the building in the manner prescribed in these By-laws which shall take into consideration the following:

(a) a visual inspection of the building, including a visual survey of the condition of the building and its structural elements and any addition or alteration to the building and its structural elements;

(b) the preparation and submission to the local authority of a report of the result of the visual inspection;

(c) if, after having considered the results of the visual inspection, the Submitting engineer reasonably suspects or is of the opinion that there is a defect, deformation or deterioration in the building or its structural elements as will or will likely endanger or reduce the structural stability or

integrity of any part of the building he shall notify the local authority of his finding and recommendation and the local authority may issue an order to the submitting engineer to carry out a full structural investigation on the building including investigation in respect of its structural elements;

(d) where the local authority has issued an order under paragraph *(c)* the submitting engineer shall carry out a full structural investigation which shall include the following:

(i) taking all reasonable steps in obtaining information relating to the design, erection, maintenance and history of the building;

(ii) checking with reasonable diligence the structural plans of the building together with its structural calculations, or if the plans or calculations are not available to reconstruct such plans and calculations where the local authority so requires, with a view to determine any inadequacy in the structural elements of the building;

(iii) carrying out tests on the structural elements of the building without damaging any part thereof;

(iv) carrying out tests on the building materials; and

(v) carrying out load testing on such parts of the building as the submitting engineer considers necessary; and

(vi) the submitting engineer shall thereafter prepare and submit to the local authority a report of the full structural investigation and his recommendations.

(5) A submitting engineer carrying out an inspection or a full structural investigation on a building shall be entitled at all reasonable times to full and free access to the building and any part thereof he is required to inspect or investigate and any person who hinders, obstructs or delays him in the performance of his duty commits an offence.

(6) Without prejudice to the right of the local authority to exercise its powers and recover expenses under these By-laws, any owner of a building who contravenes or fails to comply with a notice under paragraph (1) commits an offence.

(7) The local authority may, if it is satisfied after evaluating the visual inspection report submitted under paragraph (4)*(b)* or the full structural investigation report and recommendations of the submitting engineer submitted under paragraph (4)*(d)*(vi) —

(a) accept it in full;

(b) reject it;

(c) accept part of it; or

(d) obtain a second opinion on it.

(8) The local authority may thereafter —

(a) issue a directive to the owner of the building to take the necessary measures to rectify or remedy any defect, deformation or deterioration as recommended by the submitting engineer within such period as the local authority may specify; or

(b) in place of an inquiry under by-law 228, issue a directive to the owner of the building for closure and demolition of the building.

(9) Before exercising its powers under paragraph (8), the local authority shall, if it is reasonably practicable to do so, serve a copy of the directive made thereunder to every occupier of the building.

(10) Any person who fails to comply with a directive given under paragraph (8) commits an offence.

(11) Notwithstanding paragraph (10), where the owner of a building fails to comply with an directive issued under paragraph (8), the local authority may take any measure as specified in the said directive to secure the closure and demolition of the building and recover from the owner expenses reasonably incurred by it in relation thereto.

Powers as regards building in ruinous and dangerous state

228. (1) If after conducting such inquiry as it thinks fit, the local authority is satisfied that any building or anything affixed thereon is in a ruinous state, likely to fall or is in any way dangerous to any person therein or foot passengers on the streets adjoining such building, the local authority shall serve a notice on the owner of such building requiring him to either repair the defects or demolish the building or anything affixed thereon within such period of time as the local authority may specify and the local authority may also require such owner to put up such hoardings or fences of such specifications and within such period of time as it may specify.

(2) Notwithstanding any notice under paragraph (1), if the local authority is satisfied that it is dangerous for any person to remain or reside inside such building, it may by notice require every occupier of and every lodger in such building to vacate the building within such period of time as it may specify.

(3) If upon service of the notice the owner desires to repair or demolish the building, he shall not proceed to do so unless he has obtained approval to carry out such repair work or deposited one copy of the detailed demolition plan together with the stability report with the local authority.

(4) Where the owner fails to put up hoardings or fences within the period of time specified in the notice or fails to put up hoardings or fences in accordance with the specifications of the local authority, the local authority may enter upon such premises where the building is situate and put up such hoardings or fences and recover the expenses incurred from the owner.

(5) Any owner who fails to comply with the notice under paragraph (1) commits an offence.

PART XVII

MISCELLANEOUS

Buildings exempted

229. Except for by-laws 95 and 104, paragraph (2) of by-laws 189 and 191, the provisions under Part XII and XIII of these By-laws shall not apply to a private dwelling house, detached house, semi-detached or terrace house intended for single family occupancy.

Application of standard or code of practice

230. Where any standard or code of practice is referred to in these By-laws, and there is subsequently published a corresponding Malaysian Standard or any other corresponding standard or code of practice which is acceptable to the local authority or Director General, as the case may be, on the same subject matter, the corresponding Malaysian Standard or standard or code of practice shall be deemed to have superseded such standard or code of practice referred to and shall be complied with.

Failure to buildings

231. (1) In the event of any failure to any building or part of the building, whether in the course of erection or after completion, the principal submitting person or submitting person who —

(a) submitted the plans, drawings or calculations for such building;

(b) supervised the setting out of such building;

(c) certified that the setting out was carried out in accordance with the approved site plan;

(d) supervised the erection of such building;

(e) certified that the proper supervision of such building as carried out;

shall within one week of the occurrence of such failure or such further period as may be specified by the local authority within whose jurisdiction such building is situated —

(i) report such failure;

(ii) explain the cause of failure; and

(iii) if such failure occurred during the construction of such building, state the remedial action taken

(2) Such qualified person shall submit such further information in such manner and within such period as may be specified by the local authority.

(3) Where the local authority has reason to believe that a failure to any building or part of a building has occurred which failure has not been reported to such local authority it shall serve a notice on the qualified person who —

(a) submitted the plans, drawings or calculations for such building;

(b) supervised the setting out of such building;

(c) certified that the setting out was carried out in accordance with the approved site plan;

(d) supervised the construction of such building;

(e) certified that proper supervision of such building was carried out;

requiring him within one week of such service to —

(i) state whether such failure occurred;

(ii) explain why he failed to report such failure;

(iii) if such failure occurred during the construction of such building, state the remedial action taken.

(4) Any principal submitting person or submitting person who fails to comply with paragraph (1), (2) or (3) shall be guilty of an offence.

(5) Notwithstanding that any plan, drawing or calculation has been approved by or deposited with the local authority, the responsibility for the failure of any building or part of a building shall prima facie lie with the principal submitting person or submitting person who submitted such plan, drawing or calculation.

(6) The principal submitting person or submitting person, as the case may be, as mentioned in paragraph (1) of by-law 8 shall be subject to the same provision as specified under this by-law.

Removal of fallen materials

232. If any portion of any building falls upon any street, the owner of such building shall forthwith remove such fallen materials, or the local authority may itself do so and shall recover the expenses from the owner.

Offences

233. Any person who —

(a) is not the principal submitting person but issues a certificate of completion and compliance;

(b) issues a certificate of completion and compliance without the relevant forms as prescribed in these By-laws;

(c) issues a certificate of completion and compliance in contravention of a direction given by the local authority to withhold the issuance of such certificate of completion and compliance;

(d) knowingly makes or produces or causes to be made any false or fraudulent declaration, certificate, application or representation of any form prescribed in these By-laws;

(e) uses any forged, altered or counterfeit declaration, certificate, application or representation of any form prescribed in these By-laws knowing the declaration, certificate, application or representation have been forged, altered or counterfeited; or

(f) occupies or permits to be occupied any building or any part thereof without a certificate of completion and compliance, commits an of fence.

Compounding of offences

234. (1) The local authority or its authorised officer may compound any offence committed by any person under these By-laws by making a written offer to the person suspected of committing the offence to compound a sum not exceeding five thousand ringgit for that offence within the time specified in the offer.

(2) An offer under paragraph (1) may be made at any time after the offence has been committed, but before any prosecution for it has been instituted, and if the amount specified in the offer is not paid within the time specified in the offer or within such extended period as the local authority may grant, prosecution for the offence may be instituted at any time after that against the person to whom the offer is made.

(3) If an offence has been compounded under paragraph (1) and paid, no prosecution shall after that be instituted against that person to whom the offer to compound was made and paid.

Penalty

235. Any person who contravenes any provision of these By-laws commits an offence and shall, on conviction, be liable to a fine not exceeding one hundred thousand ringgit or to imprisonment for a term not exceeding one year or to both and in the case of a continuing offence, to a further fine not exceeding five thousand ringgit for every day during which the offence continues after conviction.

Revocation and transitional provision

236. (1) The following By-laws are hereby revoked:

(a) Sandakan Town Board Building By-laws 1951 (Amendment) By-Laws 1962;

(b) Keningau District Council (Building) By-Laws 1983;

(c) Kinabatangan District Council (Building) By-Laws, 1988 (G.N.L 29 of 1990);

(d) Kudat Town Board (Building) By-Laws, 1965 (G.N.L 84 of 1965);

(e) Lahad Datu District Council (Building) By-Laws, 1982 (G.N.L 20 of 1983);

(f) Papar District Council (Building) By-Laws, 1977 (G.N.L 49 of 1977);

(g) Ranau District Council (Building) By-Laws 1962 (G.N.L 47 of 1966);

(h) Kota Marudu/Pitas District Council (Building) By-Laws 1983 (G.N.L 58 of 1983).

(2) Any notice, order, compound, permit, approval, documents or certificates, penalty, exemption, made or issued under the revoked By-laws shall be deemed to be made or issued under these By-laws, and shall continue to remain in force and have effect, until otherwise provided for under these By-laws.

(3) Any proceedings pending or commenced under the revoked By-laws before the coming into operation of these By-laws shall be continued and concluded under the revoked By-laws as if these By-laws has not been made.

FIRST SCHEDULE

FEES

[by-laws 5(1)*(a)*, 12(1), 15(1) , 15 (2), 21(2), 21(3)*(c)*, 21(4), 27(2) and 28]

1. Processing fees for building plans

A New building:

	Fees
(i) Commercial premises	RM3.50 per sq. m. of gross built-up area.
(ii) Industrial building	
(a) light Industry	RM3.50 per sq. m. of gross built-up area.
(b) heavy Industry	RM4.00 per sq. m. of gross built-up area.
(iii) Transportation hub (airport, bus terminal terminal, train terminal, port and ferry terminal)	RM3.50 per sq. m. of gross built-up area.
(iv) Residential building	RM2.50 per sq. m. of gross built-up area.
(v) Government building	RM1.00 per sq. m. of gross built-up area.
(vi) Buildings used exclusively for places of religious worship, schools or charitable purpose	RM1.00 per sq. m. of gross built-up area.
(vii) Communication structure	RM2000.00 per submission
(viii) Any other buildings	2.00 per sq. m. of gross built-up area.

B Alteration to the existing buildings	RM1.00 per sq. m. of specified floor area
C Amendment to approved plans:	
(i) without increase of floor area;	RM100.00 per submission
(ii) with additional floor area.	As prescribed in paragraph A.
D Application for permit (other than communication structure).	RM30.00 per sq. m.

2. Fees for Permit

Permit for the following purposes:	Fee
(a) Erection of a temporary shed for shows	RM100.00 per shed per month or part thereof
(b) Erection of a temporary place of worship	RM40.00 per shed per month or part thereof
(c) Depositing of building materials on streets	RM36.00 per sq. metre per month or part thereof
(d) Erection of a builder's working shed, store or other sheds in connection with building works	RM200.00 per shed per 6 months or part thereof
(e) Erection of scaffolding on streets or footways	RM10.00 per scaffold pole per month or part thereof
(f) Erection of staging, framework, platform or temporary structure of any kind on a roof abutting a street	RM100.00 per month or part thereof

(g) Erection of protective hoardings on streets or footways	RM6.00 per metre run per month or part thereof
(h) Advertisement hoardings, framings or signboards	RM500.00 per year
(i) Communication structure:	
(i) Lattice tower	RM5000.00 per year
(ii) Monopole	
(a) not exceeding 18 metres	RM1500.00 per year
(b) exceeding 18 metres	RM3000.00 per year
(iii) Any other types of communication structures or installations.	RM1000.00 per year

3. Fees for inspection, copying and certification of plans

(a) Inspection of approved plan	RM100.00 per set of plans.
(b) Copying an approved plan	RM200.00 per set of plans.
(c) Certification of true copy of an approved plan	RM100.00 per copy.

SECOND SCHEDULE

UNIFORM BUILDINGS BY-LAWS 2022

FORM A

CERTIFICATION OF BUILDING PLANS

[sub by-law 9(1)]

Date: …….

To the Local Authority,

……

I certify that the details in the Plans Ref. No. ……..... on lot(s) ……..…..…..… Land Title No. …… Jalan …… for ……. are in accordance with the requirements of the Uniform Building By-Laws 2022 and I accept full responsibility accordingly.

Signature: .....

Stamp: …….

Name of Principal Submitting Person: ……

Registration No.: ……

Address: ……..
……
……

UNIFORM BUILDINGS BY-LAWS 2022

FORM B

DECLARATION OF AMENDMENTS TO APPROVED PLANS

[sub by-laws 12(1) and (5)]

Date: …….

To the Local Authority,

.....

We hereby declare that we have amended the Approved Plans Ref. No. ..... and to the best of our knowledge, the amendments listed below are correct and true.

Item: Particulars:

1.

2.

3.

(a) Signature: .....

Stamp: …….

Name of Principal Submitting Person: ……

Registration No.: ……

Address: ……..
…….
…….

(b) Owner Name: ……

Signature: ……
(Date:)

Stamp: ……

UNIFORM BUILDINGS BY-LAWS 2022

FORM C

CERTIFICATION OF STRUCTURAL PLANS AND CALCULATIONS

[sub by-law 16(2)]

Date: …….

To the Local Authority,

……

I certify that the details in the Plans Ref. No. .…… including the Calculations on lot(s) .....…… Land Title No …… Jalan ……..…… for …….. are in accordance with the requirements of the Uniform Building By-Laws 2022 and I accept full responsibility accordingly.

Signature: .....

Stamp: …….

Name of Principal Submitting Person: ……

Registration No.: ……

Address: ……..
……
……

UNIFORM BUILDINGS BY-LAWS 2022

FORM D

CERTIFICATION OF MECHANICAL AND ELECTRICAL PLANS

[by-law 20]

Date: ……

To the Local Authority,

……

I certify that the details in the Plans Ref. No. ……..…… for the *mechanical / electrical installations works including the calculations on lot(s) ....……. Land Title No. …… Jalan…… for …….. are in accordance with the requirements of the Uniform Building By-Laws 2022 and I accept full responsibility accordingly.

Signature: .....

Stamp: ……

Name of Principal Submitting Person: ……

Registration No.: ……

Address: ……
……
……

* *Delete whichever is inapplicable.*

UNIFORM BUILDINGS BY-LAWS 2022

FORM E

CERTIFICATE OF COMPLETION AND COMPLIANCE

[sub by-laws 216(1) and (1)*(d)*]

Date: .....

To:
*
……
……

I hereby issue the Certificate of Completion and Compliance for the building(s) on Land Title No. ……..... comprising (project component details)
……
……...……
……..
upon being satisfied that it has been completed in accordance with approved plan No. …… dated …….....
I have supervised the erection and completion of the building/s and it is to the best of my knowledge and belief that such work/s is/are in accordance with the Uniform Building By-Laws 2022 and approved plans. I hereby certify that the building/s is/are safe and fit for occupation.

…….
(Principal submitting person)

1. Particulars of the principal submitting person

Name: .....….....…

Address: .....
** BAM/BEM Registration

No. : .....……....

2. Copy to:

(a) Local Authority: .....
(Name of the local authority)

*(b) ** Board of Architects Malaysia (BAM)/Board of Engineers Malaysia (BEM)*
** The developer, if it is for development other than individually built buildings or, the owner if it is for an individually built building.*

*** Delete whichever is inapplicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM E 1

PARTIAL CERTIFICATE OF COMPLETION AND COMPLIANCE

[by-law 217]

Date: .....

To:
*
……
……

I hereby issue the Partial Certificate of Completion and Compliance for the building(s) on Land Title No. .....… comprising (project component details)
.....
.....
.....
.....
.....
completed for the portion/phase as approved by the Local Authority in accordance with approved plan No. ……..……... dated ……..……..
I have supervised the erection and partial completion of the building(s) and it is to the best of my knowledge and belief that such work/s is/are in accordance with Uniform Building By-Laws 2022 and approved plans. I hereby certify that the building(s) is/are safe and fit for occupation.

…….
(Principal submitting person)

1. Particulars of the principal submitting person

Name: .....…..…

Address: .....
** BAM/BEM Registration

No. : .....……..

2. Copy to:

(a) Local Authority: .....
(Name of the local authority)

*(b) ** Board of Architects Malaysia (BAM)/Board of Engineers Malaysia (BEM)*
** The developer, if it is for development other than individually built buildings or, the owner if it is for an individually built building.*

*** Delete whichever is inapplicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 1

CERTIFICATION OF EARTHWORKS

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the construction and completion of the earthworks and that to the best of our knowledge and belief such works are in accordance with the Approved Earthwork Plans Ref. No. ……and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date: _____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration

** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 2

CERTIFICATION OF SETTING OUTS

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the setting out of the building and that to the best of our knowledge and belief such works are in accordance with the approved Plans Ref. No. ….....……..……. and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date: _____)
(b) Licensed Land Surveyor	_____	_____ (Surveyors Board)	_____ (Date: _____)
(c) Principal submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.

** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 3

CERTIFICATION OF FOUNDATIONS

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the foundation and that to the best of our knowledge and belief such works are in accordance with the Deposited Plans Ref. No. .....and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date: _____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.

** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 4

CERTIFICATION OF STRUCTURAL WORKS

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the structural works and that to the best of our knowledge and belief such works are in accordance with the Deposited Structural Plans Ref. No. ……
and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date: _____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

……..
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 5

CERTIFICATION OF INTERNAL WATER PLUMBING

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the internal water plumbing works and that to the best of our knowledge and belief such works are in accordance with *Approved Plan/Deposited Plans Ref. No. …….. and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a)Trade Contractor (Licensed plumber)	_____	_____ (Construction Industry Development Board)	_____ (Date: _____)
(b) Submitting person	_____	_____ (*Board of Architects Malaysia/Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 6

CERTIFICATION OF INTERNAL SANITARY PLUMBING

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the internal sanitary plumbing works and that to the best of our knowledge and belief such works are in accordance with *Approved Plan/Deposited Plans Ref. No. …..….…..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a)Trade Contractor (Licensed plumber)	_____	_____ (Construction Industry Development Board)	_____ (Date: _____)
(b) Submitting person	_____	_____ (*Board of Architects Malaysia/Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 7

CERTIFICATION OF INTERNAL ELECTRICAL WORKS

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the internal electrical works and that to the best of our knowledge and belief such works are in accordance with the submitting person's Endorsed Plans and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor (Competent person)	_____	_____ (Energy Commission)	_____ (Date: _____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 8

FIRE SAFETY INSTALLATION REQUIREMENTS (ARCHITECTURAL) CERTIFICATION

[by-laws 216 and 217]

Date: .....

Project Title: .....……...

*1. We certify that we have supervised and/or carried out the erection and completion of the fire safety installation requirements (architectural) works and that to the best of our knowledge and belief such works are in accordance with the *Approved Plans/Deposited Plans Ref. No. …… and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a)	Contractor …… (Construction Project Manager)	……. (CIDB)	……..…… (Date:)
(b)	~Site Supervisory …… Staff	……. (BEM)	……..…… (Date:)
(c)	**Principal ……..... submitting person	……. (*BAM/BEM)	…….. (Date:)

OR

*2. I certify that this form is not applicable.

……
(Principal submitting person)

** Delete whichever is not applicable.*

*** Letter of clearance from Fire and Rescue Department Malaysia (except for residential buildings not exceeding 18 metres in height) shall be attached.*

 # Identification card no., if there is no relevant body in respect of registration.

~ When more than one site supervisory staff is involved, attach an annexure sheet.

NOTE: BAM Board of Architects Malaysia
BEM Board of Engineers Malaysia
CIDB Construction Industry Development board

UNIFORM BUILDING BY-LAWS 2022

FORM F 9

FIRE ALARM SYSTEM AND FIRE EXTINGUISHMENT SYSTEM (M&E)

CERTIFICATION

[by-laws 216 and 217]

Date: .....

Project Title: …….....

*1. We certify that we have supervised and/or carried out the erection and completion of the fire alarm system and fire extinguishment system (M&E) works and that to the best of our knowledge and belief such works are in accordance with the *Approved Plans/Deposited Plans Ref. No. …… and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a)	Contractor …… (Construction Project Manager)	……. (CIDB)	……..…… (Date:)
(b)	~Site Supervisory …… Staff	……. (BEM)	……..…… (Date:)
(c)	**Principal ……..... submitting person	……. (*BAM/BEM)	…….. (Date:)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

**Delete whichever is not applicable.*

*** Letter of clearance from Fire and Rescue Department Malaysia (except for residential buildings not exceeding 18 metres in height) shall be attached.*

 # Identification card no., if there is no relevant body in respect of registration.

+ Relevant regulatory body.

~ When more than one site supervisory staff is involved, attach an annexure sheet.

NOTE: BEM Board of Engineers Malaysia
M&E Mechanical & Electrical

UNIFORM BUILDING BY-LAWS 2022

FORM F 10

CERTIFICATION OF MECHANICAL VENTILATION

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the mechanical ventilation works and that to the best of our knowledge and belief such works are in accordance with the submitting person's Endorsed Plans and that we accept full responsibility or the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ + ( )	_____ (Date: _____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 11

CERTIFICATION OF LIFT/ESCALATOR INSTALLATION

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the lift/escalator installation works and that to the best of our knowledge and belief such works are in accordance with the submitting person's Endorsed Plans and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ + ( )	_____ (Date: _____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

……
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
*** Certificate of Fitness from the Department of Occupational Safety and Health shall be attached.*
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 12

CERTIFICATION OF BUILDING

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the building works and that to the best of our knowledge and belief such works are in accordance with Approved Plan Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date:_____)
(b) Principal Submitting person	_____	_____ (*Board of Architects Malaysia/Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 13

CERTIFICATION OF EXTERNAL WATER SUPPLY SYSTEM

[by-laws 216 and 217]

Date:
.....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the external water supply system and that to the best of our knowledge and belief such works are in accordance with Approved Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
*** Letter of Confirmation from the Sabah Water Department that the water supply is ready for connection shall be attached.*
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 14

CERTIFICATION OF SEWERAGE RETICULATION

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the sewerage reticulation works and that to the best of our knowledge and belief such works are in accordance with Approved Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ + ( )	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
*** Letter of Clearance from the Sabah Sewerage Services Department shall be attached.*
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 15

CERTIFICATION OF SEWAGE TREATMENT PLANT

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the sewerage treatment plants works and that to the best of our knowledge and belief such works are in accordance with Approved Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ + ( )	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
*** Letter of Clearance from the Sabah Sewerage Services Department shall be attached.*
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 16

CERTIFICATION OF EXTERNAL ELECTRICAL SUPPLY SYSTEM

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the external electrical supply system and that to the best of our knowledge and belief such works are in accordance with Endorsed Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor (Competent person)	_____	_____ (Energy Commission)	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.

^ Not applicable if works are carried out by Sabah Electricity Sdn. Bhd.

*** Letter of Confirmation from Sabah Electricity Sdn. Bhd that the electrical power supply is ready for connection shall be attached.*

** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 17

CERTIFICATION OF ROAD AND DRAIN

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the road and drain works and that to the best of our knowledge and belief such works are in accordance with *Approved Plan/Deposited Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor (Competent person)	_____	_____ (Construction Industry Development Board)	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

+

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.

*+ Letter of Confirmation from the *relevant local authority/Public Works Department shall be attached.*

** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 18

CERTIFICATION OF STREET LIGHTING

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the street lighting works and that to the best of our knowledge and belief such works are in accordance with the *Approved Plans/Deposited Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor (Competent person)	_____	_____ (Energy Commission)	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 19

CERTIFICATION OF EXTERNAL MAIN DRAIN

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the external main drain works and that to the best of our knowledge and belief such works are in accordance with the Approved Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor (Competent person)	_____	_____ (Construction Industry Development Board)	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

SABAH UNIFORM BUILDING BY-LAWS 2022

FORM F 20

CERTIFICATION OF COMMUNICATION WORKS

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of communication works and that to the best of our knowledge and belief such works are in accordance with *Approved Plans/Deposited Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ + ( )	_____ (Date:_____)
(b) **Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 21

CERTIFICATION OF LANDSCAPE

[by-laws 216 and 217]

Date: .....

Project Title: .....

*1. We certify that we have supervised and/or carried out the erection and completion of the landscape works and that to the best of our knowledge and belief such works are in accordance with the Approved Plans Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ + ( )	_____ (Date: _____)
(b) **Submitting person	_____	_____ + ( )	_____ (Date: _____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

+ Relevant regulatory body.
 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDING BY-LAWS 2022

FORM F 22

CERTIFICATION OF GROUND TREATMENT WORKS

[by-laws 216 and 217]

Date: .....

Project Title:.....

*1. We certify that we have supervised and/or carried out the erection and completion of the Ground Treatment Works and that to the best of our knowledge and belief such works are in accordance with the Deposited Plan Ref. No. ..... and that we accept full responsibility for the same.

	Name *(Individual)*	#Registration No.	Signature
(a) Trade Contractor	_____	_____ (Construction Industry Development Board)	_____ (Date:_____)
(b) Submitting person	_____	_____ (Board of Engineers Malaysia)	_____ (Date:_____)

OR

*2. I certify that this form is not applicable.

…….
(Principal submitting person)

 # I.C. No., if there is no relevant body in respect of registration.
** Delete whichever is not applicable.*

UNIFORM BUILDINGS BY-LAWS 2022

FORM G

NOTICE TO CARRY OUT RECTIFICATION WORKS

[sub by-law 216(5)]

Date:
.....

To:(Principal Submitting Person),

……
……

Project Title: .....

Take notice that an inspection on the building works has been carried out on ……..…..…... and the owner of the building is hereby required to carry out rectification works as follows: .... (specify any works to be executed) .... within …….... days from the date of service of this notice.

Take further notice that in accordance with sub by-law 216(6) you shall not issue the certificate of completion and compliance until such failure, deficiency or shortcoming, or non-compliance are rectified.

.....
(Name of local authority)

UNIFORM BUILDINGS BY-LAWS 2022

FORM H

CERTIFICATION OF RECTIFICATION WORKS

[sub by-law 216(9)]

Date:
.....

To the Local Authority,

……..

Project Title: …….....

I certify that I have supervised and/or carried out the rectification works in respect of the above project and that to the best of our knowledge and belief such works are in accordance with the Approved Plan Ref. No.: ..... and that I accept full responsibility for the same.

Signature: .....

Stamp: ……

Name of Principal Submitting Person: ……

Registration No.: ……

Address: ……..
……
……

UNIFORM BUILDINGS BY-LAWS 2022

FORM I

CERTIFICATION OF DEMOLITION WORKS PLAN

[sub by-law 221(2)]

Date: .....

To the local authority,

.....

(c) certify that the details on the demolition works plan namely (Plan No.) .....

.....

on title(s) No. ……..... …….....

…....are in accordance with the requirements of the Uniform Building By-laws 2022 and I accept full responsibility accordingly.

Submitting person: .....

3. Particulars of the principal submitting person

Name: .....

Address: .....

Registration No: .....

Professional Engineer's Stamp: .....

THIRD SCHEDULE

[by-law 38]

INTERPRETATION

1. In this Schedule, unless the context otherwise requires —

"air changes" means the hourly replacement of the volumetric content of air within an enclosure;

"cmm" means cubic metre of air per minute;

"enclosure" means room, ward, toilet, theatre, auditorium or any similarly enclosed space;

"foul air" means vitiated air and includes exhaust air from lavatories, bathrooms, urinals, toilets, kitchens, canteens, chemical store, restaurants, hairdresser shop, laboratories, dark rooms, battery rooms, car parks or similar areas, and air discharged from smoke extract system associated with fire protection service of buildings;

"fresh air" means normal outdoor air not unduly affected by odours, smoke, effluents, dust, vapours, fumes, discharged from mechanical plant and similar artificial influences which may affect the fresh air in any manner or form;

"fresh air changes" means air changes per hour and shall constitute that proportion of the air change which is wholly fresh air;

"occupancy" means the number of persons occupying an enclosure, the average rate of which shall be the equivalent of one person occupying an enclosure for a continuous period of twenty minutes in any one hour.

WINDOWLESS ROOMS

2. (1) Habitable rooms with no external walls and other enclosures shall be provided with mechanical ventilation or air-conditioning having a minimum fresh air change at the rate of 0.28 cmm per person, but in no case less than that specified in ASHRAE Standard 62-73.

(2) Isolation wards and other such areas for infectious, contagious or other dangerous diseases shall be provided with mechanical ventilation or air-conditioning having a minimum fresh air change at the rate 0.42 cmm per person.

FILTERS FOR EXHAUST AIR

3. (1) Filters for the removal of airborne bacteria shall be provided for all exhaust air discharge points to the requirements of the governing health authority.

(2) Exhaust air discharge points shall be installed at the level that the local authority may determine.

OPERATING THEATERS AND OTHER ROOMS IN HOSPITAL

4. The mechanical ventilation and air-conditioning system in the operating theater, sterilizing rooms, anaesthetic rooms, X-ray rooms and dark rooms shall be provided in accordance with the requirements of the governing health authority.

OPENINGS FOR MECHANICAL VENTILATION AND AIR-CONDITIONING SYSTEM

5. Where mechanical ventilation or air-conditioning is provided —

(a) foul air shall not be discharged into an air-well;

(b) the underside of openings for entry of air into any mechanical ventilation or air-conditioning plant shall not be less than 1 metre in height from any external pavement, road way, ground level or similar external surface;

(c) the underside of openings for the exhaust of air from any mechanical ventilation or air-conditioning plant shall be no less than 2.5 metres in height from any external pavement, road way, ground level or similar external surface;

(d) any of the enclosures from which foul air will be exhausted, the ducts, trunking, service shafts of other such items containing or conveying the foul air from such enclosures shall in no way connected to any air inlet system.

FILTRATION

6. Unless otherwise specified, where air-conditioning is mentioned herein, it shall be deemed to include air filtration down to a particle size of ten microns with an efficiency of not less than 70% arrestance.

MECHANICAL VENTILATION SYSTEMS IN BASEMENT AREAS

7. (1) Basement and other enclosures below ground level used for working areas or for occupancy of more than two hours duration shall be provided with mechanical ventilation having a minimum of six air changes per hour.

(2) Basement or underground car parks shall be provided with mechanical ventilation such that the air exhausted to the external atmosphere should constitute

not less than six air changes per hour. Air extract opening shall be arranged such that it is not less than 0.5 metres above the floor level period system.

(3) Basement and other enclosures below ground level used for working areas or for occupancy of more than two hours duration shall be provided with minimum of one fresh air change per hour, or the minimum of 0.28 cmm per person working in such area.

PROJECTION ROOMS

8. Cinemas or other projection rooms where photographic film is being used, processed or stored, which are situated in the internal portion of the building, and in respect of which no such external walls (or those overlooking verandahs, pavements or walkways) are present, shall be provided with mechanical ventilation or air-conditioning, and all plant conveying extract or exhaust air shall not be combined in any way to other such plant serving the auditorium or any other parts of the premises.

ANY OTHER ROOMS

9. Where rooms or enclosures in any building not specified in this Schedule are situated in the internal portions of the building and no such external walls (or those overlooking verandahs, pavements or walkways) are present, a minimum of one fresh air change per hour shall be provided.

WATER-CLOSETS AND TOILETS

10. Water closets, toilets, lavatories, bathrooms, latrines, urinals or similar rooms or enclosures used for ablutions which are situated in the internal portions of the building and in respect of which no such external walls (or those overlooking verandahs, pavements or walkways) are present, shall be provided with mechanical ventilation or air-conditioning having a minimum of fresh air change at the rate of 0.61 cmm per square metre of floor area or ten air changes per hour, whichever is lower.

ROOM, WINDOW ETC. AIR-CONDITIONING UNITS

11. Where room, window or wall air-conditioning units are provided as means of air-conditioning, such units shall be maintained and upkept in good working condition.

FRESH AIR CHANGES

12. (1) The minimum scale of fresh air ventilation in conjunction with recirculated, filtered and conditioned air meeting with the requirements of ASHRAE STANDARD 62-73 shall be as follows:

Residential building	0.14 cmm per occupant
Commercial premises	0.14 cmm per occupant
Factory and Workshop	0.21 cmm per occupant
School classroom	0.14 cmm per occupant
Projection room	0.14 cmm per occupant
Theatre and Auditorium	0.14 cmm per occupant
Canteen	0.28 cmm per occupant
Building of Public Resort	0.28 cmm per occupant
Offices	0.14 cmm per occupant
Conference Room	0.28 cmm per occupant
Hospital wards	0.14 cmm per occupant
Computer Room	0.14 cmm per occupant
Hotel rooms	0.14 cmm per occupant

(2) The minimum scale of fresh air ventilation in conjunction with the mechanical ventilation systems shall be as follows:

Basement and garages	minimum of 6 air changes per hour
Commercial premises (excluding laundry and boiler houses)	0.28 cmm per occupant
Factory and Workshop (the shall be based on the actual requirements)	0.56 cmm per occupant
Projection rooms	10 air changes per hour
Theatre and Auditorium	0.28 cmm per occupant
Kitchen	20 air changes per hour

NOTE - that all other areas shall meet with the minimum requirements of the ASHRAE STANDARD 62-73

FOURTH SCHEDULE

DESIGNATION OF PURPOSE GROUPS

[by-laws 95 and 100]

Number of Purpose Groups	Descriptive Title	*Purposes for which building or compartments is intended to be used*
I	Small residential	Private dwelling house detached or semidetached or terraced.
II	Institutional	Hospitals, schools, colleges, libraries, nursing homes or other similar establishment used for education or as living accommodation for, or for treatment, care or maintenance of, persons suffering from disabilities due to illness or old age or other physical or mental disability or under the age of 5 years, where such persons sleep in the premises.
III	Other residential	Accommodation for residential purpose other than any premises comprised in groups I and II including hotels, hostels, dormitories, apartments, flats, old folks homes, orphanages and service apartments.
IV	Office	Office, or premises used for office purposes, meaning thereby the purposes of administration, clerical work (including writing, book-keeping, sorting papers, filing, typing, duplicating, drawing and the editorial preparation of matter for publication), handling money and telephone and telegraph operating.

V	Shop	Shop, or shop premises, shopping complexes, food courts, wet and dry markets, premises used for the carrying on there of retail trade or business (including the sale to members of the public of food or drink for immediate consumption, retail sales by auction, the business of lending books or periodicals for the purpose of gain, and the business of a barber or hairdresser) and premises to which members of the public are invited to resort for the purpose of delivering their goods for repair or other treatment or of themselves carrying out repairs to or other treatment of goods.
VI	Factory	Factory means all premises, as defined in section 2 of the Factories and Machinery Act 1967, but excluding Those buildings classified under purpose group VIII- Storage and general
VII	Place of assembly	Place, whether public or private, used for the attendance of persons for or in connection with their social, recreational, educational, business or other activities, and not comprised within groups I to VI including convention centres, museums, art galleries, cinemas, theatres, auditoriums, place of worship, transportation passenger terminals.
VIII	Storage and general	Place of storage, deposit or parking of goods and materials (including vehicles), and other premises not comprised in groups I to VII.

DIMENSIONS OF BUILDINGS AND COMPARTMENTS

[by-law 97]

Purpose group		Height of buildings	Limit of dimensions	
			Floor are of storey in building or compartment (in m2)	*Cubic capacity of building or compartment (in m3)*
(1)		(2)	(3)	(4)
Part 1 --- Building other than single storey buildings				
II	(Institutional) **Note:** Hospital (patient accommodation ward)	Any height Any height	2,000 750	No limit No limit
III	(Other residential)	Not exceeding 28 m	3,000	8 500
III	(Other residential)	Exceeding 28 m	2,000	5 500
V	(Shop)	Any height	2 000	7 000
VI	(Factory)	Not exceeding 28 m	No limit	28 000
VI	(Factory)	Exceeding 28 m	2 000	5 500
VIII	(Storage and general)	Not exceeding 28 m	No limit	21 000
VIII	(Storage and general)	Exceeding 28 m	1 000	No limit
Part 2 -- Single storey buildings				
II	(Institutional) Note 1 (patient accommodation ward)	Any height	3 000	No limit
III	(Other residential)	Any height	3 000	No limit

NOTE: Purpose Groups I, IV, and VII are excluded as there are no limits applicable under by-law 100.

Note 1: For single storey premises not protected by a sprinkler, each patient accommodation ward shall be constructed as a compartment having at least 1 hour fire resistance period and at least ½ hour fire resistance period door for protection of door openings. It shall be provided with both an automatic fire alarm system with both an automatic fire alarm system.

FIFTH SCHEDULE

CALCULATION OF PERMITTED LIMITS OF UNPROTECTED AREAS

[by-laws 105(2) and 108]

PART I

GENERAL RULES

1. The permitted limit of unprotected areas in any side of a building or compartment shall be calculated by reference to the requirements of Part II, III or IV.

2. In calculating the size of unprotected areas or the permitted limit of unprotected areas, the following provisions shall apply:

(a) where any part of an external wall in an unprotected area, only because it has combustible material attached to it as cladding, the area of that unprotected area shall be deemed to be half the area of such cladding:

(b) no account shall be taken of any of the following:

(i) an unprotected area unless it is an area specified in subparagraph (iii) hereof, which does not exceed 0.1 square metre and which is not less than 1.5 metre from any other unprotected area in the same side of the building or compartment;

(ii) one or more unprotected areas having an area, or if more than one, an aggregate area not exceeding 1 square metre and not less than 4 metres from any other unprotected area in the same side of the building or compartment, except and such area as is specified in subparagraph (i) above;

(iii) an unprotected area in any part of an external wall which forms part of a protected shaft;

(iv) an unprotected are in the side of a building not divided into compartments, if the area is not less than 28 metres above any ground adjoining that side of the building.

PART II

RULES FOR CALCULATION BY REFERENCE TO AN ENCLOSING RECTANGLE

1. The conditions of this Part shall be satisfied if a building or compartment is so situated that no point on the relevant boundary is either between the relevant plane of reference and the side of the building or compartment or at a distance from the relevant plane of reference which is less than the distance specified in the Tables to this Part, according to the purpose group of the building or compartment, the dimensions of the enclosing rectangle and the unprotected percentage.

2. For the purpose of this Part —

"plane of reference" means any vertical plane which touches the side of some part o the side of a building or compartment, but which (however far extended) does not pass within the structure of such building or compartment (and for this purpose, any balcony, coping or similar projection shall be deemed not to be part either of the side or of the structure; and the relevant plane of reference shall in each case taken as the most favourable in that respect to the person erecting the building;

"enclosing rectangle" means the smallest rectangle on the relevant plane of reference which would —

(a) enclose all the outer edges of any unprotected areas of the building or, if the building is divided into compartments, of the compartments (other than any part of unprotected area which is at angle of more than 800 to the plane of reference), the outer edges being for this purpose projected on the plane of reference by lines perpendicular to such plane; and

(b) have two horizontal sides; and

(c) have height and width falling within those listed in the Tables to this Part;

"unprotected percentage" means the percentage of the area of the enclosing rectangle which is equal to the aggregate of the unprotected areas taken into account in calculating the enclosing rectangle and as projected on it.

TABLES TO PART II

TABLE I---BUILDINGS OR COMPARTMENTS OF PURPOSE GROUPS

I (Small Residential), II (Institutional), III (Other Residential), IV (Office) and VII (Assembly)

Width of enclosing rectangle in metres	*Distance in metres from relevant boundary for unprotected percentage not exceeding*								
	20	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
Enclosing rectangle 3 m high									
3	1.0	1.0	1.0	1.5	1.5	1.5	2.0	2.0	2.0
6	1.0	1.0	1.5	2.0	2.0	2.0	2.5	2.5	3.0
9	1.0	1.0	1.5	2.0	2.5	2.5	3.0	3.0	3.5
12	1.0	1.5	2.0	2.0	2.5	3.0	3.0	3.5	3.5
15	1.0	1.5	2.0	2.5	2.5	3.0	3.5	3.5	4.0
18	1.0	1.5	2.0	2.5	2.5	3.0	3.5	4.0	4.0
21	1.0	1.5	2.0	2.5	3.0	3.0	3.5	4.0	4.5
24	1.0	1.5	2.0	2.5	3.0	3.5	3.5	4.0	4.5
27	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.0	4.5
30	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.0	4.5
40	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.0	5.0
No limit	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.0	5.0
Enclosing rectangle 6 m high									
3	1.0	1.0	1.5	2.0	2.0	2.0	2.5	2.5	3.0
6	1.0	1.5	2.0	2.5	3.0	3.0	3.5	4.0	4.0
9	1.0	2.0	2.5	3.0	3.5	4.0	4.5	4.5	5.0
12	1.5	2.5	3.0	3.5	4.0	4.5	5.0	5.0	5.5
15	1.5	2.5	3.0	4.0	4.5	5.0	5.5	5.5	6.0
18	1.5	2.5	3.5	4.0	4.5	5.0	5.5	6.0	6.5
21	1.5	2.5	3.5	4.0	5.0	5.5	6.0	6.5	7.0
24	1.5	2.5	3.5	4.5	5.0	5.5	6.0	7.0	7.0
27	1.5	2.5	3.5	4.5	5.0	6.0	6.5	7.0	7.5
30	1.5	2.5	3.5	4.5	5.0	6.0	6.5	7.0	8.0
40	1.5	2.5	3.5	4.5	5.6	6.5	7.0	8.0	8.5
50	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.0	9.0
60	1.5	2.5	3.5	5.0	5.5	6.5	7.5	8.5	9.5
80	1.5	2.5	3.5	5.0	6.0	7.0	7.5	8.5	9.5
100	1.5	2.5	3.5	5.0	6.0	7.0	8.0	8.5	10.0
No limit	1.5	2.5	3.5	5.0	6.0	7.0	8.0	8.5	10.0
Enclosing rectangle 9 m high									
3	1.0	1.0	1.5	2.0	2.5	2.5	3.0	3.0	3.5
6	1.0	2.0	2.5	3.0	3.5	4.0	4.5	4.5	5.0
9	1.5	2.5	3.5	4.0	4.5	5.0	5.5	5.5	6.0
12	1.5	3.0	3.5	4.5	5.0	5.5	6.0	605	7.0
15	2.0	3.0	4.0	5.0	5.5	6.0	6.5	7.0	7.5
18	2.0	3.5	4.5	5.0	6.0	6.5	7.0	8.0	8.5
21	2.0	3.5	4.5	5.5	6.5	7.0	7.5	8.5	9.0
24	2.0	3.5	5.0	5.5	6.5	7.5	8.0	9.0	9.5
27	2.0	3.5	5.0	6.0	7.0	7.5	8.5	9.5	10.0
30	2.0	3.5	5.0	6.0	7.0	8.0	9.0	9.5	10.5
40	2.0	3.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5
50	2.0	4.0	5.5	6.5	8.0	9.0	10.0	11.5	12.5
60	2.0	4.0	5.5	7.0	8.0	9.5	11.0	11.5	13.0
80	2.0	4.0	5.5	7.0	8.5	10.0	11.5	12.5	13.5
100	2.0	4.0	5.5	7.0	8.5	10.0	11.5	12.5	14.5
120	2.0	4.0	5.5	7.0	8.5	10.0	11.5	12.5	14.5
No Limit	2.0	4.0	5.5	7.0	8.5	10.5	12.0	12.5	15.0

Enclosing rectangle 12 m high									
3	1.0	1.5	2.0	2.0	2.5	3.0	3.0	3.5	3.5
6	1.5	2.5	3.0	3.5	4.0	4.5	5.0	5.0	5.5
9	1.5	3.0	3.5	4.5	5.0	5.5	6.0	6.5	7.0
12	1.5	3.5	4.5	5.0	6.0	6.5	7.0	7.5	8.0
15	2.0	3.5	5.0	5.5	6.5	7.0	8.0	8.5	9.0
18	2.5	4.0	5.0	6.0	7.0	7.5	8.5	9.0	10.0
21	2.5	4.0	5.5	6.5	7.5	8.5	9.0	10.0	10.5
24	2.5	4.5	6.0	7.0	8.0	8.5	9.5	10.5	11.5
27	2.5	4.5	6.0	7.0	8.0	9.0	10.5	11.0	12.0
30	2.5	4.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
40	2.5	5.0	6.5	8.0	9.5	10.5	12.0	13.0	14.0
50	2.5	5.0	7.0	8.5	10.0	11.0	13.0	14.0	15.0
60	2.5	5.0	7.0	9.0	10.5	12.0	13.5	14.5	16.0
80	2.5	5.0	7.0	9.0	11.0	13.0	14.5	16.0	17.0
100	2.5	5.0	7.5	9.5	11.5	13.5	15.0	16.5	18.0
120	2.5	5.0	7.5	9.5	11.5	13.5	15.0	17.0	18.5
No Limit	2.5	5.0	7.5	9.5	12.0	14.0	15.5	17.0	19.0
Enclosing rectangle 15 m high									
3	1.0	1.5	2.0	2.5	2.5	3.0	3.5	3.5	4.0
6	1.5	2.5	3.0	4.0	4.5	5.0	5.5	5.5	6.0
9	2.0	3.0	4.0	5.0	5.5	6.0	6.5	7.0	7.5
12	2.0	3.5	5.0	5.5	6.5	7.0	8.0	8.5	9.0
15	2.0	4.0	5.5	6.5	7.0	8.0	9.0	9.5	10.0
18	2.5	4.5	6.0	7.0	8.0	8.5	9.5	10.5	11.0
21	2.5	5.0	6.5	7.5	8.5	9.5	10.5	11.0	12.0
24	3.0	5.0	6.5	8.0	9.0	10.0	11.0	12.0	13.0
27	3.0	5.5	7.0	8.5	9.5	10.5	11.5	12.5	13.5
30	3.0	5.5	7.5	8.5	10.0	11.0	12.0	13.5	14.0
40	3.0	6.0	8.0	9.5	11.0	12.5	13.5	15.0	16.0
50	3.5	6.0	8.5	10.0	12.0	13.5	15.0	16.5	17.5
60	3.5	6.5	8.5	10.5	12.5	14.0	15.5	17.0	18.0
80	3.5	6.5	9.0	11.0	13.5	15.0	17.0	18.5	20.0
100	3.5	6.5	9.0	11.5	14.0	16.0	18.0	19.5	21.5
120	3.5	6.5	9.0	11.5	14.0	16.5	18.5	20.5	22.5
No Limit	3.5	6.5	9.0	12.0	14.5	17.0	19.0	21.0	23.0
Enclosing rectangle 18 m high									
3	1.0	1.5	2.0	2.5	2.5	3.0	3.5	4.0	4.0
6	1.5	2.5	3.5	4.0	4.5	5.0	5.5	6.0	6.5
9	2.0	3.5	4.5	5.0	6.0	6.5	7.0	8.0	8.5
12	2.5	4.0	5.0	6.0	7.0	7.5	8.5	9.0	10.0
15	2.5	4.5	6.0	7.0	8.0	8.5	9.5	10.5	11.0
18	2.5	5.0	6.5	7.5	8.5	9.5	11.0	11.5	13.0
21	3.0	5.5	7.0	8.0	9.5	10.5	11.5	12.5	13.0
24	3.0	5.5	7.5	8.5	10.0	11.0	12.0	13.0	14.0
27	3.5	6.0	8.0	9.0	10.5	11.5	12.5	13.5	14.5
30	3.5	6.5	8.0	9.5	11.0	12.0	13.5	14.5	15.5
40	4.0	7.0	9.0	11.0	12.0	13.5	15.0	16.5	17.5
50	4.0	7.0	9.5	11.5	13.0	15.0	16.5	18.0	19.0
60	4.0	7.5	10.0	12.0	14.0	16.0	17.5	19.5	20.5
80	4.0	7.5	10.0	13.0	15.0	17.0	19.0	21.0	22.5
100	4.0	7.5	10.0	13.5	16.0	18.0	20.5	22.5	24.0
120	4.0	7.5	10.0	14.0	16.5	19.0	21.0	23.5	25.5
No Limit	4.0	8.0	10.0	14.0	17.0	19.5	22.0	24.0	26.5

Enclosing rectangle 21 m high									
3	0.5	1.5	2.0	2.5	3.0	3.0	3.5	4.0	4.5
6	1.5	2.5	3.5	4.0	5.0	5.5	6.0	6.5	7.0
9	2.0	3.5	4.5	5.5	6.5	7.0	7.5	8.5	9.0
12	2.5	4.0	5.5	6.5	7.5	8.5	9.0	10.0	10.5
15	2.5	5.0	6.5	7.5	8.5	9.5	10.5	11.0	12.0
18	3.0	5.5	7.0	8.0	9.5	10.5	11.5	12.5	13.0
21	3.0	6.0	7.5	9.0	10.0	11.0	12.5	13.5	14.0
24	3.5	6.0	8.0	9.5	10.5	12.0	13.0	14.0	15.0
27	3.5	6.5	8.5	10.0	11.5	13.0	14.0	15.0	16.0
30	4.0	7.0	9.0	10.5	12.0	13.0	14.5	16.0	16.5
40	4.5	7.5	10.0	12.0	13.5	15.0	16.5	18.0	19.0
50	4.5	8.0	11.0	13.0	14.5	16.5	18.0	20.0	21.0
60	4.5	8.5	11.5	13.5	15.5	17.5	19.5	21.0	22.5
80	4.5	8.5	12.0	14.5	17.0	19.0	21.0	23.5	25.0
100	4.5	9.0	12.0	15.5	18.0	20.5	22.5	25.0	27.0
120	4.5	9.0	12.0	16.0	18.5	21.5	23.5	26.5	28.5
No Limit	4.5	9.0	12.0	16.0	19.0	22.0	25.0	26.5	29.5
Enclosing rectangle 24 m high									
3	0.5	1.5	2.0	2.5	3.0	3.5	3.5	4.0	4.5
6	1.5	2.5	3.5	4.5	5.0	5.5	6.0	7.0	7.0
9	2.0	3.5	5.0	5.5	6.5	7.5	8.0	9.0	9.5
12	2.5	4.5	6.0	7.0	8.0	8.5	9.5	10.5	11.5
15	3.0	5.0	6.5	8.0	9.0	10.0	11.0	12.0	13.0
18	3.0	5.5	7.5	8.5	10.0	11.0	12.0	13.0	14.0
21	3.5	6.0	8.0	9.5	10.5	12.0	13.0	14.0	15.0
24	3.5	6.5	8.5	10.0	11.5	12.5	14.0	15.0	16.0
27	4.0	7.0	9.0	11.0	12.5	13.5	15.0	16.0	17.0
30	4.0	7.5	9.5	11.5	13.0	14.0	15.5	17.0	18.0
40	4.5	8.5	11.0	13.0	14.5	16.0	18.0	19.0	20.5
50	5.0	9.0	12.0	14.0	16.0	17.5	19.5	21.0	22.5
60	5.0	9.5	12.5	15.0	17.0	19.0	21.0	23.0	24.5
80	5.0	10.0	13.5	16.5	18.5	21.0	23.5	25.5	27.5
100	5.0	10.0	13.5	17.0	20.0	22.5	25.0	27.5	29.5
120	5.5	10.0	13.5	17.5	20.5	23.5	26.5	29.0	31.0
No Limit	5.5	10.0	13.5	18.0	21.0	24.0	27.5	30.0	32.5
Enclosing rectangle 27 m high									
3	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.0	4.5
6	1.5	2.5	3.5	4.5	5.0	6.0	6.5	7.0	7.5
9	2.0	3.5	5.0	6.0	7.0	7.5	8.5	9.5	10.0
12	2.5	4.5	6.0	7.0	8.0	9.0	10.5	11.0	12.0
15	3.0	5.5	7.0	8.5	9.5	10.5	11.5	12.5	13.5
18	3.5	6.0	8.0	9.0	10.5	11.5	12.5	13.5	14.5
21	3.5	6.5	8.5	10.0	11.5	13.0	14.0	15.0	16.0
24	3.5	7.0	9.0	11.0	12.5	13.5	15.0	16.0	17.0
27	4.0	7.5	10.0	11.5	13.0	14.0	16.0	17.0	18.0
30	4.0	8.0	10.0	12.0	13.5	15.0	17.0	18.0	19.0
40	5.0	9.0	11.5	13.0	15.5	17.5	19.0	20.5	22.0
50	5.5	9.5	12.5	15.0	17.0	19.0	21.0	22.5	24.0
60	6.0	10.5	13.5	16.0	18.5	20.5	22.5	24.5	26.5
80	6.0	11.0	14.5	17.5	20.5	22.5	25.0	27.5	29.5
100	6.0	11.0	15.5	19.0	21.5	24.5	27.0	30.0	35.0
120	6.0	11.5	15.5	19.5	22.5	26.0	28.5	32.0	34.0
No Limit	6.0	11.5	15.5	20.0	23.5	27.0	29.5	33.0	35.0

TABLE 2 ---BUILDINGS OR COMPARTMENTS OF PURPOSE GROUPS

V (Shop), VI (Factory) and VIII (Storage and General)

Width of enclosing rectangle in metres	*Distance in metres from relevant boundary for unprotected percentage not exceeding*								
	20	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
Enclosing rectangle 3 m high									
3	1.0	1.5	2.0	2.0	2.5	2.5	2.5	3.0	3.0
6	1.5	2.0	3.0	3.0	3.5	3.5	4.0	4.0	4.0
9	1.5	2.5	3.0	3.5	4.0	4.0	4.5	5.0	5.0
12	2.0	2.5	3.5	3.5	4.0	4.5	5.0	5.5	5.5
15	2.0	2.5	3.5	4.0	4.5	5.0	5.5	6.0	6.0
18	2.0	2.5	3.5	4.0	5.0	5.0	6.0	6.5	6.5
21	2.0	3.0	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24	2.0	3.0	4.0	4.5	5.0	5.5	6.0	7.0	7.5
27	2.0	3.0	4.0	4.5	5.5	6.0	6.5	7.0	7.5
30	2.0	3.0	4.0	4.5	5.5	6.0	6.5	7.5	8.0
40	2.0	3.0	4.0	5.0	5.5	6.5	7.0	8.0	8.5
50	2.0	3.0	4.0	5.0	6.0	6.5	7.5	8.0	9.0
60	2.0	3.0	4.0	5.0	6.0	7.0	7.5	8.5	9.5
80	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	9.5
No limit	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Enclosing rectangle 6 m high									
3	1.5	2.0	2.5	3.0	3.0	3.5	3.5	4.0	4.0
6	2.0	3.0	3.5	4.0	4.5	5.0	5.5	5.5	6.0
9	2.5	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.0
12	3.0	4.0	5.0	5.5	6.5	7.0	7.5	8.0	8.5
15	3.0	4.5	5.5	6.0	7.0	7.5	8.0	9.0	9.0
18	3.5	4.5	5.5	6.5	7.5	8.0	9.0	9.5	10.0
21	3.5	5.0	6.0	7.0	8.0	9.0	9.5	10.0	10.5
24	3.5	5.0	6.0	7.0	8.5	9.5	10.0	10.5	11.0
27	3.5	5.0	6.5	7.5	8.5	9.5	20.5	11.0	12.0
30	3.5	5.0	6.5	8.0	9.0	10.0	11.0	12.0	12.5
40	3.5	5.5	7.0	8.5	10.0	11.0	12.0	13.0	14.0
50	3.5	5.5	7.5	9.0	10.5	11.5	13.0	14.0	15.0
60	3.5	5.5	7.5	9.5	11.0	12.0	13.5	15.0	16.0
80	3.5	6.0	7.5	9.5	11.5	13.0	14.5	16.0	17.5
100	3.5	6.0	8.0	10.0	12.0	13.5	15.0	16.5	18.0
120	3.5	6.0	8.0	10.0	12.0	14.0	15.5	17.0	19.0
No Limit	3.5	6.0	8.0	10.0	12.0	14.0	16.0	18.0	19.0
Enclosing rectangle 9 m high									
3	1.5	2.5	3.0	3.5	4.0	4.0	4.5	5.0	5.0
6	2.5	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.0
9	3.5	4.5	5.5	6.0	6.5	7.5	8.0	8.5	9.0
12	4.0	5.0	6.0	7.0	7.5	8.5	9.0	9.5	10.5
15	4.5	5.5	6.5	7.5	8.5	9.5	10.0	11.0	11.5
18	4.5	6.0	7.0	8.5	9.5	10.0	11.0	12.0	12.5
21	5.0	6.5	7.5	9.0	10.0	11.0	12.0	13.0	13.5
24	5.0	6.5	8.0	9.5	11.0	12.0	13.0	13.5	14.5
27	5.0	7.0	8.5	10.0	11.5	12.5	13.5	14.5	15.0
30	5.5	7.0	9.0	10.5	12.0	13.0	14.0	15.0	16.0
40	5.5	7.5	9.5	11.5	13.0	14.5	15.5	17.0	17.5
50	5.5	8.0	10.0	12.5	14.0	15.5	17.0	18.5	19.5
60	5.5	8.0	11.0	13.0	15.0	16.5	18.0	19.5	21.0
80	5.5	8.5	11.5	13.5	16.0	17.5	19.5	21.5	23.0
100	5.5	8.5	11.5	14.5	16.5	18.5	21.0	22.5	24.5
120	5.5	8.5	11.5	14.5	17.0	19.5	21.5	23.5	26.0
No Limit	5.5	8.5	11.5	15.0	17.5	20.0	22.5	24.5	27.0

Enclosing rectangle 12 m high									
3	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	5.5
6	3.0	4.0	5.0	5.5	6.5	7.0	7.5	8.0	8.5
9	3.5	5.0	6.0	7.0	7.5	8.5	9.0	9.5	10.5
12	4.5	6.0	7.0	8.0	9.0	9.5	11.0	11.5	12.0
15	5.0	6.5	8.0	9.0	10.0	11.0	12.0	13.0	13.5
18	5.0	7.0	8.5	10.0	11.0	12.0	13.0	14.0	14.5
21	5.5	7.5	9.0	10.5	12.0	13.0	14.0	15.0	16.0
24	6.0	8.0	9.5	11.5	12.5	14.0	15.0	16.0	16.5
27	6.0	8.0	10.5	12.0	13.5	14.5	16.0	17.0	17.5
30	6.5	8.5	10.5	12.5	14.0	15.0	16.5	17.5	18.5
40	6.5	9.5	12.0	14.0	15.5	17.5	18.5	20.0	21.0
50	7.0	10.0	13.0	15.0	17.0	19.0	20.5	23.0	23.0
60	7.0	10.5	13.5	16.0	18.0	20.0	21.5	23.5	25.0
80	7.0	11.0	14.5	17.0	19.5	21.5	23.5	26.0	27.5
100	7.5	11.5	15.0	18.0	21.0	23.0	25.5	28.0	30.0
120	7.5	11.5	15.0	18.5	22.0	24.0	27.0	29.5	31.5
No Limit	7.5	12.0	15.5	19.0	22.5	25.0	28.0	30.5	34.0
Enclosing rectangle 15 m high									
3	2.0	2.5	3.5	4.0	4.5	5.0	5.5	6.0	6.0
6	3.0	4.5	5.5	6.0	7.0	7.5	8.0	9.0	9.0
9	4.0	5.5	6.5	7.5	8.5	9.5	10.0	11.0	11.5
12	5.0	6.5	8.0	9.0	10.0	11.0	12.0	13.0	13.5
15	5.5	7.0	9.0	10.0	11.5	12.5	13.5	14.5	15.0
18	6.0	8.0	9.5	11.0	12.5	13.5	14.5	15.5	16.5
21	6.5	8.5	10.5	12.0	13.5	14.5	16.0	16.5	17.5
24	6.5	9.0	11.0	13.0	14.5	15.5	17.0	18.0	19.0
27	7.0	9.5	11.5	13.5	15.0	16.5	18.0	19.0	20.0
30	7.5	10.0	12.0	14.0	16.0	17.0	18.5	20.0	21.0
40	8.0	11.0	13.5	16.0	18.0	19.5	21.0	22.5	23.5
50	8.5	12.0	15.0	17.5	19.5	21.5	23.0	25.0	26.0
60	8.5	12.5	15.5	18.0	21.0	23.5	25.0	27.0	28.0
80	9.0	13.5	17.0	20.0	23.0	25.5	28.0	30.0	31.5
100	9.0	14.0	18.0	21.5	24.5	27.5	30.0	32.5	34.5
120	9.0	14.0	18.5	22.5	25.5	28.5	31.5	34.5	37.0
No Limit	9.0	14.5	19.0	23.0	27.0	30.0	34.0	36.0	39.0
Enclosing rectangle 18 m high									
3	2.0	2.5	3.5	4.0	5.0	5.0	6.0	6.5	6.5
6	3.5	4.5	5.5	6.5	7.5	8.0	9.0	9.5	10.0
9	4.5	6.0	7.0	8.5	9.5	10.0	11.0	12.0	12.5
12	5.0	7.0	8.5	10.0	11.0	12.0	13.0	14.0	14.5
15	6.0	8.0	9.5	11.0	12.5	13.5	14.5	15.5	16.5
18	6.5	8.5	11.0	12.0	13.5	14.5	16.0	17.0	18.0
21	7.0	9.5	11.5	13.0	14.5	16.0	17.0	18.0	19.5
24	7.5	10.0	12.0	14.0	15.5	16.5	18.5	19.5	20.5
27	8.0	10.5	12.5	14.5	16.5	17.5	19.5	20.5	21.5
30	8.0	11.0	13.5	15.5	17.0	18.5	20.5	21.5	22.5
40	9.0	12.0	15.0	17.5	19.5	21.5	23.5	25.0	26.0
50	9.5	13.0	16.5	19.0	21.5	23.5	26.0	27.5	29.0
60	10.0	14.0	17.5	20.5	23.0	26.0	27.5	29.5	31.0
80	10.0	15.0	19.0	22.5	26.0	28.5	31.0	33.5	35.0
100	10.0	16.0	20.5	24.0	28.0	31.0	33.5	36.0	38.5
120	10.0	16.5	21.0	25.5	29.5	32.5	35.5	39.0	41.5
No Limit	10.0	17.0	21.0	26.5	30.5	34.0	37.0	41.0	43.5

Enclosing rectangle 21 m high									
3	2.0	3.0	3.5	4.5	5.0	5.5	6.0	6.5	7.0
6	3.5	5.0	6.0	7.0	8.0	9.0	9.5	10.0	10.5
9	4.5	6.5	7.5	9.0	10.0	11.0	12.0	13.0	13.5
12	5.5	7.5	9.0	10.5	12.0	13.0	14.0	15.0	16.0
15	6.5	8.5	10.5	12.0	13.5	14.5	16.0	16.5	17.5
18	7.0	9.5	11.5	13.0	14.5	16.0	17.0	18.0	19.5
21	7.5	10.0	12.5	14.0	15.5	17.0	18.5	20.0	21.0
24	8.0	10.5	13.0	15.0	16.5	18.0	20.0	21.0	22.0
27	8.5	11.5	14.0	16.0	18.0	19.0	21.0	22.5	23.5
30	9.0	12.0	14.5	16.5	18.5	20.5	22.0	23.5	25.0
40	10.0	13.5	16.5	19.0	21.5	23.0	25.5	27.0	28.5
50	11.0	14.5	18.0	21.0	23.5	25.5	28.0	30.0	31.5
60	11.5	15.5	19.5	22.5	25.5	28.0	30.5	32.5	33.5
80	12.0	17.0	21.0	25.0	28.5	31.5	34.0	36.5	38.5
100	12.0	18.0	22.5	27.0	31.0	34.5	37.0	40.0	42.0
120	12.0	18.5	23.5	28.5	32.5	36.5	39.5	43.0	45.5
No Limit	12.0	19.0	25.0	29.5	34.5	38.0	41.5	45.5	48.0
Enclosing rectangle 24 m high									
3	2.0	3.0	3.5	4.5	5.0	5.5	6.0	7.0	7.5
6	3.5	5.0	6.0	7.0	8.5	9.5	10.0	10.5	11.0
9	5.0	6.5	8.0	9.5	11.0	12.0	13.0	13.5	14.5
12	6.0	8.0	9.5	11.5	12.5	14.0	15.0	16.0	16.5
15	6.5	9.0	11.0	13.0	14.5	15.5	17.0	18.0	19.0
18	7.5	10.0	12.0	14.0	15.5	16.5	18.5	19.5	20.5
21	8.0	10.5	13.0	15.0	16.5	18.0	20.0	21.0	22.0
24	8.5	11.5	14.0	16.0	18.0	19.5	21.0	22.5	24.0
27	9.0	12.5	15.0	17.0	19.0	20.5	22.5	24.0	25.5
30	9.5	13.0	15.5	18.0	20.0	21.5	23.5	25.0	26.5
40	11.0	14.5	18.0	20.5	23.0	25.0	27.5	29.0	30.5
50	12.0	16.0	19.5	22.5	25.5	27.5	30.0	32.0	33.5
60	12.5	17.0	21.0	24.5	27.5	30.0	32.5	35.0	36.5
80	13.5	18.5	23.5	27.5	31.0	34.5	37.0	39.5	41.5
100	13.5	20.0	25.0	29.5	33.5	37.0	40.0	43.0	45.5
120	13.5	20.5	26.5	31.0	36.0	39.5	43.0	46.5	49.0
No Limit	13.5	21.0	27.5	32.5	37.5	42.0	45.5	49.5	52.0
Enclosing rectangle 27 m high									
3	2.0	3.0	4.0	4.5	5.5	6.0	6.5	7.0	7.5
6	3.5	5.0	6.5	7.5	8.5	9.5	10.5	11.0	12.0
9	5.0	7.0	8.5	10.0	11.5	12.5	13.5	14.5	15.0
12	6.0	8.0	10.5	12.0	13.5	14.5	16.0	17.0	17.5
15	7.0	9.5	11.5	13.5	15.0	16.5	18.0	19.0	20.0
18	8.0	10.5	12.5	14.5	16.5	17.5	19.5	20.5	21.5
21	8.5	11.5	14.0	16.0	18.0	19.0	21.0	22.5	23.5
24	9.0	12.5	15.0	17.0	19.0	20.5	22.5	24.0	25.5
27	10.0	13.0	16.0	18.0	20.0	22.0	24.0	25.5	27.0
30	10.0	13.5	17.0	19.0	21.0	23.0	25.0	26.5	28.0
40	11.5	15.5	19.0	22.0	24.5	26.5	29.0	30.5	32.5
50	12.5	17.0	21.0	24.0	27.0	29.5	32.0	34.5	36.0
60	13.5	18.5	22.5	26.5	29.5	32.0	35.0	37.0	39.0
80	14.5	20.5	25.0	29.5	33.0	36.5	39.5	42.0	44.0
100	15.5	21.5	27.0	32.0	36.5	40.5	43.0	4605	48.5
120	15.5	22.5	29.5	34.0	39.0	43.0	46.5	50.5	53.0
No Limit	15.5	23.5	29.5	35.0	40.5	44.5	48.5	52.0	55.5

PART III

RULES FOR CALCULATION BY REFERENCE TO AGGREGATE NOTIONAL AREA

1. The conditions of this Part shall be satisfied if a building is so constructed that the aggregate notional area of the unprotected areas in theside of a building or compartment does not exceed —

(a) 210 square metres (if the building or compartment is of Purpose Group I, II, III, IV, or VII); or

(b) 90 square metres (if the building or compartment is of Purpose Group V, VI or VIII);

such calculation being made by reference to any one of a series of vertical data, measured at intervals of not more than 3 metres from one another along the relevant boundary.

2. For the purposes of this Part —

"aggregate national area" means the aggregate of the areas of any unprotected areas in the side of a building or compartment, each such area being multiplied by the factor specified in the Table to this Part according to the distance of such unprotected area from the vertical datum;

"vertical datum" means a vertical line of unlimited height at any point on the relevant boundary;

"the datum line" means the line joining a vertical datum to the nearest point of the side of the building or compartment.

3. For the purposes of this Part, no account shall be taken of any unprotected area in the side of a building or compartment which is —

(a) screened from the vertical datum by any part of an external wall which is not an unprotected area; or

(b) outside a horizontal are having its centre at a point through which the vertical datum passes and having a radius measuring 50 metres and extending 900 on either side of the datum line; or

(c) facing away from the vertical datum, or making an angle not exceeding 100 with a line drawn from it to the vertical datum.

TABLE OF FACTORS

Distance of unprotected area from vertical datum in metres		*Factor*
Not less than	*Less than*	
1	1.2	80
1.2	1.8	40
1.8	2.7	20
2.7	4.3	10
4.3	6.0	4
6.0	8.5	2
8.5	12.0	1
12.0	18.5	0.5
18.5	27.5	0.25
27.5	50	0.1
50	No limit	0

PART IV

RULES FOR CALCULATION IN RESPECT OF CERTAIN BUILDINGS OF PURPOSE GROUP I OR III

1. The provisions of this Part apply only to any building of Purpose Group I or III, which has not more than three storeys and of which no side (measured on an elevation) exceeds 24 metres in length.

2. The conditions of this Part shall be satisfied if the distance between any part of a side of a building and the relevant boundary is not less than the minimum distance specified in the Table to this Part according to the length of such side and the total area of any unprotected areas to be taken into account.

TABLE TO PART IV
PERMITTED UNPROTECTED AREAS IN CERTAIN RESIDENTIAL BUILDINGS

Minimum distance (in metres) between side of building	*Length of side (in metre) not exceeding*	*Total area of unprotected area (in square metres) not exceeding*
(1)	(2)	(3)
1	24	5.6
2.5	24	15
5.0	12	up to the whole area of the wall
6.0	24	up to the whole area of the wall

SIXTH SCHEDULE

MAXIMUM TRAVEL DISTANCES AND CALCULATION OF OCCUPANCY LOAD AND CAPACITY OF EXITS

MAXIMUM TRAVEL DISTANCES

TABLE A

[by-laws 126(4), 127(2), 130(b), 134(1) and 135(1)(b)]

	Purpose Group	*Limit when alternative exits are available*			
		One-way travel	Two-way travel		Corridors
		(1)	(2)	(3)	(4)
		*Dead-End Limit (metre)	Unsprinklered (metre)	Sprinklered (metre)	*Dead-End Limit (metre)
I.	**Small residential**	NR	NR	NR	NR
II.	**Institutional**				
	Hospitals,nursing homes, etc.	15	30	45	15
	School	15	45	60	15
	Open plan	NR	30	45	
	Flexible plan	NR	45	60	
III.	**Other residential**				
	Hotels	15	30	45	15
	Apartments, flats and service apartments	20	30	60	20
	Dormitories	15	45	60	15
IV.	**Office**	15	45	60	15
V.	**Shop**	15	45	60	15
VI.	**Factory**				
	General and special purpose	15	30	60	15
	High hazard	0	22	35	0
	Open structures	NR	NR	NR	NR

VII. **Place of assembly**	15	45	60	15
VIII. **Storage and general**				
Low and ordinary hazard	15	30	60	15
High hazard	10	20	35	10
Parking garages	15	45+	60x	15
Aircraft hangars (ground floor)	15	30+	45+	15
Aircraft hangars (ground floor)	15	20	20	15

NR – No requirement or not applicable.

x Limits distance of travel on floors below in the street in sprinklered garage to 45 metres.

* The dead-end limit shall be the distance to a storey exit or to a point where alternative means of escape is available provided that the total travel distance shall not exceed the limits under (2).

+ Refers only to aircraft hangars. In any building used for aircraft assembly or other occupancy requiring undivided floor areas so large that the distances from points within the area to the nearest outside walls where exit doors could be provided are in excess of 45 metres, requirements for distance to exits may be satisfied by providing stairs leading to exit tunnels or to overhead passageways. In cases where such arrangements are not practicable, other arrangements for one-storey buildings, with distances in excess of the maximum travel distances of not more than 30 metres or 45 metres in buildings protected by a complete automatic sprinkler system, may be permitted if the complete automatic sprinkler protection is provided and if the height of ceilings, ceiling curtain boards and roof ventilation is such as to minimise the possibility that employees will be overtaken by the spread of fire or smoke within of 1.8 metres of the floor level before they have time to reach the exits provided. However that in no case may be distance to travel to reach the nearest exit exceed 120 metres.

In an open plan the direct distance shall be two-thirds of the travel distance.

CALCULATION OF OCCUPANCY LOAD AND CAPACITY OF EXITS
TABLE B
[By-law 128(2), 130(c), 131(3), 134(2),136, 137, 138, 142]

	Purpose group	*Occupancy load square metre per*	*CAPACITY OF EXITS No.of persons per unit-Exit width* (1) and - (1A)				
			Doors outside	*Horizontal exit*	*Ramp main exit*	*Ramp second exit*	*Stairs*
I.	**Small residential**	NR	NR	NR	NR	NR	NR
II.	**Institutional**		100	100	100	60	60
	Classroom area	2 net					
	Workshop and vocational areas	4.5 net					
	Day nurseries with sleeping facilities	3.5 net					
	Hospital	-	30	30	30	30	15
	Patient accommodation	24 gross					
III.	**Other residential**	20 gross	50	50	50	50	30
	Flats	24 gross					
	General public areas in hotels (bedroom in hotels at 2 person per room)	24 gross					
IV.	**Office**	10 gross (4)	100	100	100	60	60
V.	**Shop**	-	100	100	100	60	60
	Street floor and sale basement	3 gross (4)					
	Other floors	6 gross (4)					
	Storage and shipping	10 gross					
VI.	**Factory**	10 gross	100	100	100	60	60
VII.	**Place of assembly**	1.5 net	100	100	100	75	75
	Areas of concentrated use without fixed seating	0.7 net					
	Standing space	0.3 net					
VIII.	**Storage and general**						
	Car parks	20 gross	100	100	100	60	60
	Warehouse	30 gross	100	100	100	60	60

NR – No requirements or not applicable.

NOTE:

(1) Exits are measured in units of 550 milimetres width and the width of an access to exit hall be at least 700 milimetres.

(1A) For the hospital and nursing home, the minimum clear width of an exit door opening shall not be less than 1.2 metres.

(c) For places of assembly, the main exit shall be 50% of the total required exit width.

a. In determining the units of exit width for an exit doorway, only the clear width of the doorway when the door is in the open position is to be measured.

(d) Excluding any areas occupied by staircases, lifts, sanitary accommodations and any other space occupied by machinery for any lift, air-conditioning system or similar service provided for the building.

SEVENTH SCHEDULE

CLASSIFICATION OF RESTRICTION OF SPREAD OF FLAME OVER SURFACES OF WALLS AND CEILINGS

TABLE A

[by-laws 166 and 168]

Purpose group		*Exits*	*Access to exits*	*Other spaces*
I.	**Small residential**	NR	NR	NR
II.	**Institutional**	0	0	3
	Open plan or flexible plan	0	0	2 3 for movable partitions not over 2.1 m high
	Hospitals, nursing homes or residential -- custodial care	0	0	1 2 in individual room with capacity not more than 4 person
III.	**Other residential**			
	Apartments, flats and service apartments	1	1	3
	Dormitories	1	1	3
	1 and 2 family houses lodging or boarding House	0	0	3
	Hotels	0	0	3
IV.	**Office**	1	1	3
V.	**Shop**			
	-- Class A	0	0	Ceiling 2 Walls 3
	-- Class B	0	0	Ceiling 2 Walls 3
	-- Class C	0	0	3
VI.	**Factory**	3	3	3

NR -- No requirements or not applicable.

Class A Places of assembly --- 1,000 persons or more.
Class B Places of assembly --- 300 to 1,000 persons.
Class C Places of assembly --- 100 to 300 persons.

Class A Shops --- Stores having aggregate gross area of 3,000 square metres or more, or utilizing more than 3 floor levels for sales purposes.

Class B Shops --- Stores of less than 3,000 square metres aggregate gross area, but over300 square metres or utilizing any floors above or below ground floor level for sales purposes, except that if morethan 3 floors are utilized, store shall be Class A.

Class C Shops --- Stores of 300 square metres or less gross area, used for sales purposes on ground floor level only.

Class O
Cement sheets
Insulation board
Insulation board, or plaster, or concrete, or metal sheets finished with oil-based polymer paints.

Plasterboard
Fibre insulation board
Hardboard
} Finished with not less than 3.2mm of non-combustible surface.

Compressed straw slabs
Class 1
Wood-wood slabs
Fibre insulation board with felt surface, on the exposed face.
Compressed straw slabs, with felt surface on the exposed face.
Fibre insulation board, 3 coats non washable distemper.
Fibre insulation board, 1 coat non-washable distemper on a sized board.

Timber or plywood or fibre insulation board or hardboard painted with a fire retardant paint.

Class 2 or 3
Fibre insulation board finished with 1 coat or washable distemper or one coat of flat oil-paint.
Timber or plywood of density greater than 0.4 g/cm3.
Hardwood or softwood finished with oil-based or polymer paints. Plywood finished with oil-based or polymer paints.
Hardboard.
Hardboard finished with oil-based or polymer paints.
Hardboard with wall paper finished with oil-based or polymer paints.

Class 4
Untreated fibre insulated board.

NOTIONAL DESIGNATION OF ROOF CONSTRUCTIONS

TABLE B

[By-law 170(a)]

PITCHED ROOFS COVERED WITH SLATES OR TILES			
Covering material		*Supporting structure*	*Designation*
1. Natural slates 2. Cement slates 3. Clay tiles 4. Concrete tiles	} } } }	Timber rafters with or without underfelt on sarking or boarding, wood wool slabs, compressed straw slabs, wood chipboard or insulation fireboard	AA
5. Bitumen felt strip slates, or fibre based		Timbers rafters and boarding	CC
6. Bitumen felt strip slates, mineral surfaced with an underlayer of self-finished felt minimum 13.6 kg		Timber rafters and boarding	BB
The test referred to in BS 476: Part I			

EIGHTH SCHEDULE

LIMITS OF COMPARTMENTS AND MINIMUM PERIODS OF FIRE RESISTANCE FOR ELEMENTS OF STRUCTURE

[by-laws 101, 105(3), 110, 119(1), 123, 176, 179(2)]

(*Minimum periods of fire resistance*)

In this Table —

"cubic capacity" means the cubic capacity of the building or if the building is divided into compartments, the compartments of which the element of structure forms part;

"floor area" means the floor area of each storey in the building or, if the building is dividend into compartments, of each storey in the compartment of which the element of structure forms part;

"height" has the meaning assigned to the expression by paragraph (2) of by-law 178.

"NL" means no limits applicable.

PART I - BUILDINGS OTHER THAN SINGLE STOREY BUILDINGS

Purpose group		Maximum dimensions			Minimum period of fire resistance (in hours) for elements of structure (*) forming part of —	
		Height (m)	Floor area (m^2)	Cubical extent (m^3)	Ground storey or upper storey	Basement storey
(1)		(2)	(3)	(4)	(5)	(6)
I.	**Small residential**					
	House having not more than 3 storeys	NL	NL	NL	½	1(a) (x)
	House having 4 storeys	NL	250	NL	1(b)	1 (x)
	House having any number of storeys	NL	NL	NL	1	1½
II.	**Institutional**	28 over 28	2,000 2,000	NL NL	1 1 ½	1½ 2
III.	**Other residential**					
	Building or part (†) having not more than 2 storeys	NL	500	NL	½	1 (x)
	Building or part (†) having 3 storeys	NL	250	NL	1(b)	1
	Building having any number of storeys	28	3,000	8,500	1	1 ½
	Building having any number of storeys	NL	2,000	5,500	1½	2

PART I - BUILDINGS OTHER THAN SINGLE STOREY BUILDINGS

IV. Office	7.5	250	NL	1/2	1(a) (x)
	7.5	500	NL	1/2	1
	15	NL	3,500	1(b)	1
	28	5,000	14,000	1	1 1/2
	NL	NL	NL	1 1/2	2
V. Shop	7.5	150	NL	1/2	1(a) (x)
	7.5	500	NL	1/2	1
	15	NL	3,500	1(b)	1
	28	1,000	14,000	1	2
	NL	2,000	NL	2	4 (y)
VI. Factory	7.5	250	NL	1/2	1(a) (x)
	7.5	NL	1,700	1/2	1
	15	NL	4,250	1(b)	1
	28	NL	8,500	1	2
	28	NL	28,000	2	4
	over 28	2,000	5,500	2	4
VII. Places of assembly	7.5	250	NL	1/2	1(a) (x)
	7.5	500	NL	1/2	1
	15	NL	3,500	1(b)	1
	28	5,000	7,000	1	1 1/2
	NL	NL	7,000	1 1/2	2
VIII. Storage and general	7.5		NL	1/2	1(a) (x)
	7.5	150	NL	1/2	1
	15	300	1,700	1(b)	1
	15	NL	3,500	1	2
	28	NL	7,000	2	4
	28	NL	21,000	4(c)	4
	over 28	1,000	NL	4(c)	4

Notes to Part I

For the purpose of paragraph (2) of by-law 105 the period of fire resistance to be taken as being relevant to an element of structure is the period included in column (5) or (6), whichever is appropriate, in the line of entry which specifies dimensions with all of which there is conformity or, if there are two or more such lines, in the topmost of those lines.

(*) A floor which is immediately above a basement storey shall be deemed to be an element of structures forming part of a basement storey.

(+) The expression "part" means a part which is separated as described in paragraph (2) of by-law 178.

(a) The period is half an hour for elements forming part of a basement storey which has an area not exceeding 50 m2.

(b) This period is reduced to half an hour in respect of a floor which is not a compartment floor, except as to the beams which support the floor or any part of the floor which contributes to the structural support of a building as a whole.

(c) No fire resistance is required if the elements form part of a basement storey which has an area not exceeding 50 square metres. This period is reduced to 2-hours for an open-sided building if it is used solely for car parking.

(x) The item as marked are applicable only to buildings, not to compartments, except in relation to purpose group III, see also paragraph 3(a) of by-law 105 and paragraph (1) of by-law 110.

(y) If the building is fitted throughout with an automatic sprinkler system which complies with MS1910, any maximum limits specified in columns (3) and (4) shall be doubled

PART 2 - SINGLE STOREY BUILDINGS

Purpose group (1)		Maximum dimensions (m^2) (2)	Minimum period of fire resistance (in hours) for elements of structure (3)	
I.	Small residential.	NL	½	(z)
II.	Institutional.	3,000	½	(z)
III.	Other residential.	3,000	½	(z)
IV.	Office.	3,000 NL	½ 1	(z)
V.	Shop.	2,000 3,000 NL	½ 1 2	(z)
VI.	Factory.	2,000 3,000 NL	½ 1 2	(z)
VII.	Places of assembly.	3,000 NL	½ 1	(z)
VIII.	Storage and general.	500 1,000 3,000 NL	½ 1 2 4(a)	(z)

Notes to Part 2

For the purpose of paragraph (2) of by-law 105, the period of fire resistance to be taken as being relevant to an element of structure in the period included in column (3) in the line of entries which specifies the floor area with which there is conformity or, if there are two or more such lines.

(a) This period is reduced to 2-hours for open sided buildings which are used solely for car parking.

(z) See paragraph 3(a) of by-law 105 and paragraph (1) of by-law 110.

SUSPENDED CEILINGS

[by-laws 111(6) and 182]

Height of building (1)	*Type of floor* (2)	*Required fire resistance of floor* (3)	*Description of suspended ceiling* (4)
Less than 15 m	Non-compartment	1 hour or less	Surface of ceiling exposed within the cavity not lower than Class 1 (as to surface spread of flame).
	Compartment	Less than 1 hour	
	Compartment	1 hour	Surface of ceiling exposed within the cavity not lower than Class O (as to surface spread of flame): supports and fixings for the ceiling non-combustible.
15 or more	Any	1 hour or less	Surface of ceiling exposed within the cavity not lower than Class O (as to surface spread of flame) and jointless; supports and fixings for the ceiling non- combustible.
Any	Any	more than 1 hour	Ceiling of non-combustible construction and jointless; supports and fixings for the ceiling non-combustible.

Notes:

(1) References to classes are to classes as specified in by-law 166.

(2) Where the space above a suspended ceiling is protected by an automatic sprinkler system it shall be exempted from the requirements for non-combustibility and surface spread of flame classification as specified in the above table provided the ceiling is not situated over an exit passageway, protected lobby or other required protected means of escape.

NOTIONAL PERIODS OF FIRE RESISTANCE

[by-laws 119(3) and 187]

In this Table:

(a) "Class 1 aggregate" means foamed slag, pumice, blast furnace slag, pelleted fly ash, crushed brick and burnt clay products (including expanded clay), well-burnt clinker and crushed limestone.

"Class 2 aggregate" means flint gravel, granite, and all crushed natural stones other than limestone.

(b) Any reference to plaster means:

(i) in the case of an external wall 1 m or more from the relevant boundary, plaster applied on the internal face only;

(ii) in the case of any other wall, plaster applied on both faces;

(iii) if to plaster of a given thickness on the external face of a wall, except in the case of a reference to vermiculite-gypsum or perlite gypsum plaster, rendering on the external face of the same thickness;

(iv) if to vermiculite-gypsum plaster, vermiculite-gypsum plaster of a mix within the range of 1 1/2 to 2:1 by volume.

(c) Load assumed to be on inner leaf only except for fire resistance period of four hours.

PART I

WALLS

A. Mansory Construction

Construction and materials	*Minimum thickness excluding plaster (in mm) for period of fire resistance of*									
	Loadbearing					*Non-loadbearing*				
	4 hrs.	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*	*1/2 hr.*	*4 hrs.*	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*	*1/2 hr.*
1. Reinforced concrete, minimum concrete cover to main reinforcement of 25 mm:										
(a) unplastered	180	100	100	75	75					
(b) 12.5 mm cement- sand plaster	180	100	100	75	75					
(c) 12.5 mm gypsum- sand plaster	180	100	100	75	75					
(d) 12.5 mm vermiculite- gypsum plaster	125	75	75	63	63					
2. No-fines concrete of Class 2 aggregate:										
(a) 12.5 mm cement- sand plaster						150				
(b) 12.5 mm gypsum- sand plaster						150				
(c) 12.5 mm vermiculite- gypsum plaster						150				

3. Bricks of clay, concrete or sand-lime:										
(a) unplastered	200	100	100	100	100	170	100	100	75	75
(b) 12.5 mm cement- sand plaster	200	100	100	100	100	170	100	100	75	75
(c) 12.5 mm gypsum- sand plaster	200	100	100	100	100	170	100	100	75	75
(d) 12.5 mm vermiculite- gypsum or perlite-gypsum plaster	100	100	100	100	100	100	100	100	75	75
4. Concrete blocks of Class 1 aggregate:										
(a) unplastered	150	100	100	100	100	150	75	75	75	50
(b) 12.5 mm cement- sand plaster	150	100	100	100	100	100	75	75	75	50
(c) 12.5 mm gypsum- sand plaster	150	100	100	100	100	100	75	75	75	50
(d) 12.5 mm vermiculite- gypsum plaster	100	100	100	100	100	75	75	62	50	50
5. Concrete blocks of Class 2 aggregate:										
(a) unplastered		100	100	100	100	150	100	100	75	50
(b) 12.5 mm cement- sand plaster		100	100	100	100	150	100	100	75	50
(c) 12.5 mm gypsum- sand plaster		100	100	100	100	150	100	100	75	50
(d) 12.5 mm vermiculite- gypsum plaster	100	100	100	100	100	150	75	75	75	50
6. Autoclaved aerated concrete blocks density 475-1200 kg/m_3	180	100	100	100	100	100	62	62	50	50

7. Hollow concrete blocks, one cell in wall thickness, of class 1 aggregate:										
(a) unplastered		100	100	100	100	150	100	100	100	75
(b) 12.5 mm cement- sand plaster		100	100	100	100	150	100	75	75	75
(c) 12.5 mm gypsum- sand plaster		100	100	100	100	150	100	75	75	75
(d) 12.5 mm vermiculite- gypsum plaster		100	100	100	100	100	75	75	62	62
8. Hollow concrete blocks, one cell in wall thickness, of class 2 aggregate:										
(a) unplastered						150	150	125	125	125
(b) 12.5 mm cement- sand plaster						150	150	125	125	100
(c) 12.5 mm gypsum- sand plaster						150	150	125	125	100
(d) 12.5 mm vermiculite- gypsum plaster						125	100	100	100	75
9. Cellular clay blocks not less than 50% solid:										
(a) 12.5 mm cement- sand plaster									100	75
(b) 12.5 mm gypsum- sand plaster									100	75
(c) 12.5 mm vermiculite- gypsum plaster						200	100	100	100	62
10. Cavity wall with outer leaf of bricks or blocks of clay, composition, concrete or sand- lime, not less than 100 mm thick and:										
(a) inner leaf of bricks or blocks of clay, composition, concrete or sand-lime	100	100	100	100	100	75	75	75	75	75
(b) inner leaf of solid or hollow concrete bricks or blocks of Class 1 aggregate	100	100	100	100	100	75	75	75	75	75
11. Cavity wall with outer leaf of cellular clay blocks as 9 above and inner leaf of autoclaved aerated concrete blocks, density 475-1200 kg/m_3	150	100	100	100	100	75	75	75	75	75

* Perlite-gypsum plaster to clay bricks only.

B. Framed and composite construction (non-loadbearing)

Construction and materials	*Period of fire resistance in hours*
1. Steel frame with external cladding of 16 mm rendering on metal lathing and internal lining of autoclaved aerated concrete blocks, density 480-1 120 kg/m_3 of thickness of--	
50 mm	2
62 mm	3
75 mm	4
2. Steel frame with external cladding of 100 mm concrete blocks and internal lining of 16 mm gypsum plaster on metal lathing.	4
3. Steel frame with external cladding of bricks of clay, concrete or sand-lime 100 mm thick and internal lining of insulating board of thickness of 9 mm.	3
4. Steel frame with external cladding of 16 mm rendering on metal lathing and internal lining of--	
16 mm gypsum plaster on metal lathing	1
5. Steel or timber frame with facings on each side of--	
(a) metal lathing with cement-sand of gypsum plaster of thickness of--	
19 mm	1
12.5 mm	1/2
(b) metal lathing with vermiculite-gypsum or perlite-gypsum plaster of thickness of--	
25 mm	2
19 mm	1 1/2
12.5 mm	1

(c) 9.5 mm plasterboard with gypsum plaster of thickness of 5 mm	1/2
(d) 9.5 mm plasterboard with vermiculite-gypsum plaster of thickness of--	
25 mm	2
16 mm	1 1/2
10 mm	1
5 mm	1/2
(e) 12.5 mm plasterboard-unplastered	1/2
With gypsum plaster of thickness of 12.5mm	1
(f) 12.5 mm plasterboard unplastered	1
25 mm	2
16 mm	1 1/2
10 mm	1
(g) 19 mm plasterboard (or two layers of 9.5 mm fixed to break joint) without finish	1
(h) 19 mm plasterboard (or two layers of 9.5 mm) with vermiculite- gypsum plaster of thickness of--	
16 mm	2
10 mm	1 1/2
(i) 12.5 mm fibre insulating board with gypsum plaster of thickness of 12.5 mm	1 1/2
(j) 25 mm wood wools slabs with gypsum plaster of thickness of 12.5 mm	1

6. Compressed straw slabs in timber frames finished on both faces with gypsum plaster of thickness of 5 mm	1
7. Plasterboard 9.5 mm cellular core partition--	
(a) unplastered	1/2
(b) 12.5 gypsum plaster	1
(c) 22 mm vemiculite-gypsum plaster	2
8. Plasterboard 12.5 mm cellular core partition--	
(a) unplastered	1/2
(b) 12.5 mm gypsum plaster	1
(c) 16 mm vermiculite-gypsum plaster	2
9. Plasterboard 19 mm finished on both faces with 16 mm gypsum plaster	1
10. Plasterboard 12.5 mm bonded with neat gypsum plaster to each side of 19 mm plasterboard	1 1/2
11. Three layers of 19 mm plasterboard bonded with neat gypsum plaster	2
12. Wood wool slab with 12.5 mm render or plaster of thickness of--	
75 mm	2
50 mm	1
13. Compressed straw slabs, with 75 mm by 12.5 mm wood cover strips to jonts, of thickness of 50 mm	1/2

C. External walls more than 1 m from the relevant boundary (non-load bearing)

Construction and materials	*Period of fire resistance in hours*
1. Steel frame with external cladding of non-combustible sheets and internal lining of-	
(a) 9 mm insulating board	4
(b) 12.5 mm cement-sand or gypsum plaster on metal lathing	4
(c) sprayed cellulose fibre of thickness of 12.5 mm	4
(d) two layers of 9.5 mm plasterboard	1/2
(e) 9.5 mm plasterboard finished with 5 mm gypsum plaster	1/2
(f) 12.5 mm plasterboard finished with 5 mm gypsum plaster	1/2
(g) 50 mm compressed straw slabs	1/2
(h) 50 mm compressed straw slabs finished with 5 mm gypsum plaster	1
*2. Timber frame with external cladding of 10 mm cement-sand or cement-lime rendering and internal lining of-	
(a) 9 mm insulating board	1
(b) 16 mm gypsum plaster on metal lathing	1
(c) 9.5 mm plasterboard finished with 12.5 mm gypsum plaster	1
(d) 12.5 mm plasterboard finished with 5mm gypsum plaster	1
(e) 50 mm compressed straw slabs	1
(f) aerated concrete blocks--	
50 mm	3
62 mm	4
75 mm	4
100 mm	4

3. Timber frame with external cladding of 100 mm clay, concrete or sand-lime bricks or blocks, finished internally with --	
(a) insulating board	4
(b) 16 mm gypsum plaster on metal lathing	4
*4. Timber frame with external cladding of weather boarding or 9.5 mm plywood and internal lining of --	
(a) 9 mm insulating board	1/2
(b) 16 mm gypsum plaster on metal lathing	1/2
(c) 9.5 mm plasterboard finished with 12.5 mm gypsum plaster	1/2
(d) 12.5 mm plasterboard finished with 5 mm gypsum plaster	1/2
(e) 50 mm compressed straw slabs	1/2

*The presence of a combustible vapour within the thickness of these construction will not affect these periods of fire resistance.

PART II

REINFORCED CONCRETE COLUMNS

Construction and materials	*Minimum dimension of concrete column* without finish (in mm) for a fire resistance of--*				
	4 hrs.	*2 hrs.*	*1/2 hrs.*	*1 hr.*	*1/2 hrs.*
1. *(a)* without plaster	450	300	250	200	150
(b) with 12.5 mm cement-sand or gypsum-sand plaster on mesh reinforcement fixed around column	300	225	150	150	150
(c) finished with 12.5 mm encasement of vermiculite-gypsum plaster	275	200	150	120	120
(d) with 2.5 mm hard drawn steel wire fabric, of maximum pitch 150 mm in each direction, placed in cover to main reinforcement	300	25	150	150	150
(e) with limestone or light-weight aggregate as coarse aggregate	300	225	200	200	150
2. Built into +any separating wall, compartment wall or external wall++					
(a) with plaster	180	100	100	75	75
(b) finished with 12.5 mm of vermiculite-gypsum plaster	125	75	75	63	63

* The minimum dimension of a particular.

\+ No part of column projecting beyond either face of wall.

++ Having not less fire resistance than that of the column and extending to the full height of, and not less than 600 mm on each side of, the column.

PART III

REINFORCED CONCRETE BEAMS

Construction and materials	*Minimum concrete over without finish to main reinforcement (in mm) for a fire resistance of--*				
	4 hrs.	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*	*1/2 hrs.*
(a) without plaster	63	45	35	25	12.5
(b) finished with 12.5 mm vermiculite- gypsum plaster	25	12.5	12.5	12.5	12.5
(c) with 12.5 mm cement-sand or gypsum-sand plaster on mesh reinforcement fixed around beam	50	30	20	12.5	12.5

PART IV

PRESTRESSED CONCRETE BEAMS WITH POST-TENSIONED STEEL

Cover reinforcement	*Additional protection*	*Minimum concrete cover to tendons (in mm) for a fire resistance of--*			
		4 hrs.	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*
None	*(a)* none		38	25	38
	(b) vermiculite concrete slabs (permanent shuttering) 12.5 mm thick		50	38	25
	(c) plaster 12.5 mm thick on mesh reinforcement fixed around beam		38	25	25
	(d) vermiculite-gypsum plaster 12.5 mm thick or sprayed cellulose fibre 10 mm thick				25
Light mesh reinforcement (having a minimum concrete cover of 25 mm) to retain the concrete in position around the tendons	*(a)* none	100	63	63	
	(b) plaster 12.mm thick on mesh reinforcement	90			
	(c) vermiculite concrete slabs (permanent shuttering) 12.5 mm thick	75			
	(d) vermiculite concrete slabs (permanent shuttering) 25 mm thick	50			
	(e) vermiculite-gypsum plaster 12.5 mm thick	50			
	(f) vermiculite-gypsum plaster 22 mm thick	50			
	(g) sprayed cellulose fibre 10 mm thick	75			
	(h) sprayed cellulose fibre 19 mm thick	50			

PART V
STRUCTURAL STEEL

A. Encased steel stanchions (mass per metre not less than 45 kg)

Construction and materials	*Minimum thickness (in mm) of protection for a fire resistance of--*				
	4 hrs.	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*	*1/2 hrs.*
(A) Solid protection* (unplastered) 1. Concrete not leaner than 1:2:4 mix with natural aggregates--					
(a) concrete not assumed to be loadbearing, reinforced+	50	25	25	25	25
(b) concrete assumed to be loadbearing reinforced in accordance with BS 449: Part 2: 1969	75	50	50	50	50
2. Solid bricks of clay, composition or sandlime	75	50	50	50	50
3. Solid blocks of foamed slag or pumice concrete reinforced+ in every horizontal joint	62	50	50	50	50
4. Sprayed cellulose fibre of density 140 - 240 kg/m3	44	19	15	10	10
5. Sprayed vermiculite-cement		38	32	19	12.5
(B) Hollow protection++					
1. Solid bricks of clay, composition or sand- lime reinforced in evey horizontal joint, unplastered	115	50	50	50	50
2. Solid blocks of foamed slag or pumice concrete reinforced# in every horizontal joint, unplastered	75	50	50	50	50
3. Metal lathing with gypsum or cement-lime plaster of thickness of		38#	25	19	12.5

4. *(a)* Metal lathing with vermiculite-gypsum plaster of thickness of	50#	19	16	12.5	12.5
(b) Metal lathing spaced 25 mm from flanges with vermiculite-gypsum or perlite gypsum plaster of thickness of	44	19	12.5	12.5	12.5
5. Gypsum plasterboard with 1.6 mm wire binding at 100 mm pitch--					
(a) 9.5 mm plasterboard with gypsum plaster of thickness of		12.5	10	12.5	12.5
(b) 19 mm plasterboard with gypsum plaster of thickness of				7	7
6. Gypsum plasterboard with 1.6 mm wire binding at 100 mm pitch--					
(a) 9.5 plasterboard with vermiculite- gypsum of thickness of	32#	16	12.5	10	7
(b) 19 mm plasterboard with vermiculite-gypsum plaster of thickness of		10	10	7	7
7. Metal lathing with sprayed cellulose fibre of thickness of	44	19	15	10	10
8. Vermiculite-cement slabs of 4:1 mix reinforced with wire mesh and finished with plaster skim. Slabs of thickness of	63	25	25	25	25
9. Insulating boards of density 510-- 880 kg/m3 (screwed to 25 mm thick battens for ½ hour and 1 hour periods)		25	19	12	9

*Solid protection means a casing which is bedded close to the steel without intervening cavities and with all joints in the casing made full and solid.

+ Reinforcement shall consist of steel binding wire not less than 2.3 mm in thickness, or a steel mesh weighing not less than 0.48 kg/m_2. In concrete protection, the spacing of that reinforcement shall not exceed 150 mm in any direction.

++ Hollow protection means that there is a void between the protective material and the steel. All hollow protection to columns shall be effectively sealed at each floor level.

Light mesh reinforcement required 12.5 mm to 19 mm below surface unless special corner beads are used.

B. Encased steel beams (mass per metre not less than 30 kg)

Construction and materials	*Minimum thickness (in mm) of protection for a fire resistance of--*				
	4 hrs.	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*	*1/2 hrs.*
(A) Solid protection +(unplastered)					
1. Concrete not leaner than 1:2:4 mix with natural aggregates--					
(a) concrete not assumed to be loadbearing, reinforced++	63	25	25	25	25
(b) concrete assumed to be loadbearing, reinforced in accordance with BS 449: Part 2: 1969	75	50	50	50	50
2. Sprayed cellulose fibre of density 140 - 240 kg/m3	44	19	15	10	10
3. Sprayed vertimiculite-cement		38	32	19	12.5
(B) Hollow protection*					
1. Metal lathing--					
(a) with cement-lime plaster of thickness of		38	25	19	12.5
(b) with gypsum plaster of thickness of		22	19	16	12.5
(c) with vermiculite-gypsum or perlite-gypsum plaster of thickness of	32	12.5	12.5	12.5	12.5
2. Gypsum plasterboard with 1.6 mm wire binding at 100 mm pitch--					
(a) 9.5 mm plasterboard with gypsum plaster of thickness of				12.5	12.5
(b) 19 mm plasterboard with gypsum plaster of thickness of		12.5	10	7	7

3. Plasterboard with 1.6 mm wire binding at 100 mm pitch--					
(a) 9.5 mm plasterboard nailed to wooden cradles finished with gypsum plaster of thickness of					12.5
(b) 9.5 mm plasterboard with vermiculite-gypsum plaster of thickness of		16	12.5	10	7
(c) 19 mm plasterboard with vermiculite-gypsum plaster of thickness of	32+	10	10	7	7
(d) 19 mm plasterboard with gypsum plaster of thickness of			12.5		
4. Metal lathing with sprayed cellulose fibre of density 140 - 240 kg/m3 and of thickness of	44	19	15	10	10
5. Insulating boards of density 510--880 kg/m3 (screwed to 25 mm thick battens for ½ hour and 1 hour periods)		25	19	12	9
6. Vermiculite-cement slabs of 4:1 mix reinforced with wire mesh and finished with plaster skin. Slabs of thickness of	63	25	25	25	25
7. Gypsum-sand plaster 12.5 mm thick applied to heavy duty (Type B as designated in BS 1105:1963) wood wool; slabs of thickness of		50	38	38	38

*Hollow protection means that there is a void between the protective material and the steel. All hollow protection to columns shall be effectively sealed at each floor level.

+ Solid protection means a casing which is bedded close to the steel without intervening cavities and with all joints in that casing made full and solid.

++ Reinforcement shall consist of steel binding wire not less than 2.3 mm in thickness, or a steel mesh weighing not less than 0.48kg/m2. In concrete protection, the spacing of that reinforcement shall not exceed 150 mm in any direction.

PART VI

STRUCTURAL ALUMINIUM

Encased aluminium alloy stanchions and beams (mass per metre not less than 16 kg)

Construction and materials	*Minimum thickness (in mm) of protection for a fire resistance of--*				
	4 hrs.	*2 hrs.*	*1 1/2 hrs.*	*1 hr.*	*1/2 hrs.*
(A) Solid protection*					
1. Sprayed cellulose fibre of density 140 - 240 kg/m3		48	32	19	10
2. Sprayed vermiculite-cement				44	19
(B) Hollow protection+					
1. Metal lathing with vermiculite-gypsum or perlite-gypsum plaster of thickness of		32	32	16	12.5
2. Metal lathing finished with neat gypsum plaster of thickness of				19	12.5
3. Gypsum plasterboard 19 mm thick with 1.6 mm wire binding at 100 mm pitch finished with gypsum-vermiculite plaster of thickness of		22	16	10	10
4. Insulating boards of density 510 - 880 kg/m3 (screwed to 25 mm thick battens for the ½ hour period)			34	21	9

*Solid protection means a casing which is bedded close to the alloy without intervening cavities and with all joints in the casing made full and solid.

+Hollow protection means that there is a void between the protected material and the alloy. All hollow protection to columns shall be effectively sealed at each floor level.

PART VII

TIMBER FLOORS

Construction and materials	*Minimum thickness (in mm) for fire resistance of-*		
	1 hr.	1/2 hr.	modified++ 1/2 hr.
(A) Plain edge boarding on timber joists not less than 38 mm wide with ceiling of--			
(i) timber lath and plaster--thickness of plaster			16
(ii) timber lath and plaster with plaster of minimum thickness of 16 mm covered on underside with plasterboard of thickness		12.5	
(iii) metal lathing and plaster-- thickness of plaster			
(a) gypsum		16	
(b) vermiculite		12.5	
(iv) one layer of plasterboard of thickness			12.5
(v) one layer of plasterboard of minimum thickness of 9.5 mm finished with gypsum plaster of thickness			12.5
(vi) one layer of plasterboard of minimum thickness of 12.5 mm finished with gypsum plaster of thickness		12.5	
(vii) two layers of plasterboard of total thickness		25	19
(viii) two layers of plasterboard each of minimum thickness of 9.5 mm finished with gypsum plaster of thickness			5
(ix) one layer of fibre insulating board of minimum thickness of 12.5 mm finished with gypsum plaster of thickness			12.5
(x) one layer of insulating board of minimum thickness		12	
(xi) wood wool slab 25 mm thick finished with gypsum plaster of thickness		5	
(B) Tongued and grooved boarding of not less than 16 mm (finished) thickness* on timber joists not less than 38 mm wide with ceiling of--			
(i) timber lath and plaster--thickness of plaster			16
(ii) timber lath and plaster with plaster of minimum thickness of 16 mm covered on underside with plasterboard of thickness		9.5	
(iii) metal lathing and plaster--thickness of plaster			
(a) gypsum	22	16	
(b) vermiculite	12.5	12.5	
(iv) one layer of plasterboard of thickness			9.5

(v) one layer of plasterboard of minimum thickness of 9.5 mm finished with--			
(a) gypsum plaster of thickness		12.5	
(b) vermiculite-gypsum plaster of thickness	12.5		
(vi) one layer of plasterboard of minimum thickness of 12.5 mm finished with gypsum plaster of thickness		5	
(vii) two layers of plasterboard of total thickness		22	
(viii) one layer of fibre insulating board of minimum thickness of 12.5 mm finished with gypsum plaster of thickness			5
(ix) one layer of insulating board of minimum thickness		9	
(x) one layer of insulating board of minimum thickness of 12 mm finished on top with glass fibre or mineral wool of thickness	25		
(xi) wood wool slab 25 mm thick finished with--			
(a) gypsum plaster of thickness		5	
(b) vermiculite-gypsum plaster of thickness	10		
(C) Tongued and grooved boarding of not less than 21 mm (finished) thickness* on timber joist not less than 175 mm deep by 50 mm wide with ceiling of--			
(i) timber lath and plaster--thickness of plaster		16	
(ii) metal lathing and plaster--thickness of plaster		16	
(iii) one layer of plasterboard of thickness			9.5
(iv) one layer of plasterboard of minimum thickness of 9.5 mm finished with--			
(a) gypsum plaster of thickness		12.5	
(b) vermiculite-gypsum plaster of thickness	12.5		
(v) one layer of plasterboard of minimum thickness of 12.5 mm finished with gypsum plaster of thickness		5	
(vi) two layer of plasterboard of thickness		19	
(vii) one layer of fibre insulating board of thickness			12.5
(viii) one layer of fibre insulating board of minimum thickness of 12.5 mm finished with gypsum plaster of thickness		12.5	
(ix) one layer of insulating board of thickness		6	
(x) wood wool slab 25 mm thick finished with--			
(a) gypsum plaster of thickness		5	
(b) vermiculite-gypsum plaster of thickness	10		

* Or an equivalent thickness of wood chipboard.

++ The term "modified 1/2 hour" refers to the requirements specified in by-law 186

PART VIII

CONCRETE FLOORS

Construction and materials	*Minimum thickness of solid substance including screed (in mm)*	*Ceiling finish to a fire resistance of--*				
		4 hours	*2 hours*	*1 1/2 hours*	*1 hour*	*1/2 hour*
Solid flat slab or filler joist floor. Unit of channel or T section	90	22 mm V or 25 mm A	10 mm V or 12.5 mm A	10 mm V or 12.5 mm A	7 mm V or 7 mm A	nil
	100	19 mm V or 19 mm A	7 mm V	7 mm V	nil	nil
	125	10 mm V or 12.5 mm A nil	nil	nil	nil	nil
	150		nil	nil	nil	nil
Solid flat slab or filler joist floor with 25 mm wood wool slab ceiling base	90			12.5 mm G	nil	nil
	100		nil	nil	nil	nil
	125	12.5 mm G	nil	nil	nil	nil
	150	nil	nil	nil	nil	nil
Units of inverted U section with minimum thickness at crown	63				nil	nil
	75				nil	nil
	100		nil	nil	nil	nil
	150	nil	nil	nil		nil

Hollow block construction or units of box or 1 section	63				nil	nil
	75				nil	nil
	90		nil	nil	nil	nil
	125	nil	nil	nil		nil
Cellular stell with concrete topping	63	12.5 mm V suspended on metal lathing or 12.5 mm A (direct)	12.5 mm G suspended on metal lathing	12.5 mm G suspended on metal lathing	12.5 mm G suspended on metal lathing	nil

"V"-vermiculite-gypsum plaster.

"A"-Sprayed cellulose fibre.

"G"-Gypsum plaster.

Note: Where a column relating to ceiling finish contains no entry opposite a specification, the notional period of fire resistance specified in that column is not applicable.

PART IX

MINIMUM FLAME-SPREAD CLASSIFICATION OF MATERIAL CONSTRUCTION (HOMOGENOUS)*

Purpose Group	Non-sprinkler-protected Building				Sprinkler-protected Building			
	Within Room, compartment		Within circulation spaces (3)		Within Room, compartment		Within circulation spaces (3)	
	BS(4)	EN(4)	BS(4)	EN(4)	BS(4)	EN(4)	BS(4)	EN(4)
I - Small Residential	NA	NA	NA	NA	NA	NA	NA	NA
II - Institutional	NA	NA	LC(2)	A2	NA	NA	1	C
III - Other Residential	0	B	LC(2)	A2	1	C(1)	0	B(1)
IV - Offices	0	B	LC(2)	A2	2	C	1	C
V - Shop	0	B	LC(2)	A2	2	C	1	C
VI - Factory	0	B	LC(2)	A2	2	C	1	C
VII – Place of Assembly	0	B	LC(2)	A2	2	C	1	C
VIII – Storage and General	0	B	LC(2)	A2	2	C	1	C

Note:
(1) = Applies to detention facilities and healthcare, including hospital, nursing homes for handicapped, disabled, aged or persons with mental and/or mobility impairment.
(2) = Limited combustibility tested under BS 476 Part 11 or non-combustibility tested under BS 476 Part 4.
(3) = Including common corridor, passageway etc.
(4) = BS/EN refers to the test standards shown below.
NA= Not Applicable
LC = Limited combustibility
* = When composite panels are used for the construction, the minimum flame-spread classification shall be applicable to the core material of the panels-

EN 13501-1		**BS 476**	
Classification	**Test Standards**	**Classification**	**Test Standards**
Class A1	EN ISO 1182 + EN ISO 1716	Non –combustibility (NC)	BS 476 Pt. 4
Class A2	[EN ISO 1182 or EN ISO 1716]+EN 13823	Limited combustibility (LC)	BS 476 Pt. 11
Class B	EN 13823 + EN ISO 11925-2	Class 0	BS 476 Pt. 6 & 7
Class C	EN 13823 + EN ISO 11925-2	Class 1	BS 476 Pt. 7
Class C	EN 13823 + EN ISO 11925-2	Class 2	BS 476 Pt. 7
Class D	EN 13823 + EN ISO 11925-2	Class 3	BS 476 Pt. 7
Class F	EN ISO 11925-2	Class 4	BS 476 Pt. 7

NINTH SCHEDULE

TABLE OF REQUIREMENTS FOR FIRE DETECTION, FIRE ALARM SYSTEM AND FIRE EXTINGUISHMENT SYSTEMS

[By-laws 189(1), 190, 192, 193, 199, 200, 201]

Occupancy Hazard	*Extinguishing system* *Note 2*	*Detection and Fire Alarm Systems* *Note 3*
I. SMALL RESIDENTIAL		
(i) Private Dwelling up to 2 storey		
(a) Terrace Type.	—	—
(b) Semi Detached.	—	—
(c) Detached.	—	—
(ii) Private dwelling more than 2 storey	—	7
II. INSTITUTIONAL		
1. Education Occupancies.		
(a) Building used for instructional purposes only.		
(i) Open corridor designs.		
(aa) Two storeys and below.	—	—
(ab) Three to five storeys.	F	2
(ac) Six storeys and above.	F	1 & 2
(ii) Other designs.		
(aa) Less than 500 sq. m per floor.	—	—
(ab) 500 to 1,000 sq. m per floor.	F	2
(ac) 1,001 to 2,000 sq. m per floor or 18 m to 30m in height.		1 & 2
(ad) Exceeding 2,000 sq. m per floor or above 30m to 30m in height.		
(b) Canteen/kitchen detached.		

Occupancy Hazard	*Extinguishing System* *Note 2*	*Detection and Fire Alarm Systems* *Note 3*
(c) Laboratories and workshops (total floor area per block).		
(i) Less than 1,000 sq. m.	—	—
(ii) 1,000 to 2,000 sq. m.	F	1 & 2
(iii) Exceeding 2,000 sq. m.	A & F	2,5&6
(d) Library (total floor area).		
(i) Less than 500 sq. m.	—	—
(ii) 500 to 1,000 sq. m.	F	2
(iii) 1,001 to 2,000 sq. m.	F	1 & 2
(iv) Exceeding 2,000 sq. m.	A & F	2,4,5&6
(e) Detached multi-purpose hall (total floor area).		
(i) Single storey and less than 2,000 sq. m.	—	—
(ii) Two storeys and above or exceeding 2,000 sq. m.	F	2
(iii) Central air-conditioning (total floor area) exceeding 2,000 sq. m.	A & F	2 & 6
(f) Educational institutions in commercial complexes.	To be considered as part of overall risk within the complex.	
2. Hospitals and nursing homes (total floor area).		
(a) Clinic — day care		
(i) Less than 750 sq. m.	—	—
(ii) 751 to 1,000 sq. m.	F	2
(iii) 1,001 to 2,000 sq. m.	F	1 & 2
(iv) Exceeding 2,000 sq. m.	A & F	2 & 6
(b) Patient accommodation.		
(i) Part of commercial complex.	To be considered as part of overall risk with special requirements for emergency lighting, stretcher lifts, etc.	
(ii) Single storey		
(aa) Less than 750 sq. m.	F	2
(ab) 751 to 1,000 sq. m.	F	1 & 3
(ac) Exceeding 1,000 sq. m.	A & F	2,3,4,5&6

Occupancy Hazard	Extinguishing System Note 2	Detection and Fire Alarm Systems Note 3
(iii) Two storeys and above (total floor area).		
(aa) Less than 750 sq. m.	F	2
(ab) 751 to 1,000 sq. m.	F	1 & 3
(ac) Exceeding 1,000 sq. m.	A & F	2,3,4,5&6

Notes for hospital:
All fire alarm systems within wards shall be of the signal indicator type.

III OTHER RESIDENTIAL

1. Hotels.		
(a) Open corridor design with open staircase with extended lobby or tower staircase.		
(i) Two to three storeys.		
(aa) 50 rooms or less per block.	—	1 & 2
(ab) Exceeding 50 rooms per block.	F	1 & 2
(ii) Four storeys and above.		
(aa) 100 rooms or less per block.	F	1 & 2
(ab) Exceeding 100 rooms per block.	A & F	2,4,5&6
(b) Other designs.		
(i) Two to three storeys.		
(aa) Less than 20 rooms per block.	—	1 & 2
(ab) 20 to 100 rooms per block.	F	1 & 2
(ac) Exceeding 100 rooms per block.	A & F	2,4,5&6
(ii) Four storeys and above.		
(aa) Less than 50 rooms per block.	F	1 & 2
(ab) 50 rooms and over per block.	2,4,5&6	A & F
(c) Hotels above shops or office occupancies.	To provide not less than that required for overall occupancy risk or 1 & 2 above	

Occupancy Hazard	*Extinguishing System* *Note 2*	*Detection and Fire Alarm Systems* *Note 3*
2. Hostels and dormitories.		
(a) (i) Two storeys and below.	—	—
(ii) Open corridor design.		
(aa) Three to five storeys.	F	2
(ab) Six to ten storeys and total floor area not exceeding 5,000 sq. m.	F	1 & 2
(ac) Above ten storeys or total floor area exceeding 5,000 sq. m.	A & F	2,4,5&6
(iii) Other designs.		
(aa) Three to five storeys and total floor area not exceeding 3,000 sq. m.	F	1 & 2
(ab) Above five storeys or total floor area exceeding 3,000 sq. m.	A &F	2,4,5&6

Note:
Hotels at locations that cannot be reached within reasonable time or not accessible to required type and number of fire appliances shall be required to provide higher standard of protection as required by the Director General.

3. Apartments and flats.		
a. Five storeys and below.	—	7
b. Open corridor design.		
i. Six to forty storeys or less than 120m in height.	F	2,5&7
ii. Above forty storeys or exceeding 120m in height.	A & F	2,5&6

Occupancy Hazard	*Extinguishing System* *Note 2*	*Detection and Fire Alarm Systems* *Note 3*
(c) Internal staircase or core design. (i) Six to ten storeys or less than 30m in height.	F	2 & 7
(ii) Eleven to forty storeys or less than 120m in height.	F	2,5&7
(iii) Above forty storeys or exceeding 120m in height.	A & F	2,5&6
Note: For the purpose of group 3(b) and (c) in this schedule, automatic fire detection system when required shall be confined to common areas only.		
4. Service apartments.		
(i) Ten storeys and below per block or less than 30m in height.	F	2,5&7
(ii) Above ten storeys or exceeding 30 m height.	A & F	2,4,5&6
Note: Any purpose group in mixed development (such as combination of residential building ,office and shop) shall be considered as part of overall risk within the complex unless any part of the building is completely separated throughout its height both above and below ground from all other parts by a compartment wall or compartment walls in the same continuous vertical plane.		
IV. OFFICE Total gross floor area.		
1. Four storeys and below or less than 1,000 sq. m.	—	—
2. Five storeys and above or exceeding 1,000 sq. m.	F	2
3. Exceeding 18 m but less than 10,000 sq. m.	F	1 & 2
4. 30 m and above in height or exceeding 10,000 sq. m.	A & F	2,4,5&6
V. SHOP 1. (a) Floor area not exceeding 250 sq. m. per floor built as separate compartments with building less than 4 ½ storeys or 18 m height.	—	—

Occupancy Hazard	*Extinguishing System* *Note 2*	*Detection and Fire Alarm Systems* *Note 3*
(b) Combination of ground floor shop and/or residential and/or office on upper floors.		
2. Single storey.	—	—
(a) Less than 1,000 sq. m.	—	—
(b) 1,000 to 2,000 sq. m.	F	1 & 2
(c) Exceeding 2,000 sq. m.	A & F	2,4,5&6
3. Two storeys and above (total floor area).		
(a) Less than 750 sq. m.	—	—
(b) 750 to 1,000 sq. m.	F	2
(c) 1,001 to 3,000 sq. m.	F	1 & 2
(d) Exceeding 3,000 sq. m.	A & F	2,4,5&6
4. Hawkers centres, food courts, wet and dry markets.		
(a) Detached building less than 2,000 sq. m with open structure design and naturally ventilated.	—	—
(b) Exceeding 2,000 sq. m.	F	2
5. Combined shop and hotel occupancy or combined office and shop occupancy.	Gross area calculated against the highest risk requirement.	
VI. FACTORY		
1. Single storey detached, semi-detached or terrace units.		
(a) Less than 750 sq. m.	—	—
(b) 750 to 1,000 sq. m.	F	2
(c) 1,001 to 2,000 sq. m.	F	1 & 2
(d) Exceeding 2,000 sq. m.	A & F	2 & 6
2. Open structure design.		
(a) Steel or metal fabrication works, engineering or metal works or similar low fire risk establishments.		
(b) Sawmill.	F & G	2
(c) Steel mills.		
3. Two storeys and above, detached, semi detached or terrace units. Each floor built as separate compartment.	F & G	2

Occupancy Hazard	*Extinguishing System* *Note 2*	*Detection and Fire Alarm Systems* *Note 3*
(a) Less than 500 sq. m per floor.	—	2
(b) 500 to 1,000 sq. m per floor.	F	1 & 2
(c) Exceeding 1,000 sq. m per floor.	A & F	2,5&6
4. Flatted factories block (two storeys and above).		
(a) Less than 500 sq. m per floor.	—	2
(b) 500 to 1,000 sq. m per floor.	F	2
(c) Exceeding 1,000 sq. m per floor or exceeding 7,000 cu. m per compartment.	A & F	2,5&6
5. Vehicle assembly and similar plants.		
(a) Less than 1,000 sq. m total floor area.	—	—
(b) 1,000 to 2,000 sq. m total floor area.	—	2
(c) 2,001 to 5,000 sq. m total floor area.	F & G	1 & 2
(d) Exceeding 5,000 sq. m total floor area.	A,F&G	2,5&6
6. Special structures.		
(a) Factory complexes such as palm oil mill complex, palm oil refinery, sugar mills, cement works.	F & G	2
(b) Wet processes.	F	2
(c) Hazardous processes.	A,B,C,D,E,F&G (See Note 2)	1,2,3,4,5&6 (See Note 2)

Note:

1. Factories in operation after hours of darkness shall be required to provide emergency lighting as required by the Director General.
2. Special risks or hazardous processes or storage shall be required to provide fire fighting equipment or fire safety installation as required by the Director General.

Occupancy Hazard	Extinguishing System Note 2	Detection and Fire Alarm Systems Note 3
VII. PLACE OF ASSEMBLY		
1. Place of assembly below level of exit discharge exceeding 1,000 sq. m (total floor area).	A & F	2 & 6
2. Convention centres, community centres, private clubs, exhibition centres, museums and art galleries (total floor area).		
(a) Not exceeding 1,000 sq. m.	—	—
(b) 1,001 to 2,000 sq. m.	F	1 & 2
(c) Exceeding 2,000 sq. m.	A & F	2,4,5&6
3. Theatres, cinemas, concert halls, auditoriums (total floor area).		
(a) Not exceeding 1,000 sq. m.	—	—
(b) 1,000 to 2,000 sq. m.	F	1 & 2
(c) Exceeding 2,000 sq. m.	A & F	2,4,5&6
4. Amusement centres (total floor area).		
(a) Not exceeding 1,000 sq. m.	—	—
(b) 1,000 to 2,000 sq. m.	F	1 & 2
(c) Exceeding 2,000 sq. m.	A & F	2,4,5&6
5. Bus terminals, ferry terminal, train stations, airports (total floor area).		
(a) Not exceeding 1,000 sq. m.	—	2
(b) 1,000 to 2,000 sq. m.	F	1 & 2
(c) Exceeding 2,000 sq. m.	A & F	2,4,5&6
6. Place of worship		
Place of assembly used purely for religious purposes.	—	—
VIII. STORAGE AND GENERAL		
1. Car parks.		
(a) Open structure car parks above ground.		
(i) Single storey or less than 750 sq. m.	—	—
(ii) Two storeys and above or exceeding 750 sq. m per floor.	F	2

Occupancy Hazard	*Extinguishing System*	*Detection and Fire Alarm Systems*
	Note 2	*Note 3*
(b) Enclosed and underground car parks.		
(i) Less than 2,000 sq. m (total floor area).	F	2
(ii) Exceeding 2,000 sq. m (total floor area).	A & F	2,4,5&6
(c) Automated multi level car parks.	A & F	2,5&6
2. Warehouse and storage of non-combustible products such as clay and bleaching earth.		
(a) Single storey.		
(i) Less than 2,000 sq. m.	—	—
(ii) Exceeding 2,000 sq. m.	F	2
(b) Two storeys and above.	F	2
3. Warehouse and storage of combustible products.		
(a) Single storey (total floor area).		
(i) Open sided exceeding 1,000 sq. m.	F	2
(ii) Less than 250 sq. m.	—	—
(iii) 250 to 500 sq. m.	—	2
(iv) 501 to 1,000 sq. m and less than 7,000 cu. m.	F	1 & 2
(v) 1,001 sq. m to 10,000 sq. m and 7,001 cu.m to 70,000 cu.m	A & F	2 & 6
(vi) Exceeding 10,000 sq.m or exceeding 70,000 cu. m.	G,A&F	2 & 6
(b) Two storeys and over (total floor area).		
(i) Less than 1,000 sq. m or less than 7,000 cu. m.	F	1 & 2
(ii) Exceeding 1,000 sq. m or exceeding 7,000 cu. m.	A & F	2 & 6

Note:
Any purpose group in mixed development (such as combination of residential building, office and shopping mall) shall be considered as part of overall risk within the complex unless any part of the building is completely separated throughout its height both above and below ground from all other parts by a compartment wall or compartment walls in the same continuous vertical plane.

Open Structure:

(1) Total surface area of openings is to be no less than 40% of the total perimeter wall area enclosing the floor or compartment.

(2) The opening(s) is to be shaped and located in such a way that total length in plan of the opening(s) is to be no less than 50% of the perimeter of the floor or compartment.

Open Corridor:

(1) Total surface area of openings is to be no less than 25% of the total perimeter wall area enclosing the balcony.

(2) The opening(s) is to be shaped and located in such a way that total length in plan of the opening(s) is to be no less than 50% of the perimeter of the balcony.

Open Sided:

(1) All sides are open.

"Openings" is to be opened to outside, unenclosed space or permitted air-wells. Any individual opening having a surface area of less than 600 mm² or area width of opening of less than 25 mm shall not to be regarded as an opening for this purpose.

NOTE 1:

The hazardous areas and processes within any building referred to in Group VI and VIII are the following areas:

(a) Boiler room and associated fuel storage spaces.

(b) Repair shops.

(c) Rooms or spaces used for storage of materials in quantities deemed hazardous.

(d) Transformer rooms and electrical switch rooms.

(e) Plant room.

(f) Flammable liquid processing or refining operations.

(g) Indoor storage of flammable liquids.

(h) Chemical plants, solvent extraction plants, distillation plants, refineries.

(i) Process equipment, pump rooms, open tanks, dip-tanks, mixing tanks.

NOTE 2:

The letters in the second column of this schedule refer to the types of fixed extinguishing system, as follows:

A - Automatic fire sprinkler system.
B - Water spray system.
C - Foam system.
D - Gaseous system.
E - Other automatic extinguishing system.
F - Hose reel system.
G - Pressurised hydrant system.

NOTE 3:

The figures in the third column of this schedule refer to the types of fire alarm and fire detection systems as follow:

1. Automatic fire detection system.
2. Manual electric fire alarm system.
3. Signal indicator alarm system.
4. Public address system.
5. Firemen intercom system and fire command centre.
6. Automatic fire monitoring system.
7. Self-contained smoke detector.

NOTE 4:
Types of emergency illumination —

(i) Signal point units.
(ii) Central battery.
(iii) Generators.

In all cases the duration of emergency illumination in the event of failure of normal supply shall not be less than 3 hours.

NOTE 5:
For the purpose of this schedule, measurement of heights shall be taken from the level of the highest point of fire appliance access to the highest habitable floor level.

TENTH SCHEDULE
STAIRCASE LANDING WIDTH AND DEPTH
[By-law 188]

B **Stair Width** **(m)**	**A** **Minimum Landing width** **(m)**	**C** **Minimum Landing Depth** **(m)**	
1.2	2.8	1.9	Allows mattress or stretcher evacuation only (i.e. no pedestrian passing)
1.2	2.8	1.9	Allows mattress or stretcher evacuation and restricted ambulant passing
1.5	3.2	1.55	
1.75	3.6	1.35*	Allows mattress or stretcher evacuation and ambulant passing
2	4	1.25*	

Note:
*Clear landing depth, instead of the clear stair width, shall be taken for the purpose of calculating the exit capacity of the staircase.

Dated at Kota Kinabalu this 17th day of May, 2022.

DATUK SERI PANGLIMA HAJI MASIDI BIN MANJUN,
Minister of Local Government and Housing.