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VICTORIA

# GOVERNMENT GAZETTE.

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## UNIFORM BUILDING REGULATIONS

VICTORIA

1945.

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REGULATIONS UNDER THE LOCAL GOVERNMENT  
(BUILDING REGULATIONS) ACT 1940 (No. 4796).

*At the Executive Council Chamber, Melbourne, the  
twenty-sixth day of June, 1945.*

## PRESENT:

His Excellency the Governor of the State of Victoria.  
Mr. Tuckett | Mr. Chandler.

## UNIFORM BUILDING REGULATIONS.

WHEREAS it is provided by section 11 of the *Local Government (Building Regulations) Act 1940* (No. 4796) that the Governor in Council, after consideration by the Minister of any report and draft Regulations submitted to the Minister by the Commission appointed under the said Act, may make Regulations for or with respect to regulating, restricting, restraining or prohibiting the construction, pulling down and removal of buildings and any matters connected therewith, and (without affecting the generality of the foregoing) for or with respect to all or any of certain matters therein specified: And whereas the Minister has duly considered the report and draft Regulations submitted to him by the said Commission:

And whereas in conformity with the provisions of sub-section (1) of section 19 of the said Act a copy of the Regulations now made was laid before both Houses of Parliament and posted to each member of Parliament and thereafter the session continued for at least twenty-one days and the Legislative Assembly sat on at least seven days and the Legislative Council sat on at least three days:

Now, therefore, His Excellency the Governor of the State of Victoria, by and with the advice of the Executive Council thereof, in pursuance of the powers conferred by the aforesaid section 11, doth hereby make the following Regulations, and doth fix the first day of August, 1945, as the day on which the Regulations (other than those contained in Parts I. and II. of chapter 8 thereof) shall come into operation, and the first day of November, 1945, as the day on which those contained in Parts I. and II. of the said chapter 8 shall come into operation:

## CHAPTER 1.

## TITLE AND DEFINITIONS.

Clause 101.—Title of Regulations.

Clause 102.—Definitions.

## CHAPTER 1.

## TITLE AND DEFINITIONS.

101. **Title of Regulations.** These Regulations may be cited as the *Uniform Building Regulations, Victoria*.

102. **Definitions.** In these Regulations, unless inconsistent with the context or subject matter:—

“**Alteration**” includes alteration, addition, and extension and “**alter**” has a corresponding interpretation.

“**Approved**” as applied to materials and/or methods of construction means approved by the proper officer for the purposes of these Regulations.

“**Area**” applied to a building means the superficial area of a horizontal section thereof made at a point of greatest surface inclusive of the external walls and of such portions of any party wall as belong to the building.

“**Assembly building**” means any building in which persons congregate for civic, political, educational, religious, social, or recreational purposes, or for entertainment or amusement.

“**Attic**” means any floor area built wholly or partly in the roof of a building, but an attic shall not be regarded as a storey if it is wholly contained within a roof pitched at the level of the ceiling of the storey next below the attic.

- “**Authorized**” means authorized by the proper officer or body for the purposes of these Regulations.
- “**Basement**” means that floor of a building constructed below ground level or so constructed that the height of the ceiling above the level of the adjoining ground or pavement is less than the distance from such level to the floor, measured at the centre of the building frontage.
- “**Base structure**” means the structure between the level of the lowest floor and the footings which transmits the loads of the building to the footings.
- “**Chief Fire Officer**” means the Chief Officer of the Metropolitan Fire Brigade or the Chief Officer of the Country Fire Authority, as the case may be, and includes any deputy authorized by the Chief Officer to act in his stead, whether appointed generally or in a particular case.
- “**Chief Inspector of Factories**” means Chief Inspector of Factories for the State of Victoria.
- “**Common dining room**” means a dining room situated in a building of Class II. or Class III. Occupancy and intended primarily for the use of the residents of such building.
- “**Construct**” includes build, construct, rebuild, reconstruct, convert, and alter, and do any structural work, and “construction” has a corresponding interpretation.
- “**Council**” means the council of the municipality in whose municipal district the building is constructed or proposed to be constructed.
- “**Dangerous Business**” means the manufacture of gunpowders or any detonating or explosive powders or of matches ignitable by friction or of any other substance liable to sudden explosion, inflammation or ignition, or of turpentine, vitriol, naphtha, varnish, fireworks or painted covers or oil cloths, or any other manufactures liable by reason of the nature or quantity of the materials employed therein to cause sudden fire or explosion.
- “**Dead load**” of a building means the actual weight of all permanent structural and finishing work, including partition walls contained in the building.
- “**Depth**” in relation to site means the distance between the middle points of the frontage and of the rear boundary.
- “**Dwelling**” means any building or portion of a building which is used, or intended, adapted or designed for use, for living purposes and is a self-contained unit.
- “**Dual house**” means a building consisting of two storeys and containing one dwelling in each storey.
- “**Fire resistance rating**” means the minimum period of time during which an element of a structure may be expected to function satisfactorily while subjected to the Standard Fire Test as provided in clause 1401.
- “**Flat**” means that portion of a building used or intended, adapted or designed for use as a separate dwelling.
- “**Footing**” means the construction whereby the weight of the structure is transferred from the base structure to the foundation.
- “**Foundation**” means the ground upon which the footings of a building are constructed.
- “**Frontage**” means the boundary line or lines between the site and the street or streets upon which the site abuts.
- “**Habitable room**” means any room in a building of Class I., II., III. or IV. Occupancy other than a kitchen, bathroom, laundry, pantry or the like.
- “**Health Commission**” means the Commission of Public Health constituted under the Health Acts.

**“Height”**—

- (a) in relation to a building means the measurement taken from the permanent footpath level immediately in front of the centre of the face of the building to the level of the top of the eaves or flat roof.
- (b) in relation to a building when defined in terms of number of storeys means the number of storeys above the permanent footpath level or, where there is a basement, above the basement;
- (c) in relation to storeys means the measurement from one floor to the floor above or, in the case of the topmost storey, the measurement from floor to ceiling, provided that if there is no ceiling, the height shall be measured from the floor to the underside of the roof tie or, if there is no tie, to the level of half the vertical height of the rafters or other support of the roof;
- (d) in relation to a room means the height measured from floor to ceiling or, where there is no ceiling, to the underside of the rafters.

**“High Hazard Occupancy”** means any occupancy in which are goods or material which are liable to burn with extreme rapidity or from which poisonous fumes or explosions are likely to arise or occur in the event of fire.

**“House”** means any building used or intended, adapted or designed for use as a separate dwelling but does not include a flat.

**“Institutional building”** means any building into which persons are admitted to receive care or treatment.

**“Length of wall”** in relation to requirements for wall thickness means the distance of any wall between the nearer faces of cross walls, external walls, or party walls bonded into such walls and constructed in accordance with these Regulations.

**“Live load”** means all load other than dead load and includes wind load.

**“Masonry”** means stone, brick, terra cotta block, solid or hollow concrete block or other similar building unit or a combination of same laid up unit by unit and set in mortar.

**“Mezzanine floor”** means an intermediate floor placed in any storey provided that the area of all mezzanine floors in any storey or room shall not exceed one-third of the total floor area in that storey or room.

**“New building”** means any building constructed or commenced to be constructed after the date of commencement of these Regulations.

**“Occupancy”** means the purpose for which a building is used or intended to be used, but change of occupancy is not intended to include a change of tenants or proprietors.

**“Occupation”** means a contiguous floor area in a building held by one occupier and containing within such area only one class of occupancy.

**“Owner”** means the person for the time being entitled to receive the rent of the land or premises in connexion with which the word is used (whether on his own account or as the agent of or as trustee for any other person) or who would be entitled to receive the same if the land or premises were let at a rent.

**“Parapet”** means that portion of any wall which is carried up above the line of junction with a roof or gutter.

**“Party structure”** means any partition wall or floor required to have a fire resistance rating and used for the purpose of separating storeys or rooms in separate occupations or occupancies.

- “**Proper officer**” means officer of a Government Department, council, or public authority authorized by such Department council, or authority in respect of, or whose duty it is to deal with or act in regard to, any acts matters or things in connexion with which the expression is used.
- “**Qualified engineer**” means a graduate in Civil Engineering of an Australian University or of any other University whose graduates are admitted by the University of Melbourne *ad eundem gradum*, a corporate member of the Institution of Engineers Australia, or of any other engineering institution whose qualifications for membership are equivalent to those of that institution or the holder of a certificate granted by the Municipal Engineers Board.
- “**Reinforced concrete**” means concrete containing reinforcement embedded in such a manner that the two materials act together in resisting forces and complying with the requirements of clause 1314.
- “**Repair**” means the reconstruction or renewal of any part of an existing building for the purpose of its maintenance but does not cover any change of construction.
- “**S.A.A. Code or Specification**” means the specified code or specification issued by the Standards Association of Australia.
- “**Sprinkler system**” means an automatic sprinkler installation conforming to the requirements of the S.A.A. Code C.A.16-1939—Rules for Automatic Sprinkler Installations.
- “**Semi-detached Dwelling**” means one unit of a two-unit dwelling, separated from the other unit by a party wall.
- “**Square**” applied to the measurement of any area means 100 square feet.
- “**Storey**” means that portion of any building which is situated between any floor level and the floor level next above, or if there is no floor above, that portion between the floor level and the ceiling above it.
- “**Ground storey**” means that storey closest to ground level in which the height of the ceiling above the level of the adjoining ground is greater than the distance from such level to the floor measured at the centre of the building frontage.
- “**First storey**” means that storey of a building next above the ground storey, the successive storeys above the first storey being the second storey, the third storey, and so on to the topmost storey.
- “**Topmost storey**” means the uppermost storey whether constructed partly in the roof or not.
- “**Sewerage Authority**” means the Sewerage Authority within the meaning of the Sewerage Districts Acts, within the Sewerage District of which the premises connected, or to be connected, to the sewers are situated, or the Geelong Waterworks and Sewerage Trust where such premises are within the drainage area of that Trust.
- “**Shopfront**” shall be deemed to include the frame and glass, doors and door frame, ingo and ingo floors, facing to piers or pilasters, fascia, wall between head of shopfront frame and underneath of verandah or lintel over openings, and any signs or trade-marks incorporated in the design of the shopfront.
- “**Street**” means any street, road, lane, footway, square, court, alley, or right-of-way.
- “**Street alignment**” means the line between any street and an allotment of land abutting thereon.

"Sunblind" means a screen or awning attached to the wall of a building and having no support from the ground other than such wall and capable of being extended from such wall over or across any public footway or part thereof for the purpose of shade, or rolled up on a roller fixed to the face of such wall.

"Surveyor" means the Building Surveyor or the person appointed by the council to carry out the duties of Building Surveyor.

"Verandah" includes every screen awning, portico, porch, shade, covering, or other erection other than a sunblind upon or over or across any public footway or part thereof for the purpose of shade or shelter together with the supports other than the building to or against which it is attached.

"Vertical opening" means an opening in a floor between storeys of a building or in a ceiling between a storey and an attic space, including openings for stairs, lifts, and air wells, but not including openings for pipes, heating or ventilating ducts, or electrical conduits.

"Walls"—

"Bearing wall" means a wall which supports any load in addition to its own weight.

"Cross wall" means an internal wall dividing party or external walls into distinct lengths.

"External wall" means an outer wall or vertical enclosure of a building, not being a party wall.

"Fire wall" means a wall which subdivides a building to resist the spread of fire.

"Non-bearing wall" is a wall which supports no load other than its own weight.

"Panel wall" is a non-bearing wall in frame construction built between columns or piers and wholly supported at each storey.

"Partition wall" means an internal vertical structure used solely for the purpose of subdividing any storey of a building into sections and which supports no load other than its own weight.

"Party wall" means a wall forming part of a building and used or constructed to be used in any part of its height or length for the separation of adjoining buildings.

"Retaining wall" is any wall used to resist the lateral displacement of any material.

"Width of frontage" means the shortest distance between the terminal points of the side boundaries where they abut on the street alignment.

## CHAPTER 2.

## ADMINISTRATION.

- Clause 201.—Scope of Regulations.
- Clause 202.—Administration by Council.
- Clause 203.—Administration of Regulations relating to Public Buildings.
- Clause 204.—Sewerage Regulations.
- Clause 205.—Water Supply Regulations.
- Clause 206.—Appointment of Surveyor.
- Clause 207 (a) Duties of Surveyor.  
 (b) Inspections.  
 (c) Record of Inspections.
- Clause 208.—Certificate of Occupancy.
- Clause 209.—Powers of Entry.
- Clause 210.—Powers of Inspectors of Factories.
- Clause 211.—Loading Notice Plate.
- Clause 212.—Change of Occupancy.
- Clause 213.—Provision for Appeal.
- Clause 214.—Power to Modify Regulations.

## CHAPTER 2.

## ADMINISTRATION.

201. **Scope of Regulations.**—(a) Except as provided in sub-clause (b), these Regulations shall extend and apply to all alterations made to any existing building after the date of commencement of these Regulations and to all new buildings constructed after such date.

(b) These Regulations shall not apply to—

- (i) buildings used by builders during the construction of any building or by contractors carrying out works for any public body or corporation and readily removable on completion of such building or works;
- (ii) the construction of any building or to the doing of any work where such construction or work was commenced before the date of commencement of such Regulations or is to be carried out under any existing contract entered into before the commencement of such Regulations.

202. **Administration by Council.**—Except as provided in clauses 203 (b), 204 and 205 and subject to any specific reference elsewhere in these Regulations, the administration of these Regulations within any municipality shall be carried out by the council of that municipality.

203. **Administration of Regulations relating to Public Buildings.**—(a) Plans and specifications for the construction of a public assembly or institutional building shall be submitted to and approved by the Health Commission as required by the Health Acts before a permit to construct such building is issued by the Surveyor.

(b) Where it is provided in these Regulations that the construction of any public assembly or institutional building shall conform in any respect to the provisions of Regulations made under the Health Acts, such provisions shall be administered by the Health Commission.



204. **Sewerage Regulations.**—(a) Where the construction at any building will include or affect any sewerage installation or fixtures the owner or his authorized agent shall give written notice of such proposal to the Melbourne and Metropolitan Board of Works or to the Sewerage Authority (as the case may be) and shall furnish plans and sections as provided in clause 3802;

(b) In the case of any building within the area under the jurisdiction of the Melbourne and Metropolitan Board of Works, all matters affecting the sewerage installation of the property and/or the sewerage system shall conform to the By-laws and Regulations of the said Board and such By-laws and Regulations shall be administered by the said Board;

(c) In the case of any building within a Sewerage District as defined in the Sewerage Districts Act, all matters affecting the sewerage installation of the property and/or the sewerage system shall conform to the requirements of Chapters 38 to 42 (inclusive) of these Regulations and to any By-laws or Regulations not inconsistent therewith made by the Sewerage Authority for such District;

(d) Notwithstanding anything elsewhere contained the provisions of Chapters 38 to 42 (inclusive) of these Regulations shall be administered by such Sewerage Authority.

205. **Water Supply Regulations.**—The piping, fixtures and fittings for the supply of water to any building within the area under the jurisdiction of the Melbourne and Metropolitan Board of Works, and the installation of same, shall conform to the requirements of the By-laws and Regulations of the said Board and such By-laws and Regulations shall be administered by the said Board, and in respect of any building outside such area shall comply with the By-laws and Regulations of the Authority having jurisdiction in such area with respect to the construction or management and control of waterworks and such By-laws and Regulations shall be administered by such authority.

206. **Appointment of a Surveyor.**—The council of every municipality in whose municipal district these Regulations have effect shall for the effective administration of such Regulations appoint a competent person having an intimate knowledge of building to act as Surveyor.

207. **Duties of a Surveyor.**—(a) Except as otherwise expressly provided, it shall be the duty of the Surveyor to take such steps as are necessary to secure the enforcement of all the provisions of these Regulations in respect of the construction of new buildings, and alterations, additions, repairs, and changes of use or occupancy in existing buildings.

(b) **Inspections.**—For the purpose of enforcing these Regulations, the Surveyor shall periodically inspect or cause to be inspected all buildings referred to herein during the construction, demolition, underpinning, or removal, thereof, and shall make or cause to be made a final inspection on the completion of such construction, demolition, underpinning or removal, and in the course of such inspection shall make or cause to be made such tests in accordance with these Regulations as he deems necessary.

(c) **Record of Inspections.**

(i) On completion of every inspection, the Surveyor or his representative shall enter on an Inspection Record to be provided by the Council and posted on the site of the works, the date of such inspection and any directions given in relation to any part of the construction which in his opinion is unsatisfactory and shall sign same.

(ii) A duplicate of such Inspection Record shall be kept by the Surveyor and shall be available for inspection by any person having an interest in such building.

(iii) Every Inspection Record shall be in the form set out in the First Schedule.

208. **Certificate of Occupancy.**—(a) On completion of every building or any portion thereof except a building of Class I. Occupancy or on completion of any portion which in his opinion is suitable for occupation the Surveyor shall prepare in duplicate in the form set out in the Second Schedule a Certificate of Occupancy and shall issue the original of such certificate to the owner of the building. The duplicate shall be retained in the Surveyor's office and shall be available for inspection during office hours;

(b) Every Certificate of Occupancy shall show:

(i) in the case of a building of Class II., III. or IV. Occupancy, the class of occupancy for which the building has been constructed; and

(ii) in the case of a building of Class V., VI., VII., VIII. or IX. Occupancy, the Class or Classes of Occupancy and the fire hazard thereof for which the building in its several parts has been designed and approved, the maximum permissible live load on the several floors and the number of persons for whom exit space is provided from each floor;

(c) For the purposes of this clause a building or portion of a building shall be deemed to be completed, notwithstanding that the requirements of these regulations relating to the installation of artificial lighting have not been complied with provided that no person shall use or permit to be used such building or portion thereof for any purpose unless provided with lighting conforming to the requirements of Chapter 11.

(d) The possession of a Certificate of Occupancy in respect of any building or portion thereof shall not dispense from compliance with the provisions of any Act, Regulation or By-law requiring the registration of premises used or to be used for any specified purpose provided that such registration shall not be withheld merely because of non-compliance with a requirement of any Regulation or By-law inconsistent with these Regulations.

209. **Powers of Entry.**—The Surveyor shall have power to enter at all reasonable times on or in any land or building for the purpose of inspecting the same and of carrying out any duty or exercising any power imposed or conferred on him by these Regulations.

210. **Powers of Inspectors of Factories.**—Without affecting the powers of the Council of any municipality to administer these regulations as provided in Clause 202, it shall be lawful for any Inspector of Factories and Shops appointed under the Factories and Shops Act to inspect at any time any building of Class V., VI., VII. or VIII. Occupancy for the purpose of ensuring that the provisions of these regulations are observed except in so far as they relate to the construction removal and demolition of buildings and to proceed against any person deemed guilty of a breach of such regulations.

211. **Loading Notice Plate.**—On completion of any building of Class VI., VII., or VIII. Occupancy constructed pursuant to a permit granted under these Regulations, and before the occupation of any such building or portion of a building, the owner shall affix and subsequently maintain in conspicuous places on the walls thereof, not less than 3 feet above the floor, permanently attached plates in the following form showing the safe live load for which the floor has been designed.

SAFE FLOOR LOAD

Pounds per Square Foot

Uniformly Distributed.

**212. Change of Occupancy.**—(a) Before any building of Class I. Occupancy is used for any other class of occupancy or before any other building or portion thereof is used for any Class of Occupancy not endorsed on the Certificate of Occupancy in respect of such building or portion or before the fire hazard in any building is substantially increased, the owner of the building shall notify the Surveyor of the nature of the proposed occupancy or increased fire hazard and shall, where necessary, make application for a permit as provided in Chapter 5 and carry out such work as may be required under these Regulations to make the building suitable for the proposed occupancy;

(b) On completion of such alterations and before the building or portion is occupied, the Surveyor shall in the manner prescribed in clause 208 prepare and issue a new Certificate of Occupancy for the building or portion altered.

**213. Provision for Appeal.**—If any doubt, difference, or dissatisfaction in respect of any matter as to which provision is made in these Regulations arises between any parties concerned, or between any party and the Surveyor as to—

- (a) any act done, or to be done, in pursuance of the said Regulations;
- (b) the effect of the provisions of the said Regulations in any case;
- (c) the mode in which the provisions and directions of the said Regulations are or ought to be carried into effect;
- (d) whether the requirements implied in terms of qualification applied to sites, to soils, to materials, or to workmanship or otherwise, and denoting good, sound, fireproof, fit, proper, or sufficient are fulfilled in certain cases;
- (e) the expenses to be borne by the respective owners of premises parted by the same party walls or the proportions thereof;
- (f) the proportions of the expense to be borne by the occupier or by the owner of premises in respect of any works executed; or
- (g) any other matter whatever;

any party concerned may lodge an appeal with referees appointed pursuant to the provisions of the Fourteenth Schedule to the *Local Government Act 1928*, or in the case of the City of Melbourne, pursuant to the provisions of the *Melbourne Building By-laws Act 1916*.

**214. Power to Modify Regulations.**—In the case of any particular building proposed to be constructed, if the owner or builder or architect thereof considers that with respect to that building any of the provisions of these Regulations are inapplicable or will needlessly affect with injury the course and operation of business or will defeat the objects of such Regulations, and that by a modification of such provisions such objects will be attained either better or as effectually, he may lodge with the Surveyor an objection in writing and setting out the grounds of such objection, and such objection shall be considered and decided by the Surveyor and the referees as provided in the Fourteenth Schedule to the *Local Government Act* or the *Melbourne Building By-laws Act 1916* as the case may be.

## CHAPTER 3.

**PENALTIES AND ENFORCEMENT OF REGULATIONS.**

- Clause 301.—Penalties.
- Clause 302.—Illegal Occupation of Building.
- Clause 303.—Buildings Constructed Contrary to Regulations.
- Clause 304.—Expenses Caused through Breach of Regulations may be Recovered.
- Clause 305.—Occupier Obstructing Owner Liable to Penalty.
- Clause 306.—Occupier may be Required to Vacate Premises.
- Clause 307.—Serving of Notices.

## CHAPTER 3.

**PENALTIES AND ENFORCEMENT OF REGULATIONS.**

301. **Penalties.**—Any person doing an act forbidden to be done or failing to do any act directed to be done by these Regulations shall be guilty of an offence against these Regulations, and every person guilty of an offence against these Regulations shall for the first offence be liable to a penalty of not more than £20, and for every subsequent offence to a penalty of not less than £3 and not more than £20, and shall be liable to a further daily penalty of not more than £5 for any offence against the Regulations which is continued or repeated after a conviction or order by any court in relation to the offence.

302. **Illegal Occupation of Building.**—Without affecting the generality of the foregoing, any owner of a building of Class I. Occupancy which is used as a building of any other class and any owner of any other building which or any portion of which is occupied prior to the issue of a Certificate of Occupancy or is occupied for any other class of occupancy or for any occupancy of the same class having a higher fire hazard or involving a greater live load or the accommodation of a greater number of persons than that endorsed in the Certificate of Occupancy current in respect of such building or portion thereof and the occupier of any such building or portion thereof shall be deemed guilty of an offence against these Regulations.

303. **Buildings Constructed Contrary to Regulations.**

(a) **Notice to Owner or Builder.**—Where any building, work, structure, or thing is constructed in breach of any provision of these Regulations the Government Department, council, or public authority administering such provision may give notice to the owner or builder requiring him to show cause within a period to be specified therein why such building, work, structure, or thing should not be made to conform to the requirements of these Regulations or pulled down or removed, as the case may require.

(b) **Buildings may be Pulled Down, Removed, or Altered.**—If within the specified period the said owner or builder does not furnish good and sufficient reasons as aforesaid, the Department, council, or public authority, or any person authorized by such Department, council, or authority, may pull down, remove, or alter such building, work, structure, or thing, and may sell the same or the materials thereof in such manner as it thinks fit.

- (c) **Application of Proceeds of Sale.**—The proceeds of any such sale as aforesaid shall be applied:
- (i) firstly in reimbursing the expenses of pulling down or removing the buildings or parts thereof;
  - (ii) secondly in paying into the municipal or town fund any fees or penalties due by the owner thereof; and the balance of the said proceeds shall be paid to the owner or other person entitled thereto.
- (d) **Deficiency may be Recovered.**—Where the proceeds of the sale are insufficient to meet the cost of any expenses incurred and of any fees or penalties due, the balance may be recovered summarily from the owner or builder.
- (e) **Liability to Penalty in Addition.**—The exercise of the powers conferred by this clause shall not relieve any person from liability to any penalty incurred by reason of his breach of any provision of these Regulations.

**304. Expenses Caused through Breach of Regulations may be Recovered.**—In addition to any penalty that may be imposed under these Regulations, any expenses incurred by any Government Department, council, or public authority in consequence of a breach of these Regulations or in the construction or execution of any work authorized under these Regulations or of any work directed by these Regulations to be constructed or executed by any person and not constructed or executed by him shall be paid by the person committing such breach or failing to construct or execute such work.

**305. Occupier Obstructing Owner Liable to Penalty.**—If the occupier of any building or land prevents or in any manner obstructs the owner thereof or any person authorized by such owner from carrying out any work required to give effect to any of the provisions of these Regulations in respect of such building or land after reasonable notice is given such occupier by the proper officer that such work is required to conform to the provisions of these Regulations, such occupier shall be deemed guilty of an offence against these Regulations.

**306. Occupier may be Required to Vacate Premises.**—Where it is necessary for the effective carrying out of any requirement of a Government Department, council, or public authority under these Regulations for the occupier of any building or land to vacate same, or where after conviction for an offence against clause 302 any person continues to occupy any building contrary to the provisions of the said clause, written notice shall be served by or on behalf of such Government Department, council, or public authority on such occupier requiring him to vacate the said building or land within a period to be specified in such notice, and any occupier failing to comply with the provisions of any such notice shall be deemed guilty of an offence against these Regulations.

**307. Serving of Notices.**—Any notice or order by any Government Department, council, or public authority or by the proper officer or the Surveyor pursuant to these Regulations shall be deemed to be properly given to any person if such notice or order is served personally on such person or his authorized representative or is sent by registered letter addressed to the place of residence or business of such person, provided that where the address of the place of residence or business of such person is not known the said notice or order shall be deemed to be properly given if affixed to the building or land to which such notice relates.

## CHAPTER 4.

## FEES.

Clause 401.—Appointment of Fees.

Clause 402.—Calculation of Fees.

Clause 403.—Fee or Deposit Fixed by Council.

Clause 404.—Fees where Plans submitted for Preliminary Report.

## CHAPTER 4.

## FEES.

401. **Appointment of Fees.**—The fees specified in Table 401 are hereby appointed as the fees which shall be charged and received by the council for any permit granted under the Regulations by the council or for any inspection made or other service provided under the Regulations by any officer of the council.

402. (a) **Calculation of Fees for New Buildings.**—For the purpose of calculating the fee chargeable for a permit for the erection of a new building, the number of squares shall be assessed over the total gross areas of all floors. Gross areas shall be measured over the enclosing walls.

(b) **Calculation of Fees for Alterations.**—For the purpose of calculating the fee chargeable for a permit for alterations to an existing building, the number of squares shall be deemed to be the number of squares in all rooms or compartments being altered, measured over the enclosing walls.

403. (a) **Fee or Deposit fixed by Council.**—Where Table 401 empowers a council to fix a fee or a deposit, the council may fix such fee or deposit either generally or having regard to the circumstances of the particular case.

(b) **Deposit may be Appropriated.**—Where a deposit is paid to the council with any application for a permit under these Regulations, the council may appropriate such portion of the deposit as is required to make good any damage resulting from or incidental to the carrying out of works by the holder of such permit and the balance, if any, of such deposit shall be repaid to the person lodging same.

404. **Fees where Plans submitted for Preliminary Report.**—Where preliminary plans and specifications have been submitted to the Surveyor for examination and report and the prescribed fee paid therefor, the fee prescribed herein for a permit to carry out such work shall be reduced by 25 per cent. if application for such permit accompanied by complete plans, specification, and information as provided in Chapter 5 are submitted within twelve months from the date of such report and such plans, specification, and information are approved by the Surveyor.

TABLE 401.

(a) <i>Erection of New Buildings</i> —	
For each square or portion of a square up to 100 squares	3s. 6d.
For each square or portion of a square in excess of 100 squares	2s. 6d.
(b) <i>Alterations to Existing Buildings</i> —	
(i) Cutting openings only in external, internal and party walls	10s.
(ii) <i>All other Alterations</i> —	
For each square or portion of a square being altered up to 100 squares	3s. 6d.
For each square or portion of a square being altered in excess of 100 squares	2s. 3d.
(c) <i>Removal of Buildings and Material</i> —	
(i) Inspection of buildings to be removed from within municipal district	£1
(ii) Inspection of buildings or material outside municipal district	£2
(iii) Inspection of secondhand material within municipal district but not on site of works	5s.
(iv) Re-erection of removed buildings	Fee prescribed for new building
(d) <i>Erection of Street Verandahs (excluding structural alterations)</i> —	
per lineal foot measured along fascia	1s.
(e) <i>Installation of new shop front</i> —	
(i) Not necessitating structural alterations	10s.
(ii) Requiring the provision of new girders or columns	1s. per foot

(f) Erection of tent .. .. .	2s. 6d.
(g) Construction of temporary crossing .. .. .	5s. and such deposit as the Council may determine
(A) Road opening .. .. .	Such fees as the Council may determine
(i) Use of footpath or roadway during building operations	Such fees as the Council may determine
(j) Examination and report on preliminary plan and specification of building	25 per cent. of fee prescribed for permit to carry out work described therein
(k) <i>Sundry permits, services or inspections not incidental to the carrying out of work in respect of which other fees are payable—</i>	
(i) Exterior illumination, illuminated signs or lamps	10s.
(ii) Erection of wireless masts attached to building	1s. per foot
(iii) Erection of wireless masts over 25' in height and not attached to building	1s. per foot in excess of 25'
(iv) Erection of fencing, per 50' or part thereof	2s. 6d. (Max. 10s.)
(v) Erection of sunblind or blind under verandah	10s. per frontage
(vi) Construction of furnace, chimney shaft or ventilation shaft—	
Not exceeding 75' in height .. .. .	£2
Exceeding 75' but not exceeding 100' in height	£2 10s.
Each additional 10' or portion thereof	10s.
(vii) Carrying of flue from oven, stove, steam-boiler, furnace or close fire into old chimney or flue	10s.
(viii) Construction of room for the storage of petrol, films, carbide or other inflammable materials	£1
(ix) Installation of septic tank .. .. .	10s.
(x) Pulling down of building—	
of not more than two storeys .. .. .	2s. 6d. per storey
of more than two storeys .. .. .	10s. per storey
(xi) Any service, permit or inspection not otherwise provided for .. .. .	£1 (max)

## CHAPTER 5.

## APPLICATIONS FOR AND GRANTING OF BUILDING PERMITS.

- Clause 501.—Written Permit Required.
- Clause 502.—Application for Permit to be Lodged.
- Clause 503.—Information to Accompany Application for Permit to Construct.
- Clause 504.—Information to Accompany Permit to Pull Down or Remove.
- Clause 505.—Requirement for Computations.
- Clause 506.—Additional Information for Reinforced Concrete or Structural Steel Members or Timber Roof Trusses.
- Clause 507.—Examination and Approval of Plans.
- Clause 508.—Lapsing and Cancellation of Permit.
- Clause 509.—Submission of Preliminary Plans.
- Clause 510.—Copy of Plans to be Lodged.
- Clause 511.—Approved Plans, &c., not to be Varied without Consent.

## CHAPTER 5.

## APPLICATIONS FOR AND GRANTING OF BUILDING PERMITS.

501. **Written Permit Required.**—No person shall construct, pull down, or remove, or commence to construct, pull down, or remove any building unless he is the holder of a written permit from the council authorizing such construction, pulling down, or removal or without having first paid to the council the fee or fees in respect thereof specified in Chapter 4.

502. **Application for Permit to be Lodged.**—Before any person commences to construct, pull down, or remove any building, he shall lodge with the Surveyor an application in the form set out in the Third Schedule hereof for a permit authorizing such construction, pulling down, or removal.

503. **Information to Accompany Application for Permit to Construct.**—Every application for a permit to construct a building must be accompanied by—

- (a) the written consent of the owner of the land to the lodging of such application;

- (b) properly prepared and, for alterations, coloured plans in duplicate showing—
- (i) the position, elevation, form, and dimensions of the proposed building—drawn to a scale of not less than 1 inch to every 8 feet, together with drawings of necessary structural details, provided that where sufficient detail of the structure drawn to a scale of not less than 1 inch to every 2 feet is shown on the plans, such plans may be drawn to a scale of less than 1 inch to every 8 feet;
  - (ii) in buildings other than buildings of Class I. Occupancy, the point of entry of electricity supply and the space to be allowed for the main switchboards and metering equipment in positions approved by the Electric Supply Authority for the district, together with the position, level, dimensions and means of entry to any sub-station required by such authority to be incorporated in the building;
- (c) a specification describing the materials to be used in the construction and where not indicated on the drawings the sizes thereof, together with all other information not shown on the drawings which is necessary to show that the building will, if constructed in accordance with such specification, comply with the provisions of these Regulations;
- (d) a block plan drawn in ink to scale with dimensions not less than 1 inch to every 40 feet showing the boundaries and dimensions of the allotment of land, whether such allotment of land is at the intersection of two streets, and if not, the position of the allotment in relation to the nearest street corner, the position and dimensions of the proposed building, the relation thereof to the boundaries of the allotment and to any existing buildings on the same or adjoining allotments, the levels of the site in relation to the adjoining street channels and the method of drainage proposed to be adopted;
- (e) where a building is to be erected on the land a certified copy of the title to such land showing dimensions and easements (if any);
- (f) a statement showing the nature of the occupancy or occupancies for which each portion of the building is designed;
- (g) an estimate of the cost of the proposed construction and where so required by the Surveyor, the name and address of the registered architect and/or qualified engineer under whose supervision the construction is to be carried out;
- (h) if any structural members of the building are wholly or partly of reinforced concrete or structural steel or if roof trusses are framed wholly or partly in timber the drawings and calculations (in duplicate) specified in clause 506.

**504. Information to Accompany Permit to Pull Down or Remove.**—Every application for a permit to pull down or remove a building shall be accompanied by particulars of the location of the building and such other information as the council may require and, in the case of an application for a permit to remove a building for re-erection within the municipal district, by

- (a) complete plans and specifications of the building, including all proposed alterations and additions, as would be required by this chapter in the case of a new building;
- (b) a statement showing the purposes for which—
  - (i) the building has been used; and
  - (ii) the building is proposed to be used;
- (c) a certificate pursuant to section 184 of the *Health Act 1928* where the building is to be removed from any place outside the municipal district.

**505. Requirement for Computations.**—Where these Regulations provide for the submission of computations to the Surveyor, such computations shall show the total load acting on each structural member, the resulting forces and moments, and the structural dimensions of the member determined therefrom.



**506. Additional Information for Reinforced Concrete or Structural Steel Members or Timber Roof Trusses.**—Where the structural members of any building proposed to be constructed are wholly or partly of reinforced concrete or structural steel or where any roof truss is framed wholly or partly in timber, there shall be submitted with the application to construct such building—

- (a) a complete set of structural drawings of such members and/or trusses including where appropriate, footing plan and all floor and roof plans showing clearly the position of each structural member;
- (b) drawings showing typical details of all types of such structural members and/or trusses and complete schedules setting out all necessary data for each member of the structure together with the grade of concrete to be used in the construction;
- (c) a detailed copy of calculations showing the forces and/or moments on each such member and/or truss and the dimensions of the member adopted, provided that where the height of the structure does not exceed four times its average width, the calculation for wind pressure forces and moments on the columns, floor beams, girders, and slabs need not be submitted.

**507. Examination and Approval of Plans.**—(a) Such plans, specification, and additional information shall be examined by the Surveyor and, if:

- (i) the building therein referred to will, if constructed in accordance with such plans, specification, and information, comply with the provisions of these Regulations and of all Acts, By-laws, or other Regulations administered by the council and applying on the date of lodging thereof;
- (ii) such plans, specification, and information otherwise conform to the requirements of these Regulations; and
- (iii) the fee prescribed in the preceding chapter as payable in respect of the permit for which application is made has been paid to the council;

the council or its proper officer shall within 28 days after the date of lodging such plans, specification, and information, grant to the applicant a written permit for the carrying out of the work referred to in such plans, specification, and information.

(b) If the application for a permit be not granted, the council may in its discretion refund the whole or portion of the fee paid therefor.

**508. Lapsing and Cancellation of Permit.**—(a) Every permit issued pursuant to these Regulations shall, unless extended by the Council, lapse at the expiration of twelve months from the date of issue of such permit if the work for which the permit was granted has not been commenced.

(b) Where the work has been commenced but has not been continued to the satisfaction of the council the council may, at any time not less than twelve months after the date of issue of the permit and after due notice to the holder thereof, cancel such permit.

(c) When any permit has lapsed or has been cancelled, as provided in this clause, such permit shall thereafter be null and void.

**509. Submission of Preliminary Plans.**—Notwithstanding anything contained in this chapter, any person having paid the fee prescribed in item (j) of Table 401 may submit to the Surveyor preliminary plans and specification of any building proposed to be constructed, accompanied by the written consent of the owner of the site of the proposed building to the lodging of such plans and specifications, for examination and report as to whether such proposed construction is capable of being executed in conformity with these Regulations.

**510. Copy of Plans to be Lodged.**—One complete copy of all plans, specification, and information shall be retained by the Surveyor for permanent record, but the owner or mortgagee of the building or any person authorized in writing by such owner or mortgagee shall be entitled to inspect same during office hours or to obtain a copy of the plans on written application to the Surveyor and on payment of a fee covering the cost of the council of supplying such copy.

**511. Approved Plans, &c., Not to be Varied Without Consent.**—No variation from or alteration of approved plans and specification shall be made by the builder without the prior consent, in writing, of the Surveyor.

## CHAPTER 6.

## CLASSIFICATION OF BUILDINGS BY OCCUPANCY.

Clause 601.—Classification.

Clause 602.—Buildings Not Specifically Classified.

Clause 603.—Use Incidental to any Occupancy.

## CHAPTER 6.

## CLASSIFICATION OF BUILDINGS BY OCCUPANCY.

601. **Classification.**—For the purposes of these Regulations, buildings shall be divided into the following classes according to the nature of the use or occupancy:—

- (a) **Class I.—Houses.**—A house means any building used or intended, adapted, or designed for use as a separate dwelling, but does not include a flat.
- (b) **Class II.—Flats.**—A flat includes a semi-detached dwelling and each dwelling unit of a dual house.
- (c) **Class III.—Residential Buildings.**—A residential building means any building or portion of a building, not being a building of Class I., II., or IV. Occupancy, used or intended, adapted, or designed to be used for human habitation, and includes apartment house, boarding house, hostel, lodging house, residential club, residential hotel, and residential portion of premises licensed under the provisions of the *Licensing Act 1928*.
- (d) **Class IV.—Dwellings Attached to Buildings of Other Classes.**—A dwelling attached to a building of another class means that portion of a combined shop and dwelling, office and dwelling, warehouse and dwelling, or factory and dwelling designed as a residence for the occupiers of such shop, office, warehouse, or factory, and includes also that portion of any building designed as a residence for the caretaker of such building.
- (e) **Class V.—Office Buildings.**—Office building means any building or portion of a building used for professional or commercial purposes other than as a shop, warehouse, or factory, and includes a bank, broadcasting studio, office, professional chambers, stock exchange, and the office section or sections in buildings of all classes of occupancy.
- (f) **Class VI.—Shops.**—Shop means any building or portion of a building required by the provisions of the *Factories and Shops Act 1928* to be registered as a shop, and also any cafe, emporium, hotel bar, market, restaurant, sale room, and service station.
- (g) **Class VII.—Warehouses.**—A warehouse means any building or portion of a building used or intended to be used for bulk storage and/or the display or sale of goods, and not required by the provisions of the *Factories and Shops Act 1928* to be registered as a shop or factory, and includes a fire station, public garage (other than a garage used solely for repair), hangar, showroom, and storage building.
- (h) **Class VIII.—Factories.**—Factory means any building or portion of a building required by the provisions of the *Factories and Shops Act 1928* to be registered as a factory.
- (i) **Class IX.—Public Buildings.**—Public building means—
  - (i) any assembly building which is a public building within the meaning of the *Health Act 1928*, and includes an amphitheatre, cinematograph hall, amusement park, aquarium, art gallery, assembly hall, auditorium, baths (public), church, club (non-residential), circus building, coaching college, concert hall, conservatorium, dance hall, exhibition hall, grandstand, gymnasium, library, masonic temple, meeting house, recreation club pavilion, skating rink, school, stadium, and theatre; and
  - (ii) any institutional building, including a benevolent home, convalescent home, hospital, nursery, nursing home, orphanage, and sanatorium.
- (j) **Class X.—Outbuildings.**

602. **Buildings Not Specifically Classified.**—A building or portion of a building which is not included in any of the foregoing classes shall for the purposes of these Regulations be classified by the Surveyor as belonging to that class of occupancy which it most nearly resembles.

603. **Use Incidental to any Occupancy.**—Where a relatively small portion of a building is used for a purpose other than a purpose endorsed on the Certificate of Occupancy, but merely incidental to the class or classes of occupancy endorsed on the Certificate of Occupancy, such portion may, if such use does not involve a material increase in hazard to the remainder of such building, be regarded as being of the same class of occupancy as the occupancy to which such use is incidental.

## CHAPTER 7.

### TYPES OF CONSTRUCTION.

Clause 701.—Types of Construction.

Clause 702.—Fire Resistance Rating.

Clause 703.—Construction to Accord with Requirements for Specified Type.

Clause 704.—Buildings of Mixed Construction.

Clause 705.—Type 1—Framed Fire Resisting Construction.

Clause 706.—Type 2—Bearing Wall Protected Construction.

Clause 707.—Type 3—Partially Protected Construction.

Clause 708.—Type 4—Unprotected Metal Construction.

Clause 709.—Type 5—Wooden Construction.

### EXCEPTIONS.

Clause 710.—Roof Structures.

Clause 711.—Mezzanine Floors.

## CHAPTER 7.

### TYPES OF CONSTRUCTION.

701. **Types of Construction.**—For the purposes of these Regulations buildings shall be divided into the following types of construction based upon their resistance to fire:—

- (1) Framed Fire Resisting Construction.
- (2) Bearing Wall Protected Construction.
- (3) Partially Protected Construction.
- (4) Unprotected Metal Construction.
- (5) Wooden Construction.

702. **Fire Resistance Rating.**—Type 1 shall be deemed to be the most fire resistive and Type 5 the least fire resistive type of construction.

703. **Construction to Accord with Requirements for Specified Type.**—Where a building is required by these Regulations to be of any given type of construction, it shall be constructed in accordance with the requirements specified below for that type.

704. **Buildings of Mixed Construction.**—A building may contain more than one type of construction but where two or more types of construction occur in the same building and are not separated by a complete fire separation conforming to the provisions of Chapter 29, the whole building shall be regarded as that one of such types of construction offering least resistance to fire provided that in every building containing more than one type of construction and in every building of Type III. Construction:

- (a) the support to any wall shall have a fire resistance rating throughout at least equal to the fire resistance rating of such wall;

- (b) the support to any floor or roof having a fire resistance rating for all its members shall have a fire resistance at least equal to the fire resistance rating of such floor or roof;
- (c) the support to any wall, floor or roof referred to in sub-clauses (a) and (b) hereof shall mean the direct support and shall not include any lateral member of a floor system connected to such wall, floor or roof.

**705. Type 1—Framed Fire Resisting Construction.**—Framed fire resisting construction means that type of construction in which the imposed loads are carried on columns and beams or on reinforced concrete walls where same are used for shaft enclosures around stairs or lifts or other vertical openings and in which structural members are of incombustible materials having an ultimate fire resistance of not less than, in the case of—

columns (including reinforced concrete walls acting as columns), internal structural members which carry walls and fire and party walls .. .. .	4 hours
exterior panel walls, beams, girders, trusses, floors, and roofs (except as qualified in clause 2202) .. .. .	3 hours
non-bearing shaft enclosures around stairs, lifts, and other vertical openings .. .. .	3 hours

**706. Type 2—Bearing Wall Protected Construction.**—Bearing wall protected construction means that type of construction in which the walls are of masonry or reinforced concrete and structural members are of incombustible material, having an ultimate fire resistance of not less than, in the case of—

fire walls and party walls .. .. .	4 hours
bearing walls, piers, trusses other than roof trusses, and columns and girders supporting walls .. .. .	3 hours
panel walls, columns and girders not otherwise specified and shaft enclosures around stairs, lifts and other vertical openings .. .. .	2 hours
roofs trusses and roofs including beams and girders (except as qualified in clause 2202) .. .. .	2 hours
floors (including beams, girders and trusses) .. .. .	2 hours

**707. Type 3—Partially Protected Construction.**—Partially protected construction means that type of construction having external walls with a fire resistance rating of three hours and walls of lift wells with a fire resistance rating of two hours, constructed of masonry, concrete, reinforced concrete, structural steel encased in concrete, or other hard and incombustible material, and in which the interior framing and construction are partly or wholly of wood or unprotected iron or steel or of reinforced concrete supported on unprotected steel.

**708. Type 4—Unprotected Metal Construction.**—Unprotected metal construction means that type of construction in which the imposed loads are carried on an unprotected metal frame and in which the exterior walls and roof are of sheet metal or other incombustible substances.

**709. Type 5—Wooden Construction.**—Wooden construction means that type of construction in which structural parts and materials are of wood or are dependent upon a wooden frame for support, including construction having an incombustible exterior veneer.

#### Exceptions.

**710. Roof Structures.**—Structures not exceeding 10 feet either in length or in width and not exceeding 8 feet in height and intended for the protection of ventilating machinery or for like purposes, may be erected above the level of the roof of a building of Type 1, 2, or 3 Construction with external walls constructed in accordance with the provisions of clause 2009 and with a roof of impervious material.

**711. Mezzanine Floors.**—Mezzanine floors may be of timber on unprotected steel supports or of unprotected steel or iron as provided in clause 2106 (c).

## CHAPTER 8.

## SITE REQUIREMENTS.

Clause 801.—Interpretations.

Clause 802.—Minimum Area to be Preserved.

## Part I.—Buildings of Classes I. and II. Occupancy.

Clause 803.—Size of Site.

Clause 804.—Distance from Street Alignment.

Clause 805.—Corner Sites.

Clause 806.—Distance from Boundaries other than Street Alignments.

Clause 807.—Maximum Area to be Occupied by Buildings.

## Part II.—All other Buildings.

Clause 808.—In Residential Districts.

Clause 809.—Not in Residential Districts.

## Class IV.—Occupancy.—Dwellings attached to Buildings of other Classes.

Clause 810.—Open Space.

Clause 811.—Rear Access.

## Buildings of Class IX. Occupancy.

Clause 812.—Public Buildings.

## Part III.—Powers conferred on Council.

- Clause 813 (a) To prescribe brick areas.  
 (b) To fix limit of two storeys.  
 (c) To fix limit of three storeys.  
 (d) To require larger sites.  
 (e) To fix greater distance from street alignment.  
 (f) To permit construction on smaller sites.  
 (g) To vary requirements for flats in business areas.  
 (h) To dispense with rear access in existing subdivisions.

## CHAPTER 8.

## SITE REQUIREMENTS.

801. Interpretations.—For the purposes of this Chapter—

- (a) **Frontage to Corner Sites.**—Where a corner of an allotment at the junction or intersection of any streets has been rounded or angled off to facilitate traffic—  
 (i) the width of the frontage shall be measured from a point at the intersection of the prolongations of the side and front boundaries of the allotment;  
 (ii) the area shall be calculated as if the land thereby excised were portion of the allotment.
- (b) **Measurement of Distance from Boundary.**—Wherever a minimum distance is provided for, such distance shall be measured horizontally from the boundary to the outermost projection from the exterior wall except that where a chimney back not more than 5 ft. 6 in. in width or an eave so projects, the extent of the projection shall be deemed to be the horizontal distance by which it exceeds 18 inches in the case of eaves and 14 inches in the case of such chimney backs.

802. **Minimum Area to be Preserved.**—No allotment of land upon which any building has been constructed shall be reduced in area below the minimum prescribed by these Regulations or by the council in pursuance of powers conferred by Part 3 of this Chapter for a building of similar class or type.

**Part I.—Buildings of Classes I. and II. Occupancy.**

803. **Size of Site.**—No person shall construct a building of Class I. or II. Occupancy on any land having an area, depth, or width or frontage less than that specified for the particular class or type in Column I. of Table 803 of these Regulations, or in the column adopted by the council of any municipality pursuant to Part III. of this Chapter as applicable in respect of that portion of the municipal district in which such land is situated, except that in the case of a site not rectangular in shape, the width of frontage may be reduced by not more than 25 per cent., provided the site shall be capable of containing within its boundaries a rectangle having an area equal to three-fifths of the minimum area specified in the appropriate column of Table 803 and having a minimum dimension not less than the minimum frontage specified in that column.

TABLE 803.—SITE REQUIREMENTS FOR BUILDINGS OF CLASSES I. AND II. OCCUPANCY.

*Minimum Dimensions.*

Class of Occupancy.	Column 1.	Column 2.	Column 3.	Column 4.	Column 5.
<i>Class I.—Houses.</i>					
Min. area of site ..	3,300 sq. ft.	4,800 sq. ft.	6,300 sq. ft.	7,800 sq. ft.	9,300 sq. ft.
Min. width of frontage ..	33 ft.	40 ft.	50 ft.	55 ft.	60 ft.
Min. depth ..	60 ft.	70 ft.	80 ft.	90 ft.	100 ft.
<i>Class II.—Two Flats.</i>					
<i>(a) Det. House.</i>					
Min. area of site ..	5,200 sq. ft.	7,200 sq. ft.	9,200 sq. ft.	11,200 sq. ft.	13,200 sq. ft.
Min. width of frontage ..	45 ft.	60 ft.	70 ft.	75 ft.	80 ft.
Min. depth ..	70 ft.	80 ft.	90 ft.	90 ft.	100 ft.
<i>(b) Semi-detached Dwelling.</i>					
Min. area of site ..	6,000 sq. ft.	7,200 sq. ft.	9,200 sq. ft.	11,200 sq. ft.	13,200 sq. ft.
Min. width of frontage ..	60 ft.	60 ft.	70 ft.	75 ft.	80 ft.
Min. depth ..	70 ft.	80 ft.	90 ft.	90 ft.	100 ft.
<i>Three Flats.</i>					
Min. area of site ..	6,000 sq. ft.	9,000 sq. ft.	11,400 sq. ft.	13,800 sq. ft.	16,200 sq. ft.
Min. width of frontage ..	60 ft.	70 ft.	80 ft.	85 ft.	90 ft.
Min. depth ..	80 ft.	90 ft.	100 ft.	100 ft.	100 ft.
<i>Four Flats.</i>					
Min. area of site ..	7,700 sq. ft.	10,400 sq. ft.	13,000 sq. ft.	15,600 sq. ft.	18,500 sq. ft.
Min. width of frontage ..	60 ft.	70 ft.	80 ft.	85 ft.	90 ft.
Min. depth ..	80 ft.	90 ft.	100 ft.	100 ft.	100 ft.
<i>More than Four Flats.</i>					
Min. area of site ..	As specified for 4 flats plus an additional 800 sq. ft. for each flat in excess of four.				
Min. width of frontage ..	As for four flats.				
Min. depth ..	As for four flats.				

**MINIMUM DISTANCE OF OUTER WALLS FROM BOUNDARIES.**

From street alignment ..	10 ft.	15 ft.	15 ft.	15 ft.	15 ft.
From boundaries other than street alignment:					
(a) for 35 ft. of length of wall—					
1 storey building ..	4 ft.	4 ft.	4 ft.	6 ft.	6 ft.
2 storey building ..	6 ft.	6 ft.	6 ft.	8 ft.	8 ft.
(b) for each additional length of 15 ft. or part thereof	Minimum distance in (a) to be increased by 2 feet.				
(c) 3 or more storey building	Ground and first storeys as for two storey building. Storeys above first storey to be within a line drawn from a point on the boundary at the level of the lowest window sill of the building and forming an angle of 70° with the horizontal.				

804. **Distance from Street Alignment.**—No person shall construct any building of Class I. or II. Occupancy closer to the street alignment of any land than the minimum distance from street alignment specified in Column 1 of Table 803 or the column adopted by the council pursuant to Part III. of this Chapter as applicable in respect of that portion of the municipal district in which such land is situated, or closer than 35 feet to the centre line of the street to which such land has a frontage.

805. **Corner Sites.**—Where a site has a frontage to two streets, the provisions of the preceding clause shall apply to one street frontage only, but the distance of the building from the frontage to the second street (not being a lane or right-of-way) shall be not less than one and a half times the minimum distance from the side boundaries provided in the next succeeding clause, but shall not in any case be less than 8 feet.

806. **Distance from Boundaries other than Street Alignments.**—No building of Class I. or II. Occupancy shall be constructed with any wall of any storey at less distance from a boundary of the site other than a street boundary than that specified in Column 1 of Table 803 or in the column adopted by the council pursuant to Part III. of this Chapter as applicable in respect of that portion of the municipal district in which such site is situated.

807. **Maximum Area to be Occupied by Buildings.**—No building of Class I. or II. Occupancy, and no building appurtenant thereto, shall be hereafter constructed in such a way that it shall occupy more than 50 per cent. of the total area of the site of such building. The area occupied by the building shall include the areas occupied by all outbuildings but not unroofed terraces.

#### Part II.—All other Buildings.

808. **In Residential Districts.**—Every building of Class III., IV., V., VI., VII., VIII., or IX. Occupancy which is constructed adjacent to buildings of Class I. or II. Occupancy or in any area which, in the opinion of the Council, is used or intended primarily for residential purposes shall conform to the requirements of Part I. of this Chapter applicable to a building of Class I. Occupancy, except that the minimum distance from boundaries other than street alignments required by Clause 806 for a one-storey building shall be increased by 6 inches for every foot by which the height of walls exceeds 12 feet.

809. **Not in Residential Districts.**—Every building of Class III., IV., V., VI., VII., VIII., or IX. Occupancy not being a building constructed adjacent to buildings of Class I. or Class II. Occupancy or in an area which, in the opinion of the Council, is used or intended primarily for residential purposes as provided in Clause 808, shall be constructed on land having an area of not less than 2,000 square feet, a width of frontage of not less than 16 feet, and a depth of not less than 80 feet, provided that the provisions of this clause and of the last preceding clause shall not be interpreted so as to authorize the construction of buildings of Class III., IV., V., VI., VII., VIII., or IX. Occupancy in areas in which such buildings could not, apart from the said clauses, have been constructed.

#### Class IV.—Occupancy—Dwellings attached to Buildings of other Classes.

810. **Open Space.**—Every building of Class IV. Occupancy shall have connected therewith for the use of the occupants of such building a space open to the air and without roof. Such open space—

- (a) shall be of an area of not less than 450 square feet;
- (b) may be provided in the form of a flat roof at a level higher than that of the floor of the ground storey; and
- (c) shall be of dimensions of not less than 10 feet in any direction.

811. **Rear Access.**—Every building of Class IV. Occupancy with the exception of a residence for a caretaker of a building of Class V., VII., VIII. or IX. Occupancy shall have direct access from the rear of such building to a street not less than 10 feet in width.

#### Buildings of Class IX. Occupancy.

812. **Public Buildings.**—The site and location of every public assembly or institutional building shall conform to the requirements of the regulations made under the Health Acts.

**Part III.—Powers conferred on Council.**

813. The council of any municipality shall have power to make by-laws:

- (a) **Brick Areas.**—Prescribing brick areas in which no person shall construct or cause to be constructed any building the external walls of which are of material other than brick, stone, or concrete, provided that for the purposes of this sub-clause buildings of brick veneer construction conforming to the requirements of Chapter 26 shall be deemed to have external walls of brick.
- (b) **Limit of Two Storeys.**—Prescribing areas in which buildings of Classes II. and III. Occupancy shall not be constructed to contain more than two storeys including the ground storey.
- (c) **Limit of Three Storeys.**—Prescribing areas in which buildings of Classes II. and III. Occupancy shall not be constructed to contain more than three storeys including the ground storey.
- (d) **Larger Sites.**—Adopting the minimum area, depth, and width of frontage specified in Column 2, 3, 4, or 5 of Table 803 as the minimum area, depth, and width of frontage of land on which a building shall be constructed throughout the whole or in any portion of the municipal district.
- (e) **Greater Distance from Street Alignment.**—Specifying a minimum distance of the outer walls of any building from street alignment in excess of that provided in Column 1 of Table 803 or any column adopted by the council pursuant to the preceding sub-clause.
- (f) **Sites below Minimum Requirements.**—Subject to the regulations made pursuant to Section 17 of the Slum Reclamation and Housing Act, permitting:
  - (i) the construction of a building of Class I. Occupancy on land having a lesser area, depth or width of frontage or at a lesser distance from boundaries than those specified in Column 1 of Table 803 or in the Column adopted by the Council pursuant to sub-clause (d) or in Clause 805, or
  - (ii) the construction of a building of Class III., V., VI., VII., or VIII. Occupancy or a building to which a building of Class IV. Occupancy is attached on land having an area, depth or width of frontage less than that prescribed in Clause 809;
 

in any case where on the date of commencement of these regulations, such land existed as a separate allotment, and had not since been reduced in area or was shown on any plan of subdivision approved by the Council and lodged in the Office of Titles.
- (g) **Flats in Business Areas.**—Dispensing with the requirements of Clause 803 of these Regulations in the case of a building containing flats (Class II. Occupancy) or with the requirements of Clauses 803 and 807 where such flats have only one habitable room provided that:
  - (i) the site of such building shall have an area of not less than 3,300 square feet, a width of frontage of not less than 33 feet, and a depth not less than 80 feet;
  - (ii) the power conferred by this sub-clause may be exercised only in the case of a building constructed in an area used primarily for business purposes; and
  - (iii) the requirements of Part III. of Chapter 11 shall be observed in the construction of such building;
- (h) **Rear Access in Existing Subdivision.**—Dispensing with the requirements of Clause 811 in the case of a building on any land forming part of a subdivision approved by the Council and lodged in the Office of Titles prior to the date of commencement of these Regulations.



CHAPTER 9.  
BUILDING HEIGHT RESTRICTIONS.

- Clause 901.—Maximum Building Height.  
Clause 902.—Width of Street.  
Clause 903.—Height of Type 1 and Type 2 Construction.  
Clause 904.—Decorative Features, &c.  
Clause 905.—Height of other Types of Construction.  
Clause 906.—Consent of Council.  
Clause 907.—Power to Restrict Erection of Buildings of Non-fire-resisting Construction.

CHAPTER 9.  
BUILDING HEIGHT RESTRICTIONS.

901. **Maximum Building Height.**—The maximum building height in respect of any allotment of land shall be a horizontal plane at a height above the permanent footpath level at the centre of the frontage of the allotment equal to one and one-third times the width of the street to which the allotment has a frontage, provided that—

- (a) **Frontage to Two Streets of Equal Width.**—The maximum building height in respect of an allotment having frontage to two streets equal in width shall be measured from a level midway between the permanent footpath level at the centre of each of the two frontages.
- (b) **Frontages to Two Streets of Differing Width.**—The maximum building height in respect of an allotment having frontages to two streets differing in width shall be determined by the wider street for a depth of 160 feet from such wider street, and by the narrower street for any balance of the depth from such wider street.
- (c) **Narrow Streets.**—The maximum building height in respect of any allotment having a frontage to a street less than 25 feet in width shall not be determined or affected by such frontage if the allotment has a frontage to any other street 25 feet or more in width;
- (d) The amount by which the width of any street exceeds 99 feet shall not be taken into account in computing the maximum building height;

902. **Width of Street.**—The width of a street shall be determined by measuring at right angles from the building-line at the centre of the frontage of the site to the opposite building-line of the street as defined by the Surveyor.

903. **Height of Type 1 and Type 2 Construction—**

- (a) **Framed Fire Resisting Construction.**—Except as provided in clause 904 hereof, no part of any building of Type 1 Construction shall without the consent of the Council be at a greater height than the maximum building height determined pursuant to clause 901.
- (b) **Bearing Wall Protected Construction.**—Except as provided in clause 904 hereof, no part of any building of Type 2 Construction shall without the consent of the Council be at a greater height than four-fifths the maximum building height determined pursuant to clause 901.
- (c) **Mixed Construction.**—The maximum height of a building containing more than one type of construction shall be the maximum height specified for the lowest of such types.

904. **Decorative Features, &c.**—Notwithstanding anything contained above, housing for mechanical equipment, parapets not more than 3ft. 6 in. in height, wireless masts and towers, and decorative features may with the approval of the Council be constructed above the maximum building height, provided that—

- (a) no accommodation of any nature whatsoever shall at any time be provided therein;
- (b) no advertisement, sign, or lettering shall at any time be provided thereon;
- (c) no part interferes with the angle of light required to any window in the building;
- (d) except in the case of a parapet, not more than 25 per cent. of the width of frontage or 30 feet (whichever is the lesser) is occupied thereby.

905. **Height of the other Types of Construction.**—(a) Subject to the provisions of clause 2602, buildings of Type 3, 4, or 5 Construction shall not, without the consent of the Council, be erected to contain a greater number of storeys than that set out in Table 905, nor to a greater height than three-fifths of the maximum building height determined pursuant to Clause 901.

TABLE 905.

Type of Construction.	Class of Occupancy.	Maximum Number of Storeys.
Type 3 (partially protected) ..	I., II.	3
	III., IV., V., VI., VII., VIII., IX. (Assembly only)	2
Type 4 (unprotected metal) ..	IX. Institutional only (where approved by Health Commission)	2
	VIII. (where approved by Chief Inspector of Factories and the Surveyor)	2
Type 5 (Wooden) ..	All other buildings ..	1
	I.	2
	VIII. (where approved by Chief Inspector of Factories and the Surveyor)	2
	All other buildings ..	1

(b) A building of Class IV. Occupancy shall not be constructed above the first floor in any building of Type 3 Construction.

906. **Consent of Council.**—Consent to the construction of any building to a greater height than that provided by Clauses 903 and 905 shall not be given by the council of any municipality unless at the date of commencement of these regulations the erection of such building to such greater height was permissible pursuant to a by-law of the said council then in force.

907. **Power to Restrict Erection of Buildings of Non-fire-resisting Construction.**—Notwithstanding anything contained elsewhere in these Regulations, the council of any municipality may make a by-law requiring that in any specified portion of the municipal district any building exceeding one storey in height shall be of Type 1 or Type 2 Construction, and any building containing only one storey shall be of Type 3 or of a more fire-resistive type of construction.

[References.—

(a) Special Class Requirements—see Chapter 31.

(b) For buildings of Classes II. and III., see also clause 813 (b) and (c).]

CHAPTER 10.

ROOM SIZES AND HEIGHTS.

Clause 1001.—Minimum Number of Rooms.

Clause 1002.—Minimum Size of Habitable Room.

Clause 1003.—Minimum Height of Rooms in Class I., II., III., or IV. Occupancy.

Clause 1004.—Minimum Height of Rooms in Office Buildings.

Clause 1005.—Minimum Height of Rooms in Shops.

Clause 1006.—Minimum Height of Rooms in Factories.

Clause 1007.—Public Buildings.

Clause 1008.—Projections and False Ceilings.

CHAPTER 10.

ROOM SIZES AND HEIGHTS.

1001. **Minimum Number of Rooms.**—In every building of Class I. II. or IV. Occupancy every dwelling shall have at least two rooms each having an area of not less than 140 square feet, except that:

(a) where a flat (Class II. Occupancy) contains only two habitable rooms only one room shall be required to have an area of not less than 140 square feet;

(b) a flat (Class II. Occupancy) may contain only one habitable room, provided such room shall have an area of not less than 180 square feet.

**1002. Minimum Size of Habitable Room.—**

- (a) In every building the minimum floor area of every room intended for habitation shall be 110 square feet provided that:
- (i) in a building of Class III. Occupancy the minimum floor area of every such room shall be 80 square feet;
  - (ii) in a building of Class I., II., or IV. Occupancy which already contains five habitable rooms of which two have a floor area of not less than 140 square feet and three have an area of not less than 110 square feet, the minimum floor area of any additional room intended for habitation shall be 80 square feet.
- (b) The least horizontal dimension of every habitable room shall be 8 feet in a building of Class I., II., or IV. Occupancy and 7 feet in a building of Class III. Occupancy.

**1003. Minimum Height of Rooms in Class I., II., III., or IV. Occupancy.—**In buildings of Class I. II. III., or IV. Occupancy the height of rooms measured from floor to ceiling shall be in every part not less than 9 feet in rooms on the ground storey and not less than 8 ft. 6 in. in rooms above the ground storey except that in the case of a habitable room built wholly or partly in the roof, the height from floor to ceiling or if there be no ceiling to the underside of the rafters, shall be not less than 8 ft. 6 in. for at least one-half of the area of such room and the walls of such room shall in no part be less than 5 ft. 6 in. measured vertically.

**1004. Minimum Height of Rooms in Office Buildings.—**In buildings of Class V. Occupancy, the height measured from floor to ceiling shall be in every part not less than 9 feet.

**1005. Minimum Height of Rooms in Shops.—**The height, or where the ceiling is pitched or sloping the average height, from floor to ceiling in every room hereafter constructed in a building of Class VI. Occupancy shall be not less than 10 feet in the case of a room the floor area of which does not exceed 300 square feet and not less than 11 feet in the case of a room the floor area of which exceeds 300 square feet, provided that where the ceiling is pitched or sloping the actual height in any part shall be not less than 9 feet.

**1006. Minimum Height of Rooms in Factories.—**The height, or where the ceiling is pitched or sloping the average height, from floor to ceiling or if there be no ceiling to the underside of the rafters in every room hereafter constructed in a building of Class VIII. Occupancy shall be not less than 9 feet, provided that—

- (a) Where the ceiling is pitched or sloping the actual height in any part shall be not less than 8 feet;
- (b) In buildings used as bakehouses or as butchers' smallgoods houses, or for ham and bacon curing, fish curing, meat preserving, jam making, fruit preserving, dairy produce manufacturing, and similar trades, the height shall be not less than 12 feet; and
- (c) the Council may, on the recommendation of the Chief Inspector of Factories, in any particular case fix a greater height than 9 feet where the circumstances so warrant.

**1007. Public Buildings.—**The size and height of rooms, passages, and corridors in public assembly and institutional buildings shall conform to the requirements of regulations made under the Health Acts.

**1008. Projections and False Ceilings.—**Notwithstanding anything contained above, in buildings of Class II., III., IV., V., VII., or VIII. Occupancy—

- (a) beams, service pipes, or ducts may project below the minimum height prescribed, provided that the area in plan of such projections does not exceed 20 per cent. of the floor area of the room; and
- (b) false ceilings may be constructed at a height of 7 feet in lavatory blocks, and at a height of 7 ft. 6 in. in corridors, passages, and recesses.

CHAPTER 11.  
LIGHT AND VENTILATION.

Part I.

Classes I., II., III., and IV. Occupancies.

Clause 1101.—Habitable Rooms, Laundries, and Kitchens.

Clause 1102.—Common Dining Rooms.

Class V. Occupancy.—Office Buildings.

Clause 1103.—General Requirements.

Class VI. Occupancy.—Shops.

Clause 1104.—General Requirements.

Clause 1105.—Hotel Bars.

Clause 1106.—Cafes and Dining Rooms.

Clause 1107.—Kitchens.

Class VII. Occupancy.—Warehouses.

Clause 1108.—General Requirements.

Class VIII. Occupancy.—Factories.

Clause 1109.—General Requirements.

Clause 1110.—Controllable Ventilation.

Clause 1111.—Special Requirements for Ventilation of Factories.

Clause 1112.—Inlet Ventilators.

Clause 1113.—Outlet Ventilators.

Clause 1114.—Airway of Ventilators.

Clause 1115.—Construction of Ventilators.

Class IX. Occupancy.

Clause 1116.—Public Buildings.

All Classes of Occupancy.

Clause 1117.—Lighting of Corridors.

Clause 1118.—Lighting and Ventilation of Basements.

Clause 1119.—Exceptions.

Clause 1120.—Provision of Airlocks for Water Closets and Urinal Apartments.

Clause 1121.—Lighting and Ventilation of Airlocks.

Clause 1122.—Lighting and Ventilation of Water Closets, &c.

Clause 1123.—Alternative Ventilation of Airlocks, Water Closets, &c.

Clause 1124.—Mechanical Ventilation.

Clause 1125.—Ventilating Shafts.

Clause 1126.—Internal Urinals and Slop Sinks.

Clause 1127.—Water Closets, Urinals, and Slop Sinks in Existing Buildings.

Clause 1128.—Bathrooms.

Clause 1129.—Shower Recesses.

Clause 1130.—Recess from Bedroom or Bathroom.

Part II.—General Provisions for Lighting and Ventilation.

Clause 1131.—Artificial Lighting.

Clause 1132.—Minimum Value of Illumination.

Clause 1133.—Quality of Artificial Illumination.

Clause 1134.—Mechanical Ventilation.

Clause 1135.—Discharge of Foul Air.

Clause 1136.—Air Disconnection of Water Closets, &c., from Habitable Rooms or Workrooms.

Clause 1137.—Lighting and Ventilation in Exceptional Cases.

**Part III.—Light Courts.**

- Clause 1138.—Definitions.  
 Clause 1139.—Angles of Light.  
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 Clause 1142.—Courts Serving Lavatories and Sanitary Conveniences.  
 Clause 1143.—Ventilation of Light Courts.  
 Clause 1144.—Partitioning of Rooms.  
 Clause 1145.—Erections in Light Courts.

**CHAPTER 11.****LIGHT AND VENTILATION.****Part I.****Classes I, II, III, and IV. Occupancies.**

1101. **Habitable Rooms, Laundries, and Kitchens.**—In every building of Class I, II, III, or IV. Occupancy hereafter constructed—

- (a) Every habitable room and every laundry shall—
- (i) have one or more windows opening directly into the external air with superficial area clear of sash frames and free from any obstruction to the light equal to at least 12 square feet or one-eighth of the floor area of the room (whichever is the greater), and so constructed that a portion equal to at least one-sixteenth of the floor area is openable. Such opening shall extend to at least 7 feet above the floor level;
  - (ii) in addition to the ventilation afforded by a window or door, be provided with registers, vents, cowls, or ducts fixed near the ceiling, having an effective airway clear of all obstructions of not less than 12 square inches for each 100 square feet, or part thereof, of floor area;
- (b) Every kitchen shall be provided with light and ventilation as specified in sub-clause (a) for habitable rooms, except that kitchens in buildings of Class III. Occupancy may, in lieu thereof, be provided with artificial lighting; and with
- (i) an approved mechanically-operated exhaust fan connected to a ventilating shaft conforming to the requirements of clause 1125; or
  - (ii) a system of mechanical ventilation giving not less than six complete changes of air per hour.

1102. **Common Dining Rooms.**—Notwithstanding the provisions of clause 1101—

- (a) common dining rooms in buildings of Class II. or Class III. Occupancy may be lighted by means of roof or ceiling lights having a total superficial area free from all obstructions to the light of not less than one-twelfth of the floor area, or by artificial lighting subject to the provision of an approved system of natural ventilation, or of a system of mechanical ventilation, giving not less than four complete changes of air per hour;
- (b) where a building of Class III. Occupancy is constructed in an area which, in the opinion of the Council, is not used primarily for residential purposes, public or common rooms on the ground and first storeys may, in lieu of natural light and ventilation, be provided with artificial lighting and an approved system of natural or mechanical ventilation.

**Class V. Occupancy.—Office Buildings.**

1103. **General Requirements.**—Every room hereafter constructed in a building of Class V. Occupancy shall be provided with light and ventilation as prescribed in clause 1101, except that—

- (a) the superficial area of the window or windows may be not less than one-tenth of the floor area, and the openable portion not less than one-twentieth of the floor area of the room;
- (b) where any part of the floor area is distant from the nearest window more than twice the height of the head of the window above the floor, every such part shall be lighted by means of roof or ceiling lights conforming to the requirements of sub-clause (c) (i), or by artificial lighting;
- (c) any such room may be—
  - (i) lighted by means of roof or ceiling lights having a total superficial area free from all obstructions to the light of not less than one-twelfth the floor area, subject to the provision of a system of mechanical ventilation conforming to the requirements of the following paragraph or of an approved system of natural ventilation at least as effective as that required by Clause 1101;
  - (ii) ventilated by means of a system of mechanical ventilation giving not less than four complete changes of air per hour.

**Class VI. Occupancy.—Shops.**

1104. **General Requirements.**—In every building of Class VI. Occupancy hereafter constructed, other than hotel bars, cafes, dining rooms, and kitchens, every room shall be provided with—

- (a) (i) natural light as specified in clause 1103 (a); or
- (ii) a system of artificial lighting; and
- (b) (i) registers, vents, cowls, or ducts fixed either in the ceiling or near the ceiling at each end of the room and carried through directly to the external air, having an effective airway of not less than 1 square inch for every 2 square feet of floor area; or
- (ii) a system of mechanical ventilation giving not less than four complete changes of air per hour.

1105. **Hotel Bars.**—Every bar of a licensed hotel shall be provided with—

- (a) (i) natural light and ventilation as specified in clause 1101 (a), except that the registers, vents, cowls, or ducts required by paragraph (ii) thereof shall be fixed in the ceiling and carried through and above the roof; or
- (b) (i) either natural light as prescribed in clause 1101 (a) (i) or artificial lighting; and
- (ii) a system of mechanical ventilation giving not less than eight complete changes of air per hour.

1106. **Cafes and Dining Rooms.**—Every cafe and/or dining room in a building of Class VI. Occupancy shall be provided with—

- (a) (i) one or more openable windows or roof or ceiling lights opening directly into the external air with a total superficial area clear of sash frames and free from any obstructions to the light equal to at least one-tenth of the floor area of the room in the case of windows and one-twelfth of the floor area in the case of roof or ceiling lights, except that any part of the floor distant from the nearest window more than twice the height of the head of the window above the floor shall be lighted by roof lights conforming to the requirements of this paragraph or by artificial lighting; or
- (ii) a system of artificial lighting; and
- (b) ventilation as specified in clause 1104 (b).

1107. **Kitchens.**—Every kitchen in a building of Class VI. Occupancy shall be provided with light and ventilation in accordance with the requirements of clause 1101 (b) for a kitchen in a building of Class III. Occupancy.

**Class VII. Occupancy.—Warehouses.**

1108. **General Requirements.**—(a) Every room used for the display or sale of goods shall be provided with light and ventilation as prescribed in clause 1104.

(b) Every room used for bulk storage only shall be adequately lighted and shall have fixed near the ceiling registers, vents, cowls, or ducts having an effective airway clear of all obstructions of not less than 12 square inches for each 100 square feet of floor area, except that natural ventilation may be dispensed with where a system of mechanical ventilation is installed of a capacity approved by the Surveyor having regard to the nature of the storage for which such room is intended.

**Class VIII. Occupancy.—Factories.**

1109. **General Requirements.**—Every room in a building of Class VIII. Occupancy shall be provided with—

(a) one or more windows or roof or ceiling lights opening directly into the external air with a superficial area clear of sash frames and free from any obstructions to the light equal to at least one-tenth of the floor area of the room except that where any part of the floor is distant from the nearest window more than twice the height of the head of the window above the floor every such part shall be lighted by means of roof lights conforming to the requirements of this paragraph or by artificial lighting; and

(b) either controllable ventilation conforming to the requirements of Clause 1110 and permanent ventilation conforming to the requirements of Clauses 1112 to 1115, or a system of mechanical ventilation giving not less than four complete changes of air per hour or such other number of changes of air per hour to meet the particular circumstances of an industry as the Chief Inspector of Factories and the Surveyor may require.

1110. **Controllable Ventilation.**—(a) In addition to the permanent ventilation openings required in the preceding clause, windows and/or doorways openable to the outside air shall be provided for ventilation to give a minimum area of unobstructed airway equal to at least one-twentieth of the floor area of the room and half of this required area shall, if practicable, be between floor level and 7 ft. 6 in. from the floor, with openings so distributed that there is a passage of air across all parts of the room;

(b) Where any workroom with windows on one wall or on two contiguous walls only is more than 30 feet wide, or where any workroom is more than 60 feet wide, a mechanical plenum ventilating system, fans, punkahs, or other means of inducing air movement shall be provided.

1111. **Special Requirements for Ventilation of Factories.**—Notwithstanding the provisions of clause 1109, every factory and every portion thereof hereafter constructed shall be so ventilated as to render harmless any gases, vapours, dust, or impurities generated in the course of the manufacturing process, and where the Chief Inspector of Factories so directs, a fan or a mechanical ventilating system or other approved means shall be installed to prevent the inhalation of such gases, vapours, dust, or impurities by any person working in such factory.

1112. **Inlet Ventilators.**—Inlet ventilators shall—

(a) consist of ducts, shafts, or hoppers opening slantingly upwards but otherwise as directly as possible into the room either through the external walls or through the windows in such walls;

(b) as far as practicable be evenly distributed along the external walls in such positions as to ensure a passage of air across all parts of the workroom;

- (c) have the upper edges of their external openings below the lower edges of the internal openings for the fully-open position of the latter; and
- (d) have the lower edges of the internal openings from 6 ft. 6 in. to 7 feet above the level of the floor of the room being ventilated.

1113. **Outlet of Ventilators.**—(a) Outlet ventilators shall consist of flues, shafts, or tubes distributed as evenly as practicable and extending vertically without avoidable bends or angles from the ceiling line through the roof to a height not lower than the level of the ridge unless with the special approval of the Surveyor.

(b) The lower portions of such flues, shafts, or tubes shall be formed as bell mouths gradually tapered upwards, each bell mouth presenting an opening having twice the area required at the outlet of the flue, shaft, or tube, except that—

- (i) in a building consisting of a ground floor only and in the uppermost storey of a building containing more than one storey, one-third of the total required area of the outlet opening may be provided by means of openings situated in the window heads not more than 18 inches below the ceiling or immediately below the wall plates and extending through the external walls and properly shielded outside, a space of not less than 2 inches being provided between the inner face of the shield and the nearest opposite surface;
- (ii) on each storey below the uppermost storey in a building containing more than one storey the outlets may be entirely provided by means of such openings immediately below the wall plates or in the window heads;
- (iii) in a building which is unceiled or in which the ceiling or roof lining is attached to the purlins or rafters and continued up to the apex of the roof, approved ridge ventilators may be substituted for flues, shafts, or tubes required by this clause.

1114. **Airway of Ventilators.**—The effective airway of every inlet and of every outlet ventilator shall be not less than 1 square inch for every 3 square feet of floor area, or in the case of buildings proposed to be used as bakehouses or for the manufacture of white lead, red lead, or litharge, or in which lead or compounds thereof are to be used for the manufacture or repair of electric accumulators, 2 square inches for every 3 square feet of floor area.

1115. **Construction of Ventilators.**—(a) All inlet or outlet ventilators and openings shall be so constructed as to be capable of being readily cleaned out and shall not communicate with any cavity or space in the thickness of the wall nor with the space between a ceiling and any floor or roof covering above such ceiling.

(b) Flues, ducts, shafts, tubes, or hoppers shall be constructed of sheet metal not thinner than No. 24 B.W.G. or other approved material, and shall be fitted with regulating valves and appliances for opening and closing them in varying degrees.

#### Class IX. Occupancy.

1116. **Public Buildings.**—Every public assembly or institutional building shall be provided with light and ventilation in accordance with the requirements of regulations made under the Health Acts.

#### All Classes of Occupancy.

1117. **Lighting of Corridors.**—All corridors, passageways, stairways, and landings shall be provided with natural or artificial lighting except that artificial lighting shall be provided in all corridors, passageways, stairways, and landings likely to be used at night.

1118. **Lighting and Ventilation of Basements.**—Every room below the level of the street shall be provided with natural light and ventilation as specified in clause 1101 (a), provided that—

- (a) in a building of Class I. or Class II. Occupancy the external wall of such room through which light and ventilation is received shall be wholly exposed to light and air;



- (b) in any other class of building where the requisite natural light and ventilation cannot be obtained in any such room a system of artificial lighting and a system of mechanical ventilation giving not less than six complete changes of air per hour shall be installed;
- (c) subject to the approval of the Surveyor, the requirements of this clause shall not apply to a room used solely for storage purposes.

1119. **Exceptions.**—The provisions of the foregoing clauses shall not apply to airlocks, water closets, urinal apartments, slop sinks, bathrooms, or shower recesses in any class of building, but such rooms shall be provided with light and ventilation as prescribed in clauses 1120 to 1130 hereof.

**1120. Provision of Airlocks for Water Closets and Urinal Apartments.**—

- (a) (i) Except as provided in sub-clause (b), no water closet or urinal apartment within a building shall open directly into any room used for human habitation or for the manufacture, preparation, or storage of food for human consumption, or as a factory, workshop, or work place; and
- (ii) in every case where otherwise such closet or urinal apartment would open directly into any such room, an airlock shall be provided having a floor area of not less than 15 square feet per closet pan or urinal and lighted and ventilated in accordance with clause 1121 or clause 1123.
- (b) The airlock may be omitted where the water closet or urinal apartment within any building—
  - (i) opens off a room normally occupied by not more than two persons and is intended solely for the use of such persons, provided that such room is not used for the manufacture, preparation, storage, or consumption of food, or as a factory, workshop, or work place;
  - (ii) is mechanically ventilated in accordance with the provisions of clause 1124.
- (c) In a building of Class I. or Class II. Occupancy, a hall, passage, lobby, or staircase, may be considered as an airlock, provided it has a floor area of not less than 20 square feet and is lighted and ventilated as required by clause 1121.

**1121. Lighting and Ventilation of Airlocks.**—(a) Every airlock shall be—

- (i) provided with a window on an external wall abutting on to a street or on to an open space within the premises having a width of not less than 4 feet and an area of not less than the following:—
  - For the first storey above floor level of the open space —36 square feet;
  - For the second storey above floor level of the open space —72 square feet;
  - For all other storeys above floor level of the open space —100 square feet;
 and such window shall have a clear light area of not less than one twentieth of the floor area or 2 square feet whichever is the greater; or
- (ii) separately lighted by electricity and provided with a switch within the airlock; and in either of such cases
- (iii) provided with a vent or vents near the ceiling level and carried as directly to the open air as is practicable, having an effective airway of not less than 12 square inches, or 1 square inch for every 4 square feet of floor area of airlock, whichever is the greater, provided that where an airlock opens directly on to any room used for the manufacture, preparation, or storage of food for human consumption, the effective airway of such vent or vents shall be not less than 27 square inches.

(b) Glazed louvres extending to the level of the ceiling may be used in lieu of windows and ventilators required by this clause subject to their providing a clear light area of not less than 2 square feet per closet pan or urinal stall and a clear ventilating area of not less than 27 inches per closet pan or urinal stall.

**1122. Lighting and Ventilation of Water Closets, &c.—(a)** Every water closet or urinal apartment shall be provided with—

- (i) a window fixed in an external wall conforming to the provisions of clause 1121 (a) (i), such window having a clear light area of not less than 2 square feet per closet pan or urinal stall and being capable of being opened; and
- (ii) a vent or vents in or near the ceiling and carried through directly to the open air having an effective airway of not less than 12 square inches per closet pan or urinal stall, the vent openings in the inner and outer walls being directly opposite each other.

(b) Where a window or windows prescribed in sub-clause (a) provide light to a group of water closets, the water closets so lighted shall be separated by means of a partition or partitions having a clear space of 9 inches between the bottom of each partition and the floor and extending to a height of not less than 6 feet above the floor, but in no case shall any such partition extend nearer than 12 inches to the ceiling.

(c) Glazed louvres extending to the level of the ceiling may be used in lieu of windows and ventilators specified in sub-clause (a) subject to their providing an equivalent area of light and ventilation.

**1123. Alternative Ventilation of Airlocks, Water Closets, &c. —** Notwithstanding the provisions of clauses 1121 and 1122, airlocks, water closets, and urinal apartments which are separately lighted by electricity and provided with a separate switch within each compartment or airlock may be ventilated by a system of mechanical ventilation conforming to the requirements of clause 1124, or, in the case of buildings up to four storeys in height (measured from the floor of the lowest apartment to be so ventilated) by means of a ventilating shaft conforming to the requirements of clause 1125.

**1124. Mechanical Ventilation.—(a)** Every system of mechanical ventilation shall be capable of changing the air content of the water closets or urinal apartments served at least six times per hour.

(b) In every case the ventilating fan and the power unit operating same shall be in duplicate, and the connecting ducts shall be provided with changeover dampers unless the main air shaft be designed to act temporarily as an effective natural vent in the event of failure of the mechanical equipment.

(c) Subject to the requirements of clause 3015, air shafts may be used also as pipe shafts.

**1125. Ventilating Shafts.—(a)** Every ventilating shaft shall open to the sky and be carried up to such height as may be necessary to prevent the deflection of wind currents down the shaft by neighbouring structures.

(b) No other room shall open on to the same shaft as water closets, urinal apartments, airlocks, and bathrooms.

(c) The area of every such shaft and the maximum number of water closets or urinals to be served by any one such shaft shall be as shown in Table 1125, but no dimension of the shaft shall be less than 4 feet.

TABLE 1125.

Height of Ventilating Shaft in Storeys.	Minimum Area of Ventilating Shaft.	Maximum Permissible Number of Closet Pans or Urinal Stalls on any Vent Shaft
1 or 2 .. ..	16 square feet .. ..	} 4
3 or 4 .. ..	1st and 2nd storeys—16 square feet .. ..	
	3rd storey—20 square feet .. ..	
	Top storey—24 square feet .. ..	

(d) In any building in which such ventilating shaft is three or four storeys in height, a ventilating duct having a clear area of not less than 2 square feet shall be carried from the bottom of the ventilating shaft to an external wall and shall be boxed throughout.

(e) Every water closet or urinal apartment or airlock which abuts on to a ventilating shaft as aforementioned shall have a window, capable of being opened on to such shaft, with an effective glass area at least equal to one-fifth of the floor area of the apartment or airlock with a minimum of 4 square feet, and shall be provided with ventilating openings to the ventilating shaft having a total clear opening at any point of not less than 50 square inches per closet pan or urinal stall or not less than 50 square inches per 100 square feet, or part of 100 square feet, of floor area for an airlock.

(f) Where any water closet or urinal apartment or airlock is situated in a basement or cellar there shall be provided in addition to the above-mentioned requirements, a ventilating duct, carried through the roof, and fitted with an approved cowl designed to give either a positive up draught or a positive down draught in the duct, at the option of the owner. Such ventilating duct and cowl shall be capable of changing the air in such water closet or urinal apartment or airlock served by it at least six times per hour, when subject to a wind velocity of 4 miles per hour, the inside and outside temperatures being equal.

(g) Ventilating ducts serving different apartments may be combined, but the minimum area of any ventilating duct shall be 25 square inches for each closet pan or urinal stall or for each 100 square feet or part of 100 square feet of each airlock served by the said duct.

1126. **Internal Urinals and Slop Sinks.**—The position, approaches, arrangement of lighting and ventilation for internal urinals and slop sinks shall comply as nearly as possible with the provisions of this chapter for internal water closets.

1127. **Water Closets, Urinals, and Slop Sinks in Existing Buildings.**—Where any water closet, urinal, or slop sink installed in any existing building is not in replacement in the same position of an existing water closet, urinal, or slop sink, as the case may be, the positions, approaches, arrangement of lighting and ventilation of such water closet, urinal, or slop sink shall comply as nearly as possible with the provisions of this chapter.

1128. **Bathrooms.**—(a) Every bathroom in a building of Class I or Class II Occupancy shall be provided with—

- (a) (i) a window placed in an external wall conforming to the requirements of clause 1121 (a) (i), such window having a superficial area clear of sash frames and free from any obstruction to the light equal to at least 6 square feet or one-tenth of the floor area of the room (whichever is the greater) and so constructed that a portion equal to at least one-twentieth of the floor area can be opened; and
- (ii) registers, vents, cowls, or ducts fixed in or near the ceiling having an effective airway clear of all obstructions of not less than 1 square inch for each 4 square feet of floor area:
- (b) Every bathroom in a building of any other occupancy shall be provided with lighting and ventilation in accordance with sub-clause (a) or with a system of artificial lighting and
  - (i) windows and ventilating openings to a ventilating shaft, as specified in clause 1125 (e), except that such ventilating openings shall have a total clear opening of not less than 1 square inch for every 2 square feet of floor area, but in any case not less than 12 square inches; or
  - (ii) a system of mechanical ventilation giving not less than six complete changes of air per hour.

1129. **Shower Recesses.**—Shower recesses shall be ventilated as prescribed for bathrooms in clause 1128, except that registers, vents, cowls, or ducts shall have an effective airway of not less than 12 square inches.

1130. Recess from Bedroom or Bathroom.—Where a shower recess opens from a bedroom or a bathroom or where a bath is installed in a bedroom and enclosed by doors, the ventilation prescribed in clause 1129 shall, if not provided directly to the recess, be provided in the bedroom or bathroom.

**Part II.—General Provisions for Lighting and Ventilation.**

1131. Artificial Lighting.—(a) Where pursuant to this Chapter artificial lighting is substituted for natural lighting such artificial lighting shall conform to the provisions of Clauses 1132 and 1133 of these Regulations, and the illumination value shall be not less than the lower illumination value set out opposite the description of the particular task in Tables 2 and 3 of the S.A.A. Code No. CA.501-1942 and Amendment No. 1 thereof.

(b) Unless the contrary intention appears:—“average brightness” means the average of two brightness readings, one of which is taken at the point of apparent minimum brightness of a diffusing fitting; “mounting height” means the height of the centre of the light source measured from floor level; “working plane” means that portion of a horizontal, vertical, or inclined plane on or before which a visual task is performed, and all other technical expressions shall have the meanings attached to those expressions in illumination engineering practice and which are set out in the British Standard Glossary of Terms used in Illumination and Photometry being No. 233/1932 with Addendum 1935, of the British Standards Institution.

1132. Minimum Value of Illumination:—(a) Without prejudice to the additional illumination required by the nature of the task, a minimum value of illumination of 5 foot-candles shall be provided over all the working area;

(b) A minimum value of illumination of 2 foot candles shall be provided for all passages, corridors, stairways, exits and spaces other than working areas.

1133. Quality of Artificial Illumination.—The quality of illumination shall be adequate to provide comfortable vision and ensure easy, accurate, and quick seeing, and in particular the following conditions shall be observed:—

- (a) Lamps visible to any person working in the vicinity shall be fitted with properly designed reflectors or diffusing fittings, or both, or otherwise shaded from view.
- (b) Where open type reflectors are installed in any areas where work is carried on they shall be of such types as comply with the requirements of Table 1133 of these regulations.

TABLE 1133.—SHADING BARE LAMPS FROM VIEW.

Mounting Heights above Floor Level.					
Below 14 Feet above Eye Level.		14 Feet to 20 Feet.		Above 20 Feet.	
Size of Lamp (watts)	Minimum Angle of View below the Horizontal (cut-off angle).	Size of Lamp (watts)	Minimum Angle of View below the Horizontal (cut-off angle).	Size of Lamp (watts).	Minimum Angle of View below the Horizontal (cut-off angle).
*Up to 200	20°	Up to 200	20°	Any size ..	20°
300 ..	30°	300 and larger	30°	..	..
500 and larger	Direct view not permitted	..	..	..	..

\* The lamp wattages given in Table 1133 refer to general service incandescent filament lamps. Other artificial light sources of equivalent lumen output shall be subject to the same provisions as laid down in Table 1133.

- (c) Where open type reflectors are used to provide supplementary local lighting, the cut-off of such reflectors shall be not less than 40 degrees, and the light sources shall be so placed, shielded, or louvred as to be invisible to any person working in the vicinity.
- (d) Open type reflectors shall not be used in any room or office in which continuous clerical work is performed.
- (e) Where, in any room or place in which work is normally performed, any diffusing fitting having a mounting height of less than 9 feet is visible, the average initial brightness of the fitting shall not exceed 714 lumens per square foot.
- (f) Where, in any room or place in which work is normally performed, any diffusing fitting having a mounting height exceeding 9 feet but not exceeding 14 feet is visible, the average initial brightness of the fitting shall not exceed 1143 lumens per square foot.
- (g) Where, in any room or place in which work is normally performed, any diffusing fitting with a mounting height exceeding 14 feet is visible, and where any diffusing fitting of any mounting height is visible in any passage, storeroom, or other place in which work is not normally performed, the average initial brightness of any such fitting shall not exceed 1714 lumens per square foot.

- (h) Where industrial diffusing types of lighting fittings are installed in any area where work is carried on, no lamp larger than 300 watts shall be installed in 14-in. diameter glassware and no lamp larger than 500 watts shall be installed in 16-in. diameter glassware.
- (i) Where, in any room or place in which work is normally performed, any semi-indirect fitting is installed, the maximum permissible average brightness stipulated in sub-clauses (e), (f) and (g) shall not be exceeded at any part of the fitting normally visible to a person standing on the floor of the room in which the fitting is installed.
- (j) Where fluorescent tubular lamps have an initial surface brightness exceeding the limits given in sub-clauses (e), (f) and (g) for diffusing glass fittings at various mounting heights, they shall be installed in reflectors or diffusing fittings as follows:—
- (i) In Industrial Areas.—In reflectors with an angle of cut-off of not less than 20° on the long axis of the lamp if less than four lamps side by side are installed and in reflectors with an angle of cut-off of not less than 13° on the long axis of the lamp if four or more lamps side by side are installed.
- (ii) In Office Areas.—In reflectors so designed as to provide the angles of cut-off required in the foregoing paragraph when the lamp is viewed from any direction, or in diffusing fittings the initial surface brightness of which does not exceed the limits given in sub-clauses (e), (f) and (g).

1134. **Mechanical Ventilation.**—(a) When any system of mechanical ventilation is installed in a building, the owner or his representative shall on completion and at any other reasonable times allow the Surveyor to inspect the system and shall co-operate with him in operating the plant so that he may carry out any tests he considers desirable.

(b) The owner or his representative shall take all necessary steps to ensure the efficient operation of the system in conformity with these Regulations.

(c) Where a system of mechanical ventilation is used in place of natural ventilation, such system shall be operated at all times when the area it ventilates is occupied.

1135. **Discharge of Foul Air.**—Foul or vitiated air shall not be discharged from any mechanical exhaust ventilating system to any place where it may constitute a nuisance.

1136. **Air Disconnexion of Water Closets, &c., from Habitable Rooms or Workrooms.**—Bathrooms, water closets, urinals or other areas where air may be vitiated shall not be connected by means of vents in dividing walls with kitchens, habitable rooms or rooms where persons are employed, and any mechanical ventilating or air conditioning system shall be so arranged as to prevent the flow of air through the system between such rooms or areas.

1137. **Lighting and Ventilation in Exceptional Cases.**—Where the provisions of this chapter are inapplicable or where extraordinary circumstances would render their application unreasonable, the Surveyor may in any such case, notwithstanding anything elsewhere contained in this chapter, determine the amount and type of light and ventilation to be provided.

### Part III.—Light Courts.

1138. **Definitions.**—In this part, unless inconsistent with the context or subject matter—

“Light court” means a court wholly open at the top constructed or adapted for admitting light to a building, and includes such parts of light courts of adjoining buildings abutting on the common boundary of such buildings as will, when combined, form a common court, provided that reciprocal light easements thereover have been permanently created to the satisfaction of the council, and includes also a street over which such building is permanently entitled to access of light.

“A wall of light court” includes the wall or walls enclosing one side of a light court, notwithstanding that at the level of upper storeys any of such walls is set back from the vertical plane of the lowest wall.

“The basic light level” of a wall of a light court means the level of the lowest horizontal line on the lowest window or windows in such wall which permits light to be admitted through such window or windows into the room or floor lighted thereby as required by Part I. of this chapter.

- “Basic height of light court” with reference to any wall of a light court means the vertical distance from the basic light level of such wall to the level of the top of the parapet or eaves of the opposite wall of such light court.
- “Width of light court” means the shortest distance measured at right angles from the face of a wall of a light court at any given level to the face of the opposite wall, at the same level, or, if there is no opposite wall, to the vertical plane of the opposite boundary of the light court.
- “Basic width of light court” with reference to any wall of a light court means the shortest horizontal distance measured at right angles from the face of such wall at the basic light level to the vertical plane of the face of the wall or parapet of the topmost storey on the opposite boundary of the light court, or, if none, to the vertical plane of the opposite boundary of the light court.
- “Angle of light” with reference to any window in the wall of a light court means the angle formed by the vertical plane of the face of such wall and a line drawn from a point in such vertical plane and on the basic light level of such wall bisecting diagonally a rectangle having for two of its sides the basic height and the basic width of such light court.

1139. **Angles of Light.**—Except by permission of the council, every window in buildings of Classes I., II., III., IV., V., and VIII. Occupancies abutting on a light court shall have an angle of light not less than the angle of light resultant from the ratio of basic height to basic width of light court as set out in Table 1139 applicable to such window and shall receive at such angle of light unobstructed light from the sky, provided that—

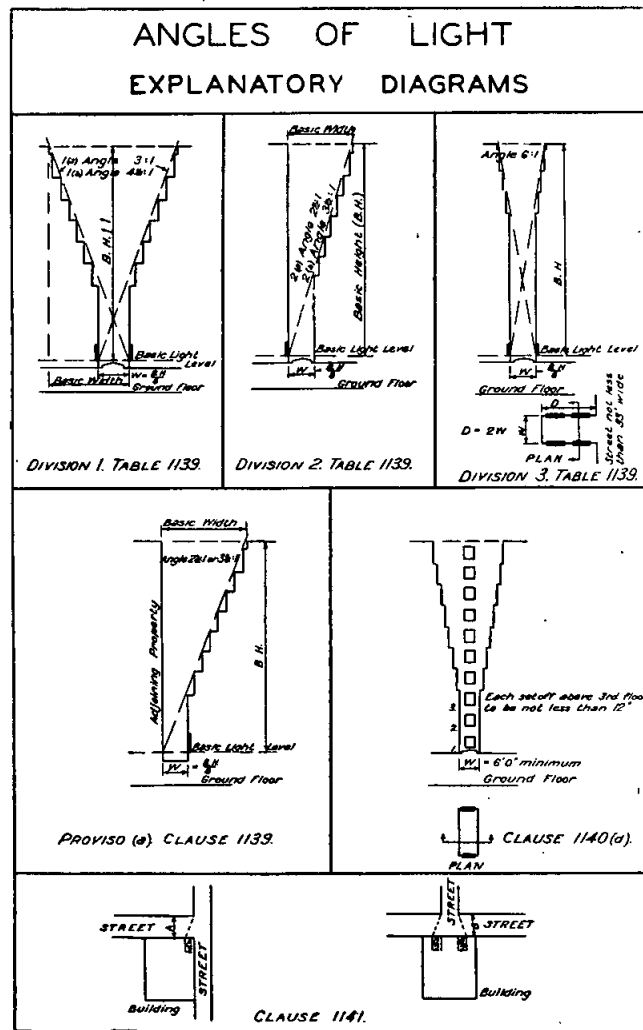
- (a) where the opposite boundary of the light court on which such window abuts is also the boundary of an adjoining property such window need not receive such unobstructed light, but shall be deemed to have the required angle of light if a window at the same basic light level erected on such opposite boundary would have the angle of light resultant from the ratio applicable according to the class of building under Division 2 of the said Table 1139;
- (b) the foregoing provisions of this clause shall not, unless otherwise directed by the Surveyor, apply to the office section of any occupancy in a building if such office section constitutes only a minor part of the occupancy; and
- (c) windows of rooms referred to in Clause 1102 and windows of rooms on the ground and first storeys of buildings of Class V. or Class VIII. Occupancy more than five storeys in height shall not be required to have the angle of light prescribed by this clause.

TABLE 1139.

Location of Window and Class of Building.	Ratio of Basic Height to Basic Width.
<b>DIVISION 1.</b>	
In all cases where windows other than those mentioned in Division 3 of this Table are erected in opposite sides of light court:—	
(a) in buildings of Classes I., II., and IV. Occupancies ..	3 to 1
(b) in buildings of Classes III., V., and VIII. Occupancies ..	4½ to
<b>DIVISION 2.</b>	
In all cases where windows other than those mentioned in Division 3 of this Table are erected in one only of two opposite sides of a light court:—	
(a) in buildings of Classes I., II., and IV. Occupancies ..	2½ to 1
(b) In buildings of Classes III., V., and VIII. Occupancies ..	3½ to 1
<b>DIVISION 3.</b>	
In all cases where windows are lighted from a light court which opens on to a street not less than 33 ft. in width and is of uniform width for its full depth from such street, such windows being distant from the street alignment not more than twice the width of such light court:—	
All classes of Occupancy .. .. .	6 to 1

1140. Width of Light Court.—The minimum width of any light court shall be as follows:—

- (a) In the case of buildings of Classes I., II., III., IV., V., and VIII. Occupancies, the minimum width at the basic light level measured from any wall wherein a window is constructed shall not be less than one-eighth of the basic height of the light court.
- (b) In the case of buildings of Class VII. Occupancy the minimum width shall not be less than one-eighth or, where the light court abuts on a right-of-way, one-tenth of the basic height of the court.
- (c) For all buildings of more than one storey in height, the minimum width of any light court shall be not less than 6 feet.
- (d) In the case of a light court having windows in one wall or opposite walls only, the minimum width from any wall which neither contains any window required to have an angle of light nor is opposite to a wall containing such a window, shall be not less than 6 feet, and where the number of storeys abutting on such light court exceeds three, shall be not less at the level of each additional storey than the width at the level of the storey immediately below, plus 1 foot.



**1141. Buildings Abutting on a Street Intersected by Another Street.**—In cases where a building abuts wholly or partly on a street which is a light court and such street is intersected by or connected with another street at right angles thereto, the Surveyor may permit windows not having the required angle of light to be constructed in that section of the wall of the building abutting on the light court and located within a distance of half the width of such court on one or both sides of the intersecting street.

**1142. Courts Serving Lavatories and Sanitary Conveniences.**—The provisions of clauses 1139 to 1141 shall not apply to courts serving lavatories and sanitary conveniences. Such courts shall have a minimum width of 4 feet.

**1143. Ventilation of Light Courts.**—Where a court, wholly or in part open at the top and constructed or used for admitting light and air to a building of Class I., II., III., IV., or V. Occupancy is constructed in connexion with such building, and the height of the court from the eaves or top of the parapet to the ceiling at the ground storey exceeds the length or breadth of such court, then—

- (a) when such court is at time of construction enclosed on every side, ventilation shall be provided by means of—
  - (i) a system of mechanical ventilation capable of giving six changes of air per hour and designed to introduce plenum air from a clean source and to distribute the air from the bottom of the light court in such a manner as to ensure even distribution over all sections of the light well which are pierced by windows, louvres, or vents; or
  - (ii) a flue constructed between the lower end of the court and the outer air having a thoroughway the least sectional area of which shall measure not less than 5 square feet or one-twentieth of the average horizontal area of such court, whichever is the greater, but in no case shall the maximum sectional area of the ventilating flue be required to exceed 20 square feet. The flue shall be not less than 18 inches across in any direction and be constructed in such a manner that it can be cleaned out;
- (b) when such court is situated upon an allotment boundary and when at the time of construction of such court the walls of buildings on adjoining allotments are not such as to make the provisions of sub-clause (a) of this clause applicable, either the flue required by sub-clause (a) (ii) hereof shall be provided during construction of such court or approved provision shall be made for the future installation, at such time as the court becomes completely enclosed, of the system of mechanical ventilation required by sub-clause (a) (i) hereof. The owner of the building in connexion with which such light court is constructed shall, if and when called on by the Surveyor, complete the installation of such system of mechanical ventilation.

**1144. Partitioning of Rooms.**—Any room of a building of class V., VI., VII. or VIII. Occupancy provided with natural light and ventilation as required by this chapter may be subdivided into smaller areas by partition walls provided that the tops of such partition walls are at least 2 ft. 6 in. below the ceiling or beam soffit immediately above them for a length sufficient to provide a clear opening of area not less than 20 per cent. of the floor area enclosed on the side of the partition wall remote from the source of natural light and ventilation subject to the provision of artificial lighting conforming to the requirements of this chapter appropriate to the particular type of room:

**1145. Erections in Light Courts.**—Vent ducts, flues, service pipes, and erections of like nature shall be permitted in light courts provided such erections are of fire-resisting materials, but where their combined area exceeds 10 per cent. of the area of such light court, the area of the light court shall be increased by the equivalent of such excess percentage. The area of such erections for the purpose of this clause shall be their horizontal projection between any two floors of a building.



## CHAPTER 12.

## PROJECTIONS BEYOND THE STREET ALIGNMENT.

- Clause 1201.—Projections to be Fire-resisting.  
Clause 1202.—Minimum Height Above Pavement.  
Clause 1203.—Limits of Projection.  
Clause 1204.—Windows and Balconies.  
Clause 1205.—Timber Window Shutters.  
Clause 1206.—Cat Heads.  
Clause 1207.—Loading Docks and Platforms.  
Clause 1208.—Service Pipes.  
Clause 1209.—Pavement Lights.  
Clause 1210.—Gates, Doors, &c., Abutting on Street.

## CHAPTER 12.

## PROJECTIONS BEYOND THE STREET ALIGNMENT.

1201. **Projections to be Fire-Resisting.**—(a) Except as provided in Chapter 31, every coping, cornice, string course, fascia, window dressing, portico, balconette, bridge connecting buildings, balustrade, architectural projection, and architectural decoration projecting beyond the street alignment shall be of brick, tile, stone, artificial stone, slate, cement, concrete, or other fire-resisting material approved for the purpose by the Surveyor.

(b) No such projection shall form part of the structural design of the building.

1202. **Minimum Height Above Pavement.**—Except as provided in Chapters 19 and 31, no projection shall extend beyond the street alignment at any height less than 9 feet from the level of the public footway.

1203. **Limits of Projection.**—No projection shall extend more than 4 feet beyond the street alignment in streets over 33 feet in width, or more than 2 feet in streets of 33 feet or less in width. No projection shall be permitted in streets less than 20 feet in width, except a kerb or buffer block projecting not more than 9 inches from the street alignment and not more than 9 inches above the adjacent street level.

1204. **Windows and Balconies.**—A balcony, balconette, or window may project not more than 3 feet over any street or road exceeding 33 feet in width, provided that—

- (a) no part of any such projection where it overhangs a street shall be less than 10 feet above the level of the street or be nearer than 4 feet to the centre of the nearest party wall or to any adjoining building or land not in the same occupation;
- (b) the total width of any such projections taken together shall not exceed one-half of the length of the wall of the building on the level of the floor on which such projections are made;
- (c) no projecting window shall exceed a total overall width of 12 feet, and the distance between projecting windows shall not be less than one-third of the total overall width of each of such windows;
- (d) projecting windows shall not be connected by a balcony any portion of which projects beyond the street alignment;
- (e) every such projection shall be constructed to the approval of the Surveyor.

1205. **Timber Window Shutters.**—Notwithstanding the provisions of clause 1201, louvred window shutters constructed in timber shall be permitted provided they project not more than 2 inches beyond the street alignment when in the fully open position.

1206. **Cat Heads.**—Cat heads or hoists shall not project over any street.

1207. **Loading Docks and Platforms.**—Every building of Class III., V., VI., VII., or VIII. Occupancy shall, unless the permission of the council to the contrary has been obtained, contain accommodation for vehicles delivering goods to or removing goods from such building. Every vehicle dock and loading platform shall be so located that no portion of any vehicle occupying or adjoining same shall project over the street alignment.

1208. **Service Pipes.**—Service pipes may project 8 inches beyond the street alignment above a height of 9 feet from the level of the public footway. Rainwater heads may project 12 inches.

1209. **Pavement Lights.**—Pavement lights extending under footways shall be enclosed by solid walls of masonry, concrete, or other approved materials surmounted by a proper stone or concrete kerb and fitted with floor lights not exceeding 4 inches square and not less than  $\frac{3}{4}$  inch thick, set in metal or concrete frames level with the surface of the footway and secured to the kerbing by being run in with lead, zinc, or other approved material. Prisms set in reinforced concrete may be used with the approval of the Surveyor. Pavement lights, unless supported on steel joists, shall not exceed 4 feet in length without the approval of the Surveyor, and no such light shall extend more than 18 inches beyond the street alignment.

1210. **Gates, Doors, &c., Abutting on Street.**—No person shall construct or hang any gate, door, window, or shutter in such a manner that any part of such gate, door, window, or shutter shall, when being opened, project over any street or public way at a height less than 9 feet above the level of the pavement.

[References.—

- (a) Footings.—See Chapter 19.
- (b) Shop Fronts.—See Chapter 31.
- (c) Verandahs and Sunblinds.—See Chapter 36.]

CHAPTER 13.

MATERIALS AND WORKING STRESSES.

Part I.—Materials.

- Clause 1301.—Requirements for Materials.
- Clause 1302.—Old and Secondhand Materials.
- Clause 1303.—Bricks.
- Clause 1304.—Cast Stone.
- Clause 1305.—Cement.
- Clause 1306.—Lime.
- Clause 1307.—Sand and Fine Aggregate.
- Clause 1308.—Coarse Aggregate for Concrete.
- Clause 1309.—Water.
- Clause 1310.—Mortars.
- Clause 1311.—Concrete.
- Clause 1312.—Restrictions on Grade "D" Concrete.
- Clause 1313.—Ready Mixed Concrete.
- Clause 1314.—Reinforced Concrete.
- Clause 1315.—Steel.
- Clause 1316.—Electrodes.
- Clause 1317.—Cast Iron.
- Clause 1318.—Timber.
- Clause 1319.—Sand-lime Bricks.
- Clause 1320.—Concrete Blocks.
- Clause 1321.—Terra Cotta Blocks.
- Clause 1322.—Galvanized Sheets.
- Clause 1323.—Roofing Tiles.
- Clause 1324.—Asbestos Cement.

Part II.—Permissible Working Stresses.

- Clause 1325.—Permissible Working Stresses.
- Clause 1326.—Tests.

## CHAPTER 13.

## MATERIALS AND WORKING STRESSES.

## Part I.—Materials.

1301. **Requirements for Materials.**—Materials used in the construction of any building shall conform to the requirements for such materials set out in this chapter.

1302. **Old and Secondhand Materials.**—No old or secondhand timber, bricks, iron, steel, or other material shall be used in the construction of any building unless the same has been first inspected and permission for its use granted by the Surveyor.

1303. **Bricks.**—All bricks used in any building shall be wholly sound, hard, and well burnt, and in conformity with the S.A.A. Specification for Building Bricks, No. A.21-1934.

1304. **Cast Stone.**—Cast stone units for structural purposes shall comply with the S.A.A. Specification for Cast Stone with Portland Cement Base, No. A.22-1934.

1305.—**Cement.**—(a) Cement shall comply with the S.A.A. Specification for Portland Cement, No. A.2-1939.

(b) For the purposes of these Regulations, the weight per cubic foot of cement shall be accepted as 94 lb., the contents of the commercial bag of cement (24 to 1 ton).

1306. **Lime.**—The lime used for lime mortar shall be either—

(a) freshly burnt quicklime in conformity with the tentative S.A.A. Specification for Quicklime, No. A. 3-1928, such quicklime being properly slaked before being mixed with the sand;

(b) hydrated lime in the form of a fine white powder and in conformity with the tentative S.A.A. Specification for Hydrated Lime, No. A.4-1928.

For the purposes of these Regulations the weight per cubic foot of dry powdered hydrated lime shall be 40 lb.

1307. **Sand and Fine Aggregate.**—(a) Fine aggregate for concrete shall consist of clean, hard, strong, durable uncoated grains, free from injurious substances, and conforming to the requirements for fine aggregate set out in the S.A.A. Code for Concrete in Building, No. C.A.2-1937.

(b) Sand for mortar for brickwork, masonry, or plastering shall conform to the requirements for fine aggregate set out in the S.A.A. Code for Concrete in Building, No. C.A.2-1937, except the requirements for grading set out therein.

(c) For the purposes of these Regulations the weight per cubic foot of sand or fine aggregate shall be deemed to be 90 lb. except where actual weights per cubic foot of dry sand or aggregate can be ascertained by tests of the material being used in the construction work, when the actual weights so ascertained shall be used.

1308.—**Coarse Aggregate for Concrete.**—(a) Coarse aggregate for Grades "A," "B," and "C" concrete as set out in Table 1311 (1) shall conform to the requirements for such set out in the S.A.A. Code for Concrete in Building No. C.A.3-1937.

(b) Coarse aggregate for Grade "D" concrete shall—

(i) consist of stone, gravel, or other approved material of similar characteristics of a maximum gauge of 3 inches, having clean, strong, durable particles and be free from injurious amounts of deleterious matter, honeycomb, weathered or disintegrated stone, flaky or elongated pieces, and dust. If considered necessary by the Surveyor, coarse aggregate shall be washed before use;

(ii) be as far as practicable evenly graded from large to small pieces, but where satisfactory grading cannot be obtained, extra cement shall be added to enable the requisite compressive strength to be obtained;

(iii) for the purposes of these Regulations be deemed to weigh 90 lb. per cubic foot, except where actual weights per cubic foot of the aggregate can be ascertained by tests of the material being used in the construction work, when the actual weights so ascertained shall be used;

- (iv) for concrete members having a minimum dimension of 18 inches, pieces of coarse aggregate larger than 3-in. gauge but not larger than one-fourth the minimum dimension of the concrete member and otherwise conforming to the requirements of paragraph (i) hereof may be hand placed in the concrete, provided that the minimum thickness of concrete between pieces or between any piece and the face of the concrete shall be not less than 50 per cent. greater than the maximum size of coarse aggregate described in paragraph (i) hereof.

1309. **Water.**—Water used for mixing concrete and mortars shall conform to the requirements for such set out in S.A.A. Code for Concrete in Building; No. C.A.2-1937.

1310.—**Mortars.**—

- (a) **Lime Mortar** shall be composed in the proportion of three volumes of sand to one volume of lime thoroughly mixed prior to use, provided that a mixture of seven volumes of sand and one volume of cement, to which 10 per cent. of hydrated lime may be added, shall be permitted where the use of lime mortar is permitted by these Regulations.
- (b) **Composition Mortar** shall be composed of a mixture of cement with hydrated lime conforming to the requirements of sub-clause. (b) of clause 1306 and sand. Not less than one part of cement shall be used to every two parts of lime, and the mortar shall contain not less than one part of cement-lime mixture to every three parts of sand. Only as much water as will render the mixture plastic shall be used.
- (c) **Cement Mortar** shall be composed of a mixture of—
- (i) 1 cubic foot of cement;
  - (ii) not more than 4 cubic feet of dry sand; and
  - (iii) as much water as will render the mixture plastic.  
Where not more than 20 per cent. by volume of the cement content of a mortar otherwise conforming to the requirements of this sub-clause is replaced by hydrated lime, such mortar may, for the purposes of these Regulations, be regarded as cement mortar.
- (d) Before water is added the other component parts of mortar shall be accurately and separately measured and thoroughly mixed together. Mortar containing cement shall be used before initial setting has commenced, and without re-tempering by the addition of further cement and/or water.

1311.—**Concrete.**—Concrete shall—

- (a) consist of cement, fine aggregate, coarse aggregate, and water conforming to the requirements for such materials set out in clauses 1305, 1307, 1308, and 1309 of these Regulations;
- (b) be proportioned by volume as specified for the various grades in Table 1311 (1), the method of measuring being as set out in S.A.A. Code for Concrete in Building, No. C.A.2-1937, provided that additional materials may be used with the approval of the Surveyor to improve workability and that the use of materials in the proportions specified shall not detract from the necessity of compliance with sub-clause (d) hereof.
- (c) be of quaking consistency but not sloppy, the slumps when tested in accordance with the Australian Standard Method for determination of Consistency of Cement Concrete No. A.8-1935 being not in excess of those set out in Table 1311 (2);
- (d) when tested for compressive strength 28 days after mixing by Australian Standard Method for making compression tests on Concrete No. A.27-1937 appended to S.A.A. Code No. C.A.2-1937, have compressive strengths not less than those set out in Table 1311 (1) for the appropriate grades.

TABLE 1311 (1).

Grade of Concrete.	Concrete Proportions.			Required Compressive Strength in lbs. per square inch.	
	Cement.	Fine Aggregate.	Coarse Aggregate.	Concrete.	Special* Concrete.
	lb.	cub. ft.	cub. ft.		
A .. .. .	94	1	2	3,000	3,750
B .. .. .	94	1½	3	2,600	3,250
C .. .. .	94	2	4	2,200	2,750
D .. .. .	94	2½	5	1,700	..

\* For increased stresses in special concrete, see clause 2404.

TABLE 1311 (2).

Concrete.	Maximum Slump in Inches.
In sections not thicker than 6" requiring forms on both sides ..	6
In columns, heavy sections, beams and slabs .. .. .	5
In footings .. .. .	4
If consolidated by vibration method .. .. .	2

NOTE.—To allow for variation in the characteristics of coarse and fine aggregates the proportions of coarse to fine aggregates given in Table 1311 (1) shall be varied where necessary in order to obtain satisfactory workability without increasing the required water-cement ratio, provided that the total number of cubic feet of fine and coarse aggregates to 94 lb. of cement shall not be increased and provided also that neither the volume of coarse aggregate nor the volume of fine aggregate shall be increased or decreased by more than one-half cubic foot per 94 lb. of cement in the case of Grade A concrete; by more than three-quarters cubic foot in the case of Grade B concrete and by more than 1 cubic foot in the case of Grade C concrete, that is:—

1:1:2 concrete may contain any mix between 1:½:2½ and 1:1½:1½.

1:1½:3 concrete may contain any mix between 1:¾:3¾ and 1:2¼:2¼.

1:2:4 concrete may contain any mix between 1:1:5 and 1:3:3.

Satisfactory workability may also be obtained by increasing the proportion of cement in the mix.

Allowance shall be made for the bulking of fine aggregate in accordance with Australian Standard No. A.26-1937, Field Methods of Determining the Necessary Adjustment for the Bulking of Fine Aggregate, appended to S.A.A. Code for Concrete in Building No. C.A.2-1937.

1312. **Restrictions on Grade "D" Concrete.**—Grade "D" concrete shall not be used except for footings in buildings of Types 3, 4, and 5 Construction, and in special cases approved by the Surveyor.

1313. **Ready Mixed Concrete.**—Where concrete used in the construction of any building is not mixed on the job, such concrete shall conform to the S.A.A. Specification for Ready Mixed Concrete No. (E) A.502-1941.

1314. **Reinforced Concrete.**—Reinforced concrete shall—

(a) consist of concrete as prescribed in clause 1311 of these Regulations and steel or other approved metal reinforcement combined;

(b) conform to the requirements of Chapter 24.

1315. **Steel.**—(a) Mild steel reinforcement for reinforced concrete and structural steel for structural members shall conform to the requirements of the S.A.A. Specification No. A.1-1940, except where prescribed to the contrary in these Regulations.

(b) All structural steel work in any building shall be designed, fabricated, and erected as prescribed in Chapter 24.

(c) **Rivets.**—Rivets shall—

- (i) as to materials conform to the requirements of S.A.A. Specification for Structural Steel No. A.1-1940;
- (ii) as to form and dimensions conform to the requirements of the S.A.A. Specification for Dimensions of Rivets, No. A.34-1938.

(d) **Bolts and Nuts.**—Bolts and nuts shall comply with the following:—

- (i) All bright bolts and nuts shall conform to the requirements of the S.A.A. Specification for B.S.W. Bright Hexagon Bolts, Set Screws, and Nuts, No. B.48-1932.
- (ii) All black bolts and nuts shall conform to the requirements of the British Standard Specification for Black Bolts and Nuts, No. 28-1932.

(e) **Castings.**—Steel castings shall conform to the requirements of the S.A.A. Specification for Steel Castings, B.27-1931.

1316. **Electrodes.**—Electrodes shall conform to the requirements of the S.A.A. Specification No. A.18-1939, "Electrodes for Metallic Arc Welding in Mild Steel Construction."

1317. **Cast Iron.**—All cast iron shall be made of clean, tough, grey iron and shall conform to the requirements of the S.A.A. Specification for Grey Iron Castings, No. B.26-1931.

1318. **Timber.**—The timber of all structural timber work used in any building shall conform to the requirements and standards as set down in the S.A.A. Specification Australian Standard Grading Rules for Sawn and Hewn Structural Timbers, No. (E) O.54-1942.

1319. **Sand-lime Bricks.**—Sand-lime bricks shall conform to the British Standard Specification for Sand-lime Bricks, No. 187-1934. When used in external walls, they shall conform to the requirements for Building Bricks, Class A, and when used in internal walls or partitions, they shall conform to the requirements for Building Bricks, Class B.

1320. **Concrete Blocks.**—Concrete blocks may be either hollow or solid, and shall conform to the following requirements:—

- (a) Such blocks shall be made of concrete materials conforming to the requirements of clause 1311, except that burnt clay or shale, blast furnace slag, cinders, or other approved material may be used as an aggregate. When cinders are used as an aggregate, they shall be weathered before use, and the combustible content shall not exceed 20 per cent. by weight of the dry cinders, and no unit shall contain more than 1 per cent. by weight of sulphur.
- (b) Solid blocks shall have an ultimate crushing strength at an age of 28 days as follows:—
  - Class A—1,500 lb. per square inch of gross area.
  - Class B—1,000 lb. per square inch of gross area.
- (c) Hollow blocks shall have a minimum crushing strength of 700 lb. per square inch of gross sectional area when tested 28 days after manufacture in position as used in the wall.
- (d) When used in positions exposed to the weather or to moisture, concrete blocks shall have a maximum absorption of 10 per cent. of the weight of the dry block when immersed in cold water for 24 hours: or shall be protected by cement or composition mortar not less than  $\frac{1}{2}$  inch thick.
- (e) No block used in any load bearing construction shall be less than 4 inches thick.

- (f) Notwithstanding anything contained above, hollow concrete blocks manufactured in a portable block making machine on the job or otherwise, or manufactured other than in a factory properly equipped for regular testing shall be made of concrete composed of one volume of cement and six volumes of approved aggregate, and shall be not less than 6 inches thick. The outer walls or shell of each block shall be not less than  $1\frac{1}{2}$  inch thick, and the cross ties and webs not less than  $1\frac{1}{4}$  inch thick.

1321. **Terra Cotta Blocks.**—(a) Terra cotta blocks shall be hard and well burnt, and the outer walls or shell and the cross ties or webs shall be not less than  $\frac{3}{4}$  inch thick.

(b) Blocks used in bearing walls shall be not less than 4 inches thick.

(c) Blocks used in positions exposed to the weather or to moisture shall be protected by cement or composition mortar not less than  $\frac{1}{2}$  inch thick. Blocks used for non-bearing partition walls and carried on a reinforced concrete slab shall weigh not more than 56 lb. per cubic foot.

1322. **Galvanized Sheets.**—Galvanized (zinc coated) sheets shall conform to the requirements set out for the appropriate class of sheets in S.A.A. Specification for Zinc Coated (Galvanized) Sheets, No. A.20-1934.

1323. **Roofing Tiles.**—(a) Cement concrete roofing tiles shall conform to the requirements of the S.A.A. Specification for Cement Concrete Roofing Tiles, No. A.14-1933.

(b) Terra cotta roofing tiles shall conform to the requirements of the S.A.A. Specification for Terra Cotta Roofing Tiles, No. A.13-1933.

1324. **Asbestos Cement.**—Asbestos cement slates, unreinforced flat sheets, and corrugated sheets shall conform to the British Standards Specification therefor, No. 690-1940.

#### Part II.—Permissible Working Stresses.

1325. **Permissible Working Stress.**—Except where prescribed to the contrary in these Regulations, the maximum stresses computed as prescribed by clause 1502 shall not exceed in the case of—

- (a) **Structural Steel Members**, the values prescribed in Chapter 24.
- (b) **Steel or Iron Castings**, the values prescribed in Chapter 24.
- (c) **Reinforcing Steel**, the values prescribed in Chapter 24.
- (d) **Brickwork**, the values set out for the appropriate conditions in Appendix to S.A.A. Code for Structural Steel in Building, No. C.A.1-1939, provided that the mortar shall be as specified in clause 1310 (a), (b), or (c), and that the maximum stresses in the case of brickwork in composition mortar shall be two-thirds of the maximum stresses on brickwork in cement mortar.
- (e) **Reinforced Brick Masonry**, the values set out in Part II. of Chapter 24.
- (f) **Stonework**, the values set out in appropriate conditions in Appendix to the S.A.A. Code for Structural Steel in Building, No. C.A.1-1939.
- (g) **Sand-lime Bricks**, when laid in cement or composition mortar, values as follows:—  
Sand-lime bricks, Class A, 175 lb. per square inch.  
Sand-lime bricks, Class B, 100 lb. per square inch.
- (h) **Concrete Blocks**, when laid in cement or composition mortar, values as follows:—  
Solid blocks, Class A, 175 lb. per square inch.  
Solid blocks, Class B, 100 lb. per square inch.  
Hollow blocks, 70 lb. per square inch of gross area.
- (i) **Terra Cotta Blocks**, when laid in cement or composition mortar, 70 lb. per square inch of gross area.
- (j) **Timber**, the values set out in the Handbook of Structural Timber Design (Second Edition), being Technical Paper No. 32, issued by the Division of Forest Products of the Council for Scientific and Industrial Research.

- (k) Concrete, Grades A, B, C, and D, the values set out in Chapter 24.
- (l) Foundations.—Loading on foundations by footings, the values set out in clause 1901 of these Regulations.
- (m) In the case of materials for which the allowable unit working stress is not prescribed in these Regulations, the allowable unit working stress shall be taken as one-quarter of the ultimate strength for metals (other than castings) subject to tension or transverse forces, one-sixth of the ultimate strength for timbers and castings, one-tenth for natural or cast stone.

1326. Tests.—(a) The builder shall when required by the Surveyor cause to be made such of the tests relating to materials set out in the various Australian Standard Specifications and Codes referred to in this chapter as the surveyor may direct. When no applicable Australian Standard Specification or Code exists, the builder shall when required by the Surveyor cause to be made such tests as the Surveyor may direct. These tests shall be carried out in the presence of the Surveyor.

(b) Frequent compression tests shall be made during the progress of the works of specimens of concrete taken from the place where it is being finally deposited in the work to enable the Surveyor to ascertain if the concrete conforms to the requirements of these Regulations.

(c) The work may be subjected by the Surveyor to approved analytical tests made from samples taken from placed work, at the rate of not less than one test for each 2,000 square feet of floor area executed in concrete.

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#### CHAPTER 14.

##### FIRE RESISTING MATERIALS.

- Clause 1401.—General.
- Clause 1402.—Requirements for Materials.
- Clause 1403.—Protection of Columns.
- Clause 1404.—Fire Rating of Materials.
- Clause 1405.—Materials for Stairs.
- Clause 1406.—Fire Retardant Materials.
- Clause 1407.—Fire Doors.
- Clause 1408.—Fire Windows.
- Clause 1409.—Fire Shutters.

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#### CHAPTER 14.

##### FIRE RESISTING MATERIALS.

1401. General.—(a) Materials of construction and any combination of such materials shall be classified for fire-resistive purposes in terms of hours of resistance to destruction when subjected to the Standard Fire Test as set out in S.A.A. Specification, No. A.30-1935.

(b) The materials and combination of materials set out in this chapter shall be assumed to have the fire-resistance ratings here given. Other materials or combinations of materials may be used in place thereof provided that such materials or combination of materials have, when subjected to the Standard Fire Test, a fire-resistance rating at least equal to that required by these Regulations for the part of the structure in which it is proposed to use such materials or combination of materials, and if, in the opinion of the Surveyor, such materials or combinations of materials are otherwise suitable for the purpose.

(c) The thickness and sizes of materials and combinations of materials given in this chapter are the minimum thicknesses and sizes which will be accepted for the purposes of fire resistance, but all such materials and methods of construction must in addition comply in all respects with all other provisions of this Regulation.



1402. **Requirements for Materials.**—Materials to be given the fire-resistance ratings set out in this chapter, shall comply with the relevant requirements of Chapter 13 hereof and with the requirements set down hereunder:—

- (a) Bricks, terra cotta blocks, and concrete blocks shall be laid in cement or composition mortar, except that lime mortar may be used in the case of buildings of one storey only.
- (b) Gypsum blocks shall be laid in gypsum or lime mortar.
- (c) Expanded metal as a base or reinforcement for plastering shall have not less than two and one-half meshes per inch.
- (d) Except where the use of gypsum plaster is permitted, plaster shall consist of cement mortar not less than  $\frac{1}{2}$  inch thick which may be finished in gypsum plaster or lime putty. Gypsum plaster shall consist of not less than two and a half parts of sand to one part of gypsum. In all cases where plastering is required, the thickness of plaster is additional to the thickness of material specified in clause 1404.
- (e) Pre-cast concrete for steel encasement shall be in large units with metal reinforcement equivalent to that specified for concrete encasement of steel work in S.A.A. Code for Concrete in Building, No. C.A.2-1937, the method of jointing such units to be approved by the Surveyor. (See also clause 2408.)

1403. **Protection of Columns.**—In factories, garages, warehouses, and other buildings in which the fire-protective covering of steel or iron columns may be injured by the movement of vehicles, materials or equipment, the Surveyor may require such covering to be protected by metal or other suitable material.

1404. **Fire Rating of Materials.**—The fire-resistance rating of materials or combinations of materials when used for the purposes described shall be assumed to be as set out hereunder:—

- (a) **Walls.**—External and internal bearing walls, fire walls, and party walls.
  - (i) **4 Hours**—
    - 9-in. solid brick or sand-lime brick.
    - 11-in. cavity walls of brick or sand-lime brick, plastered both sides.
    - 9-in. ashlar masonry.
    - 8-in. solid concrete blocks, Grade A or B.
    - 10-in. cavity walls of solid concrete blocks, Grade A or B, plastered both sides.
    - 8-in. concrete, not reinforced.
    - 6-in. reinforced concrete.
    - 5-in. reinforced concrete, plastered both sides.
  - (ii) **3 Hours**—
    - 11-in. cavity walls of brick or sand-lime brick, plastered one side.
    - 6-in. solid concrete blocks, Grade A or B.
    - 6-in. concrete, not reinforced.
    - 5-in. reinforced concrete.
    - 4-in. reinforced concrete, plastered both sides.
    - Any wall specified in clause 1404 (a) (i).
- (b) **Walls.**—Exterior panel walls, internal non-bearing walls and partitions, lift, stair and shaft enclosures.
  - (i) **3 Hours**—
    - 11-in. cavity walls of brick or sand-lime brick.
    - 10-in. cavity walls of solid concrete blocks, Grade A or B.
    - 6-in. terra cotta or hollow concrete blocks, plastered one side.
    - 5-in. concrete, not reinforced.
    - 4-in. reinforced concrete.
    - Any wall specified in clause 1404 (a).
  - (ii) **2 Hours**—
    - 4½-in. brick or sand-lime brick, plastered both sides.
    - 4-in. solid concrete blocks, Grade A or B, plastered both sides.
    - 4-in. concrete, not reinforced.
    - 3-in. reinforced concrete.
    - Any wall specified in clause 1404 (a) or 1404 (b) (i).

## (iii) 1 Hour—

- 4½-in. brick or sand-lime brick.
- 4-in. solid concrete blocks, Grade A or B.
- 3-in. solid concrete blocks, Grade A or B, plastered one side.
- 3-in. hollow concrete blocks or terra cotta, plastered both sides.
- 3-in. gypsum blocks, plastered both sides with gypsum plaster.
- 2½-in. solid Portland cement plaster or gypsum plaster on expanded metal or wire lath on incombustible studding.
- Any wall specified in clause 1404 (a) or 1404 (b) (i) or (ii).

## (c) Floors, Roofs, and Ceilings.

## (i) 3 Hours—

- 4 inches of reinforced concrete, having not less than ¾-in. cover to reinforcement.
- 4 inches of pre-cast reinforced concrete with concrete laid *in situ* above, the thickness given being exclusive of cavities and no portion of any concrete or pre-cast concrete being less than 1 inch thick.
- 7 inches minimum of composite construction consisting of a top slab not less than 2 inches thick on concrete ribs and fillers of hollow gypsum, concrete, or terra cotta blocks, the thickness of the top, bottom and sides of each block being not less than ¾ inch and with not less than ¾ inch cover to reinforcement.

## (ii) 2 Hours—

As for 3 hours.

## (iii) 1 Hour—

Wood joist construction fire stopped by filling all openings around pipes or flues with incombustible material, and covered with double board floor, having a total thickness of not less than 1½ inch, and with ceiling of at least ¾-in. plaster or gypsum plaster on expanded metal or wire lath. The weight of expanded metal or wire lath shall not be less than 2.2 lb. per square yard.

(d) Steel Columns.—Thicknesses given below are the minimum thicknesses measured from the face of the steel exclusive of rivet heads, but in the case of columns in buildings of Class VI. and Class VII. Occupancy, such thickness shall be increased by ½ inch. In columns required to have 4-hour or 3-hour ratings, re-entrant or other accessible spaces behind the specified outer protection shall be filled with concrete or with the material of the outer protection. Where the edges of the flanges of the columns project beyond the webs, the thicknesses specified may be reduced by not more than ½ inch immediately opposite such edges. (See also Clause 2408.)

## (i) 4 Hours—

- 2½ inches of concrete or pre-cast concrete.
- 2-in. concrete, plastered.
- 4½-in. brick.
- 4-in. solid concrete block, Grade A or B.
- 4-in. terra cotta, plastered.
- 4-in. hollow concrete block, plastered.

## (ii) 3 Hours—

- 2-in. concrete or pre-cast concrete.
- 1½-in. pre-cast concrete, plastered.
- 3-in. brick.
- 3-in. solid concrete blocks, Grade A or B.
- 3-in. terra cotta, plastered.
- 3-in. hollow concrete blocks, plastered.
- Any material specified under clause 1404 (d) (i).

- (iii) 2 Hours—  
 1½-in. pre-cast concrete.  
 1-in. pre-cast concrete, plastered.  
 2-in. solid concrete blocks, Grade A or B.  
 2-in. terra cotta, plastered.  
 2-in. hollow concrete blocks, plastered.  
 Any material specified under clause 1404  
 (d) (i) or (ii).
- (e) **Combination Columns.**—The thickness specified below is the minimum thickness of concrete cover over the face of the main steel members, but in the case of columns in buildings of Class VI. and Class VII. Occupancy, such thickness shall be increased by ½ inch.
- (i) 4 Hours—  
 2-in. concrete.
- (ii) 3 Hours—  
 As for 4 hours.
- (iii) 2 Hours—  
 As for 4 hours.
- (f) **Reinforced Concrete and Composite Columns.**—The thicknesses specified below are the minimum concrete cover over the main reinforcements. All structural steel must be covered at least 3 inches in buildings of Class VI. and Class VII. Occupancy and 2½ inches in all other buildings.
- (i) 4 Hours—  
 2-in. concrete.  
 1½-in. concrete, plastered.
- (ii) 3 Hours—  
 1½-in. concrete.  
 1-in. concrete, plastered.
- (iii) 2 Hours—  
 1-in. concrete.
- (g) **Steel Beams, Girders, and Trusses.**—Thicknesses given below are the minimum thicknesses measured from the outer face of the steel. Re-entrant angles are to be filled. (See also Clause 2407.)
- (i) 4 Hours—  
 2-in. concrete.  
 1½-in. concrete, plastered.
- (ii) 3 Hours—  
 1½-in. concrete.  
 1-in. concrete, plastered.
- (iii) 2 Hours—  
 1-in. concrete.
- (h) **Reinforced Concrete Beams, Girders, and Trusses.**—Thicknesses specified below are the minimum concrete cover over main reinforcement, including stirrups over ½-in. diameter.
- (i) 4 Hours—  
 1½-in. concrete.
- (ii) 3 Hours—  
 As for 4 hours.
- (iii) 2 Hours—  
 1-in. concrete.
- (i) **Lintels.**—Lintels shall have or shall be so protected as to have the same degree of resistance to fire as to the walls in which they occur, provided that steel or iron angles, plates, or bars carrying the outer portions of external walls and supported from structural beams or lintels or spanning over openings in walls and partitions of one or two-hour rating, or over openings in walls of Class I. or Class II. Occupancy shall not be required to have a fire-resistance rating.
- (j) **Base Structures.**—A base structure shall have a fire rating at least equal to that of the portion of the building which it supports.

1405. (a) **Stairs.**—Except as provided in clause 2710 (a), the following materials will be permitted for stairs:—

- (i) Reinforced concrete.  
 (ii) Iron or steel, not less than ¼ inch in thickness.

- (iii) Jarrah, red gum, or other timber having an average density at 12% moisture content of more than 50 lb. per cubic foot and having a finished thickness of not less than  $1\frac{3}{4}$  inch.

(b) **Ceilings and Soffits of Staircases.**—The following materials will be permitted for ceilings or soffits of staircases:—

- (i) Plaster.
- (ii) Approved plaster or asbestos sheeting.
- (iii) Tongued and grooved jarrah or other hard timber having a finished thickness of not less than  $\frac{3}{4}$  inch.

**1406. Fire Retardant Materials.**—The following materials shall be classified as fire-retardant materials:—

(a) **For Roof Coverings—**

- (i) Sheet metal, not less than No. 26, B.W.G. in thickness.
- (ii) Slates.
- (iii) Terra cotta or cement roofing tiles.
- (iv) Asbestos cement sheets, not less than  $\frac{3}{16}$  inch in thickness.
- (v) Built-up roofing, consisting of successive layers of roofing felt, the final layer consisting of asbestos felt impregnated with tar or asphalt, or other roofing felt impregnated with tar or asphalt and covered with gravel or granulated slate or stone.
- (vi) Concrete, granolithic, terrazzo, cement mortar, and other similar incombustible materials.

(b) **For Internal Construction—**

- (i) Iron, steel, or copper sheets, not less than No. 26, B.W.G. in thickness.
- (ii) Asbestos cement sheets having a thickness of not less than  $\frac{5}{32}$  inch.
- (iii) Any material specified under sub-clause (a) (vi) of this clause.

**1407. Fire Doors.**—Fire doors shall be classified as two-hour or one-hour fire doors:—

- (a) Two-hour fire doors shall be wood-cored metal-clad doors complying with the specification for Construction and Installation of Fire Doors of the Fire and Accident Underwriters' Association of Victoria, or any other type which will provide equivalent resistance to fire, the spread of fire and smoke, and transmission of heat when subjected to the Standard Fire Test, and which is otherwise suitable and approved by the Fire and Accident Underwriters' Association of Victoria.
- (b) One-hour fire doors shall be hollow metal or metal-clad doors, capable of providing a resistance of one hour to fire, to spread of fire and smoke, and to transmission of heat when subjected to the Standard Fire Test, and which are approved by the Fire and Accident Underwriters' Association of Victoria.
- (c) Where a one-hour fire door is required by these Regulations a properly framed solid or solid-core hardwood door of not less than  $1\frac{3}{4}$ -in. finished thickness, and of scantlings in no case less than  $3\frac{3}{4}$  inches x  $1\frac{3}{4}$  inch in sectional area shall be permitted.
- (d) Where a one-hour fire door is required by these Regulations a door having a higher fire rating may be used in place thereof.
- (e) Except as provided in clauses 2801 and 2803 and in special circumstances approved by the Surveyor, no opening protected by a fire door shall exceed 56 square feet in area.
- (f) Where glazing is permitted in fire doors elsewhere in these Regulations, such glazing shall not exceed 2 square feet in superficial area, shall be secured with metal beads, and shall consist of—
  - (i) wired glass not less than  $\frac{1}{4}$  inch thick;
  - (ii) electric copper glazing not less than  $\frac{1}{4}$  inch thick, the area of each individual pane being not more than 16 square inches.
- (g) All fixings, frames, sills, fastenings, and other details of fire doors shall be in accordance with the specification for Construction and Installation of Fire Doors of the Fire and Accident Underwriters' Association of Victoria.

1408. **Fire Windows.**—(a) One-hour fire windows shall be—

- (i) electro-copper glazing or steel-framed windows glazed with wired glass, complying with the specification for Construction and Installation of Fire Windows and Electric Copper Glazing of the Fire and Accident Underwriters' Association of Victoria; or
  - (ii) glass masonry assembled, constructed, and installed in accordance with the requirements of the Fire and Accident Underwriters' Association of Victoria.
- (b) Two-hour fire windows shall consist of two one-hour fire windows built into the one opening, with an air space between.
- (c) No opening protected by a fire window shall exceed 56 square feet in superficial area.
- (d) One-hour wired glass skylights shall be similar in construction and glazing to fire windows, and shall be supported on steel or concrete kerbs. No skylight opening shall exceed 100 square feet in superficial area.
- (e) All fixings, frames, sizes, fastenings, and other details of fire windows and skylights shall be in accordance with the specification for Construction and Installation of Fire Windows, Electro Copper Glazing, and Wired Glass Skylights of the Fire and Accident Underwriters' Association of Victoria.

1409. **Fire Shutters.**—Fire shutters shall be tin-clad, steel-clad, iron or steel gauze shutters or steel interlocking roller shutters, complying with the specification for Construction and Installation of Fire Shutters of the Fire and Accident Underwriters' Association of Victoria.

#### CHAPTER 15.

##### LIVE AND DEAD LOADS.

- Clause 1501.—Design for Loads.
- Clause 1502.—Determination of Dimensions of Structural Members.
- Clause 1503.—Live Loads.
- Clause 1504.—Impact.
- Clause 1505.—Live Load Reductions.
- Clause 1506.—Partitions.
- Clause 1507.—Loading Notice Plates.
- Clause 1508.—Maximum Loading During Construction.
- Clause 1509.—Wind Loading.
- Clause 1510.—Extra Loads.
- Clause 1511.—Light Frame Buildings.
- Clause 1512.—Buildings Divided by Expansion Joints.
- Clause 1513.—Combined Stresses.
- Clause 1514.—Load on Roof Covering.
- Clause 1515.—Weight of Materials.

#### CHAPTER 15.

##### LIVE AND DEAD LOADS.

1501. **Design for Loads.**—Every building and every portion thereof shall be designed to withstand the forces and to support the loads both dead and live to which it is subject, without exceeding the stresses allowed for the various materials elsewhere in these Regulations.

1502. **Determination of Dimensions of Structural Members.**—The method of determining the dimensions of structural members shall, except where prescribed to the contrary in these Regulations—

- (a) in the case of reinforced concrete structural members, be in conformity with the S.A.A. Code for Concrete in Building, No. C.A.2-1937;
- (b) in the case of structural steel members, be in conformity with the S.A.A. Code for Structural Steel in Building, No. C.A.1-1939, and the S.A.A. Welding Code No. C.A.8-1939;

(c) in cases not provided for in the S.A.A. Codes specified in the preceding sub-clauses, admit of a rational analysis and be in accordance with the established principles of mechanics and structural design;

(d) in the case of timber members, be in conformity with the Handbook of Structural Timber Design (second edition), being Technical Paper No. 32, issued by the Division of Forest Products of the Council for Scientific and Industrial Research.

1503. Live Loads.—The minimum live loads for which a building or portion of a building may be designed shall be the loads specified in Table 1503 for the particular occupancy or for the occupancy most closely resembling same, but where the actual live loads to be imposed thereon exceed the loads specified in Table 1503 the design shall provide for the actual live loads.

TABLE 1503.—MINIMUM LIVE LOADS.

Class of Occupancy.	Portion.	Minimum Live Load lb. per square foot.	
Class I.—Houses .. ..	All .. .. .	40	
Class II.—Flats .. ..	Common dining rooms and Lounges .. .. .	60	
	All other portions .. ..	40	
Class III.—Residential buildings ..	Common dining rooms ..	60	
	Any room used for dancing ..	100	
	All other portions .. ..	40	
Class IV.—Dwellings attached to other classes of buildings	All .. .. .	40	
Class V.—Office buildings ..	Ground floor entrance halls, vestibules and porches ..	100	
	All other portions .. ..	50	
Class VI.—Shops	All .. .. .	100	
Class VII.—Warehouses— (a) Garages .. ..	Floors at street level .. ..	150	
	Other floors— If designed for passenger-cars only .. .. .	75	
	If designed for storage of commercial vehicles .. ..	150	
	(b) Other warehouses ..	Portions used for display and not for storage of goods ..	100
		All other .. .. .	150
Class VIII.—Factories .. ..	To be calculated .. ..	(Min.) 100	
Class IX.—Public buildings— (a) Assembly Churches ..	Aisles and corridors .. ..	80	
	Other portions— Having fixed seats .. ..	40	
	Having moveable seats .. ..	60	
	Dance halls .. .. .	100	
	Libraries .. .. .	200	
	Schools .. .. .	All other .. .. .	70
		Assembly rooms and corridors	80
	Other portions— Having fixed seats .. ..	40	
	Having moveable seats .. ..	60	
	Theatres .. .. .	40	
	All other places of public assembly .. .. .	Dressing rooms .. .. .	40
		All other .. .. .	100
	(b) Institutional .. ..	.. .. .	100
		All .. .. .	40

TABLE 1503—continued.

Class of Occupancy.	Portion.	Minimum Live Load lb. per square foot.
All classes of Buildings—		
(a) Roofs pitched .. ..	.. .. .	See clause 1509
(b) Roofs flat, available for traffic or resort, or accessible by lifts or stairs	.. .. .	50
(c) Roofs flat, not available for traffic or resort and inaccessible by lifts or stairs	.. .. .	10
(d) Cantilever verandahs ..	.. .. .	30
(e) Escape stairs .. ..	.. .. .	100
Public footpaths and arcades for pedestrian traffic only	.. .. .	150
Loading docks and floors (except floors of garages) carrying vehicular traffic (See also cl. 1503)	.. .. .	200

1504. Impact.—Where a floor or portion of a floor in a building is to be designed to carry machinery, the live load shall be increased by the addition of 50 per cent. of the weight of such machinery to provide for impact, and each member shall be designed to support the load so computed, provided that the dimensions of such members shall not be less than those determined under the loading requirements given in Table 1503.

1505. Live Load Reductions.—(a) In designing columns, piers, and walls, the percentage reductions in total live loads set out in Table 1505 (Live Load Reductions) shall be allowed.

TABLE 1505.—LIVE LOAD REDUCTIONS.

	Class of Occupancy.	
	Class VII. Warehouses. Percentage Reduction of Floor Live Load.	Buildings of All Other Classes. Percentage Reduction of Floor Live Load.
Columns, piers and walls carrying—		
The roof .. .. .	0	0
One floor and roof .. .. .	0	0
Two floors and roof .. .. .	5	10
Three floors and roof .. .. .	10	20
Four floors and roof .. .. .	15	30
Five floors and roof .. .. .	20	40
Six or more floors and roof .. .. .	25	50

(b) In buildings other than buildings of Class VII. Occupancy (Warehouses), a reduction of 15 per cent. of the floor live load shall be allowed in designing beams and girders carrying 300 square feet or more of floor space, but such reduction shall not be taken into account in the design of columns.

(c) Footings and base structures shall be designed to carry the live and dead loads transmitted to them after allowing for the reductions in respect of columns, piers, and walls set out in Table 1505.

1506. Partitions.—The type and weight of partitions shall be specified, but where the positions of partitions are not definitely located in the design, the beams and floor slabs shall be designed to carry, in addition to the specified live load uniformly distributed, a uniformly distributed dead load per square foot equal to not less than 10% of the actual weight per foot run of such partitions. Where the type and weight of partitions have not been determined, provision may be made in the design for an estimated weight and any partitions subsequently erected shall not exceed such estimated weight.

1507. **Loading Notice Plates.**—On completion of any building of Class VI., VII., or VIII. Occupancy constructed pursuant to a permit granted under these Regulations, and before the occupation of any such building or portion of a building the owner shall affix and subsequently maintain in conspicuous places on the walls thereof, not less than 3 feet above the floor, notice plates conforming to the requirements of clause 211 showing the safe live loads the floor or portion of the floor has been designed to support.

1508. **Maximum Loading During Construction.**—The maximum stress imposed on any part or member of a building during course of construction shall be not more than 25 per cent. in excess of the working stress specified in these Regulations.

1509. **Wind Loading.**—All buildings and parts of buildings exposed to wind pressure shall be designed to resist safely both during construction and after completion the wind pressure set out below:—

- (a) Walls and other vertical surfaces shall be designed for 12½ lb. per square foot pressure on the windward side and 7½ lb. per square foot suction on the leeward side, provided that where the site is not specially exposed to wind, the wind loading on such surfaces, if less than 50 feet high, may be taken as a pressure of 8 lb. per square foot on the windward side and a suction of 5 lb. per square foot on the leeward side.
- (b) Inclined surfaces shall be designed for wind loadings as set out hereunder, negative signs indicating suction:—

*Plane Roof Surfaces.*

<i>Angle of Inclination.</i> (θ)	<i>Wind loading lb. per sq. ft.</i>	
	<i>Windward slope.</i>	<i>Leeward slope</i>
Less than 20° .. .. .	— 12	.. .. . — 9
20° to 30° .. .. .	1.2θ — 36	.. .. . — 9
Greater than 30° .. .. .	.. .. .	.. .. . — 9

*Rounded Roof Surfaces.*

$$\left\{ \text{Ratio of } \frac{\text{Rise}}{\text{Span}} = r. \right\}$$

(i) *Windward quarter of the roof arc.*

<i>Roofs Resting on elevated vertical supports</i>	<i>Roofs springing from Ground Level.</i>
· r. <i>Wind Loading</i> <i>lb. per</i> <i>sq. ft.</i>	
Less than 0.2 .. .. . — 12	For all ratios of rise to span (r) a normal pressure of 19r lb. per sq. ft. shall be provided for.
0.2 to 0.35      80 r—28	

(ii) *Central Half of the roof arc.*

<i>Roofs resting on elevated vertical supports.</i>	<i>Roofs springing from Ground Level.</i>
For all ratios of rise to span (r) a suction of (15r + 11) lb. per sq. ft. shall be provided for.	For all ratios of rise to span (r) a suction of 11 lb. per sq. ft. shall be provided for.

(iii) *Leeward quarter of the roof arc*—For all ratios of rise to span a suction of 9 lb. per square foot shall be provided for.

(c) In addition to the loads specified in sub-clauses (a) and (b) an internal pressure (equivalent to external suction) or suction (equivalent to an external pressure) of 4½ lb. per square foot shall be allowed for buildings nominally airtight but with small openings. For buildings in which 30 per cent. or more of the wall surface is capable of being opened, an internal pressure of 12 lb. per sq. ft. or an internal suction of 9 lb. per square foot shall be allowed.



1510. **Extra Loads.**—In addition to the loads referred to in Clause 1509 (b) a vertical pressure of 10 lb. per square foot over the entire area of all roof surfaces shall be provided for. In buildings in which special loads, such as shafting or runaways are attached to roof trusses or other roof members, such trusses or other roof members shall be designed to support the special loads as a further additional loading.

1511. **Light Frame Buildings.**—Light frame buildings with large openings shall be designed to resist stresses due to pressure of wind entering such openings.

1512. **Buildings Divided by Expansion Joints.**—Where a building is divided up into sections by expansion and contraction joints, each section must be considered separately in regard to wind pressure unless the sections are suitably anchored together.

1513. **Combined Stresses.**—For members carrying combined stresses due to wind and other loads and for members carrying wind load only, in addition to their own dead load, the working stress may be increased  $33\frac{1}{2}$  per cent., provided (i) the section thus found is not less than that required for all loads other than those due to wind, and (ii) in the case of timber the increase in stress may be in accordance with the recommendations given in the Handbook of Structural Timber Design referred to in Clause 1502 (d).

1514. **Load on Roof Covering.**—Where roof covering is supported at intervals greater than 18 inches, such covering shall be capable of supporting, without fracturing, a load of 200 lb. centrally placed between the supports, but the mere bending of the roof covering shall not be regarded as a fracture.

1515. **Weight of Materials.**—The weight of the materials actually employed in the structure under the provisions of these Regulations shall be determined on the building, and shall not exceed those used in the design without the approval of the Surveyor.

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#### CHAPTER 16.

##### PRECAUTIONS DURING CONSTRUCTION AND PULLING DOWN OF BUILDINGS.

Clause 1601.—Protection of Public.

Clause 1602.—Protection of Workmen.

Clause 1603.—Temporary Ramps.

Clause 1604.—Protection of Adjacent Property.

Clause 1605.—Height of Walls during Construction.

Clause 1606.—Pulling Down of Buildings.

Clause 1607.—Alterations to Buildings.

Clause 1608.—Permit for Pulling Down or Removal.

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#### CHAPTER 16.

##### PRECAUTIONS DURING CONSTRUCTION AND PULLING DOWN OF BUILDINGS.

1601. **Protection of Public.**—(a) Where a building is to be constructed or pulled down at or adjoining the building line of any street, precautions shall be taken to ensure the safety of the public using such street and particulars of such precautions shall be submitted to and approved by the Surveyor before any work is commenced.

(b) Where excavations connected with the construction or pulling down of any building are made in or adjoining any street, such excavations shall be adequately fenced and, at night, lighted to prevent injury to the public, and where considered necessary by the Surveyor, shall be properly timbered to prevent damage to such street.

**1602. Protection of Workmen.**—Where excavations connected with the construction or pulling down of any building require to be timbered, such timbering shall be so constructed as to afford adequate protection for workmen.

**1603. Temporary Ramps.**—Where temporary ramps are required to provide access to excavations in connexion with any building operations, such ramps shall be constructed to a suitable grade and have the necessary strength and stability. Every ramp shall have a minimum width of 10 feet and a guide or kerb on each side at least 9 inches in height and 6 inches in width.

**1604. Protection of Adjacent Property—**

- (a) (i) Where excavation or demolition is to be made in proximity to an existing building, the walls of such building shall be shored and/or underpinned and/or protected as may be necessary to ensure stability;
  - (ii) where the foundation of an existing building is of material likely to become unstable as a result of the excavation of adjoining ground additional precautions shall be taken to ensure its stability;
  - (iii) underpinning shall be in conformity with the requirements of clause 2014.
- (b) Where the foundation of an existing building consists of hard stable rock the requirements of sub-clause (a) relating to underpinning may be dispensed with.

**1605. Height of Walls during Construction.**—No wall or portion of a wall shall, during its construction, be built to a height greater than 5 feet or six times its thickness, whichever is the greater, unless it is supported by temporary shores, proper scaffolding or buttresses at intervals of length not greater than 30 times its thickness, until such time as roof or floor ties or cross walls are in position.

**1606. Pulling Down of Buildings.**—The following requirements in connexion with the pulling down of buildings shall be complied with:—

- (a) unless otherwise approved by the Surveyor, storey after storey shall be completely removed;
- (b) materials being removed from any building shall not be placed upon the floor or floors of such building, but shall be lowered to the ground immediately upon displacement and removed from the site unless otherwise permitted by the Surveyor;
- (c) no portion of any external wall abutting on any street or road shall be pulled down except between such hours as the Surveyor may direct;
- (d) for the purpose of preventing or lessening nuisance from dust, material displaced from a building shall be kept sprayed with water.

**1607. Alterations to Buildings.**—Where alterations are being made to any building, every portion of the building likely to become structurally insecure by reason of such alterations shall be adequately shored up and supported.

**1608. Permit for Pulling Down or Removal.**—(a) No building or any substantial portion thereof shall be pulled down or removed unless a permit for such pulling down or removal has first been issued pursuant to the provisions of Chapter 5 of these Regulations.

(b) Where the pulling down or removal of any building affects any sewerage or water supply installation, prior notification of such pulling down or removal shall be given to the Sewerage Authority and/or to the authority supplying water to such building and any requirements of such Authority as to sealing of pipes shall be complied with.

[Sanitary Accommodation for Workmen during Construction.—  
See clause 3010.]

## CHAPTER 17.

**DAMPNESS AND DRAINAGE OF SITE.**

Clause 1701.—Land Liable to Flooding.

Clause 1702.—Land without Proper Means of Drainage.

Clause 1703.—Stormwater Drains.

Clause 1704.—Treatment of Ground Beneath the Building.

Clause 1705.—Subsoil Drainage.

## CHAPTER 17.

**DAMPNESS AND DRAINAGE OF SITE.**

1701. **Land Liable to Flooding.**—(a) Except as provided in sub-clause (b) hereof, no building shall be constructed upon any land liable to be flooded or inundated by water.

(b) The Council may by resolution permit a building to be constructed on any such land provided that :

- (i) the surface of the lowest floor and all inlets to a sewerage system are constructed to a level approved by the Surveyor, but in any case not lower than 12 inches above the maximum flood level;
- (ii) measures approved by the Surveyor are taken to prevent the retention of flood waters and flood debris beneath the building.

1702. **Land without Proper Means of Drainage.**—(a) No building intended or adapted to be used wholly or partly for residential purposes shall be constructed upon land which cannot at all times be efficiently drained by gravitation into some adjoining street, channel, or drainage easement, on to, through, or over which such drainage may lawfully be discharged.

(b) The Council may by resolution permit buildings of Class V, VI, VII, or VIII. Occupancy to be constructed on any such land provided that the requirements of clause 1703 are complied with.

1703. **Stormwater Drains.**—(a) Every new building or every existing building that is being altered or extended, shall be provided with a complete and effective system of stormwater drains to the satisfaction of the Surveyor for the collection of stormwater discharged from the roof of the building and the interception and collection of storm and surface water from the allotment on which the building is erected, and for the conveyance of such storm and surface water to some point where it may be lawfully discharged.

(b) Such drains shall—

- (i) be constructed of cast iron, brick, stone, salt-glazed ware, or other material approved by the Surveyor
- (ii) be constructed to regular falls and be at every point of sufficient capacity to carry the whole of the water collected;
- (iii) when the line of any such drain crosses any public footway, be constructed in conformity with the requirements of the Surveyor:

(c) Downpipes connected to such drains for the collection of roof water may be exposed inside a building provided they are constructed in cast iron or sheet metal of not less than 24 B.W.G.

(d) Downpipes when inside a building and encased in such a manner as to be inaccessible shall be of copper, wrought iron, cast iron, or other approved non-corrosive material.

1704. **Treatment of Ground Beneath the Building.**—Where the Surveyor considers it necessary, the surface of the ground beneath any building shall be—

- (a) regraded and provided with adequate outlets to prevent any accumulation of water beneath the floors, or
- (b) covered with approved damp-resisting material.

1705. **Subsoil Drainage.**—Where the Surveyor considers such action necessary, the subsoil at the site of any new building shall be drained by means of a system of subsoil drains properly laid to an approved out-fall. The layout and type of drains and the method to be used for disposing of the subsoil water shall be approved by the Surveyor.

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## CHAPTER 18.

### EXCAVATIONS.

Clause 1801.—Depth of Foundation Excavation.

Clause 1802.—Inspection of Foundation Excavations.

Clause 1803.—Retaining Walls.

Clause 1804.—Removal of Water from Excavations.

Clause 1805.—Excavations Adjacent to Adjoining Buildings.

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## CHAPTER 18.

### EXCAVATIONS.

1801. **Depth of Foundation Excavation.**—Subject to the provisions of clause 1901 of these Regulations, excavations for foundations shall be taken to such depths as will, in the opinion of the Surveyor, give a foundation capable of effectively supporting the loads to be imposed thereon by the footings.

1802. **Inspection of Foundation Excavations.**—Twenty-four hours' notice in writing shall be given to the Surveyor when excavations for foundations are ready for inspection and no footing shall be placed in position until the excavations have been inspected and approved by the Surveyor.

1803. **Retaining Walls.**—All permanent excavations with slopes steeper than the angle of repose or natural slope of the soil shall have retaining walls of masonry or reinforced concrete of sufficient strength and stability to retain the embankment together with any surcharged loads.

1804. **Removal of Water from Excavations.**—Water shall be removed from excavations before concrete is deposited, unless otherwise directed by the Surveyor. Any flow of water into the excavation shall be diverted through proper side drains to a sump, or shall be removed by other approved methods which will avoid washing the freshly deposited concrete. Water and vent pipes and drains, if left in position, shall be filled by grouting or otherwise after the concrete has thoroughly hardened.

1805. **Excavations Adjacent to Adjoining Buildings.**—See clause 1604.

CHAPTER 19.  
FOUNDATIONS AND FOOTINGS.

- Clause 1901.—Loading on Foundations.
- Clause 1902.—Pile Foundations.
- Clause 1903.—Pile Driving Formula.
- Clause 1904.—Tests may be Required.
- Clause 1905.—Foundation Tests.
- Clause 1906.—Pile Loading Tests.
- Clause 1907.—Footings.
- Clause 1908.—Projection of Footings.

CHAPTER 19.  
FOUNDATIONS AND FOOTINGS.

1901. Loading on Foundations.—The maximum loading per square foot which any footing shall be permitted to transmit to its foundation shall—

- (a) where the bearing capacity of the foundation has been tested, be not more than the bearing capacity disclosed by such test.
- (b) where the bearing capacity of the foundation has not been tested, be not more than the loading shown in Table 1901 for the particular material comprising the foundation.

TABLE 1901.  
Allowable Loading on Foundations.

Kind of Materials.	Tons per Square Foot.
Alluvial soil, made ground, very wet sand .. .. .	Up to $\frac{1}{2}$
Soft clay or loam .. .. .	" 1
Ordinary clay and dry sand mixed with clay .. .. .	" 2
Dry sand and dry clay .. .. .	" 3
Hard clay and firm coarse sand .. .. .	" 4
Firm coarse sand and gravel .. .. .	" 6
Shale rock .. .. .	" 8
Soft sandstone .. .. .	" 12
Medium sandstone .. .. .	" 20
Hard sandstone (free of seams up to a depth of 6 feet) .. .. .	" 30
Hard igneous rock .. .. .	" 40

1902. Pile Foundations.—(a) Where the bearing capacity of the foundation is not adequate to support any portion of a building, such building or portion thereof shall be erected on a foundation of piles.

(b) All piles shall be designed to withstand the forces involved in the handling and driving and to support the live and dead loads without exceeding the stresses laid down in these Regulations.

(c) (i) Piles may be driven by drop hammers or steam hammers or forced down by hydraulic rams or other suitable means. The work shall be done in such a manner as not to injure the pile, and any pile injured shall be withdrawn and rejected provided that if only the head of the pile is injured, the injured portion only need be removed. The remaining portion of the pile must be adequately embraced by the pile capping, which shall be designed to transmit the whole of the live and dead loads from the building to the piles and to distribute it as required amongst the piles.

(ii) In all cases jetting may be used to assist the driving, but the jetting shall be discontinued in the final stages and the requisite resistance of the pile reached by the application of hammer blows or pressure methods only.

(d) Where piles are driven, the total load on any pile shall not exceed the allowable value as determined by the Hiley Pile-driving formula given in clause 1903.

(e) Where piles are forced down by applied pressure, the total applied pressure at which the piles cease to subside shall be not less than the live and dead loads to be supported by such piles.

### 1903. Pile-driving Formula.—

(a) *Hiley Piledriving Formula.*—The load on any pile shall not exceed the allowable value determined from the Hiley formula as follows:—

$$R = \frac{4nWh}{s + c/2}$$

Where  $R$  is the allowable load on the pile in pounds,

$n$  the efficiency of the blow as prescribed in paragraph (b) hereof,  
 $W$  the weight of the striking part of the hammer in pounds,

$h$  the height of the free fall of the hammer in feet as prescribed in paragraph (c) hereof,

$s$  the average penetration per blow in inches for the last five blows, ( $s$  shall be measured during the driving and not upon re-driving when a pile has been allowed to stand more than one hour after having been driven. In the case of wood piles, broomed heads shall be cut out to sound wood before making penetration measurements).

$c$  the sum of the temporary elastic compressions of the pile, the driving head and the ground. The value of ( $c$ ) may be determined experimentally or may be estimated from the values given in paragraph (d) hereof.

(b) *Estimation of the Efficiency of the Blow ( $n$ ).*—Where the pile is driven into penetrable ground the efficiency of the blow shall be assumed to be given by

$$n = \frac{W + e^2P}{W + P}$$

For the special case where a pile point meets with refusal on impenetrable rock the efficiency of the blow shall be assumed to be

$$n = \frac{W + 0.5e^2P}{W + 0.5P}$$

where  $P$  is the weight of the pile which includes helmet or driving cap or anvil,

$e$  is the coefficient of restitution of the hammer on the pile. This shall be assumed to have the following values:

0.5 for steel ram of double-acting hammer striking on steel anvil and driving steel sheet-piles or reinforced concrete piles,

0.4 for steel ram of double-acting hammer striking on steel anvil and driving timber piles,

0.4 for cast iron ram of single-acting or drop hammer striking directly on head of reinforced concrete pile not fitted with a helmet,

0.33 for ram of single-acting hammer striking on a 1-inch thick plate on the top of a helmet containing a wood cap fitted to a 16 by  $\frac{3}{4}$  inch steel piling tube,

0.25 for cast iron ram of single-acting or drop hammer striking on well-conditioned wood cap of helmet in driving reinforced concrete piles or directly on head of timber pile,

0.25 for steel piling tubes driven by a mandrel, and

0.0 for a deteriorated condition of head of timber pile or of the wood cap and for excess of packing in helmet

(c) *Estimation of the height of fall ( $h$ ).*—The values of  $h$  shall be taken as:

$H$  for drop hammers released by a monkey trigger,

$0.9H$  for single acting steam hammers,

$0.8H$  for drop hammers actuated by a wire rope from friction winch,

Where  $H$  is the actual stroke of the hammer or ram in feet.

For double-acting hammers:

$$h = \frac{H(W + AM)}{W}$$

Where  $A$  is the area of the piston in square inches acted on by the steam  
 $M$  is the mean effective steam pressure in pounds per square inch

Alternatively,  $Wh$  may be determined by means of an approved device attached to the hammer measuring the actual energy in foot pounds per blow delivered. Where single-acting hammers or drop hammers work in leader guides inclined at an angle  $\theta$  from the vertical a further allowance must be made for the frictional resistance of the guides and for the reduced component of gravity acting along the direction of the guides. This shall be done by substituting for  $h$ ,

$$h_1 = h(\cos \theta - \mu \sin \theta)$$

where  $\mu$  is the coefficient of friction (usually 0.1).

- (d) *Estimation of the total temporary compression (c).*—The total temporary compression in inches (c) occurring at each blow of the hammer, shall be determined by measurement during the driving of the pile, or alternatively may be estimated approximately by calculation using the following formula :

$$c = \frac{3R}{A} \left\{ \frac{L}{E} + .0001 \right\}$$

*R* may be the allowable pile load in pounds assumed in the design unless the allowable load computed from the penetration varies more than 20 per cent. from such assumed load.

*A* is the area of cross section of the pile, or in the case of a pile driven by a mandrel or a tube, the area of cross-section of the mandrel or tube, in square inches,

*L* is the length of the pile, tube or mandrel in inches,

*E* is the modulus of elasticity of the material of the pile, tube or mandrel in pounds per square inch :

- (e) *Penetration for an allowable load.*—The penetration (*s*) for an allowable load may be determined from the Hiley formula as given in the preceding paragraphs of this clause. A negative value of *s* indicates that a heavier hammer must be used.

**1904. Tests may be Required.**—Whenever the supporting capacity of a foundation or of a pile is in the opinion of the Surveyor, doubtful, he may require tests to be made to enable him to determine the loading to be permitted thereon. The loading so determined shall be taken as the allowable loading.

**1905. Foundation Tests.**—(a) Whenever a test of a foundation is required, a test pit with vertical sides shall be excavated to the level of the proposed footing and the test load shall be applied over an area of at least 1 square foot.\* This load shall be of the same intensity as it is proposed to use in service, provided that in filled ground it shall be one and a half times as great. It shall be left undisturbed for 24 hours after settlement has ceased. This load shall then be doubled by the successive application at intervals of at least four hours, of at least four equal increments. The total load shall be left undisturbed until 24 hours after settlement has ceased. The soil so tested shall be deemed adequate for the proposed intensity of loading, if the settlement under the intensity of loading proposed for use in service is less than  $\frac{3}{8}$  inch and if the total settlement throughout the test does not exceed  $\frac{3}{4}$  inch.

(b) Measurements of settlement shall be made every hour for six hours after each application of load and at least every twelve hours thereafter.

**1906. Pile Loading Tests.**—In testing a pile in place, it shall be loaded to twice its proposed working load, by additions at not less than four-hour intervals of loads not more than 5 tons. Measurement of settlement shall be made and recorded immediately before and after the addition of each load. Such measurements shall be adjusted to compensate for the elastic compression of the pile. The pile shall be considered adequate to support the proposed working load if the total settlement so measured does not exceed  $\frac{1}{2}$  inch and if no further settlement occurs after a lapse of 48 hours.

**1907. Footings.**—(a) Every building shall have a complete system of footings constructed of concrete conforming to the requirements of clause 1311 and capable of transmitting the whole of the dead and live loads from the building to the foundations in such a manner that the pressure on the foundations in no place exceeds that permitted by clause 1901, and the stresses in the materials of the footings do not exceed those permitted for such materials pursuant to Chapter 13.

(b) Where a wall has a continuous footing which is not suitably reinforced, the minimum width and depth shall be as follows:—

(i) **Width.**—The footings shall be at least 8 inches wider than the thickness of the wall resting upon it, measured at the level of the lowest floor, such additional width extending equally on each side of the wall, except where it adjoins a boundary or another wall.

(ii) **Depth.**—The depth of the footing shall be not less than 12 inches, unless the foundation consists of firm rock.

(c) In all pier and column footings, the centroid of pressure of each footing shall reasonably coincide with the centre of gravity of the load supported by the footing.

**1908. Projection of Footings.**—Footings shall not extend more than 12 inches beyond the street alignment, provided that where the highest part thereof is not less than 6 feet below the level of the ground, they may extend not more than 3 feet beyond the street alignment.

\*Allowance should be made for the fact that on certain types of soil the unit bearing value under large footings is less than that under small footings.

CHAPTER 20.

**WALLS AND PARTITIONS IN TYPES 1, 2, AND 3 CONSTRUCTION.**

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- Clause 2058.—Approval Required to Increase Thickness.  
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**Part X.—Additional Storey on Existing Building.**

- Clause 2060.—Construction.

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**CHAPTER 20.****WALLS AND PARTITIONS IN TYPES 1, 2, AND 3 CONSTRUCTION.****Part I.—General Provisions.**

2001. **Materials.**—Every building of Type 1, 2, or 3 Construction shall be enclosed with external walls of masonry, concrete, reinforced concrete, or other hard and incombustible material.

2002. **Masonry.**—The term "masonry" shall mean stone, brick, terra cotta block, solid or hollow concrete block, or other similar building unit or materials or a combination of them, laid up unit by unit and set in mortar.

2003. **Hollow Masonry Blocks.**—Hollow masonry blocks shall not be used in bearing walls except in one-storey buildings.

2004. **Wall Fulfilling More than One Function.**—Where any wall is required to fulfil more than one of the functions specified in these Regulations, it shall be constructed in accordance with the highest standard prescribed in any respect for any of its functions.

2005. **Use of Materials Having Thickness of 4 inches.**—Where a thickness of 4½ inches or a multiple thereof is required by this chapter, a thickness of 4 inches or a corresponding multiple thereof shall be accepted if the standard thickness of the materials used in the construction is 4 inches or a multiple thereof.

2006. **Framing into Walls.**—Where structural steel beams or other metal members frame into external, party, or fire walls, the ends shall have protection against fire appropriate to the rating specified for the wall. Where wooden joists, beams, or other combustible members frame into such walls, the ends shall not project beyond the centre line of such walls and shall be not less than 4½ inches from similar members framing into the opposite side of the wall.

2007. **Expansion Joints.**—Expansion joints shall be provided in all masonry, concrete, or reinforced concrete walls which continue for a distance of more than 100 feet in the case of masonry walls or 80 feet in the case of concrete or reinforced concrete walls without a set-off greater than three times the thickness of the wall.

2008. **Facings.**—(a) Facings shall consist of—

- (i) Stone or synthetic stone not less than 2 inches thick;
- (ii) Architectural terra cotta not less than 4 inches thick;
- (iii) Ceramic veneer not less than 1 inch thick;
- (iv) Flat tiles not less than 1 inch thick;
- (v) Other approved materials;

(b) Facings may be used on the outer face of reinforced concrete or masonry walls, provided that each unit of the facing shall be tied to the structural walling with substantial non-corrosive metal wall ties;

(c) Facings required to contribute to the strength of a wall shall be not less than 4 inches in thickness in every part and shall be built concurrently with the wall and bonded into the backing for not less than 4 inches at every third course;

(d) In the case of facing 2 inches or less in thickness, horizontal chases at not more than 18-in. centres shall be provided in the structural walling and vertical steel rods not more than 16 inches apart, secured to non-corrosive metal anchors, built into the walling. The facing shall be filled in solid at back with cement mortar;

(e) Architectural terra cotta shall be used only in conjunction with brick walling and shall be bonded to same by setting the brickwork into the interstices of the terra cotta blocks;

(f) The provision of sub-clause (b) hereof shall not apply to tiles having a thickness of less than 1 inch, but such tiles shall not be used above a height of 8 feet from the level of the footpath;

(g) In the case of tile facings on reinforced concrete walls, open or mastic joints shall be provided at intervals of not more than 5 feet horizontally and vertically;

(h) Where necessary, additional fixings for the support of facings shall be provided to the approval of the Surveyor.

2009. **Structures above Level of Roof.**—Notwithstanding anything contained in Chapter 7 or elsewhere in this chapter, structures not exceeding 10 feet either in length or in width and not exceeding 8 feet in height and intended for the protection of ventilating machinery or for a like purpose may be constructed above the level of the roof of a building of Type 1, 2, or 3 Construction with external walls of masonry not less than 4 inches in thickness, and with a roof of impervious material.

2010. **Arches and Lintels.**—(a) Arches shall be constructed of masonry or reinforced concrete, shall be well built and keyed, and shall have good and sufficient abutments.

(b) Lintels shall be of stone, reinforced concrete, or reinforced masonry, or of iron or steel of approved sections.

(c) Where steel angles are used for lintels in external walls, the masonry shall bear at least  $2\frac{3}{4}$  inches on such angles.

(d) Lintels shall have a bearing on the wall at each end measured in the direction of their length of not less than  $4\frac{1}{2}$  inches.

#### Part II.—Base Structures.

2011. **Construction.**—A base structure shall be a continuous wall or piers and beams capable of transmitting to the footings the whole weight of the building, together with the live loads, and shall be constructed of solid masonry, concrete, or reinforced concrete, provided that hollow masonry shall not be used below ground level.

2012. **Thickness.**—Every base structure shall be of not less thickness than the wall it supports, and where it is constructed of solid masonry shall be built in cement or composition mortar. Where a base structure constructed as a continuous wall is of the same thickness as the wall it supports, and in addition supports a floor load, the structural members of such floor shall be carried, in the case of—

- (a) base structures  $4\frac{1}{2}$  inches or less in thickness with a floor on one side only, on 9-in. x  $4\frac{1}{2}$ -in. piers at 4-ft. 6-in. centres bonded into the base structure;
- (b) base structures  $4\frac{1}{2}$  inches or less in thickness with a floor at the same level on each side and base structures more than  $4\frac{1}{2}$  inches in thickness, on offset or corbel courses, provided that where the floor is continuous through the wall, offsets or corbels shall not be required.

For the purposes of this clause, the inner portion of a hollow wall used as a base structure shall be deemed to be the base structure.

2013. **Hollow Wall.**—Where a base structure supports a hollow wall, the base structure may be built as a hollow wall provided filling of concrete or of composition or cement mortar is placed therein, as the wall is built, to a height at least 3 inches above ground level.

2014. **Underpinning.**—The underpinning of walls, piers, columns, and chimneys—

- (a) shall rest upon solid ground or upon a footing conforming to the requirements of Chapter 19;
- (b) shall be built of cement concrete or of brick or stone bedded in cement mortar and securely wedged up and/or caulked to the full thickness and length of the old wall or work or to an additional thickness if the increased height of the wall or additional soil pressure so requires;
- (c) may, notwithstanding the provisions of the preceding sub-clause, be carried out by a system of isolated piers or piers and beams.

2015. **Ventilation.**—Base structures shall be ventilated as provided in clause 2110.

#### Part III.—External Bearing Walls and Party Walls.

##### A.—MASONRY WALLS.

2016. **Bonding.**—All masonry external bearing walls and party walls shall be properly bonded and solidly put together with composition or cement mortar or, as provided in clause 2024, with lime mortar, and walls shall be bonded together at junctions.

2017. **Corbelling.**—No portion of any such wall supported on corbelling shall overhang any part below it to a greater extent than 9 inches, and then only provided the projection be well and solidly corbelled out and that the inside of the wall carrying such corbelling be carried up vertically in continuation of the lower face thereof to sufficient height to ensure stability.

2018. **Thickness of Walls.**—The minimum thickness of every external and party wall in Types 2 and 3 Construction shall be as specified in Table 2018 for the appropriate class and storey, subject to the provisions of clause 1325 and to the modifications set out in clauses 2019 to 2023.

TABLE 2018.—THICKNESSES OF EXTERNAL AND PARTY WALLS IN TYPES 2 AND 3 CONSTRUCTION.

*Section I.—Buildings of Classes I., II., III., IV., V., and X. Occupancies.*

Length of Wall.	Number of Storeys.	Thickness of Wall in Inches.	
		If Built in Composition Mortar.	If Built in Cement Mortar.
Not exceeding 20 feet	1	9	9
	2	9; 9	9, 9
	3	13½, 9, 9	9, 9, 9
	4	13½, 13½, 9, 9	13½, 9, 9, 9
Not exceeding 35 feet	1	9	9
	2	13½, 9	9, 9
	3	13½, 13½, 9	13½, 9, 9
	4	18, 13½, 13½, 9	13½, 13½, 9, 9
Not exceeding 50 feet	1	13½	9
	2	13½, 13½	13½, 9
	3	18, 13½, 13½	13½, 13½, 9
	4	18, 18, 13½, 13½	18, 13½, 13½, 9
	5	18, 18, 18, 13½, 13½	18, 18, 13½, 13½, 9
	6	22½, 18, 18, 18, 13½, 13½	18, 18, 18, 13½, 13½, 9
Exceeding 50 feet	1	13½	9
	2	13½, 13½	13½, 9
	3	18, 13½, 13½	13½, 13½, 9
	4	18, 18, 13½, 13½	18, 13½, 13½, 9
	5	22½, 18, 18, 13½, 13½	18, 18, 18, 13½, 13½
	6	22½, 22½, 18, 18, 13½, 13½	22½, 18, 18, 18, 13½, 13½

*Section II.—Buildings of Classes VI., VII., VIII., and IX. Occupancies.*

Length of Wall.	Number of Storeys.	Thickness of Wall in Inches.	
		If Built in Composition Mortar.	If Built in Cement Mortar.
Not exceeding 35 feet	1	9	9
	2	13½, 9	9, 9
	3	13½, 13½, 9	13½, 9, 9
	4	18, 13½, 13½, 9	13½, 13½, 9, 9
Not exceeding 75 feet	1	13½	13½
	2	18, 13½	13½, 13½
	3	18, 18, 13½	18, 13½, 13½
	4	22½, 18, 18, 13½	18, 18, 13½, 13½
	5	22½, 22½, 18, 18, 13½	22½, 18, 18, 13½, 13½
	6	22½, 22½, 22½, 18, 18, 13½	22½, 22½, 18, 18, 13½, 13½
Exceeding 75 feet	1	18	13½
	2	18, 18	18, 13½
	3	22½, 18, 18	18, 18, 13½
	4	22½, 22½, 18, 18	22½, 18, 18, 13½
	5	22½, 22½, 22½, 18, 18	22½, 22½, 18, 18, 13½
	6	27, 22½, 22½, 22½, 18, 18	22½, 22½, 22½, 18, 18, 13½

2019. **Additional Thickness by Piers.**—Where in Section I. of Table 2018 walls exceeding 50 feet in length are required to have a greater thickness than walls not exceeding 50 feet in length, and where in Section II. of the said table walls exceeding 75 feet in length are required to have a greater thickness than walls not exceeding 75 feet in length, such additional thickness may be in the form of equally spaced piers projecting 4½ inches, provided the aggregate width of the piers shall amount to at least one-fifth part of the length of the wall.

2020. **Reductions in Thickness of Walls.**—(a) In buildings of Type 2 Construction the thickness required by Section I. of Table 2018 for walls exceeding 50 feet in length may be reduced to that required for walls from 35 feet to 50 feet in length and the thickness required by Section II. of Table 2018 for walls exceeding 75 feet in length may be reduced to that required for walls not exceeding 75 feet in length.

(b) In buildings of Type II. or Type III. Construction the thickness of external or party walls of reinforced brick masonry may be  $4\frac{1}{2}$  inches less than that prescribed by Table 2018, provided such walls are constructed in accordance with the requirements of Clauses 2414, 2415 and 2416 (b) and are not in any case less than 9 inches in thickness.

2021. **Thickness in Relation to Height of Storey.**—If any storey exceeds in height eighteen times the thickness prescribed for the walls of such storey, the thickness of every external wall and party wall throughout such storey shall be increased to one-eighteenth part of the height of such storey, and the thickness of every such wall below that storey shall be increased to a similar thickness, but  $4\frac{1}{2}$  inches of such additional thickness may be confined to piers properly distributed and having an aggregate width of not less than one-fourth part of the length of the wall.

2022. **Walls in Classes VII. and VIII. Occupancies.**—In buildings of Classes VII. and VIII. Occupancies containing not more than one storey, walls from 35 feet to 75 feet in length may be constructed to a thickness of 9 inches provided that—

- (a) they shall be strengthened by equally spaced piers projecting  $4\frac{1}{2}$  inches and having an aggregate width of not less than one-fifth part of the length of the walls; and
- (b) the height of such walls shall not exceed 12 feet when built in lime mortar or 13 ft. 6 in. when built in cement or composition mortar.

2023. **Buildings of One Storey.**—A building containing not more than one storey and not intended or adapted for use for habitable purposes may be enclosed with external walls not less than  $4\frac{1}{2}$  inches in thickness built in cement mortar, provided that—

- (a) the width of the building measured in the direction of the span of the roof shall not exceed 30 feet and the height of the walls shall not exceed 9 feet;
- (b) piers measuring 9 inches x  $4\frac{1}{2}$  inches shall be formed at intervals of not more than 9 feet;
- (c) the roof shall be so constructed that the walls are not subject to any thrust therefrom;
- (d) such walls shall not be required to support any load other than the distributed load of the roof;
- (e) cross walls of equivalent buttresses shall be constructed at intervals of not more than 30 feet.

2024. **Lime Mortar in One-Storey Buildings.**—In buildings of not more than one storey, walls may be built in lime mortar provided they are of not less thickness than that specified in Table 2018 for a wall built in composition mortar.

2025. **Hollow Walls.**—External walls of buildings of all classes of occupancy may be hollow walls, provided that—

- (a) the inner and outer parts of the wall shall be separated by a cavity which shall be of width throughout not greater than 3 inches;
- (b) the inner and outer parts of the wall shall be securely tied together with suitable bonding ties of adequate strength formed of galvanized iron, glazed stoneware, or other approved material. Such ties shall be spaced apart not more than 27 inches horizontally, and every fourth course of brickwork vertically;
- (c) no hollow wall 11 inches or less in thickness shall be of greater superficial extent than three squares in any one storey unless strengthened by a cross wall, fireplace, or projecting pier to the satisfaction of the Surveyor;
- (d) the aggregate thickness of the two parts, excluding the width of the cavity, shall be throughout not less than the minimum thickness prescribed in Table 2018 for solid walls of the same height and length and for the same class of building.

- (e) where the roof of a building of Class I, II, III, or IV. Occupancy having 11-in. hollow walls is supported by a roof truss or girders having a span of more than 30 feet, piers or stanchions shall be provided under the ends of such roof truss or girders.

**2026. Recesses and Openings.**—Recesses and/or openings may be made in an external or party wall, provided that—

- (a) the back of every such recess is not less than 9 inches in thickness;
- (b) an arch of at least two rings of brickwork, an approved reinforced concrete lintel of the full depth of the recess, or an approved steel section be constructed over each recess, except a recess formed for a lift, on every storey. Where a recess does not exceed 5 inches in depth and where the back of the recess is of not less thickness than is required for the next highest storey, corbelling in brick or stone may be substituted for the arch or lintel;
- (c) the total area of recesses and/or openings in any storey of such wall does not exceed one-half of the whole elevational area of such wall in that storey if segmental arch or lintel construction is used, or three-fifths of such area if approved semi-arch or continuous lintel construction is used;
- (d) the recesses do not come closer than  $13\frac{1}{2}$  inches to the nearer face of any abutting external or party wall;
- (e) the aggregate width of recesses in any storey does not exceed three-quarters of the whole length of the wall in that storey if segmental arch or lintel construction is used, or four-fifths of such length if approved semi-arch or continuous lintel construction is used. The Surveyor may, however, allow wider recesses subject to the sectional area of the wall being maintained;
- (f) the openings comply with the provisions of Chapters 28 and 29;
- (g) an arch or lintel conforming to clause 2010 be constructed over such opening;
- (h) the net sectional area of any wall after deduction of openings shall not be less than one-third of the full sectional area of such wall on plan in the case of segmental arch or lintel construction or one-fourth in the case of semi-arch or continuous lintel construction;
- (i) the foregoing requirements as to sectional area shall not apply to shop fronts;
- (j) shop fronts or other large openings may be framed wholly or partly in structural steel or reinforced concrete to give the necessary strength and stability, provided that all parts are properly tied or bonded to one another.

**2027. Chases.**—Chases may be made in any external or party wall, provided that—

- (a) at least 9 inches of solid material remains at back of each chase;
- (b) chases are not more than 14 inches wide or more than  $4\frac{1}{2}$  inches deep, measured from the face of the wall;
- (c) chases are at least 7 feet apart if on the same side of the wall and 5 feet apart if on opposite sides.

**2028. Designed Walls.**—Compliance with the provisions of Clauses 2018 to 2025 and sub-clauses (c), (d) and (h) of Clause 2026 may be dispensed with provided that detailed computations are submitted demonstrating that the walls of a building have the necessary strength and stability and otherwise conform to the requirements of these regulations.

2029. **Hollow Concrete Blocks.**—Where hollow concrete blocks of the type specified in clause 1320 (f) are used in the construction of a wall of a building above the base structure, the following provisions shall apply:—

- (a) Such wall shall not be a wall required by these Regulations to have a thickness of more than 9 inches;
- (b) such building shall not exceed one storey or 14 feet in height;
- (c) the blocks shall be bedded and jointed in composition mortar;
- (d) trusses, joints, and beams shall be let into the wall in such a manner as to transfer the loads to the wall.

#### B.—CONCRETE WALLS.

2030. **Concrete Walls, unreinforced,** shall be of the same thickness as required by these Regulations for masonry walls based on a unit thickness of 4 inches.

2031. **Reinforced Concrete Walls.**—Every reinforced concrete wall shall have a thickness of at least 1/25th of its height or length between supports, whichever is the shorter, but in no case of less than 4 inches, and shall have the necessary strength and stability. A built-in pier or pilaster introduced to reduce the length between supports shall be not less in width or depth than 1/12th of the height of such pier or pilaster. A horizontal support introduced to reduce the height between supports shall consist of a concrete slab joining the wall for the full length on at least one side or of a reinforced concrete beam of a width equal to at least 1/16th of the span.

2032. **Reinforcement.**—Every reinforced concrete wall shall have in each direction an amount of reinforcement of not less than .0025 of the cross-sectional area, but the amount of reinforcement in any direction may be varied in special circumstances provided the total reinforcement is not less than .005 of the cross-sectional area.

2033. **Chases and Recesses.**—No chase or recess shall be cut or formed in any concrete or reinforced concrete wall which would impair the stability of the wall or reduce its minimum thickness to less than 4 inches.

#### C.—SPECIAL PROVISION FOR WALLS OF HOUSES AND FLATS.

2034. **Use of Other Materials or Methods of Construction.**—Notwithstanding anything contained in these Regulations, materials of a lesser thickness or other materials or methods than those prescribed by these Regulations may be used in the construction of walls—whether pre-fabricated or built *in situ*—in buildings of Class I. or Class II. Occupancy containing not more than two occupancies, provided that the use of such materials and/or methods of construction results in walls which—

- (a) have the necessary strength and stability and in addition provide sufficient strength and stability to the structure as a whole;
- (b) have a satisfactory heat insulation value; and
- (c) satisfactorily resist the penetration of moisture.

#### Part IV.—External Non-Bearing Walls.

2035. **Panel Walls.**—(a) Panel walls may be constructed of masonry, laid in composition or cement mortar, provided that—

- (i) every such wall shall have a thickness of not less than 9 inches if a solid wall or 11 inches if a cavity wall;
- (ii) the unsupported area of such wall between structural members shall not exceed 300 square feet;
- (iii) the outer 4½ inches of such wall may be supported on continuous steel angles bolted to the face of the structural framework bearing on such steel angles for not less than 3 inches;
- (iv) any panel wall constructed as a hollow wall shall be securely tied as specified in clause 2025 (b); or

(b) Panel walls may be constructed of reinforced concrete, provided that such reinforced concrete—

- (i) is not less than 4 inches thick in any part;
- (ii) is of not less thickness in any part than 1/30th of the unsupported height between successive floors or beams unless laterally supported by cross walls, piers, or built-in columns at intervals not exceeding 30 times the thickness of the wall.

(c) If detailed computations are submitted demonstrating that the structure has the necessary strength and stability, the requirements of sub-clauses (a) and (b) as to minimum thicknesses may be waived.

#### Part V.—Cross Walls, Fire Walls, and Internal Bearing Walls.

##### A.—MASONRY WALLS.

2036. **Materials.**—Every cross wall shall be constructed of the same kind of material and in the same manner as the wall to which it provides lateral support.

2037. **Construction.**—Every cross wall, fire wall, or internal bearing wall constructed of masonry shall be properly bonded and solidly put together with composition or cement mortar or as provided in clause 2024 with lime mortar, and walls shall be properly bonded at junctions. Every cross wall shall be carried up to the plate level of the topmost storey.

2038. **Design.**—Where computations covering design of cross walls, fire walls and internal bearing walls are not submitted, the following requirements shall be observed:—

(a) **Thickness of Walls.**—Every such wall shall have a thickness of not less than two-thirds of the thickness required by Table 2013 for external and party walls of the same dimensions and in the same class of building, except that—

- (i) a cross wall or an internal bearing wall in the topmost and second topmost storeys may be  $4\frac{1}{2}$  inches in thickness where the external or party wall is required by such table to be 9 inches in thickness;
- (ii) no cross wall shall be required as such to exceed  $13\frac{1}{2}$  inches in thickness;
- (iii) every fire wall shall have a thickness of not less than 9 inches.

(b) **Thickness in Relation to Height of Storey.**—If any storey exceeds in height thirty-two times the thickness prescribed by sub-clause (a), the thickness of every cross wall, fire wall, and internal bearing wall shall be increased to 1/32nd part of the height of such storey, and the thickness of every such wall below that storey shall be increased to a similar thickness provided that, except in the case of cross walls,  $4\frac{1}{2}$  inches of such additional thickness may be confined to piers properly distributed, the aggregate widths of which amount to at least 1/4th part of the length of the wall.

(c) **Recesses and Openings.**—The aggregate superficial area of all recesses and openings in cross walls, fire walls, and internal bearing walls shall not exceed that permitted for external and party walls constructed of similar materials, except that if a cross wall is carried on a girder across the ground storey and is supported by piers to the satisfaction of the Surveyor, it shall be deemed to be a cross wall for the purpose of these Regulations.

##### B.—CONCRETE WALLS.

2039. **Reinforced Concrete Walls.**—Every such wall constructed of reinforced concrete shall have the necessary strength and stability and shall have a thickness of not less than 1/48th of its height or length between supports whichever is the shorter, provided that the minimum thickness shall be 3 inches in the case of a cross wall or internal-bearing wall.

2040. **Junctions.**—Where a reinforced concrete cross wall joins a masonry external wall such walls shall be bonded to the satisfaction of the Surveyor with steel reinforcing rods spaced at intervals of not more than  $13\frac{1}{2}$  inches.



2041. **Reinforcement.**—Every reinforced concrete wall shall have in each direction, an amount of reinforcement of not less than .0025 of the cross sectional area, but the amount of reinforcement in any direction may be varied in special circumstances provided the total reinforcement is not less than .005 of the cross sectional area.

2042. **Chases and Recesses.**—No chase or recess shall be cut or formed in any concrete or reinforced concrete wall which would impair the stability of the wall or reduce the minimum thickness to less than 3 inches or, in the case of a fire wall, 4 inches.

#### Part VI.—Partitions.

2043. **Thickness.**—The minimum thickness of every partition wall constructed of masonry or concrete shall be as determined by the following formula, provided that the length of the wall may be reduced by the introduction of stiffening piers to the approval of the Surveyor:—

$$T = \frac{3H + L}{200}$$

Where  $T$  = thickness in inches.

$H$  = height in inches.

$L$  = length in inches.

#### Part VII.—Parapets.

2044. **When Required in External Walls.**—Every external wall built within 3 feet of land not in the same occupation or within 3 feet of any adjoining building or within 2 feet of any street shall have a fire resistance rating of 3 hours and shall be carried up to form a parapet.

2045. **In Party and Fire Walls.**—Party and fire walls shall be carried up to form parapets, except that a party wall joining buildings of Class II. Occupancy may be finished immediately below a flat roof of fire-resisting construction or immediately below the roof covering, provided such roof covering consists of fire-retardant materials as defined in clause 1406.

2046. **Construction.**—Every parapet shall be constructed of—

- (a) masonry set in cement or composition mortar and of a thickness not less than  $\frac{1}{4}$ th of its height or 8 inches, whichever is the greater;
- (b) concrete of a thickness not less than  $\frac{1}{10}$ th of its height or 8 inches, whichever is the greater; or
- (c) where the parapet is connected to a reinforced concrete roof or wall, reinforced concrete not less than 4 inches in thickness.

2047. **Minimum Heights.**—(a) Every parapet in a building of Class I, II, III, IV, or V. Occupancy shall be carried to a height of 15 inches, and in a building of Class VI, VII, VIII, or IX. Occupancy to a height of 36 inches from the highest part of the adjoining gutter, or where no gutter adjoins, from the roof covering measured at right angles to the slope of the roof.

2048. **Parapets above Dormers.**—Parapets on external and party walls shall be carried up above any dormer, lantern light, skylight, or other erection of combustible material fixed above the roof or flat on any building within 4 feet of such parapet wall, and to the thickness required by clause 2046.

2049. **Damp Proofing.**—Every masonry parapet shall have a horizontal damp course as required by clause 2053.

## Part VIII.—Damp Courses.

2050. **Horizontal Damp Course.**—(a) Every masonry wall and fire-place shall have a complete and continuous damp course constructed either of sheet lead, slates laid in cement mortar, approved waterproofed cement mortar, approved factory-prepared premixed damp-course mortar consisting of cement, sand, waterproofing, plasticising and colouring compounds, approved factory-premixed, black hydro-carbon cement damp-course mortar, or other approved durable material impervious to moisture.

(b) When factory-premixed damp course is used, the requisite gauging water only shall be added on the job.

(c) Tar and sand shall not be used as a damp course.

2051. **Crushing Strength of Mortar.**—Damp-proofing mortar shall have a crushing strength at least equal to that of the mortar in which the wall is built.

2052. **Position of Horizontal Damp Course.**—The damp course shall be laid beneath the level of the lowest floor and at a height of not less than 3 inches above the surface of the ground adjoining the wall.

2053. **Damp Proofing of Parapets.**—Where a wall is finished with a parapet, a damp-proof course, as prescribed in clause 2050, shall be inserted at the base of the parapet unless the parapet is effectively rendered with cement or composition mortar on both sides and on the top.

2054. **Vertical Damp Course.**—Where any portion of the walls of the lowest storey of a building are below the level of and in contact with the ground adjacent to such walls, such portion shall be built as a hollow wall, in accordance with the provisions of clause 2056, or shall be rendered impervious to moisture by—

- (a) a vertical damp course consisting of approved bituminous or asphaltic material, waterproofed cement mortar, or approved factory-prepared premixed damp-course mortar;
- (b) an approved integral waterproofing compound in the case of a reinforced concrete wall;
- (c) an approved waterproof rendering applied to the internal face of the wall; or
- (d) such other material as may from time to time be approved by the Surveyor.

2055. **Position of Vertical Damp Course.**—Where a wall is rendered impervious to moisture by a vertical damp course as prescribed in clause 2054, such damp course shall be—

- (a) inserted between two parts of the wall, each of which shall have a thickness of not less than 9 inches; or
- (b) applied to the face of the wall and retained in position by a brick or other lining not less than  $4\frac{1}{2}$  inches thick, such thickness being in addition to the thickness of the wall prescribed by clause 2018 of these Regulations, except that where the vertical damp course is not less than 27 inches in height, such lining may be considered as part of the thickness of the wall.

2056. **Hollow Walls.**—Where portion of a wall described in clause 2054 is built as a hollow wall—

- (a) the cavity shall—
  - (i) be not less than 2 inches wide;
  - (ii) extend to a height of 6 inches above the adjoining ground; and
  - (iii) be effectively drained to the approval of the Surveyor.
- (b) horizontal damp courses, as prescribed in clause 2050, shall be inserted in such wall at the base and the top of the vertical damp course or cavity.

2057. **Junction of Damp Courses.**—Where a horizontal damp course provided in a wall or floor meets any vertical damp course, such damp courses shall be effectively junctioned.

**Part IX.—Existing Walls.**

2058. **Approval Required to Increase Thickness.**—No existing wall shall be increased in thickness without the approval of the Surveyor.

2059. **Construction.**—Where an increase in the thickness of an existing wall is approved, the additional thickness shall unless otherwise approved by the Surveyor—

- (a) have a maximum thickness of  $4\frac{1}{2}$  inches;
- (b) be constructed of material similar to that of the existing wall; and
- (c) be bonded in to the existing wall to a depth of not less than 4 inches and for at least one-fourth of its area.

**Part X.—Additional Storey on Existing Building.**

2060. **Construction.**—Subject to the approval in writing of the Surveyor, an additional storey may be constructed on an existing building without the walls of such building being increased in thickness, provided that—

- (a) (i) the walls and floor of such storey shall be constructed of reinforced concrete;
- (ii) the roof shall be constructed of reinforced concrete or the tops of opposite walls shall be effectively tied together with reinforced concrete to the approval of the Surveyor;
- (iii) special provision shall be made for reinforcing the junctions of columns and of roof and floor beams and slabs; and
- (iv) the additional storey shall in all respects comply with the provisions of these Regulations; or
- (b) (i) the total loads of the additional storey shall be supported independently of the existing structure; and
- (ii) the additional storey shall in all respects comply with the provisions of these Regulations.

[Reference.—For Walls of Lift Wells.—See clause 3213.]

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**CHAPTER 21.****FLOORS.**

Clause 2101.—Floors in Types 1 and 2 Construction.

Clause 2102.—Floor Fulfilling More than One Function.

Clause 2103.—Concrete Floors Not Required to have a Fire Resistance Rating.

Clause 2104.—Structural Steel in Floors.

Clause 2105.—Timber Floors.

Clause 2106.—Mezzanine Floors.

Clause 2107.—Floors Constructed Below Ground Level.

Clause 2108.—Covering of Broken Stone, &c., may be Omitted in Certain Cases.

Clause 2109.—Treatment of Ground Surface Beneath Buildings.

Clause 2110.—Requirements for Sub-floor Ventilation.

Clause 2111.—Openings through Floors.

Clause 2112.—Timber Sizes.

## CHAPTER 21.

## FLOORS.

2101. **Floors in Types 1 and 2 Construction.**—In buildings of Types 1 and 2 Construction, floors required to have a fire-resistance rating of two or three hours shall be constructed in accordance with the requirements of Chapters 14 and 24.

2102. **Floor Fulfilling More Than One Function.**—When any floor is required to fulfil more than one of the functions specified in these Regulations, it shall be constructed in accordance with the highest standard prescribed in any respect for any of its functions.

2103. **Concrete Floors not Required to have a Fire-resistance Rating.**—Floors constructed of concrete, steel and concrete, or rib and hollow block construction and not required to have a fire-resistance rating shall be designed in accordance with the provisions of Chapter 24.

2104. **Structural Steel in Floors.**—All structural steel in floors shall be designed in accordance with the provisions of Chapter 24.

2105. **Timber Floors.**—All timber construction in floors shall conform to the requirements of Chapter 25.

2106. **Mezzanine Floors.**—(a) Mezzanine floors or galleries may be constructed in buildings provided that when such floors or galleries exceed in area one-third of the total floor area of the room in which they are built they shall each be considered as constituting an additional storey.

(b) The height from the ceiling beneath every mezzanine floor to the main floor level shall be not less than 7 ft. 6 in. clear in every part;

(c) Mezzanine floors may be constructed of timber on unprotected steel supports or of unprotected steel or iron provided that there shall not be more than two such floors in any room of any building.

2107. **Floors Constructed below Ground Level.**—When any portion of the lowest storey of a building is constructed below the level of the ground immediately adjoining such storey, then—

(a) a complete system of subsoil drainage, as prescribed in clause 1705, shall be installed in the ground below the floor, and the surface of such ground shall be graded with even falls to the subsoil drains;

(b) the whole of that portion of the floor which is below the level of the ground externally adjoining the lowest storey shall have the ground beneath the floor covered to a depth of at least 2 inches with broken stone, brick, or terra cotta of not less than  $\frac{3}{4}$ -in. gauge; and

(c) such ground shall be covered with tar or bituminous paving or with cement concrete not less than 3 inches thick, the surface of the broken stone, brick, or terra cotta being first covered with building paper, tarred screenings, or other material that will effectively prevent the concrete penetrating the interstices in the broken stone, brick, or terra cotta.

2108. **Covering of Broken Stone, &c., May be Omitted in Certain Cases.**—Notwithstanding the provisions of the preceding clause, the covering of broken stone, brick, or terra cotta may be omitted if the nature of the ground underneath the floor renders same unnecessary or if the floor paving consists of a concrete slab.

2109. **Treatment of Ground Surface Beneath Buildings.**—See Chapter 17.

2110. **Requirements for Sub-floor Ventilation.**—When the lowest floor in any building is constructed clear of the ground, the space between the bottom of the bearers and the ground immediately below shall be not less than 6 inches and shall be ventilated—

(a) by openings in the external walls, the openings being protected by suitable air bricks or gratings of a sufficient size to provide a net ventilating area of  $\frac{1}{2}$  square foot for every 20 feet run of external wall; and

(b) by openings in the internal base walls of a net area of  $\frac{1}{2}$  square foot for every 10-ft. run of base wall, the openings being so arranged as to permit a continuous circulation of air to pass beneath the whole area of the flooring.

2111. **Openings through Floors.**—Where openings are formed through floors, every such opening shall be trimmed for, with trimmers and trimming joists of sufficient size to support the additional loads.

2112. **Timber Sizes.**—Sizes of floor timbers shall be as prescribed by clause 1325 (*j*) of these Regulations or as specified in Chapter 25 where such is applicable, and where necessary joists shall have adequate side support by bridging or other approved means.

[Reference—

Floors in factories. See Chapter 31.]

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## CHAPTER 22.

### ROOFS AND ROOF STRUCTURES.

- Clause 2201.—Drainage from Roofs.  
Clause 2202.—Roofs in Types 1 and 2 Construction.  
Clause 2203.—Roof Coverings.  
Clause 2204.—Timber in Fire-resisting Roofs.  
Clause 2205.—Enclosure of Flat Roofs.  
Clause 2206.—Only One Storey in Roof.  
Clause 2207.—Construction of Bulkheads.  
Clause 2208.—Tanks.  
Clause 2209.—Timber Roof Construction.

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## CHAPTER 22.

### ROOFS AND ROOF STRUCTURES.

2201. **Drainage from Roofs.**—(*a*) Every roof shall be provided with a complete drainage system capable of collecting the whole of the rain water falling on such roof and discharging it to the storm water drains required by clause 1703.

(*b*) Roofs shall be graded to spouting or gutters, which shall be connected to the storm water drains by downpipes.

(*c*) Every spouting, gutter, and downpipe shall be—

- (i) of sufficient capacity to carry all storm water collected by it;
- (ii) of galvanized sheet iron or incorrodible sheet metal not less than 26 B.G. in thickness, cast iron, approved combination of cement and asbestos, concrete or reinforced concrete covered with bituminous sheeting as required for concrete flat roofs, or other materials approved by the Surveyor;
- (iii) constructed with continuous falls to outlets; and
- (iv) securely fixed to eaves and/or walls.

2202. (a) **Roofs in Type 1 Construction.**—Buildings of Type 1 Construction shall have flat roofs having a fire-resistance rating of three hours provided that a pitched roof not having a fire-resistance rating may be constructed on any building not exceeding in height three-fifths of the maximum height allowed by clause 903 (a) of these Regulations or three storeys, whichever is the lesser.

(b) **Roofs in Type 2 Construction.**—Buildings of Type 2 Construction shall have flat roofs having a fire-resistance rating of two hours provided that a pitched roof not having a fire-resistance rating may be constructed on any building not exceeding in height three-quarters of the maximum height allowed by clause 903 (b) of these Regulations or three storeys, whichever is the lesser.

2203. **Roof Coverings.**—Every roof not required to have a fire-resistance rating, together with every flat and gutter forming part thereof, and every turret, dormer, lantern light, skylight, and other erection placed thereon, shall be externally covered with fire-retardant materials, as defined for the purpose in clause 1406, securely fixed to withstand wind loads, except that—

- (a) cornices and barge boards of dormers if not exceeding 12 inches in depth, and the doors, door-frames, windows, and sash frames of dormers, turrets, lantern lights, skylights and other erections other than those at the bottom of light courts may be of wood;
- (b) flat roofs shall be covered externally with sheet metal of thickness not less than 26 gauge or with two layers of approved felt and a surface covering of bituminous roofing material or with such other materials as may be approved by the Surveyor.
- (c) roofs of buildings of Class I. Occupancy and buildings appurtenant thereto may be covered with wood shingles underlaid with unsaturated asbestos felt weighing not less than 14 lb. per 108 square feet when over a combustible roof.

2204. **Timber in Fire-resisting Roofs.**—Where timber is used for securing ceiling coverings, &c., in connexion with roofs of fire-resisting construction, the prescribed thickness of fire-resisting material shall be continuously maintained over the whole area of the roof.

2205. **Enclosure of Flat Roofs.**—Every flat roof to which access is provided by lift or stairs shall be enclosed by a parapet conforming to the requirements of Part VII. of Chapter 20, except that such parapet shall either be continued to a height of 3 ft. 6 in. or be surmounted by an approved metal guard railing to a total height of 3 ft. 6 in. above the roof.

2206. **Only One Storey in Roof.**—Not more than one storey shall be constructed in the roof of any building.

2207. **Construction of Bulkheads.**—Bulkheads or other structures over stair or lift wells on flat roofs not required to have a fire-resistance rating may be erected with walls of studding covered with corrugated galvanized iron, asbestos cement, or other approved materials.

2208. **Tanks.**—(a) Tanks to contain water or other fluid placed on or above the roof of any building shall be supported on masonry, structural steel, or reinforced concrete, except that the seating of iron tanks may be of jarrah.

- (b) Covers on top of water tanks placed on roofs shall be of metal.
- (c) Facilities shall be provided for cleaning out of tanks.

2209. **Timber Roof Construction.**—Sizes and spacing of roof timbers shall be as prescribed by Chapter 25.

[References—

For requirements relating to roofs above furnaces, see Chapter 23.

For requirements relating to woodwork near flues, see Chapter 23.

For requirements relating to roofs of buildings of steel framed and reinforced concrete framed construction, see Chapter 24.]

## CHAPTER 23.

## CHIMNEYS, FIREPLACES, FLUES, &amp;c.

## Part I.—General Provisions.

- Clause 2301.—Materials for Chimneys.  
 Clause 2302.—Construction of Chimneys.  
 Clause 2303.—Construction of Hearths.  
 Clause 2304.—Jambs.  
 Clause 2305.—Fireplace Backs.  
 Clause 2306.—Chimney Breasts.  
 Clause 2307.—Arches and Lintels.  
 Clause 2308.—Location of Steam Pipes, &c.  
 Clause 2309.—Gas Stoves.  
 Clause 2310.—Flue Pipes for Gas Appliances.  
 Clause 2311.—Flue Pipes for Fuel Bath Heaters

## Part II.—Chimneys Not Used for Trade Purposes.

- Clause 2312.—Height of Chimneys.  
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 Clause 2314.—Thickness of Chimneys Constructed at Angle.  
 Clause 2315.—Soot Doors.  
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 Clause 2317.—Treatment of Inside Face of Chimneys.  
 Clause 2318.—Plugs in Chimneys.  
 Clause 2319.—Timber Near Chimneys.  
 Clause 2320.—Distance of Metal Pipes from Combustible Material.  
 Clause 2321.—Cutting Away of Chimney Breast in Party Walls.  
 Clause 2322.—Flashing of Chimney Stacks.  
 Clause 2323.—Construction of Floors Near Fuel Stoves.  
 Clause 2324.—Construction of Floors Under Gas or Electric Stoves.  
 Clause 2325.—Construction Near Boiler or Furnace.

## Part III.—Chimneys Used for Trade Purposes.

- Clause 2326.—Construction of Masonry Chimney Shaft.  
 Clause 2327.—Distance of Flues from Combustible Material.  
 Clause 2328.—Distance of Steam Pipes from Combustible Material.  
 Clause 2329.—Construction of Floors and Ceilings Near Ovens, Boilers, Furnaces.  
 Clause 2330.—Construction of Walls Near Ovens, Boilers, or Furnaces.

## CHAPTER 23.

## CHIMNEYS, FIREPLACES, FLUES, &amp;c.

## Part I.—General Provisions.

2301. Materials for Chimneys.—Every chimney shall be constructed of—
- (a) solid masonry properly bonded and solidly put together with mortar; or
  - (b) other suitable, good, hard, and incombustible material properly and solidly put together, and this requirement as to material shall be deemed to be satisfied by the use of any material which complies with the test for materials for flues, furnace casings, hearths, and similar purposes prescribed in S.A.A. Specification No. A.30--1935.

2302. **Construction of Chimneys.**—Every chimney shall be—

- (a) built upon footings conforming to the requirements of Chapter 19;
- (b) carried upon steel girders bearing directly upon walls having the necessary strength and stability; or
- (c) carried upon corbels of masonry, steel, concrete, or reinforced concrete, the work so corbelled being constructed for the full width of the jamb and projecting not more than 14 inches from the face of the wall.

2303. **Construction of Hearths.**—(a) A hearth constructed of stone, slate, bricks, tiles, cement, or other incombustible material shall be fixed under and in front of every fireplace opening.

(b) Every such hearth shall—

- (i) be solidly and securely supported;
- (ii) have a thickness of not less than 4 inches;
- (iii) extend not less than 6 inches beyond each end of the fireplace opening;
- (iv) project not less than 14 inches from the face of the chimney breast; and
- (v) be so laid that its surface is not lower than the floor of the room in which the hearth is situated.

2304. **Jambs.**—The jambs of every fireplace opening shall be not less than 8 inches in thickness on each side of the opening.

2305. **Fireplace Backs.**—The back of every fireplace opening from the hearth up to a height of 12 inches above the arch or lintel shall be constructed of—

- (a) solid masonry at least 8 inches thick;
- (b) reinforced concrete at least 6 inches thick; or
- (c) reinforced concrete faced with masonry or fire brick of a total thickness of 6 inches.

Provided that—

openings for stoves or fire-brick grates may be of brickwork 4 inches thick.

2306. **Chimney Breasts.**—The breast of every chimney shall be of incombustible material at least 4 inches in thickness.

2307. **Arches and Lintels.**—An arch of brick, stone, or concrete or lintel of steel or reinforced concrete of sufficient strength shall be built over the opening of every fireplace to support the breast thereof.

2308. **Location of Steam Pipes, &c.**—A pipe for conveying steam or smoke or other products of combustion shall not discharge into a street, or be fixed against any building on the face adjoining any street.

2309. **Gas Cooking Stove.**—Every gas cooking stove which is not situated in a fireplace or fire recess shall be provided with a suitable hood or canopy discharging into the open air by means of a pipe. Such pipe shall be not less than 4 inches in diameter and shall be provided with a suitable cowl to prevent draught. The receptive surface of such hood or canopy shall be not less in area than the total floor area covered by the gas stove.

Provided however that such hood or canopy shall not be required if a mechanical exhaust or an approved means of natural ventilation be provided.

2310. **Flue Pipes for Gas Appliances.**—Flue pipes for gas appliances shall be constructed in accordance with the requirements of the regulations made under the *Gas Regulation Act 1933*.

2311. **Flue Pipes for Fuel Bath Heaters.**—Flue pipes for fuel bath heaters shall be carried through the roof to a height of not less than 18 inches. The projecting portion of the flue pipe shall be provided with an outer casing 1 inch clear of the flue pipe commencing at the ceiling level and terminating in an approved cowl, cap, or terminal.



**Part II.—Chimneys Not Used for Trade Purposes.**

2312. **Height of Chimneys.**—Every chimney shall be carried up at least 1 foot above the highest part of the roof structure, and, unless rendered secure to the satisfaction of the Surveyor, shall have a height, measured from the highest point of junction with the adjoining roof or gutter, of not more than six times its least width.

2313. **Angle of Chimneys.**—Chimneys shall not be inclined at a lesser angle than 45 degrees to the horizontal, except that the Surveyor may sanction any less angle provided that approved soot doors of not less area than 40 square inches are provided.

2314. **Thickness of Chimneys Constructed at Angle.**—When the upper side of any chimney is constructed at an angle of less than 45 degrees with the horizontal, the thickness of such upper side shall be not less than 9 inches.

2315. **Soot Doors.**—Every soot door shall be distant at least 15 inches from any woodwork.

2316. **Rounding of Angles.**—Every angle at a change of direction in a chimney shall be properly rounded.

2317. **Treatment of Inside Face of Chimneys.**—The inside of every chimney shall be rendered or lined with fire-resisting piping or stone-ware throughout its length.

2318. **Plugs in Chimneys.**—Wooden plugs shall not be driven nearer than 3 inches or iron fastenings nearer than 2 inches to the inside of any flue or chimney opening.

2319. **Timber Near Chimneys.**—No timber shall be placed within 3 inches from the inner face of any chimney or flue.

2320. **Distance of Metal Pipes from Combustible Material.**—No metal pipe for conveying smoke or other products of combustion shall be placed nearer than 9 inches to any combustible material and any lagging used shall be of incombustible material.

2321. **Cutting Away of Chimney Breast in Party Walls.**—A chimney breast or shaft built with or in any party wall shall not be cut away, unless the Surveyor certifies that it can be done without injuriously affecting the stability of any building.

2322. **Flashing of Chimney Stacks.**—Every chimney stack shall be effectively flashed at its junction with the roof.

2323. **Construction of Floors Near Fuel Stoves.**—The floor under every stove not heated by gas or electricity and the floor surrounding same for a space of 15 inches in front of every fire and 9 inches elsewhere shall be formed of materials of an incombustible and non-conducting nature having a thickness of not less than 3 inches.

2324. **Construction of Floors Under Gas or Electric Stoves.**—The floor under any oven or stove heated by gas or electricity shall be formed of incombustible and non-conducting materials, unless a space of not less than 6 inches is provided between the floor and the bottom of the oven or stove.

2325. **Construction Near Boiler or Furnace.**—(a) Every floor or portion of a floor under or within a distance of 6 feet from a furnace shall be constructed of materials having a fire-resistance rating of 1½ hours.

(b) Every portion of a wall within a distance of 6 feet from and every portion of a floor, ceiling, or roof above and within a distance of 6 feet from any boiler or furnace shall be protected with fire-retardant materials.

(c) Where the heating unit is adequately self-insulated the provisions of sub-clause (b) hereof shall not apply.

**Part III.—Chimneys Used for Trade Purposes.**

2326. **Construction of Masonry Chimney Shaft.**—Except where computations and details of the design are submitted to and approved by the Surveyor, every chimney shaft used for the purposes of any trade or business shall be constructed of solid masonry in conformity with the following provisions:—

(a) If the shaft is detached, it shall be built with a batter from the base to the top at the rate of at least 1¼ inches in every ten (10) feet of height.

- (b) **Thickness.**—(i) The thickness of the masonry at the top of the shaft and for 25 feet below the top shall be not less than 9 inches where the external dimension does not exceed 5 feet and not less than 14 inches where the external dimension is greater than 5 feet;
- (ii) for the purpose of calculating the thickness of any other portion of the shaft, every 25 feet shall be at least  $4\frac{1}{2}$  inches thicker than the 25 feet immediately above;
- (iii) every cap, cornice, pedestal, plinth, string course, or other variation from the masonry shall be additional to the minimum thickness specified above.
- (c) The least width of the base of the shaft if rectangular in shape shall be at least 1/10th of the proposed height of the shaft or if not rectangular in shape then 1/12th of the height. The height of the shaft shall be measured from the top of the footings.

2327. **Distance of Flues from Combustible Material.**—No flue for conveying smoke or other products of combustion shall be placed nearer than 9 inches to any combustible material and any lagging used shall be of incombustible material.

2328. **Distance of Steam Pipes from Combustible Material.**—Pipes for conveying steam or air at a temperature exceeding 212 degrees Fahr., shall not be fixed nearer than 6 inches to any combustible material and any lagging used shall be of incombustible material.

2329. **Construction of Floors and Ceilings Near Ovens, Boilers, or Furnaces.**—(a) Every floor or portion of a floor under or within 6 feet of any oven, boiler, or furnace shall be constructed of materials having a fire-resistive rating of not less than 3 hours.

(b) Any floor, ceiling, or roof or portion thereof above and within a distance of 6 feet from any oven, boiler, or furnace shall be constructed of materials having a fire-resistive rating of not less than 3 hours.

(c) Where the heating unit is adequately self-insulated the provisions of sub-clause (b) hereof shall not apply.

2330. **Construction of Walls Near Ovens, Boilers, or Furnaces.**—Every wall or portion of a wall within a distance of 6 feet from any oven, boiler, or furnace shall be constructed of materials having a fire-resistive rating of not less than 4 hours.

#### CHAPTER 24.

#### REINFORCED CONCRETE. REINFORCED BRICK MASONRY. AND STRUCTURAL STEEL DESIGN AND CONSTRUCTION.

##### Part I.—Reinforced Concrete and Structural Steel Design and Construction.

- Clause 2401.—Reinforced Concrete Construction.
- Clause 2402.—Structural Steel Construction.
- Clause 2403.—Working Stresses.
- Clause 2404.—Increased Stresses in Special Concrete.
- Clause 2405.—Variations from S.A.A. Codes.
- Clause 2406.—Other Metal Reinforcement.
- Clause 2407.—Concrete Fireproofing.
- Clause 2408.—Pre-cast Concrete Fireproofing.
- Clause 2409.—Pre-cast Concrete Units.
- Clause 2410.—Reinforcement in Hydraulic Works.
- Clause 2411. Timber in Floors of Fire-resisting Construction.

##### Part II.—Reinforced Brick Masonry Design and Construction.

- Clause 2412.—Working Stresses.
- Clause 2413.—Method of Design.
- Clause 2414.—Mortar.
- Clause 2415.—Bond.
- Clause 2416.—Reinforced Brick Masonry Walls.

##### Part III.—Tests.

- Clause 2417.—Tests.

## CHAPTER 24.

PART I.—REINFORCED CONCRETE AND STRUCTURAL STEEL  
DESIGN AND CONSTRUCTION.

2401. Reinforced Concrete Construction.—All reinforced concrete construction shall, except where prescribed to the contrary in these Regulations, conform to the requirements of the S.A.A. Code for Concrete in Building No. C.A.2-1937.

2402. Structural Steel Construction.—Except where prescribed to the contrary in these Regulations, all structural steel construction in any building shall be designed, fabricated, and erected in accordance with the requirements of the S.A.A. Code for Structural Steel in Building, No. C.A.1-1939 and/or the S.A.A. Welding Code No. C.A. 8-1939.

2403. Working Stresses.—Subject to the provisions of clauses 2401 and 2402, working stresses shall not exceed, in the case—

- (a) structural steel members, the values set out in the S.A.A. Code for Structural Steel in Building, No. C.A.1-1939;
- (b) reinforcing steel, the values set out in the S.A.A. Codes for Structural Steel in Building, No. C.A. 1-1939 and for Concrete in Building, No. C.A. 2-1937;
- (c) steel or iron castings, the values set out in S.A.A. Code for Structural Steel in Building, No. C.A. 1-1939;
- (d) concrete, Grades A, B, and C, the values set out for concrete in the S.A.A. Code for Concrete in Building, No. C.A. 2-1937, except that where other values are set out in Table 2403, the working stresses shall not exceed the values set out in such table;
- (e) concrete, Grade D, 400 lb. per square inch.

TABLE 2403.—PERMISSIBLE STRESSES IN CONCRETE.

To be Adopted in lieu of Stresses laid down in S.A.A. Code C.A.2.

Concrete—See Table 1311 (1).	A.	B.	C.
	$f_c =$ 3,000 lb. $n = 10.$	$f_c =$ 2,600 lb. $n = 12.$	$f_c =$ 2,300 lb. $n = 15.$
Kind of Stress.	Permissible Unit Stress in lbs. per square inch.		
Flexure: $f_c$ —			
Extreme fibre stress in compression ( $f_c$ ) ..	1,050	900	750
Extreme fibre stress in compression adjacent to supports of continuous or fixed beams or of rigid frames ( $f_c$ ) ..	1,200	1,050	880
Shear: $v$ —			
Beams with anchorage of longitudinal steel but with no web reinforcement ( $vc$ ) ..	60	50	40
Beams with anchorage of longitudinal steel and with properly designed web reinforcement ( $v$ ) ..	180	150	120
Flat slabs at distance “ $d$ ” from edge of column cap or drop panel ( $vc$ ) ..	90	75	60
Footings where longitudinal bars have anchorage ( $vc$ ) ..	60	50	40
(Footing shear area may be taken as a plane extending at 45° outwards from edge of bearing in lieu of a vertical plane at edge of bearing)			
Bond: $u$ (with anchorage of longitudinal steel), in beams and slabs and footings—			
Plain bars ( $u$ ) ..	110	100	90
Deformed bars ( $u$ ) ..	130	120	110
Bearing: $f_c$ —			
Where a member rests on a concrete pier, pedestal or block, the area of which is at least 10 per cent. greater than the area in bearing the allowable bearing stress may be ( $f_c$ ) ..	750	650	550
Axial Compression: $f_c$ —			
In columns with lateral ties or ligatures ( $f_c$ ) ..	675	600	500
In columns with continuous spirals a special formula for $f_c$ is used.—See cl. 127, S.A.A. Code, C.A. 2			

2404. **Increased Stresses in Special Concrete.**—The permissible working stresses in concrete under these Regulations may be increased to those shown in Table 2404 when the following conditions (a), (b), (c), (d), in addition to those elsewhere prescribed are fulfilled:—

- (a) The work shall be designed by a Chartered Engineer having at least seven years' continuous experience in the design and construction of important structural architectural and engineering work.
- (b) The work shall be carried out under the responsible and continuous supervision of a qualified engineer who shall be present during the whole time concrete is being mixed and poured.
- (c) The following tests and determinations of all concrete materials shall be carried out by the designer and the results submitted to the Surveyor:—
  - (i) standard physical and chemical tests including the determination by fineness modulus method of the optimum proportions of fine and coarse aggregates corresponding to the normal proportions specified, at weekly intervals or whenever the source of supply or grading is altered;
  - (ii) the amount of water required to give the minimum slump test compatible with suitable workability at daily intervals and whenever there is a change in the water content of the aggregates. The amount of water so determined shall be accurately measured and added to each batch of concrete.
- (d) Approved power vibration of not less than 5,000 impulses per minute shall be used for consolidating concrete in position. Care shall be taken not to touch the reinforcing steel. Vibration shall be applied for short periods at closely spaced points and excessive vibration at any one point shall be avoided.

TABLE 2404.—PERMISSIBLE STRESSES IN SPECIAL CONCRETE.  
To be Adopted in lieu of Stresses laid down in S.A.A. Code C.A.2.

Special Concrete—See Table 1311 (1).	A.	B.	C.
	$f'_c =$ 3,750 lb. $n = 10$	$f'_c =$ 3,250 lb. $n = 10$	$f'_c =$ 2,750 lb. $n = 12$
Kind of Stress.	Permissible Unit Stress in lbs. per square inch.		
<b>Flexure: <math>f_c</math>—</b>			
Extreme fibre stress in compression ( $f_c$ ) ..	1,200	1,050	900
Extreme fibre stress in compression adjacent to supports of continuous or fixed beams or of rigid frames ( $f_c$ ) ..	1,350	1,200	1,050
<b>Shear: <math>v</math>—</b>			
Beams with anchorage of longitudinal steel but with no web reinforcement ( $vc$ ) ..	70	60	50
Beams with anchorage of longitudinal steel and with properly designed web reinforcement ( $v$ ) ..	200	170	140
Flat slabs at distance "d" from edge of column cap or drop panel ( $vc$ ) ..	105	90	75
Footings where longitudinal bars have anchorage ( $vc$ ) ..	70	60	50
(Footing shear area may be taken as a plane extending at 45° outwards from edge of bearing in lieu of a vertical plane at edge of bearing.)			
<b>Bond: <math>u</math> (with anchorage of longitudinal steel), in beams and slabs and footings—</b>			
Plain bars ( $u$ ) ..	120	110	100
Deformed bars ( $u$ ) ..	140	130	120
<b>Bearing: <math>f_c</math>—</b>			
Where a member rests on a concrete pier pedestal or block, the area of which is at least 10 per cent. greater than the area in bearing, the allowable bearing stress may be ( $f_c$ ) ..	950	800	700
<b>Axial compression: <math>f_c</math>—</b>			
In columns with lateral ties or ligatures ( $f_c$ ) ..	800	700	600
In columns with continuous spirals a special formula for $f_c$ is used. See cl. 127 (S.A.A. Code C.A. 2)			

2405. **Variations from S.A.A. Codes.**—The following variations from the S.A.A. Codes shall be adopted under these Regulations:—

- (a) In computing the resistance to negative moments at supports of T beams the area of steel in compression shall in no case be taken as exceeding 3 per cent. of the area of the web of the T beam below the slab.
- (b) In computing the safe load on reinforced concrete columns with longitudinal reinforcement and lateral ties, no longitudinal reinforcing steel in excess of 4 per cent. of the total area of the column may be taken into account. In all reinforced concrete columns when the total amount of the longitudinal reinforcement exceeds 2 per cent. of the area of the column taken into account as carrying load, lapped joints in the reinforcement will not be permitted and a direct method must be used for transferring the load from the upper reinforcing bars to the lower. The lateral ties shall further provide for a shearing force equal to  $2\frac{1}{2}$  per cent. of the load carried by the vertical reinforcement.
- (c) When bending stress has to be added to direct load stress in columns, the permissible unit stress in compression may be increased to .35 f.c. provided that in no case shall any part of the column be less than would be required if the bending moments were omitted.
- (d) The increase in deflection of beams, as working stresses are increased, should be noted and excessive deflections and consequent excessive creep should be avoided. In every reinforced concrete beam, the ratio of depth to span shall be so proportioned that the deflection under full load will not exceed  $1/2000$ th the span.
- (e) When more than one layer of bars in tension is provided in planes parallel to the plane of the neutral axis of a beam then the average stress in the bars will be accepted as determining the maximum permissible stress provided that the actual average stress in the lower layer of bars must not exceed the average stress in the whole of the bars by more than 10 per cent.; when more than one layer of bars is provided in a beam the clear vertical distance between layers of bars shall not be less than 1 inch for round bars and  $1\frac{1}{2}$  inch for square bars.
- (f) Where structural steel beams are encased in concrete in accordance with the requirements for a four-hour fire-resistant rating, the permissible stresses in the extreme fibres under bending moment may be increased to 20,000 lb. per square inch.
- (g) Only those connexions of structural steel members which it is impracticable to make in the workshop may be made on the site. In addition to those cases named in the S.A.A. Code C.A. 1-1939 for connexions, black bolts not less than  $\frac{3}{4}$  inch diameter may also be used in all places not subjected to direct shearing forces, e.g., top connecting cleats of rolled steel joists and attachments of rolled steel joists to seating brackets.
- (h) The eccentricity of any load applied by a structural steel member to a bracket attached to a column shall be considered equal to the distance from the centroid of the column to the face on which the bracket is attached, plus one-tenth inch per ton of such load or plus one  $\frac{1}{2}$  inch whichever is the greater. For the eccentricity of any load applied to a column by a steel beam supported on the top of the column the difference in shear at the two opposite faces of the column shall be taken as the eccentric load, and the eccentric arm shall be considered as three-eighths the distance between the column faces.
- (i) In the design of steel frame buildings the end fixity of the beams may be taken into account when joints are constructed and bending moments determined in accordance with the Code of Recommendations given in the Final Report of the Steel Structures Research Committee, 1936, of the British Department of Scientific and Industrial Research, and in welded joints end fixity of beams shall be taken into account as set out in S.A.A. Welding Code, No. C.A. 8-1939.

- (j) Where one end of a structural steel column is restrained in direction and held in position and the other end is neither restrained in direction nor held in position the effective length of the column shall be taken as twice the actual length.
- (k) For the purposes of rating in terms of fire resistance, cover over reinforcement in concrete shall be not less than as specified in Chapter 14.
- (l) (i) A combination column shall consist of a number of structural steel sections laced diagonally or battened together to form a structural steel column, the space between the sections being filled with concrete, the column wrapped with wire or an approved equivalent as required for structural steel columns encased in concrete, and the sections covered with concrete at least 2 inches thick except over rivet heads. The structural steel portions shall be connected at joints in accordance with the provisions of these Regulations governing joints in structural steel.
- (ii) Flanged joints may be used in the structural steel portion when the column is entirely under compressive stress provided all butting ends are machine faced, the connexion is capable of transmitting a force at least equal to 20 per cent. of the load on the upper column and the flanges are symmetrically arranged and connected on the four faces of the column.
- (iii) Special brackets shall be used to receive the entire floor load at each storey.
- (iv) The permissible load on a combination column shall be equal to 0.25 f'c. of the area of the concrete inside the lacing or batten plates, plus the permissible load on similar structural steel if in a composite column as defined in the S.A.A. Code for Concrete in Building No. C.A. 2-1937.
- (m) In simple beams or freely supported end spans of continuous beams anchorage shall be provided:
- (i) by extending, without bending, not less than one-half of the maximum tensile reinforcement beyond the face of the support to provide a straight embedment of not less than five diameters with a plain or embracing hook in addition; or
- (ii) by extending a similar amount of reinforcement beyond the face of the support and then bending the bars in the direction of the depth of the beam, away from the bearing surface of the support. In this case the length of embedment shall be not less than fifteen diameters plus a plain or embracing hook;
- (iii) for indented bars or bars providing a satisfactory mechanical bond the plain or embracing hook prescribed in paragraphs (i) and (ii) may be omitted provided that in case (i) the straight embedment shall not be less than ten diameters.
- In continuous or cantilever beams each bar of the negative tensile reinforcement shall be extended, without bending, beyond the face of each support to provide a straight embedment of not less than 40 diameters plus a plain hook. Not less than one-third of the area of the negative reinforcement shall be extended six diameters beyond the point of inflection and each bar shall have a plain hook in addition. In the case of deformed bars or bars providing a satisfactory mechanical bond the plain hook may be omitted.
- (n) Except at splices, parallel bars shall be spaced so that the horizontal distance between any two bars shall not be less than  $1\frac{1}{2}$  times the diameter of the larger of the two bars, and the vertical distance between any two bars shall not be less than the diameter of the larger bar subject to the further requirement that in no case shall the distance between parallel bars be less than the size of the largest piece of aggregate used, plus  $\frac{1}{4}$  inch.

- (o) Where steel reinforcement is introduced in beams and slabs to provide for shearing forces such reinforcement shall be capable of taking any excess shear not provided for by the concrete, but where the concrete is capable of providing for not more than two-thirds of the total shear then the steel shear reinforcement must be capable of providing for the whole of the shear.
- (p) The temporary supports for reinforcing bars in forms shall not be spaced closer than 100 diameters, and bars placed near the top of beams shall have the supports removed after concreting to allow the bars to follow shrinkage movements in the setting concrete.

**2406. Other Metal Reinforcement.**—A pair of mild steel round bars cold twisted together helically, while restrained, so that the effective length of the twisted bars is the same as the length of the straight bars shall be approved as reinforcement for concrete subject to the following provisions:—

- (a) Such reinforcement shall not be used in columns, struts, or similar structural members.
- (b) The steel before twisting shall conform to the S.A.A. Specification for Structural Steel No. A. 1-1940 and after twisting shall have a yield point of not less than 54,000 lb. per square inch.
- (c) The yield point referred to in the preceding paragraph shall be obtained by applying a preliminary stress of 30,000 lb. per square inch after having bound the test piece of twisted bars at the ends to prevent slipping in the jaws of the testing machine. The gauge length of 24 inches shall then be marked off and the stress increased until the elongation reaches 0.2 per cent. = .048 inches, the stress at which this elongation is reached being taken as the yield point.
- (d) The working stress for beams and slabs shall not exceed—
  - in tension 27,000 lb. per square inch;
  - in shear reinforcement 18,000 lb. per square inch;
  - in compression 9,000 lb. per square inch;
  - in bond stress, a stress similar to that provided for round mild steel reinforcement, the sum total of two circumferences of the twisted bars being taken in computing this stress.
- (e) The requirements for end anchorage shall be similar to those prescribed for indented bars in clause 2405 (m).
- (f) In beams the ratio of depth to span shall be so proportioned that the deflection under a full load will not exceed 1/2000 of the span. In slabs the deflection shall not exceed 1/1000 of the span.
- (g) The steel used in any construction work shall be suitably marked for the purpose of identification.

**2407. Concrete Fireproofing.**—Where the thickness of concrete fireproofing on the soffit of steel beams and girders is less than 1/12th of the width of the bottom flange plus 1½ inch, such fireproofing shall be—

- (a) rammed in from the side, the bottom of the side forms being made removable for the purpose; or
- (b) of pre-cast concrete.

**2408. Pre-cast Concrete Fireproofing.**—Pre-cast concrete for fireproofing shall have rebated or interlocking joints and sufficient projecting rods or wires to ensure adequate bond to poured concrete. The space between the steel and pre-cast concrete shall be filled with concrete.

**2409. Pre-cast Concrete Units.**—(a) The use of pre-cast reinforced concrete units shall be permitted in the construction of floors and other suitable portions of buildings subject to compliance with the provisions of these Regulations in regard to—

- (i) quality of materials;
- (ii) loading and stresses on the materials; and
- (iii) workmanship;

if it be shown that the building has the necessary strength and stability.

(b) The stress limitations prescribed in these Regulations shall not apply to pre-cast reinforced concrete units where the following requirements are complied with:—

- (i) the units shall be manufactured under approved factory conditions and competent engineering control and are branded with a permanent identification mark of the manufacturer;
- (ii) proper testing facilities shall be provided for testing units;
- (iii) at the age of delivery, the units shall be capable of sustaining, without damage, a superimposed test load calculated as half the dead load plus one and one-half times the live load;
- (iv) tests shall be carried out by the manufacturer in the presence of the Surveyor when so required. Up to 10 per cent. of the units may be tested to the loading prescribed in the preceding paragraph and shall all pass this test. In addition, 1 per cent. may be tested to the point beyond which the unit will sustain no further load. In this case the load at failure shall not be less than two and one-half times the design load, consisting of dead load plus live load. Specimens for test shall be selected by the Surveyor. Failure to pass these tests shall cause rejection of the batch of units represented by the test.

2410. **Reinforcement in Hydraulic Works.**—In hydraulic works the tensile stress in the steel reinforcement must be reduced sufficiently to keep cracks in the concrete within the limits required for water tightness.

2411. **Timber in Floors of Fire-resisting Construction.**—Timber may be used in floors of fire-resisting construction for the construction or securing of floor or ceiling coverings provided that the prescribed thickness of fire-resisting material is maintained throughout the whole area of the floor.

**Part II—Reinforced Brick Masonry Design and Construction.**

2412. **Working Stresses.**—The allowable unit working stresses in pounds per square inch, in reinforced brick masonry constructed under the supervision of a qualified engineer, shall not exceed the values given in the following tables:—

Type of Stress.	Allowable unit working stress lb. per sq. in.
Compression (Extreme fibre stress in bending) ..	400
Direct Compression on Piers ..	300
Shear (no web reinforcement) ..	25
Shear (with web reinforcement taking entire shear) ..	50
Bond: Deformed bars (horizontal and vertical) ..	60
Modulus of Elasticity (E) ..	1,200,000

2413. **Method of Design.**—The formulæ, assumptions, and requirements set out in these Regulations for reinforced concrete shall as far as applicable be used in the design of reinforced brick masonry.

2414. **Mortar.**—Cement mortar shall be used in reinforced brick masonry.

2415. **Bond.**—(a) All reinforced brick masonry shall be laid with full header courses at least every fourth course in height, or there shall be at least one full header in every 60 square inches of wall surface, except that in brickwork laid up with all interior joints flushed, headers need not be used.

(b) In lieu of the headers prescribed in the preceding sub-clause metal ties may be substituted in the number of one tie for every two headers. These metal ties shall consist of not less than ¼-inch hot drawn mild steel wire with hooks at both ends, or of ⅜-inch corrugated steel bars without hooks, extending to within not less than ¼-inch of the wall faces, in the number of one per stretcher in every sixth course.

(c) All bed, end and wall joints shall be completely filled with mortar, and all reinforcing steel shall be entirely embedded in the mortar. The clearance between the bar and the brick shall be at least one-half the diameter of the bar.

(d) Reinforcement shall be of deformed bars providing an approved mechanical bond, and shall be braced and held in place firmly enough to prevent the breaking of bond while the brickwork is being laid.



**2416. Reinforced Brick Masonry Walls.—(a) Thickness—**

- (i) Reinforced brick masonry walls shall be designed to resist any lateral or other pressure to which they may be subjected, including eccentric loads;
- (ii) No reinforced brick masonry wall shall be less than 9 inches thick;
- (iii) Reinforced brick masonry bearing walls shall have a minimum thickness of 1/25th of the unsupported height. Buttresses, built-in columns, or piers may be designed to carry all the vertical loads;
- (iv) Non-bearing panel walls of reinforced brick masonry shall have a thickness of not less than 9 inches, and not less than 1/30th of the unsupported height;
- (v) Subject to the other requirements of this section, reinforced brick masonry walls shall have a thickness at least equal to that specified elsewhere in these Regulations for reinforced concrete bearing walls.

(b) **Working Stresses.**—The working compressive stresses in such walls shall not exceed 75 lb. per square inch when the wall is 25 times the thickness in height, proportionally increasing to 150 lb. per square inch when the wall is 15 times the thickness in height.

(c) **Reinforcement.**—Such walls shall be reinforced with at least 1/4 of 1 per cent. of steel in each direction, vertical and horizontal. Walls more than 9 inches thick shall have the reinforcement for each direction placed in two layers or planes parallel to the wall faces, not less than 2 inches nor more than 1/3rd of the wall thickness from the exterior face, and not less than 1 inch nor more than 1/3rd of the wall thickness from the interior wall face. The vertical steel shall not be relied on to carry load unless tied and arranged as in columns. The reinforcing bars shall not be spaced further apart than 18 inches, nor shall they be smaller than the equivalent of 3/8-inch round bars.

**Part III.—Tests.**

2417. **Tests.**—(a) Where tests carried out in any portion of a building indicate deficiency in the construction to such an extent as to unduly reduce the factor of safety, that portion of the work shall be subjected to a load test, in which the superimposed load shall be equal to one-half the dead load plus one and one-half times the live load. The load shall be left in position for a period of 24 hours before removal.

(b) The structure shall be considered to have passed the test if the maximum deflection at the end of the 24-hours period does not exceed the value of  $D$  as given by the following:—

$$D = \frac{.001 L^2}{12t}$$

in which—

$L$  is the span,  $t$  is the total depth of the slab or beam, and  $D$  is the maximum deflection—all expressed in the same units.

(c) If the deflection exceeds the value of  $D$  as given in the above formula, the construction shall be considered to have passed the test if within 24 hours after the removal of the load the slabs or beams show a recovery of at least 75 per cent. of the observed deflection.

(d) Any construction which does not pass the test shall be reconstructed and reinstated in accordance with the provisions of these Regulations.

**CHAPTER 25.****TIMBER BUILDINGS AND CONSTRUCTION.**

- Clause 2501.—Framework.
- Clause 2502.—Support for Framework.
- Clause 2503.—Provision of Dampcourse.
- Clause 2504.—Vermin Plates.
- Clause 2505.—External Covering for Walls.
- Clause 2506.—Distance of Timber Walls from Boundary.
- Clause 2507.—Lining of Walls and Ceilings.
- Clause 2508.—Attics.
- Clause 2509.—Re-erection of Removed Buildings.

## CHAPTER 25.

## TIMBER BUILDINGS AND CONSTRUCTION.

2501. **Framework.**—The framework of every timber building shall be constructed in accordance with the recommendations set out for Class I. Construction in Building Frames (Timbers and Sizes) being Pamphlet No. 112 issued by the Council for Scientific and Industrial Research, provided that—

- (a) temporary buildings and any building in which rigidity is not essential may be constructed in accordance with the recommendations set out for Class II. Construction in the said Pamphlet No. 112;
- (b) where mixed Victorian hardwoods are used, the recommendations for Strength Group C shall be adopted, and where Douglas fir (oregon) is used, the recommendations for Strength Group D shall be adopted;
- (c) where it is desired to use materials, methods, sizes, and/or spacings other than as prescribed herein, or where in any particular case the said recommendations are inapplicable or the sizes unsuitable, computations and details shall be submitted to and the design approved by the Surveyor.

2502. **Support for Framework.**—The framework of walls shall rest upon—

- (a) sleeper walls of masonry or concrete not less than 4 inches in thickness provided that where they are of an excessive height or where the distance between vertical supports is excessive, such walls shall be stiffened with piers not less than 8 inches in width and 4 inches thicker than and bonded into the sleeper walls;
- (b) piers of masonry or concrete measuring not less than 9 in. x 9 in.
- (c) piers or stumps of concrete not less than 4 in. x 4 in. in size with sole plates integrally cast having a bearing area of not less than 72 square inches. Any concrete stump which exceeds in height six times its least dimension shall be reinforced to the approval of the Surveyor;
- (d) stumps of red gum or other approved timber. Any stump projecting more than 3 feet above the surface of the ground shall be securely braced. The bottom of every stump shall be at a depth below the natural surface of the ground equal to one-fourth of the length of the stump, but in no case less than 18 inches and shall rest upon and be securely fastened to—
  - (i) a base of concrete not less than 72 square inches in area;
  - (ii) a base of masonry constructed in cement or composition mortar having a bearing area of not less than 72 square inches; or
  - (iii) a sole plate of red gum or other approved timber having a thickness of not less than 1½ inch and a bearing area of not less than 72 square inches; except that where the ground is sandy or silty, or where the Surveyor so approves, stumps may be placed on continuous sole plates laid 1 inch below the surface of the ground but such stumps shall be adequately braced.

2503. **Provision of Dampcourse.**—Where the framework of walls is supported upon sleeper walls a dampcourse conforming to the requirements of Part VIII. of Chapter 20 shall be provided.

2504. **Vermin Plates.**—Vermin plates shall be provided in all cases where the floor is of timber construction.

2505. **External Covering for Walls.**—Walls shall be covered externally with—

- (a) weatherboards—
  - (i) not less than 9/16 inch in thickness; or
  - (ii) tapered from a thickness of not less than ¾ inch to a thickness of not less than ¼ inch;
- (b) asbestos cement not less than 3/16 inch in thickness; or
- (c) other durable materials having a satisfactory resistance to the penetration of moisture.

2506. **Distance of Timber Walls from Boundary.**—Timber walls shall not be constructed within 4 feet of the boundary of any allotment of land not in the same occupation.

2507. **Lining of Walls and Ceilings.**—The internal lining of all walls and ceilings of timber buildings of Classes I, II, III, and IV. Occupancies shall be of lath and plaster or approved expanded metal and plaster finished to a hard surface, plaster sheets, asbestos cement sheets, or other durable materials, but lining of textile materials and/or paper shall not be permitted.

2508. **Attics.**—An attic storey shall not be constructed in a timber building which already contains two storeys.

2509. **Re-erection of Removed Buildings.**—Every building or erection removed or transported whether from within or without the municipal district, for re-erection on a site within the municipal district, shall, when re-erected, comply with all the provisions of this by-law relating to new buildings of the appropriate class of occupancy and type of construction.

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CHAPTER 26.

**REINFORCED CONCRETE AND MASONRY VENEER  
CONSTRUCTION.**

- Clause 2601.—Veneer Construction.  
 Clause 2602.—Number and Separation of Dwellings.  
 Clause 2603.—Wall Construction.  
 Clause 2604.—Loading on Timber Framework.  
 Clause 2605.—Construction of Timber Framework.  
 Clause 2606.—Supports of Timber Framework.  
 Clause 2607.—Attic Storey Prohibited in Two-storey Buildings.  
 Clause 2608.—Construction of Outer Veneer of External Walls.  
 Clause 2609.—Requirements for Base Structures.  
 Clause 2610.—Fixings for Pipes in Veneer Walls.  
 Clause 2611.—Maximum Dimensions of Veneer Walls.  
 Clause 2612.—Distance of Veneer Walls from Boundary.  
 Clause 2613.—Internal Linings.

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CHAPTER 26.

**REINFORCED CONCRETE AND MASONRY VENEER  
CONSTRUCTION.**

2601. **Veneer Construction.**—Buildings of Class I. or Class II. Occupancy may be constructed with external walls of reinforced concrete or masonry veneer, in accordance with the provisions of this Chapter.

2602. **Number and Separation of Dwellings.**—(a) Not more than two dwellings shall be constructed in any building of veneer construction.

(b) Where a building is designed for two dwellings, such dwellings shall be placed side by side, and be separated by a wall having a thickness of not less than 8 inches if constructed of masonry or concrete, or of not less than 6 inches if constructed of reinforced concrete, every such wall being carried up to the level of the underside of the roof.

2603. **Wall Construction.**—The external walls of a building of veneer construction shall consist of an inner framework of timber construction and an outer veneer of masonry or reinforced concrete.

**2604. Loading on Timber Framework.**—The timber framework of the external walls, together with that of the internal walls, shall sustain and transmit to the base structure the live loads prescribed by Chapter 15, together with the dead load of the building exclusive of the masonry or concrete veneer.

**2605. Construction of Timber Framework.**—The construction of the timber framework shall conform to the requirements of clause 2501.

**2606. Supports of Timber Framework.**—The timber framework of external walls shall—

- (a) rest upon—
  - (i) stumps of red gum or other approved timber not less than 4 in. x 4 in. in size, spaced at 4-ft. centres, securely braced and resting upon the footings of the masonry or concrete veneer; or
  - (ii) masonry piers 8 in. x 4 in. in size, spaced at not more than 5-ft. centres and bonded to the outer veneer; and
  - (iii) in the case of two-storey buildings, masonry not less than 8 inches in thickness carried to the level of the underside of bearer plates;
- (b) otherwise conform to the requirements of Chapter 25.

**2607. Attic Storey Prohibited in Two-storey Buildings.**—An attic storey shall not be constructed in a building of veneer construction which already contains two storeys.

**2608. Construction of Outer Veneer of External Walls.**—The outer veneer of external walls shall consist of masonry or reinforced concrete, which shall be—

- (a) constructed on footings not less than 15 inches wide and 10 inches deep and otherwise conforming to the requirements of Chapter 19;
- (b) not less than 4 inches in thickness;
- (c) in the case of masonry veneer, constructed with cement or composition mortar, except that composition mortar shall not be used in walls exceeding 12 feet in height;
- (d) bonded to the timber framework with approved galvanized wire or other approved galvanized wall ties, spaced not further apart than 18 inches horizontally and 24 inches vertically; and
- (e) so constructed as to leave a clear air-space between the veneer and the timber of not less than 1 inch, and not more than 2 inches.

**2609. Requirements for Base Structures.**—Base structures of external walls shall be provided with—

- (a) ventilation openings as prescribed in clause 2110 (a); and
- (b) dampcourse below floor plates as prescribed in Part VIII. of Chapter 20.

**2610. Fixings for Pipes in Veneer Walls.**—Except where approved types of fixings are used, flashing to a depth of 1½ inch and bolts for the full thickness of the wall shall be built in during the construction of veneer walls to provide adequate fixings for downpipes, vents, and sewer pipes.

**2611. Maximum Dimensions of Veneer Walls.**—No veneer wall having a thickness of less than 6 inches shall be constructed—

- (a) to a greater height than 20 feet; or
- (b) in the case of a two-storey building to a greater length than 24 feet unless a set off of at least 2 ft. 6 in. is made or adequate stiffening piers are introduced.

**2612. Distance of Veneer Walls from Boundary.**—Walls having timber framework and outer veneer of masonry or concrete in accordance with the provisions of this Chapter shall not be constructed within 4 feet of the boundary of any allotment of land not in the same occupation.

**2613. Internal Linings.**—Internal linings of walls and ceilings shall conform to the requirements therefor set out in Chapter 25.

## CHAPTER 27.

## MEANS OF EGRESS.

- Clause 2701.—Application.
- Clause 2702.—Relation of Population to Exits.
- Clause 2703.—Kinds of Exits.
- Clause 2704.—Fire Isolated Stairs.
- Clause 2705.—Location of Exits.
- Clause 2706.—Exits from Buildings of Classes I., II., III., and IV. Occupancy.
- Clause 2707.—Exits from Buildings of Classes V., VI., VII., and VIII. Occupancy.
- Clause 2708.—Stairways Discharging on to Floor above Street Level.
- Clause 2709.—Changes in Width of Exit.
- Clause 2710.—Construction of Stairs.
- Clause 2711.—Landings.
- Clause 2712.—Guards and Handrails.
- Clause 2713.—Measurement of Width.
- Clause 2714.—Space under Stairs.
- Clause 2715.—Enclosing Walls.
- Clause 2716.—Ramps.
- Clause 2717.—Horizontal Exits.
- Clause 2718.—Height of Exits.
- Clause 2719.—Aisles and Passages.
- Clause 2720.—Doorways.
- Clause 2721.—Revolving Doors.
- Clause 2722.—Door Fastenings.
- Clause 2723.—Maintenance of Exits.
- Clause 2724.—Lighting and Ventilation of Exits.

## CHAPTER 27.

## MEANS OF EGRESS.

2701. Application.—(a) Every building other than a public building shall be provided with exits in accordance with the provisions of this chapter.

(b) Every public building shall be provided with exits as prescribed by regulations made under the Health Acts.

## Clause 2702.—Relation of Population to Exits.—

(a) When the number of persons for whom egress space is to be provided is not stated in the application for a building permit, it shall be ascertained by applying to the space available for occupation the following areas per person:—

Concert rooms and meeting halls provided with seating accommodation	5 square feet
Dance halls	8 square feet
Restaurants	12 square feet
Schoolrooms	15 square feet
Shops and Markets—	
(i) Sales basements and ground floors	40 square feet
(ii) Other floors	60 square feet
Offices and showrooms	100 square feet
Warehouses, bulk stores, public garages, and motor showrooms	300 square feet
Factories (excluding any space more than 13 feet from the floor)	400 cubic feet

- (b) For any occupancy not specified in sub-clause (a) the Surveyor shall determine the scale to be used.
- (c) It shall be an offence against these Regulations for any person to permit any building to be occupied by a greater number of persons than that for which exits are provided.

2703. **Kinds of Exits.**—For the purposes of this Chapter, exits shall consist of stairs, ramps, horizontal exits, passageways, and doorways used either singly or in association to provide the necessary passage to a street or to an open space leading to a street.

2704. **Fire-isolated Stairs.**—(a) When a stairway is required to be fire-isolated, the walls, ceilings, floors, and doors shall be so constructed as to provide complete enclosure of the stairway from the room or space served to the exterior of the building provided that—

- (i) a stairway need not be enclosed on the uppermost storey, except where it is the only means of exit from such storey or where it provides access to the roof of the building;
- (ii) where a stairway is not enclosed on the uppermost storey a solid balustrading of incombustible material shall be constructed on such storey to a height of 3 feet above the level of the floor.

(b) Such walls, floors and ceilings shall have a fire-resistance rating of two hours, provided that in Type 1 Construction the requirements of clause 705 shall be observed.

(c) The fire-resistance rating of any ceiling shall mean that of such ceiling in association with any floor or roof construction immediately above it and the rating of any floor shall mean that of such floor in association with any ceiling beneath it.

(d) When an exit or any part thereof is required to have a minimum fire-resistance rating, then all construction which supports such exit or part thereof and which transfers its live and dead loads to the ground shall have a rating at least equal to that of the exit or portion thereof supported.

(e) When any exit stairway leading from an upper floor to an exit from the building is continued past the level of such exit to provide access to any lower floor, such continuation shall be assumed to be part of such exit stairway and shall be fire-isolated if the exit stairway is required to be fire-isolated.

(f) Openings in enclosing walls of fire-isolated stairways shall conform to the requirements of clause 2804, except that doors opening on to a street or exterior passageway and not required to be protected pursuant to clause 2807 shall not be required to have a fire-resistance rating.

(g) Where a fire-isolated stairway is required by these Regulations, an external stairway may be substituted therefor.

2705. **Location of Exits.**—(a) Except as provided in sub-clause (b) hereof, exits shall be so located that no point in a floor area, room, or space served by them is distant from an exit more than—

- (i) in unsprinklered buildings of high hazard occupancy—  
80 feet,  
in sprinklered buildings of high hazard occupancy—100 feet;
- (ii) in unsprinklered buildings not having a high hazard occupancy—100 feet,  
in sprinklered buildings not having a high hazard occupancy—150 feet.

(b) The distance shall be measured from the most remote point to the exit except that where a building not having a high hazard occupancy is divided into rooms or apartments as in offices or residential buildings the distance shall be measured from the corridor entrance of such rooms to the nearest exit.

(c) In buildings of Types 3, 4, and 5 Construction, exits shall be so arranged that there are no pockets or dead ends in which occupants may be trapped.

(d) All exits shall be as far apart as practicable and, when more than one exit is required, they shall be distributed as uniformly as possible within or around the floor area, room, or space they are to serve.

**2706. Exits from Buildings of Class I., II., III., and IV. Occupancy—**

- (a) **From Rooms.**—Every room intended for more than 80 persons shall have at least two doorways remote from each other.
- (b) **From Buildings.**—Every building containing more than one storey above the ground storey shall have alternative exits, one of which shall be a fire-isolated stairway. Additional means of exit shall be provided where the distance of travel exceeds the limits prescribed by clause 2705. Where more than three stairways are required by these Regulations, at least two shall be fire-isolated and where more than six stairways are required at least three shall be fire-isolated.
- (c) **From Basements.**—Except in a building of Class I. Occupancy, every basement area shall have direct access to at least two independent exits, one of which shall be fire-isolated, provided that where any such basement is used solely for the housing of mechanical equipment, the non-fire-isolated exit may be in the form of a fixed ladder or steep stair.
- (d) Every exit shall have a minimum width of 3 ft. 4 in., except that in buildings of Class I. and Class IV. Occupancy, and in buildings of Class II. Occupancy containing not more than four flats, the minimum width may be reduced to 2 ft. 8 in.

**2707. Exits from Buildings of Class V., VI., VII., and VIII. Occupancy—**

- (a) Every building containing Class V., VI., VII., or VIII. Occupancy shall have exits in accordance with the following requirements:—
- (i) Every such building not more than two storeys in height shall be provided with alternative means of escape or with a fire-isolated stairway.
- (ii) Every such building more than two storeys in height shall be provided with alternative means of escape, one or more of which shall be a fire-isolated stairway except that in a building of Type 1 or 2 Construction and not more than three storeys in height alternative means of escape shall not be required where the fire-isolated stair has no communication with the ground floor.
- (b) Additional means of exit shall be provided where the distance of travel exceeds the limit prescribed by Clause 2705.
- (c) Where more than three stairways are required by these Regulations at least two shall be fire-isolated, and where more than six stairways are required at least three shall be fire-isolated.
- (d) Every basement area shall have direct access to at least two independent exits, one of which shall be fire-isolated, provided that where any such basement is used solely for the housing of mechanical equipment, the non-fire-isolated exit may be in the form of a fixed ladder or steep stair.
- (e) **Width of Exits.**—The aggregate width of exits serving any floor area shall be sufficient to provide for the number of persons accommodated in that area on the basis of 20 inches of width per 20 persons, or part thereof, provided that—
- (i) in a building of Type 1 or Type 2 Construction having alternative means of escape, the number of persons per 20 inches of exit width may be increased by 25 per cent.;
- (ii) for each fire-isolated stair provided in addition to those required under these Regulations, the number of persons per 20 inches of exit width may be further increased by 25 per cent.;
- (iii) in a building not more than two storeys in height the number of persons per 20 inches of exit width may be further increased by 25 per cent.;

- (iv) every exit shall have a minimum width of 3 ft. 4 in., except that a stair serving a floor area accommodating not more than 25 persons may be reduced to 2 ft. 8 in. in width;
- (v) the width of any stairway in excess of 5 ft. shall not be regarded as part of the aggregate width required by these Regulations.

2708. **Stairways Discharging on to Floor above Street Level.**—In buildings of Classes III., V., and VI. Occupancy a stairway serving upper floors and not required to be fire-isolated may discharge on to a floor area not more than 15 feet above the level of the street at the entrance thereto provided that an unobstructed aisle at least as wide as such stairway is maintained from such stairway to an exit from the building.

2709. **Changes in Width of Exit.**—No means of exit shall decrease in width in the direction of exit travel.

2710. **Construction of Stairs.**—

- (a) **Materials.**—Except in buildings of Class I. Occupancy every stair and landing shall be constructed of fire-resisting materials as defined in clause 1405, provided that in the case of buildings exceeding three storeys in height, external stairs shall be constructed of metal not less than  $\frac{1}{4}$  inch in thickness or of reinforced concrete.
- (b) **Winders.**—The use of winders is prohibited in exit stairways, except in buildings of Class I. and Class IV. Occupancy.
- (c) **Geometric Stairs.**—In all classes of buildings the use of geometric stairs may be permitted on condition that—
  - (i) the centre of curvature is outside the outer string and at a minimum distance therefrom equal to at least two-thirds of the width of the stair; and
  - (ii) the width of treads exclusive of nosing or overhang is 11 inches measured at a distance of 20 inches from the outer string.
- (d) **Treads and Risers.**—
  - (i) Treads and risers shall be of uniform width.
  - (ii) Treads shall have a width of not less than 10 inches (exclusive of nosing) and risers shall have a height of not more than  $7\frac{1}{2}$  inches, except that in stairs not required to be fire-isolated in buildings of Classes I., II., III., IV., V., and VII. Occupancy, and in stairs to mezzanine floors the width of treads may be  $9\frac{1}{2}$  inches.
  - (iii) Treads and landings shall be solid and shall be so constructed as to prevent persons slipping thereon.
- (e) **Head Room.**—Every stairway shall have a head room clearance of not less than 6 ft. 8 in., measured vertically above any landing or above a line connecting the nosings of stair treads.
- (f) **Lining.**—The lining, if any, of the spandrils and of the underside of stairs and landings shall be constructed of materials as specified in clause 1405 (b). The underside of all internal stairs shall be so lined unless risers are fitted.

2711. **Landings.**—

- (a) **Stairs to be in Straight Flights.**—Except in winders or geometric stairs, every stair shall have straight flights with half-space or quarter-space landings at intervals of not more than sixteen nor less than two risers, but no stair shall have more than 32 successive risers, whether in two or more flights, without a change of direction through at least 60 degrees.
- (b) The length and width of landings shall be not less than the width of stairways on which they occur, except that in a straight flight the distance between risers on a landing may not be less than 36 inches.



2712. **Guards and Hand-rails.**—(a) Every stairway shall have a wall or a well-secured balustrade or guard on each side.

(b) Every stairway when 40 inches or less in width shall have hand-rails on at least one side, and when more than 40 inches in width, shall have hand-rails on both sides.

(c) When the width of a stairway is 80 inches or more, one or more intermediate hand-rails continuous between landings, shall be provided, the number and positions of intermediate hand-rails being such that there shall not be more than 60 inches between hand-rails.

(d) Hand-rails shall be fixed at a vertical height of not less than 34 inches above the nosing of the tread and not less than 36 inches above the landing, and shall be so constructed that there will be no obstruction on or above them tending to break a hand hold.

(e) Every external stairway and its landings and platforms shall be fitted with a hand-rail and an intermediate rail on its open sides.

2713. **Measurement of Width.**—The width of stairs shall be measured—

(a) when the stairs are enclosed on each side with walls, between the finished surfaces of the walls;

(b) when a stair has a wall on one side only, between the finished surface of the wall and the inner side of the balustrade;

(c) when balustrades are provided on both sides, between the inner surfaces of the balustrades.

2714. **Space under Stairs.**—Except in the case of stairs in a building of Class I., II., III., or IV. Occupancy the space under stairs shall be left entirely open or shall be entirely closed without openings thereto.

2715. **Enclosing Walls.**—All walls and partitions enclosing non-fire-isolated stairs shall be covered with fire-retardant materials as defined in clause 1406.

2716. **Ramps.**—

(a) Ramps may be substituted for stairways provided they conform to such of the requirements of this chapter for stairways as are applicable.

(b) Ramps shall be in straight lengths with a landing at each change of direction having a length and a width at least equal to the width of the ramp.

(c) Ramps serving as exits or giving access to exits shall have a slope not greater than one in eight.

(d) Ramps used for purposes other than exit travel shall not be limited as to gradient.

(e) Ramps shall be provided with an approved non-slip surface.

(f) Outgoing car ramps from buildings shall be so located as to provide a section at least 12 feet long between the end of the ramp and the exit at the street alignment, the grade of such section being not more than one in fifteen.

2717. **Horizontal Exits.**—

(a) **Definition.**—A horizontal exit shall mean the connexion by a bridge, balcony, vestibule, or doorway of two floor areas at substantially the same level, such floor areas being located in the same building and entirely separated from each other by construction having a fire-resistance rating of two hours.

(b) **Clear Width of Parts.**—When vestibules, open-air balconies, or bridges are used as parts of any horizontal exit, they shall be constructed of fire-resisting material and their clear width shall be at least as great as that of the exit doorways opening into them, except that hand-rails may project into this clear width not more than 4 inches.

(c) **Gradients.**—In any horizontal exit where there is a difference in level between the connected floor areas, gradients shall not exceed those specified in clause 2716 (c) for ramps. Stairs or steps shall not be used in a horizontal exit in conjunction with a gradient.

- (d) **Doors.**—Every opening used in connexion with a horizontal exit shall be protected by a two-hour fire door provided that—
- (i) when located in a fire wall there shall be a two-hour fire door on each side of the wall, if practicable a vestibule being provided on one side thereof.
  - (ii) no locks or fastenings shall be placed on such doors that would prevent them from being opened from either side.
- (e) **Exits.**—There shall be at least one exit accessible to or from the space on each side of a horizontal exit.

2718. **Height of Exits.**—Exits shall have a minimum height of 6 ft. 8 in. throughout.

2719. **Aisles and Passages.**—Access shall be provided to the exits from each floor by means of continuous aisles or passage-ways which shall—

- (a) be so arranged that the occupants of every compartment shall have convenient access at all times to every exit leading from the floor on which such compartment occurs;
- (b) have an aggregate width at least equal to the width required for the exit to which such aisles or passage-ways discharge, but in no case less than 2 ft. 8 in.;
- (c) be of a height throughout of not less than 7 ft. 6 in., except that where such aisles or passages pass under stairs their height may be reduced to 6 ft. 8 in.

2720. **Doorways.**—

- (a) **Hanging of Doors.**—The doors of exit doorways shall be so hung and arranged that when open they shall not diminish or obstruct the required width of the doorway, passage-way, hall-way, stairway, or other means of exit. Swinging doors in their swing shall not reduce the effective width of stairways or landings to less than 20 inches nor shall they reduce the effective width of a passage-way or hall-way to less than the minimum width required.
- (b) All doors in exit doorways shall open in the direction of exit travel, excepting doors in buildings of Class I., II., or IV. Occupancy and doors serving only a ground floor area of not more than 1,500 square feet, provided that this requirement shall not prohibit the use of doors swinging both inwards and outwards.
- (c) Doors abutting on a street shall be recessed so as not to encroach on the public way, or they may open inwards provided they be locked back in such a manner as to require a key to release them.
- (d) No exit door shall open immediately on to a flight of stairs but shall open on to a landing of which neither the length nor the width shall be less than the width of the door.
- (e) Doors to fire-isolated stairways shall be self closing except that any such door may be kept open by an approved fusible link, provided that an additional self-closing door constructed of hardwood not less than 1½ inch in thickness or other material having equivalent fire-resisting qualities is fitted in the opening in such a manner as to cause no obstruction to the stairway when opened, and provided further that any glazing in such additional self-closing door shall be fire-resisting and shall not exceed in area 30 per cent. of the area of the door.

2721. **Revolving Doors.**—Revolving doors may be used only in doorways giving direct access to a street but in no case shall a revolving door form part of a means of exit required under these Regulations.

2722. **Door Fastenings.**—

- (a) Fastenings on any required exit door shall be such that the door may be readily opened from the inside without the use of keys.

- (b) **Fastenings on Doors Across Passages.**—No fastening shall be used on a door across a passage except such as will allow the door to be instantly opened from either side without a key or other special appliance.
- (c) **No Fastenings on Inner Doors.**—No fastenings whatever shall be used on the inner of two doors hung in the same doorway, archway, or other opening.
- (d) **Fastenings to be in Order.**—Knobs of drawback and other locks and of bolts shall be securely riveted and all fastenings shall be maintained in good working order and state of repair.
- (e) **Prohibition of Obstructions on Doors.**—No door guard, lock, catch, handle, door pull or any similar appliance shall be affixed to the door of any exit so that when the door is in the fully opened position such appliance projects and to any extent obstructs the exit.

2723. **Maintenance of Exits.**—All exits shall be maintained in an efficient condition and shall at all times during occupancy of the building be kept readily accessible and clear of obstructions.

2724. **Lighting and Ventilation of Exits.**—Every stairway or other means of exit and corridors and passage-ways appurtenant thereto shall be effectively ventilated and artificially lighted. The lighting circuit shall be a separate one controlled from the stair enclosure, and shall be continuously in operation while the building is occupied, provided that in buildings of Class I., II., and IV Occupancy where a stair serves one dwelling only a separate lighting circuit shall not be required.

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## CHAPTER 28.

### FIRE PROTECTION OF OPENINGS.

- Clause 2801.—Doorways in Party Structures.
- Clause 2802.—Windows in Party Structures.
- Clause 2803.—Openings in Fire Walls.
- Clause 2804.—Openings in Walls of Fire-isolated Stairways.
- Clause 2805.—Openings Near External Fire-isolated Stairways.
- Clause 2806.—Doorways of Lift Shafts.
- Clause 2807.—Openings within 20 feet of Openings in other Occupation.
- Clause 2808.—Openings Abutting on Land in Other Occupation.
- Clause 2809.—Openings Abutting on Common Light Courts.
- Clause 2810.—Openings Overlooking Flat Roof.
- Clause 2811.—Skylights in Courts.
- Clause 2812.—Openings Connecting Dwelling with Trade Building.
- Clause 2813.—References.

## CHAPTER 28.

## FIRE PROTECTION OF OPENINGS.

2801. **Doorways in Party Structures.**—Doorways will be permitted in party structures provided that—

- (a) such doorways open on to stair case landings or passage-ways;
- (b) the net area of each of such doorways shall not exceed 56 square feet without the express permission of the Surveyor;
- (c) the total width of such openings in any one storey shall not exceed 50 per cent. of the length of the wall;
- (d) such doorways are protected with fire doors hung in such a manner as not to obstruct the landings or passage-ways and having a fire-resistance rating of two hours.

2802. **Windows in Party Structures.**—Glazed openings in party structures will be permitted provided that—

- (a) such openings are provided with two-hour fire windows;
- (b) no such opening exceeds 15 square feet in area;
- (c) the glazing in each opening is divided into panels not exceeding 5 square feet in area; and
- (d) the total area of the openings in any one storey does not exceed 20 per cent. of the area of the wall in that storey.

2803. **Openings in Fire Walls.**—(a) Where fire walls are required to limit the floor area of a building as prescribed in clause 2911, openings will be permitted in such walls provided that the net area of any such opening shall not exceed 56 square feet, and the width of such opening or openings shall not exceed one-half of the length of the wall in which they occur;

- (b) Where openings larger than 56 square feet are essential they may be constructed subject to the approval of the Surveyor;
- (c) Such openings shall be protected with automatic double fire-doors which when combined will have a fire resistance rating of four hours.

2804. **Openings in Walls of Fire-isolated Stairways.**—Except as provided in clause 2704 (f) openings in walls of fire-isolated stairways shall be protected by one-hour fire doors as defined in clause 1407 (b) or by glazing conforming to the provisions of clause 2802. Such fire doors shall conform also to the requirements of clause 2720.

2805. **Openings Near External Fire-isolated Stairways.**—(a) All windows within 10 feet of an external exit stairway shall be one-hour fire windows conforming to the requirements of clause 1408.

(b) All doors within 10 feet of such stairway shall conform to the requirements for doors to fire-isolated stairways prescribed in clause 2804.

2806. **Doorways of Lift Shafts.**—Doorways of lift shafts of buildings shall be fitted with—

- (a) approved roller shutters; or
- (b) one-hour fire doors, any glazing therein conforming to the provisions of clause 1407 (f).

2807. **Openings Within 20 feet of Openings in Other Occupation.**—Every opening in the external wall of a building any portion of which opening is within 20 feet of any opening in another building or of any roof of non-fire-resisting construction or of any wooden building or wooden portion of a building shall—

- (a) have an area not exceeding 56 square feet unless the Surveyor otherwise approves; and
- (b) (i) in the case of door openings be fitted with one-hour fire-doors or with fire shutters conforming to the requirements of Clause 1409;
- (ii) in the case of window openings be fitted with tin-clad or wire gauze shutters or one-hour fire windows which in the case of show windows may be in the form of window backs not more than 2 feet from the building line.

Provided that the requirements of sub-clause (b) shall not apply to shopfronts in an arcade building fitted with a sprinkler system.

2808. **Openings Abutting on Land in Other Occupation.**—Openings which abut on land in other occupation shall be either—

- (a) fitted with one-hour fire windows; or
- (b) protected with tin-clad or wire gauze shutters.

2809. **Openings Abutting on Common Light Courts.**—All openings in external walls abutting on enclosed light courts common to separate buildings shall be either—

- (a) fitted with one-hour fire windows; or
- (b) protected with tin-clad or wire gauze shutters.

2810. **Openings Overlooking Flat Roof.**—(a) All openings overlooking a flat roof and providing a means of access to the roof or providing light to the building shall—

- (i) in the case of door openings be fitted with doors cased externally with sheet metal of not less than 26 B.G. or with one-hour fire doors; and
- (ii) in the case of window openings conform to the requirements of clause 2807 (b) (ii).

(b) The provisions of sub-clause (a) shall not apply to doors or windows of a caretaker's residence or other structure constructed on the roof of a building when such residence or structure is separated by party structures from all other portions of the building.

2811. **Skylights in Courts.**—All skylights which are placed in courts or wells constructed in buildings, or which are constructed on roofs of fire-resisting construction, shall be constructed with glazed metal or glazed concrete frames having a fire-resistance rating of one hour.

2812. **Openings Connecting Dwelling with Trade Building.**—When the walls or floors separating a portion of a building used for purposes of trade or manufacture from that used for dwelling purposes are required by clause 2909 to have a fire-resistance rating, then all door openings in such walls or floors shall be protected by fire doors and fire windows as required for party structures by clauses 2801 and 2802 of this chapter.

2813. **References.**—For the purposes of these Regulations, fire doors, fire windows, and fire shutters shall mean fire doors, fire windows, and fire shutters as defined in Chapter 14.

## CHAPTER 29.

### UNITING OF BUILDINGS AND SUBDIVISION OF BUILDINGS BY FIRE RESISTING STRUCTURES.

Clause 2901.—Buildings may be Connected.

Clause 2902.—United Buildings.

Clause 2903.—Connexion Unnecessary on Ground Floor.

Clause 2904.—Procedure when Buildings no Longer United.

Clause 2905.—Stopping Up of Openings.

Clause 2906.—Separation of Flats.

Clause 2907.—Subdivision of Residential and Institutional Buildings.

Clause 2908.—Separation of Occupations in other Buildings.

Clause 2909.—Separation of Different Classes of Occupancy within a Building.

Clause 2910.—Separation of Different Types of Construction.

Clause 2911.—Limitation of Floor Area.

## CHAPTER 29.

UNITING OF BUILDINGS AND SUBDIVISION OF BUILDINGS  
BY FIRE RESISTING STRUCTURES.

2901. **Buildings may be Connected.**—Buildings may with the approval of the council be connected by openings in party or external walls dividing such buildings or by gangways, provided that—

- (a) such gangways shall not, without the consent of the council, cross over or under any public street or road;
- (b) the net area of any such opening shall not exceed 56 square feet without the express permission of the Surveyor;
- (c) such openings are protected with fire doors hung in such a manner as not to obstruct the landings or passage-ways and having a fire-resistance rating of two hours;

2902. **United Buildings.**—Buildings so connected shall not be deemed to be united to form one building unless—

- (a) such buildings are wholly in one occupation;
- (b) such buildings are, subject to the provisions of clause 2903, connected on every floor;
- (c) connecting gangways are enclosed and are constructed of materials having a fire-resistance rating of four hours in the case of walls and three hours in the case of roof and floor;
- (d) the buildings so united would, when considered as one building, be in conformity with the requirements of these Regulations.

2903. **Connexion Unnecessary on Ground Floor.**—Where buildings are connected on every floor above the ground floor, and the ground floor and the basement (if any) in such building are provided with alternative means of escape such buildings shall be deemed to conform to the requirements of clause 2902 (b).

2904. **Procedure when Buildings no Longer United.**—When any buildings deemed to be united to form one building cease to be in one occupation, the owner thereof, or if the buildings are the property of different owners, then each such owner shall—

- (a) give notice thereof to the Surveyor;
- (b) forthwith submit plans and specifications of any work required in order that each building shall conform to the requirements of these Regulations;
- (c) have such work carried to completion as early as practicable after issue of building permit by the council.

2905. **Stopping Up of Openings.**—All openings and gangways connecting openings between buildings deemed to be united to form one building shall be maintained until the consent of the council has been obtained to their being stopped up and such consent shall not be given unless and until each such building conforms to the requirements of these Regulations.

2906. **Separation of Flats.**—In every building of Class II. Occupancy hereafter constructed (including every existing building hereafter converted to a building of Class II. Occupancy) every flat shall be separated—

- (a) from corridors provided for the common use of the occupants by walls having a fire-resistance rating of one hour;
- (b) from other portions of the building by—
  - (i) walls having a fire-resistance rating of three hours or, in the case of a building of Type 1 or Type 2 Construction, of one hour;
  - (ii) by floors having a fire-resistance rating of two hours.

2907. **Subdivision of Residential and Institutional Buildings.**—All walls and partitions between rooms and between a room and corridor in buildings of Class III. and institutional buildings of Class IX. Occupancy shall have a fire-resistance rating of one hour in the case of buildings of Types 1 and 2 Construction and of two hours in the case of buildings of Type 3 Construction. Openings in such walls and partitions shall not be required to have a fire-resistance rating.

**2908. Separation of Occupations in other Buildings.—**

- (a) In buildings of Class V. Occupancy, floors separating different occupations shall have a fire-resistance rating of one hour;
- (b) In buildings of Classes VI., VII. and VIII. Occupancy, different occupations shall be separated by party structures having a fire-resistance rating of one hour.
- (c) In Assembly buildings of Class IX. Occupancy, different occupations shall be separated by party structures having a fire-resistance rating of four hours in the case of walls and of three hours in the case of floors.

**2909. Separation of Different Classes of Occupancy within a Building.—**(a) In any building constructed in part as a dwelling and in part to be used for business purposes, such parts shall be separated by a party structure when the total floor area of the part used for business purposes exceeds 1,500 square feet. Such party structure shall have a fire resistance rating of two hours;

- (b) In any building constructed in part as a building of Class II. or Class III. Occupancy and in part to be used for business purposes, such parts shall be separated by a party structure having a fire-resistance rating of two hours;
- (c) In any building constructed to contain in part an Assembly Building of Class IX. Occupancy, such part shall be separated from the remainder of the building by a party structure having a fire-resistance rating of three hours in the case of walls and of two hours in the case of floors;
- (d) In any building containing mixed Occupancies of Class VI., VII. or VIII. the various classes of Occupancy shall be separated by a party structure conforming to the requirements of Clause 2908 (b) unless otherwise approved by the Council;
- (e) Where a private garage is attached to any building of Class I., II. or III. Occupancy, such garage shall be separated therefrom by a wall having a fire-resistance rating of one hour or by a floor having a fire-resistance rating of two hours. Except in the case of a building of Class III. Occupancy, a doorway not more than 3 feet wide shall be permitted in such wall provided the sill is raised at least two inches above the garage floor and the doorway is fitted with a self-closing door having a fire-resistance rating of one hour. The floor of the garage shall be of concrete or other hard incombustible material.

**2910. Separation of Different Types of Construction.—**When different types of construction in a building are separated by a fire-resisting structure, such structure shall have a fire-resistance rating of four hours in the case of a wall and of three hours in the case of a floor, including beams, girders and trusses.

**2911. Limitation of Floor Area.—**(a) No building or portion of a building of Type 3, 4 or 5 Construction used as a shop, warehouse or factory shall extend to more than 35,000 square feet total floor area, or where a sprinkler system is installed to more than 55,000 square feet, whether on one or more floors, unless divided by walls having a fire resistance rating of 4 hours or by floors having a fire resistance rating of 3 hours, in such a manner that the total floor area within any division shall not exceed 35,000 and 55,000 square feet respectively, except that—

- (i) the Council may consent to a larger area subject to satisfactory provision being made and maintained for lessening as far as reasonably practicable danger from fire, but so that such consent shall expire when the building ceases to be used for the purposes in respect of which the consent was given;
  - (ii) this provision shall not apply to assembly shops and similar buildings one storey in height where the manufacturing process requires an undivided area;
- (b) Staircases and lift wells connecting two or more divisions shall be fire isolated by walls having a fire resistance rating of 3 hours;
- (c) Doors opening on to such staircases and lift wells shall be 2 hour fire doors.

## CHAPTER 30.

## SANITATION.

## Part I.—Sanitary Accommodation in Buildings.

- Clause 3001.—General.  
 Clause 3002.—Houses and Flats.  
 Clause 3003.—Buildings of Class III. Occupancy.  
 Clause 3004.—Buildings of Classes V., VI., VII., and VIII. Occupancy.  
 Clause 3005.—Buildings of Class IX. Occupancy.  
 Clause 3006.—General Provisions for Conveniences.  
 Clause 3007.—Construction of Water Closets.  
 Clause 3008.—Pan Closets.  
 Clause 3009.—Distance of Pan Closets from Street.  
 Clause 3010.—Sanitary Accommodation for Workmen.  
 Clause 3011.—Impervious Floors in Sanitary Conveniences.

## Part II.—General Sanitary Provisions.

- Clause 3012.—Definitions.  
 Clause 3013.—Fixtures not to Abut against Walls.  
 Clause 3014.—Internal Cocks.  
 Clause 3015.—Concealment of Pipes.  
 Clause 3016.—Concealed Standing Wastes.  
 Clause 3017.—Troughs Abutting against Brick Wash Coppers.  
 Clause 3018.—Construction of Shower Compartments.  
 Clause 3019.—Safes Required.  
 Clause 3020.—Cistern Overflows.  
 Clause 3021.—Discharge from Overflows.  
 Clause 3022.—Foul-water Drains.  
 Clause 3023.—Discharge of Foul-water Drains.  
 Clause 3024.—Discharge to Council Pipe Drains.  
 Clause 3025.—Household Drainage and Sewerage.

## CHAPTER 30.

## SANITATION.

## Part I.—Sanitary Accommodation in Buildings.

3001. **General.**—Unless otherwise specified, sanitary conveniences as prescribed in this chapter shall be connected to a public sewerage system, or to a septic tank system conforming to the requirements of the Septic Tank Regulations, or shall be constructed in accordance with the requirements of clause 3008.

3002. **Houses and Flats.**—(a) For every building of Class I. or Class IV. Occupancy and for every flat in a building of Class II. Occupancy there shall be provided one closet.

(b) Where the number of inmates of a house or flat occupied by more than one family exceeds eight but does not exceed twelve, at least two closets shall be provided and for every additional ten or fraction of ten such inmates, one additional closet shall be provided.



3003. Buildings of Class III. Occupancy.—For every building of Class III. Occupancy there shall be provided sanitary conveniences as follows:—

- (a) Where accommodation is provided for a number of inmates not exceeding eight, at least one closet for males and one closet for females.
- (b) Where accommodation is provided for a number of inmates exceeding eight, at least one closet for any number of males up to eight and one additional closet for every subsequent eight or fraction of eight, and one closet for any number of females up to six and one additional closet for every subsequent eight or fraction of eight.
- (c) One urinal for any number of male inmates up to eight and one additional urinal for every subsequent sixteen or fraction of sixteen, provided that where the premises are sewered a pedestal closet having a lift-up seat shall be deemed to be a urinal.
- (d) In the case of a boarding house, such additional closets and urinals for the needs of the public frequenting such premises as shall be approved by the council.
- (e) In the case of a licensed victualler's premises such additional closets and urinals for the needs of the public frequenting such premises as may be required by the Licensing Court.
- (f) for the purposes of sub-clauses (a), (b), and (c) "inmates" includes employees whether or not such employees reside on the premises.

3004. Buildings of Classes V., VI., VII., and VIII. Occupancy.—  
 (a) Where closets and urinals are connected to a sewerage system, closet and urinal accommodation shall be provided as follows:—

TABLE 3004.  
*Closets for Males.*

Number of Males.	Number of Closets.
1-20 .. .. .	1
21-45 .. .. .	2
46-70 .. .. .	3
71-100 .. .. .	4
For every additional 30 males .. .. .	1 additional closet

*Closets for Females.*

Number of Females.	Number of Closets.
1- 90 .. .. .	1 for every 15 or portion thereof
90-180 .. .. .	1 for every 20 or portion thereof
Over 180 .. .. .	1 for every 25 or portion thereof

*Urinals for Males.*

Number of Males.	Number of Urinals.
1-25 .. .. .	1
26-50 .. .. .	2
For every additional 50 males .. .. .	1 additional urinal.

(b) Where closets and urinals are not connected to a sewerage system—

- (i) there shall be provided sanitary conveniences in the proportion of one closet for every twenty or fraction of twenty persons;
- (ii) closets shall be so arranged that not more than six closets are constructed in any one group;
- (iii) adequate urinal accommodation shall be provided for every building in which four or more males are to be employed

(c) In any building in which the majority of those employed are to be of one sex and not more than two are to be of the other sex, separate or distinct closet accommodation for one sex only shall be required if suitable closet accommodation is provided in adjacent or adjoining premises for the persons of the sex in the minority.

**3005. Buildings of Class IX. Occupancy.**—Every public assembly or institutional building shall be provided with sanitary conveniences in accordance with the provisions of regulations made under the Health Acts.

**3006. General Provisions for Conveniences.**—(a) Rooms containing water closets, urinals, or slop-sinks shall not be used for any other purpose whatever provided that except in buildings of Class III. Occupancy such rooms may also contain baths and wash-basins.

(b) Closets constructed in a group shall be separated from one another by means of partitions extending to a height of at least six feet and shall be provided with doors.

(c) All water closets and urinals shall be conveniently situated and, where separate closet accommodation is provided for the sexes, shall be suitably separated and properly designated.

(d) Except as provided in clause 3003 (c) "urinal" shall mean for the purposes of this chapter a stall capable of accommodating one individual user at a time, provided that where conveniences in the form of continuous slabs or troughs are permitted every 24 inches of available clear length thereof shall be deemed to be one urinal.

**3007. Construction of Water Closets.**—(a) Every water closet apartment shall have an area of not less than 13 square feet, a width of not less than 2 feet 8 inches (internal measurements) and a height measured from floor line to wall plate level of not less than 7 feet.

(b) The floors of all internal water closet apartments shall be constructed of concrete not less than 3 inches thick or of other impervious material and suitably graded or they shall be provided with safes of lead or other approved material in accordance with the requirements of Part XIII. of Chapter 41.

(c) The floors of all external water closets shall be constructed of concrete not less than 3 inches thick and suitably graded.

(d) Doors of external water closets shall be provided with a ventilation space of 3 inches at top and at bottom of door or with other approved means of ventilation.

**3008. Pan Closets.**—Pan closets shall be constructed in conformity with the requirements of the General Sanitary Regulations made under the Health Act.

**3009. Distance of Pan Closets from Street.**—Pan closets constructed appurtenant to any building shall—

- (a) be distant not less than 75 feet from the street alignment of the land upon which the building is constructed;
- (b) be distant 10 feet from any other street or road exceeding 25 feet in width;
- (c) be distant not less than 25 feet from any house not in the same occupation whether in the same or on adjoining land;
- (d) if constructed within 4 feet of the boundary of any adjoining allotment of land be separated therefrom by a wall of masonry or concrete not less than 8 inches in thickness carried up to a height of 12 inches above the level of the roof as a parapet wall.

**3010. Sanitary Accommodation for Workmen.**—(a) In connexion with the construction of all buildings, approved sanitary accommodation shall be provided on the site of the works, the number of closets being at least one-twentieth of the maximum number of men simultaneously employed thereon.

(b) Every closet not connected to a sewerage system shall be placed at the rear of the site at least 4 feet from any boundary fence and 25 feet from any house and shall be constructed in accordance with the provisions of the General Sanitary Regulations except that an impervious floor shall not be required.

**3011. Impervious Floors in Sanitary Conveniences, &c.**—The floor of every closet in a building of Class III. or Class VIII. Occupancy and the floor of every urinal apartment in any occupancy shall be constructed of or covered with durable impervious material.

**Part II.—General Sanitary Provisions.**

3012. **Definitions.**—For the purposes of this Part, unless inconsistent with the context or subject matter—

“Combined waste pipe” means any pipe which receives the discharge from both soil and waste fixtures and conveys the same to the drains. Combined waste pipes are connected directly to the drain and are used only in connexion with the Combined Pipe System.

“Drain” means that portion of a drainage system not vested in a public authority, which conveys the discharge from soil, waste, combined waste and other drainage pipes from any system to a public sewerage system or to a septic tank system installed in connexion with, and for the drainage of, a building.

“Fixtures” means all apparatus or appliances together with their necessary appurtenances and connexions, which may be attached to the plumbing or drainage system of any property, and which are intended for the collection or retention of any wastes or waste waters for discharge into a public sewerage system or a septic tank system installed in connexion with, and for the drainage of, a building.

“Soil pipe” means any pipe which conveys the discharge from water closets, slop-sinks, mortuaries, operating theatres, or urinals to a drain.

“Trap” means any fitting designed to retain a quantity of water to arrest the passage of air or gases through such fitting.

“Vent pipe” means any pipe for the admission of air to or exit of air from a soil, waste, or combined waste pipe or drain and includes any vent pipe to an individual trap having for its purpose the prevention of loss of water seal in such trap.

“Waste pipe” means any pipe which conveys the discharge from any fixture, except water closets, slop-sinks, mortuaries, operating theatres, or urinals to a drain.

3013. **Fixtures not to Abut against Walls.**—Unless otherwise directed or permitted by the council, sinks, troughs, and similar fixtures in premises, other than buildings of Classes I., II., and IV. Occupancy where food for human consumption is prepared, manufactured, or stored for sale, and draining boards, slabs, and plates used in connexion with such fixtures, shall not abut against any wall, but shall have a clear space of not less than 6 inches between such fixtures and any wall surfaces or obstructions.

3014. **Internal Cocks.**—No cock delivering water shall be fixed within a building unless a sink, lavatory basin, or other approved fixture or a properly drained impervious floor is provided underneath.

3015. **Concealment of Pipes.**—(a) For purposes of inspection and convenience of repairing, all soil, waste, combined waste, and main vent pipes, and traps shall, except where passing through walls, partitions, and floors, be reasonably accessible at all times.

(b) In hospitals and similar institutions, all soil, waste, combined waste, and main vent pipes, where practicable, shall be fixed on the outside of external walls or in pipe ducts having a minimum width of 2 feet and minimum area of 9 square feet (measured clear of all pipes or other obstructions) and shall be so arranged as to facilitate inspection and maintenance at all times. Such pipe ducts shall be provided with access doors so placed as to permit ready inspection of every straight line of soil, waste, combined waste or main vent pipe.

(c) In buildings other than hospitals and similar institutions, if soil, waste, combined waste, or main vent pipes are concealed within pipe ducts or recesses in walls, such pipe ducts or recesses shall, except as provided in sub-clause (d) hereof—

(i) be provided with approved means of access and have a width of not less than 2 feet and a minimum area of 9 square feet (measured clear of all pipes and other obstructions); or

(ii) have at least one of its sides constructed of woodwork, brickwork in lime mortar, terra cotta or gypsum blocks, plaster on expanded metal lathing, or other suitable material, so constructed and fixed as to be capable of being removed independently of and without damage to any other part of the structure and provided with inspection openings so placed as to allow ready inspection and maintenance of every straight line of soil, waste, combined waste or main vent pipe.

(d) Access openings required by sub-clause (c) may be omitted provided that the owner of the building shall undertake in writing, in a form to be approved by the Sewerage Authority, to accept all liability for damage or inconvenience that may occur and shall, on completion of the work, lodge with the Sewerage Authority one copy of a plan showing the position of the inspection openings concealed.

(e) Branch and anti-siphonage vent pipes may be concealed in hollow walls or may be built in lime mortar in wall chases provided the pipes and fittings are made of cast iron or wrought iron or steel pipe, or of brass or copper of thickness not less than that given in the following table:—

Nominal Internal Diameter.	Minimum Permissible Actual Internal Diameter.	Minimum Permissible Wall Thickness (S.W.G.).		British Standard Pipe Thread for Screwed Connexions.
		Screwed Connexions.	Brazed or Compression Joints.	
Inches.	Inches.			Inches.
1½	1 1/8	12	16	1½
1¾	1 5/8	12	16	1½
2	1 7/8	11	16	2
2½	2 1/8	11	14	2½
3	2 3/8	10	14	3
4	3 1/4	8	12	4

(f) All inspection or access openings to concealed pipes shall be finished throughout with smooth surfaces, and shall be of such size and shape as to permit the entrance of cleaning tools, as required, to the pipe.

(g) For the purposes of this section a straight line of soil, waste combined waste, or main vent pipes shall be taken to include any offset or deviation from the straight line of not more than 45 degrees and not more than 3 feet in length.

**3016. Concealed Standing Wastes.**—Concealed standing wastes shall not be permitted unless of approved type and readily accessible for cleaning.

**3017. Troughs Abutting against Brick Wash Coppers.**—Wherever the end of a wash trough abuts against the brickwork of a wash copper, the space between the end of trough and the brickwork shall be bridged with suitable waterproof material and made watertight.

**3018. Construction of Shower Compartments.**—(a) The floors of shower compartments shall be well graded to an outlet and shall be constructed of concrete not less than 3 inches in thickness and either trowelled smooth or covered with tiles set in cement mortar or with other impervious material or may be constructed of timber if covered with enamelled cast iron, approved non-corrosive sheet metal or other approved material turned up at the edges and flashed in accordance with the requirements of sub-clause (b) hereof.

(b) All flashing shall be properly secured and made watertight and turned up at the walls at least 4 inches, except where the walls are tiled when the flashing shall be carried up at least 1 inch behind the tiles.

(c) The level of the grating on the outlet shall be at least 2 inches below the level of the floor outside and adjoining the shower compartment or, where a kerb is provided, at least 2 inches below the level of the kerb.

(d) The walls of shower compartments shall be finished with cement mortar rendered to a smooth surface or covered with tiles set in cement mortar or shall be lined with approved non-corrosive sheet metal or other approved material, with impervious joints.

**3019. Safes Required.**—Unless the floor is constructed of concrete not less than 3 inches in thickness or other approved impervious material and graded to a suitable outlet or is completely covered with rubber or linoleum  $\frac{3}{8}$  inch in thickness or other approved material, safes of lead or other approved impervious material shall be fitted under all slop-sinks and internal water closets and in such other positions as may be directed by the Melbourne and Metropolitan Board of Works or by the Sewerage Authority in accordance with the requirements of Part XIII. of Chapter 41.

**3020. Cistern Overflows.**—Every cistern supplied with water shall have an overflow pipe of adequate size discharging in a position where it will not cause damage but where it will act as a warning pipe. On ground floors where cisterns are fixed over impervious floors graded to drain outside of the room, the overflow may discharge on to such floors provided no damage is likely to arise therefrom.

**3021. Discharge from Overflows.**—Overflows may discharge into the open air above ground floor level only when the discharge will not cause any inconvenience or nuisance. In all other cases the pipes must be brought nearly to the ground surface or be arranged to discharge where they will not prove a source of annoyance or inconvenience.

**3022. Foul-water Drains.**—(a) Every closed drain carrying foul water from a building shall—

- (i) if within a sewered area under the jurisdiction of the Melbourne and Metropolitan Board of Works, conform to the requirements of the said Board;
  - (ii) if within a sewered area under the jurisdiction of any sewerage authority conform to the provisions of Chapters 38 to 42 (inclusive) of these Regulations and of any by-laws or regulations not inconsistent therewith made by the said authority;
  - (iii) if connected to a septic tank system comply with the Septic Tank Regulations under the Health Act.
- (b) Every closed foul-water drain exceeding 20 feet in length other than a drain specified in sub-clause (a) hereof, shall—

- (i) have an opening for admission of air at or near its lower end and an educt vent connected at or near its upper end and carried up above the highest part of the roof and fitted at its upper end with a bird-proof cowl or wire basket;
- (ii) be air disconnected from every waste pipe or downpipe discharging thereto.

**3023. Discharge of Foul-water Drains.**—Every foul-water drain other than a drain referred to in clause 3022 (a) shall discharge—

- (a) to a street channel or drainage easement if the council so permits;
- (b) to a system of sub-soil absorption drains or a covered soak-pit after removal of grease and solid matter;
- (c) to a sufficient area of absorbent soil not less than 20 feet distant from the building or from any street; or
- (d) to an impervious tank or pit from which the drainage shall be removed as often as may be required and so disposed of as not to cause any nuisance or danger to health or to pollute any river, stream, watercourse, lake, lagoon, swamp, or marsh.

**3024. Discharge to Council Pipe Drains.**—In any area in which an underground pipe drainage system is provided by the council for the disposal of foul-water drainage, the foul-water drainage of every building shall be carried to such pipe drain by pipes which shall be fitted with a grease trap if so required by the council.

**3025. Household Drainage and Sewerage.**—

- (a) (i) In sewered areas under the jurisdiction of the Melbourne and Metropolitan Board of Works all household drainage and sewerage shall be conveyed to the sewers of the said Board and the whole of the sanitary plumbing and drainage installation shall conform to the requirements of this chapter and the by-laws of the said Board;

- (ii) in sewered areas under the jurisdiction of a sewerage authority all household drainage and sewerage shall be conveyed to the sewers of the said authority and the whole of the sanitary plumbing and drainage installation shall conform to the requirements of this chapter and of Chapters 38 to 42 (inclusive) of these Regulations and of any by-laws or regulations not inconsistent therewith made by the said authority;
- (b) in unsewered areas—
- (i) all sinks, water troughs, baths, and lavatory basins shall be provided with properly constructed wastepipes of lead or galvanized wrought iron with wiped or screwed joints and so fixed as to discharge into drains outside the building;
- (ii) all covered or underground drains conveying household drainage or sewerage shall be efficiently trapped or air-disconnected from the discharge pipes from the house. Such drains shall be constructed of wrought iron, cast iron, salt glazed ware, or cement concrete pipes of an internal diameter of not less than 4 inches laid with a sufficient fall to an outlet. Every such drain if of iron shall have the joints made with lead and if of salt glazed ware or cement concrete with cement mortar, the joints to be airtight;
- (iii) open drains for conveying household drainage or sewerage shall be of hard burnt bricks, semi-circular salt glazed ware, or drainage tiles bedded in and jointed with cement mortar. All joints must be watertight.

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CHAPTER 31.

**SPECIAL CLASS REQUIREMENTS.**

**Classes I., II., and IV. Occupancy.—Houses, Flats, and Dwellings attached to other Classes of Buildings.**

Clause 3101.—Kitchens.

Clause 3102.—Bathrooms.

Clause 3103.—Laundry Accommodation.

References.

**Class III. Occupancy.—Residential Buildings.**

Clause 3104.—Bathrooms.

Clause 3105.—Washbasins.

Clause 3106.—Walls and Floors of Bathrooms and Lavatories.

References.

**Class V. Occupancy.—Offices.**

References.

**Class VI. Occupancy.—Shops.**

Clause 3107.—Shopfronts.

Clause 3108.—Show Cases and Mirrors.

Clause 3109.—Facings.

Clause 3110.—Stallboards.

Clause 3111.—Walls above Shopfronts.

Clause 3112.—Shopfronts Abutting on Exits.

Clause 3113.—Kiosks.

Clause 3114.—Floors and Walls in Shops used for Sale of Perishable Food Stuffs.

References

**Class VII. Occupancy.—Warehouses.**

## References.

**Class VIII. Occupancy.—Factories.**

- Clause 3115.—Air Space.  
 Clause 3116.—Dining Rooms, Bathrooms, &c.  
 Clause 3117.—Washing Facilities.  
 Clause 3118.—Heating.  
 Clause 3119.—Roofs of Rooms Occupied by Females.  
 Clause 3120.—Concrete Floors.  
 Clause 3121.—Drinking Water.

## References.

- Clause 3122.—Regulations under Factories and Shops Acts governing Special Trades.  
 Clause 3123.—Regulations under Health Acts governing Offensive Trades.

**Class IX. Occupancy.—Public Buildings.**

- Clause 3124.—Public Buildings.

**Class X. Occupancy.—Outbuildings.**

- Clause 3125.—Stables.  
 Clause 3126.—Workshops.  
 Clause 3127.—Laundries.  
 Clause 3128.—Motor Garages.  
 Clause 3129.—Walls of Garages.  
 Clause 3130.—Conservatories, Greenhouses, and Aviaries.  
 Clause 3131.—Sleep-outs, Tents, &c.  
 Clause 3132.—Fowlhouses, Kennels, &c.

## CHAPTER 31.

**SPECIAL CLASS REQUIREMENTS.**

Classes I., II., and IV. Occupancy.—Houses, Flats, and Dwellings attached to other Classes of Buildings.

3101. **Kitchens.**—(a) Every dwelling shall be provided with—

- (i) a room or annexe to be used as a kitchen, and except in the case of a kitchen serving a common dining room in a building containing Class II. Occupancies, having one wall of such room or annexe an external wall;

- (ii) suitable facilities for the storage of food stuffs.

(b) Every kitchen shall be provided with—

- (i) a suitable appliance for the cooking of food, but no cooking appliance shall be placed in or upon any balcony, balconette, bathroom, portico, stair, landing, verandah, bedroom, sleep-out or passageway or any place other than a kitchen, kitchenette, or kitchen living room;

- (ii) a sink fitted in position and having a water tap over it and a waste pipe leading from it to an impervious drain.

(c) Where a kitchen has a floor area of less than 80 feet it shall be constructed as an annexe to a habitable room and the opening between the kitchen and the habitable room shall be at least 7 feet in height and 5 feet in width.

3102. **Bathrooms.**—(a) Subject to the provisions of sub-clause (b) there shall be provided in every dwelling hereafter constructed a bathroom having an area of not less than 30 square feet in which shall be fixed a bath of adequate size.

(b) Where a hot-water service is installed in any building of Class II. Occupancy containing only one habitable room, there may be substituted for the bathroom required by sub-clause (a) a recess having an area of not less than 18 square feet and containing a shower connected to such hot-water service.

3103. **Laundry Accommodation.**—(a) In every dwelling of Classes I. and IV. Occupancy there shall be provided appurtenant thereto and for the sole use of the occupants thereof a laundry equipped with approved copper and troughs or other approved means of laundering.

(b) In every building hereafter constructed to contain flats (Class II. Occupancy) there shall be provided appurtenant thereto at least one laundry equipped with approved copper and troughs or other approved means of laundering for every four flats in such building.

(c) Where in the opinion of the Surveyor adequate and satisfactory means of laundering are provided in each flat, sub-clause (b) hereof shall not apply.

[References.—

(a) Building height restrictions .. . . .	See Chapter 9
(b) Fire services .. . . .	See Chapter 32
(c) Floor loadings .. . . .	See Chapter 15
(d) Floors required to have a fire-resistance rating .. . . .	See Chapter 29
(e) Lighting and ventilation .. . . .	See Chapter 11
(f) Means of egress .. . . .	See Chapter 27
(g) Sanitation .. . . .	See Chapter 30
(h) Site requirements .. . . .	See Chapter 8
(i) Sizes and heights of rooms (including attic rooms) .. . . .	See Chapter 10]

**Class III. Occupancy.—Residential Buildings.**

3104. **Bathrooms.**—(a) Every building of Class III. Occupancy hereafter constructed to contain accommodation for not more than eight persons shall be provided with a bathroom equipped with either a combined plunge and shower bath or with a plunge bath and a recess containing a shower.

(b) In every building of Class III. Occupancy hereafter constructed to contain accommodation for more than eight persons, one bathroom conforming to the requirements of sub-clause (a) shall be provided in respect of the first eight persons and additional bathrooms equipped with a plunge or shower bath shall be provided in the proportion of one bathroom for every additional six persons or fraction thereof if the building is connected to a public water supply and one bathroom for every additional twenty persons or fraction thereof if the building is not connected to a public water supply.

3105. **Washbasins.**—(a) In every building of Class III. Occupancy hereafter constructed washbasins connected with an approved drainage system or alternatively some other approved means of performing personal ablutions shall be provided. Where washbasins are not provided in all bedrooms, the number of such washbasins shall be not less than the number of bathrooms required by clause 3104.

(b) In every licensed victualler's premises hereafter constructed there shall be provided such washbasins for the use of the public frequenting the premises as the Licensing Court may require.

3106. **Walls and Floors of Bathrooms and Lavatories.**—The walls of every bathroom and lavatory shall be provided with a smooth impervious finish to a height of 6 feet and the floor shall be constructed of concrete with an approved impervious finish or constructed of wood and rendered impervious or completely covered with sheet lead, rubber, or linoleum not less than  $\frac{1}{4}$  inch in thickness.



## [References.—

- (a) Building height restrictions .. .. See Chapter 9
- (b) Fire services .. .. See Chapter 32
- (c) Floor loadings .. .. See Chapter 15
- (d) Lighting and ventilation .. .. See Chapter 11
- (e) Means of egress .. .. See Chapter 27
- (f) Room sizes and heights .. .. See Chapter 10
- (g) Sanitation .. .. See Chapter 30
- (h) Site requirements .. .. See Chapter 8
- (i) Special requirements for licensed premises .. .. See *Licensing Act 1928*]

## Class V. Occupancy.—Offices.

## [References.—

- (a) Building height restrictions .. .. See Chapter 9
- (b) Fire separation from portions of buildings used as shops or factories .. .. See Chapter 29
- (c) Fire services .. .. See Chapter 32
- (d) Floor loadings .. .. See Chapter 15
- (e) Lighting and ventilation .. .. See Chapter 11
- (f) Means of egress .. .. See Chapter 27
- (g) Sanitation .. .. See Chapter 30
- (h) Room sizes and heights .. .. See Chapter 10]

## Class VI. Occupancy.—Shops.

3107. **Shopfronts.**—(a) No shopfront shall exceed two storeys in height above the level of the public footpath in front of the shop.

(b) No part of any shopfront frame shall be fixed—

- (i) nearer than 3 inches to the centre line of a reinforced concrete party wall;
- (ii) nearer than 4 inches to the centre of a masonry party wall;  
or
- (iii) nearer than 4 inches to a wall of adjoining premises when such premises have a separate wall;

(c) An arch or lintel complying with the requirements of clause 2010 shall be provided over every shopfront opening.

(d) Shopfront openings may be framed wholly or partly in structural steel or reinforced concrete in conformity with the provisions of clause 2026 (j).

(e) Shopfronts within a distance of 20 feet from an opening in an external wall of any building shall be constructed in conformity with the provisions of clause 2807.

(f) The upper section of a shopfront may, providing such portion is constructed not less than 9 feet above the pavement, project—

- (i) not more than 12 inches if the street which such shopfront faces be 33 feet or more in width; or
- (ii) not more than 8 inches if the street which such shopfront faces be less than 33 feet in width.

(g) Mouldings shall not project more than  $\frac{1}{2}$  inch beyond the street alignment in any portion of the shopfront at a lesser height than 9 feet above the pavement.

3108. **Show Cases and Mirrors.**—Mirrors and show cases shall be affixed flat against a wall, pier, or pilaster in such a way that no portion shall project beyond the street alignment.

3109. **Facings.**—Tiling or other applied facing on any wall, pier, or pilaster shall not project beyond the street alignment at a lesser height than 9 feet above the pavement, except where a shopfront is being constructed on an existing building in which case facing applied to piers only may project not more than 2 inches.

3110. **Stall-boards.**—Stall-boards under shop fronts shall be constructed of brickwork, stonework, concrete, or other material having a fire-resistance rating of not less than one hour.

3111. **Walls above Shopfronts.**—Subject to the provisions of clause 3107 (e), walls between head of shopfront frames and underside of verandah or lintel over openings may be constructed of timber or other approved material.

3112. **Shopfronts Abutting on Exits.**—Where a shopfront abutting on an exit from a stairway required to be fire-isolated is returned along a passage or lobby to a depth greater than the width of such passage or lobby, such shopfront shall be protected by a sprinkler system, approved self-coiling rolling corrugated steel shutters running in metal grooves and fitted with proper appliances on the outside thereof suitable for raising and lowering, or by material having a fire-resistance rating of one hour.

3113. **Kiosks.**—(a) Kiosks may be constructed in positions approved by the Surveyor.

(b) Every kiosk shall have—

- (i) a minimum height of 8 feet measured from the floor to the ceiling;
- (ii) a minimum internal dimension of 3 ft. 6 in., and a minimum floor area of 16 square feet;
- (iii) adequate ventilation communicating directly with the external air;
- (iv) a minimum floor area of 20 square feet per person when occupied by more than one person;

(c) For the purposes of this clause, a kiosk means a stall or enclosed apartment for the sale or distribution of goods and which the public do not enter.

3114. **Floors and Walls in Shops Used for Sale of Perishable Food Stuff.**—In all shops hereafter constructed in which perishable foodstuffs are to be sold or displayed for sale, floors shall be constructed of impervious material or suitably covered as to be rendered impervious, and walls shall have a smooth impervious finish to a height of 6 feet.

[References.—

- |                                                                         |                 |
|-------------------------------------------------------------------------|-----------------|
| (a) Fire isolation of shops from remaining portions of building .. .. . | See Chapter 29  |
| (b) Floor loadings .. .. .                                              | See Chapter 15  |
| (c) Lighting, light courts, and ventilation .. .. .                     | See Chapter 11  |
| (d) Means of egress .. .. .                                             | See Chapter 27  |
| (e) Room sizes and heights .. .. .                                      | See Chapter 10  |
| (f) Sanitation .. .. .                                                  | See Chapter 30  |
| (g) Shop verandahs over public footways .. .. .                         | See Chapter 36] |

**Class VII. Occupancy.—Warehouses.**

[References.—

- |                                      |                 |
|--------------------------------------|-----------------|
| (a) Fire services .. .. .            | See Chapter 32  |
| (b) Floor loading .. .. .            | See Chapter 15  |
| (c) Lighting and ventilation .. .. . | See Chapter 11  |
| (d) Means of egress .. .. .          | See Chapter 27  |
| (e) Sanitation .. .. .               | See Chapter 30] |

**Class VIII. Occupancy.—Factories.**

3115. **Air Space.**—From the floor level to a height of 13 feet, the free air space in every workroom in a building of Class VIII. Occupancy shall amount to at least 400 cubic feet per person employed therein.

3116. **Dining Rooms, Bath Rooms, &c.**—Where in the opinion of the Chief Inspector of Factories, the nature of the manufacturing process to be carried on in any factory hereafter constructed so requires, dining rooms, bath rooms, and/or rest rooms for the use of the employees in such factories shall be provided to the satisfaction of the Chief Inspector.

**3117. Washing Facilities.**—(a) Except where special provision is made by regulations under the Factories and Shops Acts, washing facilities shall be provided in every factory hereafter constructed consisting of one wash basin and tap for every 15 persons or fraction of 15 starting or finishing work at one time or two feet of washing troughs for 15 persons or fraction of 15 starting or finishing work at any time together with water sprays spaced not more than 2 feet apart. Where the Chief Inspector of Factories so requires, such basins or troughs shall be supplied with hot water also;

(b) Except where the permission of the Chief Inspector of Factories to the contrary has been obtained, there shall be provided in any building in which females will be required to engage in work other than clean sedentary work footbaths set on floor level in the proportion of one for every three wash basins or sprays, such footbaths being supplied with warm and cold water.

**3118. Heating.**—Every factory hereafter constructed shall be provided with suitable means and appliances for warming it to a temperature of 60° F. where manual work is carried on, and 65° F. where the work is of a sedentary nature provided that the Chief Inspector of Factories and the Surveyor may exempt from this clause any factory in which the nature of the industry makes heating facilities unnecessary or undesirable. Every combustion heating appliance shall be provided with a flue sufficient to carry off to the open air all products of combustion unless, in the case of a gas appliance, a certificate of approval has been obtained from the National Gas Association of Australia.

**3119. Roofs of Rooms Occupied by Females.**—Where any room in a factory hereinafter constructed is to be occupied by female employees, and the roof is of iron and at a lesser distance than 20 feet above the floor, either the roof shall be lined or a ceiling constructed in such room.

**3120. Concrete Floors.**—If floors in factories are constructed of concrete, masonry, asphalt or similar materials, wooden floors, pads or platforms or insets of bitumen or strips of bituminous felt shall be provided over all areas where employees are required to stand at their work.

**3121. Drinking Water.**—Every factory shall be provided with a bubbler and mouth guard or with another approved device for the supply of clean wholesome drinking water, so placed as to be accessible to all employees at all times.

[References.—

(a) Fire protection of openings .. ..	See Chapter 28
(b) Fire separation of occupancies .. ..	See Chapter 29
(c) Fire services .. ..	See Chapter 32
(d) Floor loadings .. ..	See Chapter 15
(e) Building height restrictions .. ..	See Chapter 9
(f) Lighting and ventilation .. ..	See Chapter 11
(g) Means of egress .. ..	See Chapter 27
(h) Room sizes and heights .. ..	See Chapter 10
(i) Sanitation .. ..	See Chapter 30
(j) Special occupancy requirements .. ..	See clauses 3122 and 3123]

**3122. Regulations under Factories and Shops Acts governing Special Trades.**—Buildings to be used for any of the following purposes shall be constructed in conformity with the Regulations made under the Factories and Shops Acts:

Ham and bacon curing, meat preserving, jam making, fruit preserving, dairy produce, confectionery manufacturing and similar trades.

Bakchouses or manufacture of butchers small goods.

Leather dressing, tanning, parchment making and similar trades.

Antimony works, smelting works of any kind, works for treatment of pyrites, ammonia and other similar works or reclamation of rubber works.

Manufacture of white lead, red lead and litharge.

Buildings in which lead or compounds thereof are used for the manufacture or repair of electrical accumulators.

Manufacture, repair, manipulation, storage or use of inflammable motion picture film, celluloid, or other nitro-cellulose products.

**3123. Regulations under Health Acts governing Offensive Trades.—**

- (a) Buildings to be used for the purposes of any offensive trade within the meaning of the Health Acts shall be constructed in conformity with the Regulations relating to offensive trades made under such Acts;
- (b) The site of every such building shall be subject to the approval of the Council but no such building shall be situated at a lesser distance than 40 feet from any street more than 25 feet in width.

**Class IX. Occupancy.—Public Buildings.**

3124. Every public building within the meaning of the Health Acts shall be constructed in conformity with the requirements of any Regulations made under the said Act and to the approval of the Health Commission.

**Class X. Occupancy.—Outbuildings.**

3125. Stables.—Stables may be constructed, subject to the following conditions:—

- (a) External walls shall not exceed 11 feet in height from the level of the ground to the top plate of the wall or the underside of the eaves.
- (b) Floors shall be paved with hard bricks or stone pavers set in cement mortar, or with cement concrete or other approved impervious material.
- (c) Every part of a stable shall be distant not less than—
  - (i) 50 feet from the boundary of the street or road to which the property has a frontage;
  - (ii) 10 feet from any other street or road of a greater width than 25 feet;
  - (iii) 5 feet from any other street or road of a lesser width than 25 feet or from the boundary of any land not in the same occupation; and
  - (iv) 30 feet from any building used as a dwelling house.
- (d) The provisions of paragraph (iii) of the preceding sub-clause shall not apply to an external wall constructed of masonry or concrete not less than 9 inches in thickness.
- (e) No room other than a store room shall be constructed over or adjoining a stable.
- (f) A manure pit or pits constructed of impervious material and fitted with approved covers shall be provided in connexion with every stable, and every such manure pit shall conform to the requirements set out in sub-clause (c) hereof for stables.

3126. Workshops.—Workshops (other than those coming within the classification of factories as defined in these Regulations), sheds, and similar structures may be constructed, subject to the following conditions:—

- (a) If constructed as appurtenant to a building of another class, they shall be attached to and constructed of similar materials to the main building in which case they shall conform to the requirements as to distance from boundaries prescribed by these Regulations for the main building; or
- (b) if detached from the main building they shall be distant not less than—
  - (i) 10 feet from any dwelling on the same allotment;
  - (ii) 25 feet from any dwelling on land owned or occupied by a person other than the owner or occupier of the land upon which such structure is to be constructed;
  - (iii) 50 feet from the boundary of the street or road to which the land on which such structure is to be constructed has a frontage;
  - (iv) 10 feet from any other street or road of a greater width than 25 feet; and
  - (v) subject to the provisions of sub-clause (c) hereof 4 feet from any other street or road of a lesser width than 25 feet and from the boundary of any land not in the same occupation.

- (c) The provisions of paragraph (v) of the preceding sub-clause shall not apply to a structure of which the external wall adjoining such boundary is—
- (i) in the case of a structure not exceeding 9 feet in height to the highest point of the roof and having a superficial area of not more than 200 square feet, covered with galvanized iron of not less than 26-gauge or other approved fire-retardant material; and
  - (ii) in the case of a structure exceeding 9 feet in height to the highest point of the roof or having a superficial area of more than 200 square feet, constructed of masonry or concrete not less than 9 inches in thickness and carried up to a height of 12 inches above its own roof or gutter to form a parapet.

3127. **Laundries.**—A laundry not exceeding 150 square feet in superficial area may be constructed as appurtenant to any dwelling provided that—

- (a) if it is distant 10 feet or more from such dwelling it shall be constructed in conformity with the provisions of sub-clauses (b) and (c) of clause 3126 except that paragraph (ii) of sub-clause (b) shall not apply; and
- (b) if it is constructed within 10 feet of such dwelling it shall conform to the requirements as to distance from boundaries prescribed by these Regulations for such dwelling.

3128. **Motor Garages.**—Motor garages constructed appurtenant to buildings of Classes I., II., and III. Occupancy shall conform to the following requirements:—

- (a) Except where the consent of the Council to the contrary has been obtained the walls of every garage exceeding 400 square feet in area shall be constructed of masonry, concrete, reinforced concrete, or other hard and incombustible material.
- (b) No garage shall without the permission of the council be constructed closer to the street alignment than the buildings to which it is appurtenant.
- (c) Every garage attached to a building shall be separated therefrom by a floor or ceiling having a fire-resistance rating of 1½ hours or by walls and/or doors having a fire-resistance rating of one hour, and any floor constructed in such garage shall be of incombustible material.
- (d) If the garage is detached from the main building, it shall be distant not less than 5 feet therefrom;
- (e) Where a garage is constructed nearer than 4 feet to the boundary of any adjoining allotment—
  - (i) it shall be at least 50 feet distant from the alignment of the street to which the allotment has a frontage;
  - (ii) no portion shall be within 12 feet of any window in the main building on such adjoining allotment;
  - (iii) the wall nearest such boundary shall be constructed of masonry, concrete, reinforced concrete, or other hard and incombustible material approved by the Surveyor;
  - (iv) no part of the garage shall be constructed to a greater height than 9 feet above the ground level;
  - (v) no means of access shall be provided on to the roof.

3129. **Walls of Garages.**—(a) Masonry walls of garages may be of a thickness of 4½ inches, provided that they are constructed in cement mortar, with piers projecting 4½ inches for a width of 13½ inches and spaced at not more than 10 feet centres.

(b) Notwithstanding the provisions of clause 2044, a garage shall not be required to have a parapet wall provided the roof is covered with fire-retardant materials.

3130. **Conservatories, Greenhouses, and Avaries.**—Conservatories, greenhouses, and avaries may be constructed, subject to the Council's approval of the location, design, and materials of construction.

3131. **Sleepouts, Tents, &c.**—Detached sleepouts and tents to be used for sleeping-out purposes may be constructed as appurtenant to any building of Class I, III. or IV. Occupancy, provided that—

(a) such sleepouts or tents—

- (i) shall be situated at least 75 feet from the alignment of the street to which the allotment has a frontage;
- (ii) shall be distant not less than 10 feet from any street or road exceeding 25 feet in width;
- (iii) shall be distant not less than 5 feet from any other boundary of the land on which they are to be constructed;
- (iv) shall be distant not less than 4 feet from any other building or sleep-out on such land;
- (v) shall have walls not exceeding 8 ft. in height and floors constructed of approved material and in accordance with the requirements of Chapter 21;
- (vi) shall be provided with ventilation openings having an effective airway at least equal in area to one-fifth of the floor area;
- (vii) shall be covered and roofed with material approved by the Surveyor;

(b) tents are provided with a canvas fly or false roof of material approved by the Surveyor separated from the roof of the tent by an open space of not less than 6 inches.

3132. **Fowlhouses, Kennels, &c.**—Fowlhouses, kennels, and similar structures may be constructed appurtenant to buildings of Classes I, III. and IV. Occupancy provided that such structures—

- (a) shall have a height not exceeding 8 feet and a total superficial area not exceeding 100 square feet;
- (b) shall be distant not less than 75 feet from the boundary of the street or road to which the building has a frontage;
- (c) shall be distant not less than 10 feet from any other street or road of a greater width than 25 feet;
- (d) shall be distant not less than 5 feet from any other street or road of a lesser width than 25 feet or from the boundary of any adjoining allotment of land;
- (e) shall be distant not less than 40 feet from any dwelling, whether on the same or adjoining land;
- (f) shall be covered and roofed with a material approved by the Surveyor.

## CHAPTER 32.

### SERVICES AND EQUIPMENT.

- Clause 3201.—Gas Installations.
- Clause 3202.—Electrical Installations.
- Clause 3203.—Fire Services in Buildings Containing Flats.
- Clause 3204.—Fire Services in other Buildings.
- Clause 3205.—Equipment where Public Water Supply is Available.
- Clause 3206.—Equipment where Public Water Supply is Not Available.
- Clause 3207.—Exemptions.
- Clause 3208.—Timber and Storage Yards, Buildings over Three Storeys in Height, &c.
- Clause 3209.—Fire Service in High Buildings.
- Clause 3210.—Fire Extinguishers.
- Clause 3211.—Certain Buildings to be Connected to Fire Station.
- Clause 3212.—Sprinkler Installations.
- Clause 3213.—Lifts and Lift Shafts.
- Clause 3214.—Escalator Installations.
- Clause 3215.—Mechanical Ventilation.

References.

## CHAPTER 32.

## SERVICES AND EQUIPMENT.

3201. **Gas Installations.**—Where any gas appliance is installed in or appurtenant to any building, such installation shall conform to the requirements of the regulations made under the *Gas Regulation Act* 1933.

3202. **Electrical Installations.**—All electrical apparatus and installations for lighting, heating, and power, or for other applications of electricity shall conform to the requirements of the wiring and any other regulations of the State Electricity Commission of Victoria.

3203. **Fire Services in Buildings Containing Flats.**—Every building containing flats and exceeding two storeys in height shall be provided with external 2½-in. fire hose cocks (hydrant valves) on a 2½-in. fire service, in the proportion of at least one to every six flats, the position of the hose cocks being subject to the approval of the Chief Fire Officer.

3204. **Fire Services in Other Buildings.**—(a) Fire services as prescribed in clause 3205 or 3206 shall be provided in—

- (i) Every building of Class III. Occupancy exceeding one storey in height in which more than 25 persons usually reside.
- (ii) Every building of Class V. Occupancy exceeding three storeys in height.
- (iii) Every building of Class VI. Occupancy having an area greater than 2,000 square feet.
- (iv) Every building of Class VII. Occupancy.
- (v) Every building of Class VIII. Occupancy.
- (vi) Every public building other than a theatre or a school.

(b) Every theatre and school shall be provided with fire services as required by Regulations made under the Health Acts.

3205. **Equipment where Public Water Supply is Available.**—Every building specified in clause 3204 shall, where a public water supply is available, be provided with the following equipment for fire extinction:—

- (a) Pipes of not less than 2½-in. diameter conducting water from a street water main to within the building, fitted with 2½-in. fire hose cocks (hydrant valves) and hoses, in such number and in such positions as the Chief Fire Officer may direct, provided that in any case where the use of a pipe 2½ inches in diameter is not allowed by the water supply authority, pipes having a diameter of not less than 1½ inch may be used.
- (b) Chemical fire extinguishers as required by the Chief Fire Officer but in the proportion of not less than one to every 2,000 square feet of floor area.

3206. **Equipment where Public Water Supply is Not Available.**—Where a public water supply is not available or where the water main has not a sufficient capacity or does not contain water at sufficient pressure to permit of the installation of an efficient fire-extinguishing water service, there shall be provided in every building specified in clause 3204—

- (a) an elevated tank or cistern capable of containing at least 10 gallons of water per 100 square feet of floor area of the building with a minimum of 400 gallons, such tank or cistern being supplied by a service pipe fitted with a ball cock or by a pump or other suitable method and having water pipes of 3-in. diameter leading from the tank or cistern to fire taps and hoses in such number and positions as the Chief Fire Officer may direct;
- (b) chemical fire extinguishers in such positions and numbers as the Chief Fire Officer directs, but in no case less than the number prescribed in clause 3205 (b).

3207. **Exemptions.**—Where in the opinion of the Surveyor, and, in the case of factories, of the Chief Inspector of Factories, after consultation with the Chief Fire Officer, the application of any of the provisions of clause 3205 or 3206 is unnecessary or unsuitable having regard to the circumstances of any particular building, such provision may be dispensed with or alternative requirements for such building may be prescribed.

**3208. Timber and Storage Yards, Buildings over Three Storeys in Height, &c.**—Every timber or storage yard, every building more than three storeys in height and not coming within the provisions of the foregoing clauses, and every other building where, by reason of the construction of the building, the nature of its use, the nature of its contents or any other special circumstances the Chief Fire Officer so directs, shall be provided with a water supply service and such equipment for fire extinction purposes as may be required by the Chief Fire Officer.

**3209. Fire Service in High Buildings.**—All buildings exceeding four-fifths the maximum building height as provided in clause 901 shall be provided with a rising main not less than 3 inches in diameter up to the roof level, such main to have a 2½-in. outlet with fire hose cock on each floor and on roof, to be in a position approved by the Chief Fire Officer, and to be provided with back pressure and stop valves, also screwed cap connexions to which a fire brigade pump can be attached.

**3210. Fire Extinguishers.**—

- (a) Chemical fire extinguishers required by the foregoing provisions of this Chapter shall be of a type approved by the Fire and Accident Underwriters' Association of Victoria;
- (b) Where such extinguishers are installed in a building within the area served by a properly constituted fire brigade, the owner of the building shall arrange with the Fire Brigades Board for the periodical testing and inspection of all appliances for the extinction of fire and fire alarm systems if any and in the event of any such appliance or fire alarm system being found defective by the inspecting officer of the said Board shall on receipt of a report to that effect immediately cause the defects to be rectified;
- (c) The owner of the building shall maintain in proper order and condition to the satisfaction of the Council all appliances required by these regulations to be provided for the control or extinction of fire or for the saving of life at fires.

**3211. Certain Buildings to be Connected to Fire Station.**—(a) Every public building other than a theatre or a school, the registered accommodation of which exceeds 1,500 persons; and

(b) Every other building in which the council, after consultation with the Chief Fire Officer considers that such provision is necessary by reason of—

- (i) the construction of the building;
- (ii) the nature of its use;
- (iii) the nature of its contents; or
- (iv) any other special circumstances;

shall be connected by direct telephone alarm with the nearest Fire Brigade Station. The position and numbers of alarms in any building shall be determined by the Chief Fire Officer and the installation shall be carried out to his satisfaction.

**3212. Sprinkler Installations.**—

Every building more than two storeys in height used as a public garage or parking station, every basement used for the housing of mechanical equipment and every arcade shall be provided with a sprinkler system.

**3213. Lifts and Lift Shafts.**—

- (a) **Lift Installations.**—Every lift installation shall conform to the requirements of the S.A.A. Lift Code No. C.A.3-1941 and of the Regulations made under the Lifts Regulation Act.



**(b) Lift Shafts—**

- (i) Except as provided in paragraph (ii) hereof, the shaft of every lift shall be constructed and enclosed throughout its height with walls having a fire-resistance rating of two hours. Such shaft shall be enclosed, at the bottom in cases where it is not carried down to the foundations of the building, and at the top in cases where it is not carried up to the roof, with material having a similar fire-resistance rating;
  - (ii) notwithstanding the provisions of clause 2806, the shaft of any passenger lift constructed within the well hole of a fire-resisting stair enclosure may be enclosed with open metal grilles or guards and open metal doors.
- (c) Goods Lifts.**—A goods lift shall not be constructed in or communicate directly with a fire-isolated stairway.
- (d) Doors to lift shafts.**—See clause 2806.
- (e) Glazed openings** may be inserted in walls of lift wells subject to compliance with the requirements of clause 2802.

**3214. Escalator Installations.**—One or more escalators for the transport of passengers may be installed in any building provided that every such escalator shall be designed, constructed, installed, and operated in conformity with the relevant provisions of the S.A.A. Lift Code No. C.A. 3-1941.

**3215. Mechanical Ventilation.**—(a) Where the installation of a mechanical ventilating or air-conditioning system is required or permitted under these Regulations, it shall conform, as far as practicable, to the appropriate requirements of—

- (i) the Code of Minimum Requirements for Comfort Air Conditioning issued by the American Society of Heating and Ventilating Engineers;
- (ii) the Code of Minimum Requirements for Heating and Ventilating Buildings issued by the American Society of Heating and Ventilating Engineers;
- (iii) the Code for Heating and Ventilating Garages issued by the American Society of Heating and Ventilating Engineers;
- (iv) the Regulations for the Installation of Air Conditioning, Warm Air Heating, Air Cooling, and Ventilating Systems issued by the National Board of Fire Underwriters of the United States of America.

(b) Where references are made to certain American climatic conditions in the codes mentioned in paragraphs (i), (ii), and (iii), of sub-clause (a), for the purpose of these Regulations references shall be made to local conditions.

(c) Where, in the regulations mentioned in paragraph (iv) of sub-clause (a) reference is made to American codes in Part I., Regulations 131, 134, and 181 and in Part II., Regulation 381, it shall be understood for the purpose of these Regulations that the corresponding local codes shall be adopted.

(d) Where in the codes and regulations mentioned in sub-clause (a) gauges of sheet metal and similar requirements are specified as U.S. gauges, the equivalent Imperial Standard Wire gauge thickness shall be substituted therefor.

(e) Mechanical ventilating systems shall conform also to the requirements of Chapter 11 of these Regulations.

[References. **Hot Water Installations.**—(a) For requirement relating to flues. See Chapter 23. (b) For requirements relating to floors under and ceilings over boilers. See clauses 2325 and 2329.]

## CHAPTER 33.

**RESTORATION OF BUILDINGS AND ALTERATION TO EXISTING BUILDINGS.**

Clause 3301.—Restoration of Buildings.

Clause 3302.—Re-erection of Buildings.

Clause 3303.—Alterations and Additions to Buildings.

## CHAPTER 33.

**RESTORATION OF BUILDINGS AND ALTERATION TO EXISTING BUILDINGS.**

3301. **Restoration of Buildings.**—If, in the opinion of the Surveyor, any building be destroyed, demolished, or pulled down to the extent of more than one-half of its value, exclusive of foundations, such building shall not be restored, reconstructed, or repaired except in accordance with the provisions of these Regulations.

3302. **Re-erection of Buildings.**—In the event of the destruction by fire or other unforeseen cause of any building which exceeds the maximum height permitted under Chapter 9 of these regulations such building shall not be reconstructed except in conformity with the provisions of these regulations.

3303. **Alterations and Additions to Buildings.**—

(a) **General.**—All alterations, additions, and repairs to buildings shall conform to the provisions of these Regulations.

(b) **Major Alterations and Repairs.**—(i) If alterations and/or repairs in excess of 50 per cent. of the value of an existing building are made to such building within any period of three years, the entire building shall be made to conform to the requirements of these Regulations.

(ii) Any building which for any reason whatsoever requires repairs, at any one time, in excess of 50 per cent. of the value thereof, not deducting from such value any loss caused by fire or any other reason, shall be made to conform to the requirements of these Regulations or shall be demolished.

(c) **Changed Occupancy.**—(i) If the existing use or occupancy of a building is changed and the building does not conform to the requirements of these Regulations for the proposed new occupancy, the entire building shall be brought into conformity with these Regulations, except that if the use or occupancy of only portion of the building is changed and such portion is separated from the remainder of the building in accordance with the provisions of Chapter 29, then such portion only need be made to comply with these Regulations.

(ii) Any existing building not covered by the preceding paragraph which has its floor area or its number of storeys increased or its use or occupancy changed shall be provided with exits and fire-protection facilities as required by these Regulations for the proposed new occupancy or occupancies.

(d) **Minor Alterations and Repairs.**—Minor alterations and repairs not covered by the preceding paragraphs may be made with the same type of materials as used in the original construction provided that not more than 25 per cent. of the roof covering of any building shall be replaced in any period of twelve months unless the entire roof covering is made to conform to the requirements of these Regulations. New roofing meeting the requirements of these Regulations may be placed over existing roofing when such existing roofing and the roof framing are such as to permit the new roofing to be properly supported and securely fastened.

[References. Increasing Thickness of Existing Walls.—See clauses 2058-59.

Construction of Additional Storey on Existing Buildings.—See Clause 2060.]

## CHAPTER 34.

**RUINOUS AND DANGEROUS BUILDINGS.**

Clause 3401.—Power of Entry.

Clause 3402.—Procedure in Case of Ruinous and Dangerous Buildings.

Clause 3403.—Notice to Owner.

Clause 3404.—Powers of Council.

## CHAPTER 34.

**RUINOUS AND DANGEROUS BUILDINGS.**

3401. **Power of Entry.**—If the Surveyor has cause to believe that any building or any part of a building is in a ruinous state or is dangerous to the public he may enter therein or thereon and make such inspection and reasonable tests as may be necessary to determine whether such building or part thereof is in a ruinous state or dangerous to the public.

3402. **Procedure in Case of Ruinous and Dangerous Buildings.**—If after inspection it appears to the Surveyor that any building or portion thereof or any fixture attached thereto or any fence on or within 10 feet of the street alignment is in a ruinous state or is dangerous to the public or to the occupiers of the building, he—

- (a) may cause a proper hoarding or fence or props to be erected for the protection of the public and of the occupiers;
- (b) shall, where necessary, cause the adjoining buildings to be properly shored up;
- (c) shall submit to the council a report describing the condition of the building fixture or fence and any action taken by him for the protection of the public and/or occupiers of the building and for the shoring up of adjoining buildings.

3403. **Notice to Owner.**—On receipt of a report from the Surveyor the council shall, if in its opinion circumstances so warrant, serve notice on the owner of such building fixture or fence requiring him within a time to be specified in such notice to pull down, secure, or repair such building or portion thereof, fixture or fence.

3404. **Powers of Council.**—If within the time specified the said owner does not pull down, secure, or repair such building fixture or fence to the satisfaction of the council, he shall be deemed guilty of a breach of these Regulations and the council may exercise in relation to such building fixture or fence the powers conferred by clause 303 of these Regulations as if same were a building fixture or fence constructed contrary to these Regulations.

## CHAPTER 35.

**FENCES.**

Clause 3501.—Plan and Specification Required.

Clause 3502.—Fences at Intersections.

Clause 3503.—Hoods, Pergolas, &c.

Clause 3504.—Seepage to be Diverted.

Clause 3505.—Barbed Wire Adjacent to Streets.

## CHAPTER 35.

**FENCES.**

3501. **Plan and Specification Required.**—No fence on or within 10 feet of the street alignment shall be constructed or added to or re-constructed for more than one-quarter of its length or for more than 15 feet in any 50 feet except in accordance with a plan and specification submitted to and approved by the Surveyor.

3502. **Fences at Intersections.**—Such fences of every allotment situated at any intersection of streets used for vehicular traffic as are within a distance of 30 feet from the point of intersection of the building alignments of such streets shall not be constructed to a greater height than 4 feet above the level of the footpath except with the consent of the Council.

3503. **Hoods, Pergolas, &c.**—(a) Hoods, pergolas, and ornamental heads to gateways or fences shall be constructed in accordance with a design and of materials approved by the Surveyor.

(b) No part of any such hood, pergola, or ornamental head shall project more than 12 inches beyond the building alignment and no projection shall be at a lesser height than 9 feet from the level of the footpath.

3504. **Seepage to be Diverted.**—All retaining walls or brick or concrete fences shall have seepage diverted in a manner approved by the Surveyor, but in no case shall seepage be discharged on to a public footpath.

3505. **Barbed Wire Adjacent to Streets.**—Where barbed wire is erected adjacent to any street it shall be set back not less than 6 inches from the street alignment up to a height of 7 ft. 6 in. above the level of the street but in no case shall barbed wire project beyond the street alignment.

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CHAPTER 36.

**STREET VERANDAHS AND SUN BLINDS**

**Part I.—Street Verandahs.**

Clause 3601.—Permit Needed.

Clause 3602.—Construction.

Clause 3603.—Roof of Cantilever Verandah.

Clause 3604.—Verandah Ceilings.

Clause 3605.—Height above Pavement.

Clause 3606.—Blinds under Verandahs.

**Part II.—Sun Blinds**

Clause 3607.—Approval of Council.

Clause 3608.—Height.

Clause 3609.—Construction.

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CHAPTER 36.

**STREET VERANDAHS AND SUN BLINDS.**

**Part I.—Street Verandahs.**

3601. **Permit Needed.**—(a) No verandah shall be constructed over the footway of any street unless a permit for such construction has first been obtained from the Council.

(b) The plan and specification lodged with the application for a permit shall be open for inspection by any person interested at all reasonable times and without charge.

3602. **Construction.**—(a) Every cantilever or suspended girder shall be constructed of steel or reinforced concrete; purlins and rafters shall be of timber or other approved material.

(b) Pillar verandahs, when permitted, shall be of such form and dimensions as may be approved by the Surveyor.

3603. **Roof of Cantilever Verandah.**—The roof of every cantilever or suspended verandah shall—

(a) have a fall of  $\frac{1}{2}$  inch per foot;

(b) be covered with approved fire-retardant material which is impervious to moisture and conforms to the provisions of clause 1514;

(c) be provided with a box gutter of approved material; and

(d) be provided with a downpipe or pipes of wrought iron, cast iron, or other approved material chased into walls or piers or so set back as not to project beyond the face of the building, and such downpipes shall discharge into the street channel, or underground storm water drain.

3604. **Verandah Ceilings.**—When so required by the Council, the underside of all verandahs shall be lined and such lining shall be level.

3605. **Height above Pavement.**—(a) In streets with footpaths less than 10 ft. 6 in. in width, every cantilever verandah shall terminate in line with the kerb at a minimum height of 12 ft. 6 in.;

(b) In streets with footpaths 10 ft. 6 in. or more in width, every cantilever verandah shall be recessed 2 ft. 6 in. from the kerb at a minimum height of 10 ft.

3606. **Blinds under Verandahs.**—Blinds may be provided under verandahs, subject to the approval of the Council.

[Reference. **Loading on Roofs.**—See Chapter 15.]

#### Part II.—Sun Blinds.

3607. **Approval of Council.**—No sun blind shall be constructed to project over any street except with the approval of the Council.

3608. **Height.**—Every sun blind shall be so constructed that it is in no part at a lesser height than 7 ft. 6 in. above the footway and that it does not project more than 6 feet from the building to which it is attached.

3609. **Construction.**—Every sun blind shall be—

- (a) constructed of linen or cotton duck weighing not less than 10 oz. to the square yard or of other approved material;
- (b) well sewn and properly secured;
- (c) attached to a suitable roller contained in a box and securely fixed with metal plugs to the face of the building or incorporated in the shopfront design.

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#### CHAPTER 37.

##### DANGEROUS BUSINESSES AND STORAGE OF INFLAMMABLE LIQUIDS AND NITRO CELLULOSE PRODUCTS.

Clause 3701.—Dangerous Businesses.

Clause 3702.—Approval of Surveyor Required in All Cases.

References.—Storage of Inflammable Liquids and Nitro Cellulose Products.

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#### CHAPTER 37.

##### DANGEROUS BUSINESSES AND STORAGE OF INFLAMMABLE LIQUIDS AND NITRO CELLULOSE PRODUCTS.

3701. **Dangerous Businesses.**—(a) No building which is situated at a less distance than 40 feet from any street or from any land not in the same occupation or at a less distance than 50 feet from any other building shall be used for the purpose of carrying out any dangerous business.

(b) Where a dangerous business is in existence at the date of commencement of these Regulations, no other building shall be erected within 50 feet thereof.

3702. **Approval of Surveyor Required in All Cases.**—No person shall use any building or part thereof for any dangerous business or for the purpose of manufacture, repair, storage, &c., of any inflammable liquid or of any nitro cellulose product, and no person shall construct or cause to be constructed any building or part thereof to be so used, unless the Surveyor shall have first approved of the plans of the building and of the arrangements made for ensuring compliance with the provisions of these Regulations and any other regulations governing same.

[References. **Storage of Inflammable Liquids.**—See Regulations for the Storage of Petroleum, &c., made pursuant to the provisions of section 656 of the *Local Government Act 1928*.

**Storage of Liquid Fuel.**—See Rules and Requirements of the Fire and Accident Underwriters' Association of Victoria.

**Storage of Inflammable Motion Picture Film, Celluloid, or other Nitro Cellulose Product.**—See Regulations for the Storage of Nitro Cellulose Products, made pursuant to the provisions of section 656 of the *Local Government Act 1928*, and Rules of the Fire and Accident Underwriter's Association of Victoria.

**Manufacture, Repair, &c., of Nitro Cellulose Product.**—See Regulations made under the *Factories and Shops Act 1928*.]

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## SEWERAGE REGULATIONS

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### CHAPTER 38.

#### GENERAL PROVISIONS.

- Clause 3801.—Definitions.
- Clause 3802.—Authority to be Notified of New Buildings, Alterations, Additions, &c.
- Clause 3803.—Application of Regulations.
- Clause 3804.—Maintenance and Defective Work.
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- Clause 3809.—Materials.
- Clause 3810.—Testing of Materials.
- Clause 3811.—Workmanship.
- Clause 3812.—Concrete.
- Clause 3813.—Cement Mortar.

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### CHAPTER 38.

#### GENERAL PROVISIONS.

3801. **Definitions.**—In the construction and interpretation of the provisions contained in Chapters 38-42 (inclusive) of these Regulations, unless inconsistent with the context or subject matter—

“Anti-siphonage vent (or back vent)” means any vent pipe from any individual trap to the open air or to a main or branch vent pipe, having for its purpose the prevention of loss of water seal in the trap.

“Approved” means approved by the Authority or its proper officer.

“Authority” means the Sewerage Authority within the meaning of the Sewerage Districts Acts, within the Sewerage District of which the premises connected, or to be connected, to the sewers are situated, or the Geelong Waterworks and Sewerage Trust where such premises are within the drainage area of that Trust.

- "Bore, diameter, or size" in reference to any pipe means the nominal internal diameter thereof.
- "Building" means any building used as a work place, residence, place of business, place of amusement, or place of human habitation or for the storage of food intended for human consumption, but does not include out-buildings unless such are used for any of the above purposes.
- "Combined pipe system" means that type of plumbing installation in which disconnector traps are omitted and both soil and waste pipes are connected directly to the drain or to a common pipe taking both soil and waste discharge and in which a common system of venting is used for all classes of pipe.
- "Combined waste pipe" means any pipe which receives the discharges from both soil and waste fixtures and conveys the same to the drain. Combined waste pipes are connected directly to the drain, and are used only in connexion with the combined pipe system.
- "Disconnector trap" means a trap for isolating or disconnecting waste pipes from the drain and soil pipes and providing inlet ventilation to the waste pipe or pipes discharging into it.
- "Drain" means that portion of a drainage system, not vested in the Authority, which conveys the discharge from soil, waste, combined waste, and other drainage pipes from any system to the sewer, and includes any drain for draining any group or block of houses by combined operation under order of Authority, but does not include stormwater drainage pipes.
- "Educt vent" means an opening or pipe for the exit of air from, and the induction of draught in, a soil pipe, waste pipe, combined waste pipe, or drain.
- "External closet" means any closet other than an "internal closet".
- "Fittings" mean all apparatus or appliances, together with their necessary appurtenances and connexions, for use in connexion with the plumbing or drainage system of any property, with the exception of fixtures and straight piping.
- "Fixtures" mean all apparatus or appliances, together with their necessary appurtenances and connexions, which may be attached to the plumbing or drainage system of any property, and which are intended for the collection or retention of any wastes or waste waters for ultimate discharge into the sewerage system.
- "Induct vent" means an opening or pipe for the admission of air to a soil pipe, waste pipe, combined waste pipe, or drain.
- "Interceptor trap (or boundary trap)" means a trap for preventing the passage of air or gases from the sewer to the drain, and situated on the drain at some point between the sewer and the lowest inlet to the drain.
- "Internal closet" means any closet which is entered from or has an opening into any building.
- "Proper officer" means the proper officer of the Sewerage Authority.
- "Separate pipe system" means that type of plumbing installation in which separate pipes are provided for soil and waste discharges and for the ventilation of soil and waste fixtures and in which every waste pipe is connected to the drain through a disconnector trap.
- "Sewer" means any conduit for the carriage of sewage which is vested in the Authority.
- "Sewerage District" means any area which under the Sewerage Districts Acts is proclaimed the Sewerage District of the Authority, and includes any area which is added to and forms part of such Sewerage District and also means the drainage area of the Geelong Waterworks and Sewerage Trust.
- "Sewerage Installation" of a property means all soil, waste, and combined waste pipes and drains conveying household drainage, sewage and trade wastes to the sewers of the Sewerage Authority, and all vent pipes, fixtures, fittings, apparatus and appliances connected thereto.

“Sewerage system” includes all sewers, fittings, fixtures, appliances, plant, machinery, and any other sewerage works vested in the Authority.

“Slop sink” means any fixture, other than a closet pan or urinal, used for the discharge of soil or urine waters and provided with a flushing apparatus.

“Soil pipe” means any pipe which conveys the discharge from water closets, slop sinks, mortuaries, operating theatres, or urinals to the drain.

“Stack” means any vertical line of soil, waste, combined waste, or vent piping, with its offsets, if any.

“Trap” means any fitting designed to retain a quantity of water to arrest the passage of air or gases through such fitting.

“Waste pipe” means any pipe which conveys the discharge from any fixture, except water closets, slop sinks, mortuaries, operating theatres, or urinals, to a disconnector trap in the case of the separate pipe system or directly to the drain in the case of the combined pipe system.

“Water seal (or trap seal)” means the vertical distance between the dip and the crown weir of a trap.

“Wrought Iron” and “Sheet Iron” include mild steel sheet.

“Yard gully” means a drainage trap which is used externally and fitted with a dished top and grating.

**3802. Authority to be Notified of New Buildings, Alterations, Additions, &c.**—Every person who shall intend to erect a building on any property within the Sewerage District or to rebuild or to make any alterations or additions to any such building shall, before commencing such work, give to the Authority fourteen (14) days' notice in writing of such intention, accompanied by plans and sections of such intended buildings, alterations, or additions, showing their positions, dimensions, depths and levels of foundations, cellars or basements, all appurtenant walls and fences, the intended lines of drainage, and the boundary of the land, which plans and sections shall become the property of the Authority.

**3803. Application of Regulations.**—Any work or thing in respect of or in connexion with sewerage in any Sewerage District shall conform to the requirements of Chapters 38 to 42 (inclusive) of these Regulations and to any By-laws not inconsistent therewith made by the Authority.

**3804. Maintenance and Defective Work.**—Any drain pipe, soil pipe, trap, water closet, urinal, sink, grease trap, or other fixture or fitting laid, used, or constructed otherwise than in accordance with these Regulations, or which shall, in the opinion of the Authority, be or become bad or of defective quality, shall, upon notice in writing from the Authority to the owner or occupier of the property, be by such owner or occupier removed or repaired in the manner determined and within the time fixed by the Authority, and if such owner or occupier fails to comply with the requirements of the notice, he shall be liable to prosecution and a penalty for an offence against these Regulations, or the Authority may, if it think fit, remove or repair the said defective fitting and recover from such owner or occupier the cost so incurred.

**3805. Inspection.**—All materials, pipes, bends, junctions, fittings, fixtures, and apparatus shall be inspected by the proper officer to ensure compliance with these Regulations and/or any by-law of the Authority.

**3806. Tests.**—Every drainage and/or plumbing system in its entirety or in sections shall be subjected to such tests as the Authority or its proper officer shall direct. All equipment, material, power, and labour necessary for tests shall be furnished by the plumber or drainer, as the case may be. All work shall be left uncovered and accessible until inspected and/or tested and approved.

**3807. Defective Work.**—All materials, pipes, bends, junctions, fittings, fixtures, and apparatus which on inspection and/or test are found to be defective shall be removed and replaced by sound ones, and all leaking or otherwise defective joints shall be made tight and good and every part of the drainage and/or plumbing system shall be made to conform to these Regulations and/or any by-law of the Authority and shall be subject to the approval of the Authority or its proper officer.



3808. **Maintenance by Owner or Occupier.**—Every silt trap, grease trap, oil trap, or neutralizer, and such other appliance as the Authority may direct, shall be maintained by the owner or occupier at his own expense, and shall be cleaned at such intervals as may be necessary to ensure that such trap or appliance operates in an efficient and hygienic manner.

3809. **Materials.**—All materials, pipes, bends, junctions, fittings, fixtures, and apparatus shall be of the best of their respective kinds, sound and free from defects, and shall comply with such Australian Standard Specifications as apply and are accepted by the Authority; otherwise they shall comply with a standard approved by the Authority or its proper officer.

3810. **Testing of Materials.**—All materials, pipes, bends, junctions, fittings, fixtures, and apparatus shall be submitted for examination and/or test, and shall not be placed in position until passed and stamped by the Authority. Such testing of materials shall be paid for by the person submitting same, whether passed or rejected, and shall be done at such time and place and at such rates as may, from time to time, be ordered or fixed by the Authority.

3811. **Workmanship.**—All work shall be executed in a thorough and workmanlike manner and to the satisfaction of the Authority or its proper officer.

3812. **Concrete.**—Concrete, unless otherwise ordered by the Authority or its proper officer, shall consist of one part Portland cement, two parts clean sharp sand, and four parts hard metal, shingle, or gravel not exceeding  $\frac{3}{4}$ -in. gauge, and shall be thoroughly mixed with clean water to such consistency as ordered or approved by the proper officer of the Authority.

3813. **Cement Mortar.**—Cement mortar, unless otherwise ordered by the Authority or its proper officer, shall consist of one part Portland cement and two parts clean sharp sand and properly mixed with an approved proportion of clean water.

## CHAPTER 39.

### DRAINAGE.

#### Part I.—General.

Clause 3901.—Size of Drains.

Clause 3902.—Materials.

Clause 3903.—Cast Iron Pipes.

Clause 3904.—Interceptor Traps.

Clause 3905.—Inspection Chambers.

Clause 3906.—Inspection Openings.

Clause 3907.—Gratings.

Clause 3908.—Drain Openings Not in Use.

Clause 3909.—Replacing or Inserting Pipes.

Clause 3910.—Use of Concrete.

#### Part II.—Basement and Cellar Drainage.

Clause 3911.—Fixtures.

Clause 3912.—Prevention of Back Flow.

#### Part III.—Pipe Trenches.

Clause 3913.—Pipe Trenches.

#### Part IV.—Drains Under Buildings, &c.

Clause 3914.—Drains Under Buildings.

**Part V.—Traps—Drainage.**

- Clause 3915.—Trapping of Inlets.  
 Clause 3916.—Water Seal.  
 Clause 3917.—Provision of Yard Gullies.

**Part VI.—Ventilation.**

- Clause 3918.—Vents on Main Drain.  
 Clause 3919.—Vents on Branch Drains.  
 Clause 3920.—Size of Drainage Vents.  
 Clause 3921.—Materials, &c., for Drainage Vents.  
 Clause 3922.—Induct Vents.  
 Clause 3923.—Materials, &c., for Vents of Soil or Waste Pipes.  
 Clause 3924.—Soil Vent Pipes.  
 Clause 3925.—Anti-siphonage Vents.  
 Clause 3926.—Height of Vent Pipes.  
 Clause 3927.—Ground Vents.  
 Clause 3928.—Chimneys.  
 Clause 3929.—Vents Near Chimneys.  
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 Clause 3933.—Vents in Outbuildings.  
 Clause 3934.—Pipe Clips, &c.  
 Clause 3935.—Attachment to Walls.  
 Clause 3936.—Supporting Vents.  
 Clause 3937.—Vents Adjoining High Buildings.

**CHAPTER 39.****DRAINAGE.****Part I.—General.**

3901. **Size of Drains.**—Every drain shall be of adequate size for the drainage of the property to be served in accordance with the requirements of clause 4002 with a minimum diameter of 4 inches.

3902. **Materials.**—All drain pipes, bends, junctions, and fittings used shall be of glazed stoneware, concrete, cast iron, or other material approved by the Authority, provided that the proper officer may prohibit the use of any of the above-mentioned where the circumstances or conditions are considered unfavourable.

3903. **Cast Iron Pipes.**—Cast iron drainage pipes and their fittings shall comply with the standard approved by the Authority for cast iron water pipes and their fittings of similar diameters.

3904. **Interceptor Traps.**—Where directed by the Authority but not otherwise, an interceptor trap shall be fixed in the drain laid from any property to the sewer. Such trap shall be fixed as near as practicable to the boundary, and wherever practicable shall be within the boundaries of the property. If required by the Authority the interceptor trap shall be extended to ground level and fitted with the approved cover or an inspection chamber shall be provided for the trap.

3905. **Inspection Chambers.**—All drains shall, wherever directed by the Authority, join in an inspection chamber at least 3 feet long by 2 feet wide, fitted with a closed cover. The portions of the drains crossing the floor of the inspection chamber shall be connected either in a straight line or by curved junctions in the floor of the chamber. All inspection chambers shall be rendered with cement mortar to a smooth surface and made water-tight.

3906. **Inspection Openings.**—Every line of drain shall be provided with an inspection opening inside and within 5 feet of the boundary line of the property, at each junction not provided with an inspection chamber, at each change of direction, at each fixture, and in no case at greater than 30 feet intervals, and in paved areas these shall, if directed by the proper officer, be brought to the surface and furnished with approved air-tight covers. The area of an inspection opening shall be not less than the area of the drain.

Inspection openings in stoneware or concrete drains shall be sealed by means of discs, approved by the Authority, fixed with cement mortar and capable of being easily removed without damage to the pipes, or otherwise as directed by the Authority.

3907. **Gratings.**—Every inlet to a drain other than from a water closet shall be effectively protected by an approved grating of ample area. Gratings to disconnector traps and gully traps shall be securely fixed. The aggregate area of the apertures in any grating covering a ventilation opening shall be not less than the sectional area of the pipe or drain ventilated by such grating. Every opening for ventilation shall at all times be kept perfectly free from obstruction.

3908. **Drain Openings Not in Use.**—The ends of all drains not immediately connected with the plumbing fixtures shall be securely closed with water-tight imperishable materials.

If such drains be of stoneware or concrete, a stoneware, cast iron, or other approved disc shall be cemented in; if of wrought iron, a plug shall be screwed on the end; if of cast iron, a cast iron plug shall be caulked in with lead.

3909. **Replacing or Inserting Pipes.**—Where it becomes necessary to remove a pipe to clear a stoppage or to insert a pipe or branch in an existing stoneware or concrete drain, the pipe so removed shall be replaced by an inspection pipe or inspection junction of the same length, by one of the following methods:—

- (a) The top half of the socket of the new pipe and of the existing downstream pipe may be removed, but the bottom half shall, in each case, be left intact and the joints surrounded with concrete;
- (b) An approved split pipe with double collar surrounded with concrete may be used;
- (c) A length of not less than three pipes may be removed, the centre pipe replaced by an inspection pipe, and the pipes dropped back into place without springing or cutting.

Junctions in existing metal pipes shall not be made unless an approved closure pipe is used in each case.

Springing pipes into position shall not be permitted.

3910. **Use of Concrete.**—Concrete shall be used in each of the following cases:—

- (a) Around and under yard gully basins—the exposed surfaces to be rendered in cement mortar;
- (b) Around the top of educt vent and induct vent pipe sockets where exposed;
- (c) Around interceptor trap covers and tops of disconnector traps where the surface is not paved;
- (d) Under and around bends rising vertically off oblique branches, and under bases of all drainage traps;
- (e) Around drains where such drains are, in the opinion of the proper officer, liable to be affected by tree roots.
- (f) If required by the proper officer, for anchor blocks on steep grades, in bad or refilled ground, around jump ups, and in any place where the pipes have insufficient cover or are liable to be affected by traffic.

**Part II.—Basement and Cellar Drainage.**

3911. **Fixtures.**—No water closet, urinal, and/or other fixture shall be placed in any cellar or basement or on any floor below ground level, unless by consent of the Authority previously obtained and subject to such conditions as the Authority may impose, and then only when, in the opinion of the Authority, other provision cannot be made. The owner shall submit such plans and/or other information as the Authority may require and shall undertake, in writing, to accept all liability for damage that may occur; provided always, that if such fixtures and their surroundings are not kept in a sanitary condition, or if the purpose for which such cellar, basement, or floor below ground level is used, be changed, such consent may be revoked by the Authority at any time and that upon fourteen (14) days' notice of revocation such fixture shall be abolished by the owner.

3912. **Prevention of Back Flow.**—Where such cellar, basement, or floor below ground level is at such a level as may, in the opinion of the Authority, involve risk of back flow in the event of the sewer becoming overcharged, the sewage from all fixtures therein shall be raised by ejector, siphon, or other approved mechanical appliance to such height as ordered, and discharged into the sewer as and where directed.

**Part III.—Pipe Trenches.**

3913. **Pipe Trenches.**—The trench for the house drain from any property shall be so dug as to meet the Authority's sewer at the position provided or to be provided for the connexion. The material from the trench shall be so placed as to cause the least possible obstruction and inconvenience to the public. Proper barriers and lights shall be maintained, where necessary, to guard against accident during the progress of the work.

In filling the trench, selected refilling shall first be deposited around and over the pipe to a depth of 12 inches and carefully consolidated, after which the remainder of the trench shall be filled in in layers and rammed or flooded, as ordered or approved by the responsible officer. No stone shall be used in refilling until earth or gravel has been placed over the pipe to a depth of 1 foot, or more if directed.

On no account shall any water, sand, earth, or other prohibited discharge be allowed to enter the sewer during the progress of the work.

On completion of refilling, the surface shall be restored as nearly as possible to the same condition as it was in before operations were commenced, unless the owner, in writing, otherwise requires.

**Part IV.—Drains Under Buildings, &c.**

3914. **Drains under Buildings.**—Every drain shall, as far as practicable, be so constructed as not to pass under any building or outbuilding.

Where a drain does pass under a building or outbuilding it shall, if practicable, be laid in a direct line for the whole distance beneath such building or outbuilding, and shall have approved means of access for rodding outside the walls of the building or outbuilding, and also, if directed by the Authority, beneath the building or outbuilding. The pipes used under buildings, and if directed by the Authority, under outbuildings, shall be of stoneware or concrete surrounded by not less than four (4) inches of concrete or three (3) inches of cement mortar or of cast iron.

In any case in which pipes pass through or under walls, approved provision shall be made to prevent injury to the pipes by settlement, and in outer walls to prevent the ingress of vermin.

**Part V.—Traps—Drainage.**

3915. **Trapping of Inlets.**—Every inlet to any drain, other than inlets provided for ventilation in accordance with these Regulations or any by-law of the Authority, shall be provided with an approved trap.

3916. **Water Seal.**—Every drainage trap shall have a water seal not less than 2 inches in depth.

3917. **Provision of Yard Gullies.**—A yard gully shall be provided in the yard of every property as near as practicable to the kitchen or back door, with a tap placed over it at a height of not less than 2 feet, unless other approved provision is made for taking household liquid refuse. No yard gully shall be situated within a building or outbuilding.

## Part VI.—Ventilation.

3918. **Vents on Main Drain.**—The main drain shall be ventilated at its upper end by a pipe ventilator erected vertically, and such ventilator may be a soil vent pipe or combined waste vent pipe.

If the drain is provided with an interceptor trap, there shall be in addition a ventilator connected to the interceptor trap shaft. In such cases there shall, wherever practicable, be a difference in height of not less than 6 feet between the tops of the vents at the upper and lower ends of the drain, respectively.

3919. **Vents on Branch Drains.**—Where the length of a branch drain measured along the centre line of pipes, including the drop, if any, from the centre line of the main drain to the centre of the outlet side of the water seal of the highest drainage trap exceeds 20 feet, such branch drain shall be vented in accordance with the provisions of clause 3920.

3920. **Size of Drainage Vents.**—Drainage vent pipes shall, unless otherwise ordered, be of not less than 4 inches diameter in the case of educt vents and not less than 3 inches diameter in the case of induct vents, with the provision that where more than one educt vent is provided the vent on the longest line of drain shall be of not less than 4 inches diameter and all others of not less than 3 inches diameter, but in no case shall a drainage vent be of smaller diameter than necessary to comply with the requirements of clause 4003.

Unless otherwise ordered or approved by the Authority, every such vent pipe shall be without return bend and provided with approved basket end, educt, or induct cowl as directed by the Authority.

3921. **Materials, &c., for Drainage Vents.**—Drainage vent pipes situated wholly outside of buildings or outbuildings shall be of cast iron, galvanized wrought iron, galvanized sheet iron, or other approved material above ground, and of stoneware or concrete or other material approved by the Authority beneath the surface of the ground.

All galvanized sheet iron vent pipes shall be double galvanized with longitudinal joints grooved, welded, or riveted, and circumferential joints riveted and soldered, and shall be of not less gauge than 20 for 3-in. and 4-in. diameter pipes and 18 for 6-in. pipes. Where ordered by the proper officer, the first 6 feet above ground shall be of cast iron or other approved material.

Drainage vent pipes inside a building or outbuilding shall, unless otherwise approved, be of cast iron, of soil pipe strength, or of galvanized wrought iron.

3922. **Induct Vents.**—Every induct vent shall be securely supported in a manner approved by the Authority or its proper officer.

3923. **Materials, &c., for Vents of Soil or Waste Pipes.**—Vent pipes shall be of cast iron, wrought iron, lead, solid drawn copper, or brass, except that where the vent pipe is entirely outside a building, grooved sheet copper or grooved welded or riveted double galvanized sheet iron vent pipes may be used, but such sheet copper or sheet iron vent pipes shall not be used at a level lower than 2 feet above the level of the highest fixture served thereby.

Lead vent pipes shall be of not less than 7 lb. lead for use with water closets, urinals, or slop sinks, and of not less than 6 lb. lead for use with other fixtures.

Solid drawn copper or brass vent pipes shall comply with the requirements of clause 4108 for waste or soil pipes.

External vent pipes of sheet copper or galvanized sheet iron shall be of a gauge not less than the following:—

1½-in., 2-in., 2½-in. diameter .. ..	22 gauge.
3-in. and 4-in. diameter .. ..	20 gauge.
6-in. diameter .. ..	18 gauge.

3924. **Soil Vent Pipes.**—In all cases the upward extension from the soil or combined waste pipe for ventilation shall pass in as direct a manner as possible above and, if necessary, through the roof.

3925. **Anti-Siphonage Vents.**—(a) Loss of water seal in traps must be prevented by proper ventilation in accordance with the requirements of clause 4003. Such anti-siphonage vents from fixtures shall be carried up in accordance with clause 3926 or joined to the branch or main vent above the level of the fixture, unless special permission to the contrary is granted by the Authority.

(b) These vent pipes shall connect to the waste, combined waste, or soil pipe on the opposite side of the water seal to the fixture at a point not less than 3 inches nor more than 12 inches from the crown of the trap, except in the case of baths and closet pans, when the vent pipe shall be not more than 4 feet from the crown of the trap. No other fixture shall be connected to the soil waste or combined waste pipe between the anti-siphonage vent and the fixture which it serves.

(c) Individual anti-siphonage vents may be omitted on the waste pipes of lavatory basins, sinks, baths, showers, and other flat-bottomed fixtures, provided that:

- (i) the trap on the outlet of the fixture is of an approved non-syphoning type; and
- (ii) the length of the waste pipe from the outlet of the trap to the disconnecter trap or vertical waste pipe does not exceed a length approved by the Authority.

**3926. Height of Vent Pipes.**—Except as provided in clause 3929, every vent pipe extending upwards from a soil or drain pipe shall be carried not less than 6 feet higher than any door, window, or other opening into a building within a distance of 30 feet thereof, and in any case every educt vent shall be carried at least 18 feet above ground level and 6 feet above the level of the eaves or coping.

Every vent pipe extending upwards from a waste or combined waste pipe or disconnecter trap shall be carried 4 feet above any door, window, or other opening into a building within 15 feet thereof, and in any case at least 2 feet above the level of the eaves or coping. Any vent pipe which extends into a gable of a building shall be carried at least 2 feet above the point of intersection with the roof. Where necessary, in the opinion of the Authority or its proper officer, vents shall be carried to such additional heights as may be required to prevent effectually the escape of foul air into any building within the vicinity.

Vent pipes shall, where necessary, be provided with sufficient clips or stays to support them effectively.

**3927. Ground Vents.**—Ground vents may be used on boundary traps when situated not less than 30 feet from any window, door, or other opening into a building.

**3928. Chimneys.**—No chimney shall be used as a ventilator to any drain, soil, combined waste, or waste pipe.

**3929. Vents near Chimneys.**—Vents must, as far as possible, be kept away from chimneys and ventilating air shafts.

Where a ventilator pipe terminates 6 feet or more from a chimney opening or ventilating air shaft, the requirements of clause 3926 shall apply, but where the distance is less than 6 feet the vent pipe shall, provided it is at least 18 feet long, terminate not less than 2 feet below the top of such chimney or air shaft.

**3930. Vent Pipe Grades.**—All vertical lines of vent pipe shall connect, full size, at their bases with a soil, waste, combined waste, or drain pipe at an angle of not less than 45 degrees to the horizontal and shall extend in undiminished size above the roof or be connected to the soil, waste, or vent stack, in compliance with the requirements of clause 3931, on a grade of not less than 1 in 40.

All offsets shall be at a grade of not less than 45 degrees to the horizontal.

Vent pipes shall not be used as waste or soil pipes.

**3931. Combining of Vents.**—The various vents may be combined by branching together, or vent pipes may be branched into a soil, combined waste, or waste pipe above the level of the highest fixture, provided that, in the case of the Separate Pipe System, only vents which serve traps of the same class shall be branched together, and that soil vents are branched into soil pipes and waste vents into waste pipes only.

**3932. Galvanized Sheet Iron Vent Branches.**—Where a branch is required to an existing galvanized sheet iron vent pipe, a brass saddle piece, bolted and soldered to the vent, shall be used.

3933. **Vents in Outbuildings.**—Galvanized sheet iron vent pipes may be used inside external water closets, stables, or open outbuildings, but where liable to damage shall be protected as directed by the proper officer.

3934. **Pipe Clips, &c.**—There shall be at least one pipe clip to each 6-ft. length of vent pipe.

For cast iron pipe without lugs, or wrought iron pipe, approved coated wrought iron clips, and for galvanized sheet iron pipe  $1\frac{1}{2}$  in. x 14 gauge galvanized band iron clips, or approved pipe hooks shall be provided.

Wherever it is necessary to fix pipes clear of the wall, approved extension clips shall be used. Clips, in the case of cast iron pipes, must be placed tight up against the head or underside of the collar.

3935. **Attachment to Walls.**—Unless otherwise directed by the proper officer, where a galvanized sheet iron pipe with or without offset is carried up above the brick wall of a building or outbuilding it shall be secured by a galvanized wrought iron clip leaded into the wall near the top wherever possible and bolted against the vent pipe, or by other approved means.

All band iron clips of vent pipes to brick walls shall be fastened with nuts and bolts leaded in, or by means of T-headed bolts passed through the brick joints and turned at right angles to the joints, or by other approved means.

3936. **Supporting Vents.**—Wherever a vent pipe with offset extends more than 10 feet above such offset, it shall be stayed, as directed by the proper officer, with  $\frac{1}{2}$ -in. galvanized wrought iron piping.

An unsupported length of not more than 15 feet above the highest clip of straight vent pipe, without offset, will be permitted.

3937. **Vents Adjoining High Buildings.**—In any case in which a building is erected next to an existing building of less elevation and any windows of the new building are located within 30 feet of any existing vent stack on the lower building, the owner of such new building shall defray the cost of such alterations to the vents of the previously existing building as are necessary to conform with clause 3926.

The owner of the lower or existing building shall make such alterations upon the receipt of money, or security therefor sufficient for the purpose, from the owner of the new or higher building, or shall permit at the election of the owner of the new or higher building the making of such alteration by the owner of such new or higher building.

## CHAPTER 40.

### PIPE CAPACITIES.

#### Capacities of Soil, Waste, Combined Waste, Drain, and Vent Pipes.

Clause 4001.—Fixture Units.

Clause 4002.—Sizes of Soil, Waste, Combined Waste, and Drain Pipes.

Clause 4003.—Sizes of Vents.

Clause 4004.—Waste Pipes.

Clause 4005.—Soil Pipes.

Clause 4006.—Combined Wastes.

Clause 4007.—Connexions to Drain.

Appendix.

CHAPTER 40.

PIPE CAPACITIES.

Capacities of Soil, Waste, Combined Waste, Drain, and Vent Pipes.

4001. **Fixture Units.**—For the purpose of determining the size of any soil, waste, combined waste, drain, or vent pipe, the following equivalent fixture units shall be adopted, unless otherwise directed by the Authority, and the least nominal outlet diameter shown hereunder for any fixture shall be the minimum outlet diameter for such fixture, except as provided in clause 4136 for water closet pans.

Fixture.	Nominal Outlet Diameter. Inches.	Fixture Units.
One Lavatory Basin .. .. .	1½	1
One Lavatory Basin .. .. .	1½	1½
For each lavatory basin over 20 served by such pipe	..	½ for each basin
One kitchen sink (up to 6 inches depth to overflow) ..	2	3
One bath (with or without overhead shower) ..	1½	4
.. .. .	2	6
One wash trough set with common trap .. .. .	1½	3
.. .. .	2	5
One urinal or group of urinals draining to a common trap	2	3
One slop sink .. .. .	2½	3
.. .. .	3	4
One shower compartment .. .. .	2	3
One water closet .. .. .	4	6
Group of fixtures contained in one apartment—		
Bath and lavatory basin .. .. .	..	6
Bath, lavatory basin and shower .. .. .	..	6
Bath, lavatory basin, shower and water closet .. .. .	..	6

For fixtures other than those shown, the equivalent fixture units to be adopted shall be determined by the proper officer.

4002. **Sizes of Soil, Waste, Combined Waste, and Drain Pipes.**—The sizes of soil, waste, and combined waste pipes computed in accordance with the methods set out in the appendix to this chapter shall be not less than the sizes determined on the basis of the total number of fixture units drained or likely to be drained in accordance with the following table:—

PERMISSIBLE MAXIMUM NUMBER OF FIXTURE UNITS.  
Grade not less than—

Diameter of Pipe- (Inches.)	1 in 60.	1 in 40. (a)	1 in 30.	1 in 25.	1 in 20.	1 in 15.	1 in 12. (b)	1 in 4. (c)	Vertical Stacks.
1½	..	..	..	..	..	6	6	8	9
2	..	..	..	..	9	10	12	17	24
2½	..	..	..	14	16	18	20	28	36
3	..	..	20	22	24	27	30	40	50
4	..	100	108	115	125	135	150	210	260
6	420	490	560	600	650	740	820	1,150	1,400

(a) Corresponds to 88½° fittings.  
(b) Corresponds to 85° fittings.  
(c) Corresponds to 75° fittings.

Provided that—

- (a) Soil, waste, and combined waste pipes shall not be diminished in the direction of flow;
- (b) The diameter of trap, soil, waste, or combined waste pipe receiving the discharge from any fixture shall in no case be less than the nominal outlet diameter of such fixture with a minimum of 1½ inches, nor shall any soil pipe be less than 3 inches in diameter;
- (c) Not more than two closet pans shall discharge into any 3-in. graded soil or combined waste pipe;
- (d) For the purpose of this section, offsets in vertical stacks may be treated as though vertical, provided the length of offset does not exceed 5 feet measured horizontally;
- (e) Where 45-degree fittings are used throughout for connexions to any stack, the "permissible maximum number of fixture units for vertical stacks" in the above table may be increased by 50 per cent;



- (f) Not more than one-half of the total permissible number of fixture units for a vertical stack, in accordance with the above table, shall be connected to such stack in any 8-ft. length thereof;
- (g) Soil, waste, and combined waste pipes shall be as direct and free from bends as practicable; where bends are unavoidable, approved provision shall, if necessary, be made to safeguard fixtures connected immediately above or below such bends.

4003. Sizes of Vents.—

- (a) **Length of Vent.**—For the purposes of this clause the length of any vent shall be defined as follows:—
  - (i) Length of main vent shall be the height of the building, in storeys, above the floor on which are situated the lowest fixtures served by such vent;
  - (ii) Length of branch vent shall be the height of the building, in storeys, above the floor on which are situated the lowest fixtures served by such vent, plus an additional storey for each 12 feet, or part of 12 feet, in the length of the branch vent, measured horizontally from the main vent to the fixture in question;
- (b) **Main and Branch Vents.**—The sizes of main and branch vents, computed in accordance with the method set out in the appendix to this chapter, shall be not less than the sizes determined from—
  - (i) the size of soil, waste or combined waste pipe or stack to be vented;
  - (ii) the total number of fixture units served by the main vent, or by that portion of the branch vent under consideration; and
  - (iii) the length of the vent,
 in accordance with the following table:—

MINIMUM PERMISSIBLE SIZES OF MAIN OR BRANCH VENTS (INCHES).

Diameter of Soil, Waste or Combined Waste Pipe. (Inches).	Total Number of Fixture Units Served.	Total Length of Vent in Storeys.									
		1	2	3	4	5	6	7	8	9	10 and Over.
1½	Up to 8	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
	9 - 14	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
2	Up to 12	1½	1½	1½	1½	2	2	2	2	2	2
	13 - 36	1½	1½	1½	1½	2	2	2	2	2	2
2½	Up to 12	1½	1½	1½	1½	2	2	2	2½	2½	2½
	13 - 36	1½	1½	1½	1½	2	2	2	2½	2½	2½
3	37 - 54	1½	1½	1½	2	2	2½	2½	2½	2½	2½
	Up to 12	1½	1½	2	2	2	2	2	2	2	2½
4	13 - 24	2	2	2	2½	2½	2½	2½	2½	2½	2½
	25 - 42	2	2	2½	2½	2½	2½	2½	2½	2½	2½
5	43 - 75	2	2½	2½	2½	2½	2½	2½	2½	2½	2½
	Up to 12	2	2	2	2½	2½	2½	2½	2½	2½	2½
6	13 - 24	2	2	2	2½	2½	2½	2½	2½	2½	2½
	25 - 36	2	2	2½	2½	2½	2½	2½	2½	2½	2½
7	37 - 48	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	49 - 72	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
8	73 - 120	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	121 - 180	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
9	181 - 300	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
	301 - 390	2½	2½	2½	2½	2½	2½	2½	2½	2½	2½
10	Up to 600	4	4	4	4	4	4	4	4	4	4
	601 - 1,300	4	4	4	4	4	4	4	4	4	4
11	1,301 - 2,100	4	4	4	4	4	4	4	4	4	4
		4	4	4	4	4	4	4	4	4	4

Provided that—

- (i) No vent shall be less than 1½ inches in diameter, and in no case shall a main or branch vent have a diameter less than one-half of that of the soil or waste pipe which it serves;
- (ii) For 2-in. and 2½-in. waste pipes the main or branch vent shall have a diameter of not less than 1½ inches;
- (iii) No branch vent need be larger in diameter than the soil or waste pipe which it serves;

(c) **Individual Anti-Siphonage Vents.**—The sizes of individual anti-siphonage vents shall be not less than the sizes determined from the diameter of the fixture trap served, in accordance with the following table:—

Diameter of Fixture Trap.	Minimum Permissible Size of Anti-siphonage Vent.	Diameter of Fixture Trap.	Minimum Permissible Size of Anti-siphonage Vent.
Inches.	Inches.	Inches.	Inches.
1½	1½	3	2
2	1½	4	2
2½	2		

**4004. Waste Pipes.**—Except as provided in clause 4006, separate waste pipes shall be provided for each of the following classes of polluted water, viz.:—

- (a) Water from baths, sinks, lavatory basins, wash troughs, and grease traps where such are ordered or required, and other waters containing a small proportion of soap and/or dirt;
- (b) Water from kitchen and scullery sinks or other fixtures, to grease traps where such are ordered or required.

**4005. Soil Pipes.**—Except as provided in clause 4006, soil pipes shall be provided for soil water from closets and other waters containing faecal matter, and for urinal waters from slop sinks and urinals, and, where directed, for discharges from operating theatres and mortuaries.

**4006. Combined Wastes.**—The proper officer may approve of the adoption of the Combined Pipe System for plumbing installations subject to the following conditions and such other conditions as he may think necessary in any particular case, viz.:—

- (a) Application shall be made in writing by the owner or his authorized agent who shall submit with such application—
  - (i) plans showing clearly all floors and basements (if any) upon which fixtures are, or are proposed to be installed, the nature and position of all fixtures, the size and arrangement of all soil, waste, combined waste, and vent pipes, and the position, size, and approximate depth of all drains and the intended use of each room in which a fixture is, or is proposed to be installed, and of each room from which a water closet or urinal is entered directly;
  - (ii) sectional line diagrams showing clearly each soil, waste, combined waste, or vent pipe or stack, together with their sizes and the positions of all fixtures connected thereto, and, where required, the gradients of the soil, waste, or combined waste pipes;
  - (iii) such other information as the proper officer may require.
- (b) The size and arrangement of all soil, waste, combined waste, drain, and vent pipes, shall be approved by the proper officer.

**4007. Connexions to Drains.**—Except as provided in clause 4006, all waste pipes shall, unless otherwise permitted, discharge under the grating of a yard gully or into a disconnector trap.

All soil and combined waste pipes, including those for urinals and slop sinks, shall be connected direct to the drain.

## APPENDIX.

METHOD OF COMPUTING THE SIZES OF SOIL, WASTE, COMBINED WASTE,  
AND VENT PIPES IN ACCORDANCE WITH THE REQUIREMENTS OF  
CHAPTER 40.*Fixtures.*

1. In accordance with clause 4001, classify the various fixtures and determine the maximum number of fixture units to be provided for in each portion of the system under consideration. Cleaners' sinks and floor wastes which are not regularly in use during the period of maximum use of other fixtures need not be included in determining the number of fixture units to be provided for.

*Sizes of Graded Soil and Waste Pipes.*

2. (a) By reference to clause 4002, determine from the maximum number of fixture units served at the point under consideration the required sizes and grades of the soil, waste, and combined waste pipes in each portion of the system.

(b) Compare the sizes so obtained with the minimum permissible sizes for the particular case and adopt the larger.

*Sizes of Vertical Soil and Waste Stacks.*

3. (a) By reference to clause 4002, determine from the maximum number of fixture units served at the point under consideration the required sizes of vertical soil, waste, and combined waste stacks.

(b) Ascertain whether the number of fixture units connected to the stack within any 8-ft. length is within the permissible limits of provision (f) of clause 4002; if not, adopt such larger size stack as will comply with this requirement.

(c) Compare sizes so obtained with the minimum permissible sizes for the particular case and adopt the larger sizes, subject to provision (a) of clause 4002.

*Size of Main Vents.*

4. (a) Determine the vertical length of the main vent in storeys from its connexion at its lower end with a soil, waste, or combined waste pipe or drain to the ceiling level of the top floor.

(b) From the table of permissible sizes in clause 4003, determine for the maximum number of fixture units served by the vent, the required size for a vent of such a length.

(c) Compare the sizes so determined with minimum permissible sizes and adopt the larger.

*Sizes of Branch Vents.*

5. (a) Determine the approximate vertical length in storeys of the main vent from the point of connexion of the branch vent under consideration to the ceiling level of the top floor.

(b) Determine the horizontal length of the branch vent from its connexion with the main vent to the furthest end of the portion under consideration.

(c) Allowing one storey for each 12 feet, or part of 12 feet, in horizontal length of branch vent, as determined by Rule 5 (b) above, add this length in storeys to the length in storeys determined by Rule 5 (a) above.

(d) Determine the number of fixture units served by the portion of branch vent under consideration.

(e) From the table of permissible sizes in clause 4003, determine the minimum size of vent required for the above number of fixture units and for the total length of vent in storeys as determined by Rule 5 (c) above.

(f) Compare the sizes so determined with the minimum permissible sizes and adopt the larger, subject to the provision that no vent need be larger than the soil, waste, or combined waste pipe which it serves.

## CHAPTER 41.

## PLUMBING.

## Part I.—General.

Clause 4101.—Flashing.

Clause 4102.—Pipes through Roof.

## Part II.—Soil, Waste, and Combined Waste Pipes.

Clause 4103.—General.

Clause 4104.—Materials.

Clause 4105.—Lead Pipes.

Clause 4106.—Wrought Iron Pipes.

Clause 4107.—Cast Iron Pipes.

Clause 4108.—Copper and Brass Pipes.

Clause 4109.—Use of Lead Pipes.

Clause 4110.—Supporting Lead Pipes.

Clause 4111.—Length of Unvented Waste Pipes.

Clause 4112.—Junctions.

Clause 4113.—Sealing of Pipes.

Clause 4114.—Sheet Metal Bends and Offsets.

Clause 4115.—Painting.

## Part III.—Joints.

Clause 4116.—Lead Pipe.

Clause 4117.—Wrought Iron Pipe.

Clause 4118.—Wrought Iron Pipe to Lead Pipe.

Clause 4119.—Brass or Copper Pipes.

Clause 4120.—Lead Pipe to Cast Iron Pipe.

Clause 4121.—Sheet Iron Pipe to Cast Iron Pipe.

Clause 4122.—Sheet Iron Pipe to Wrought Iron or Steel Pipe.

Clause 4123.—Sheet Iron Pipe to Lead Pipe.

Clause 4124.—Lead Pipe to Concrete or Stoneware Pipe.

Clause 4125.—Concrete or Stoneware Traps to Lead Pipe.

Clause 4126.—Connexion of Closet Pan Traps to Soil Pipe or Drain.

Clause 4127.—Cistern Flush Pipe to Closet Pan.

Clause 4128.—Vent Pipe to Closet Pan.

Clause 4129.—Outlet Fittings to Fixtures.

Clause 4130.—Waste Pipes to Troughs.

## Part IV.—Fixture Traps.

Clause 4131.—Fixtures to be Trapped.

Clause 4132.—Omission of Traps.

Clause 4133.—Position of Traps.

Clause 4134.—Materials.

Clause 4135.—Depth of Water Seal.

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Clause 4138.—Form of Trap.

Clause 4139.—Lead Traps.

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Clause 4140.—Gratings.

**Part VI.—Cleaning Eyes and Inspection Openings.**

Clause 4141.—Provision for Inspection and Cleaning.

Clause 4142.—Inspection Openings on Soil and Combined Waste Pipes.

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**Part VII.—Grease Traps.**

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Clause 4145.—Construction of Grease Traps.

Clause 4146.—Grease Trap Ventilation.

Clause 4147.—Size of Grease Trap.

Clause 4148.—Outlet Pipes.

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Clause 4149.—Fixing Closet Pan.

Clause 4150.—Closet Pans.

Clause 4151.—Closet Pan Seats.

Clause 4152.—Flushing Apparatus.

Clause 4153.—Flushing Cisterns.

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Clause 4155.—Flushing Apparatus other than Cisterns.

Clause 4156.—Storage Tanks.

Clause 4157.—Venting Closet Pans.

Clause 4158.—Grouped External Closets.

**Part IX.—Urinals and Flushing Apparatus.**

Clause 4159.—Details of Construction, &c.

Clause 4160.—Flushing Apparatus.

Clause 4161.—Flushing Cisterns.

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**Part X.—Slop Sinks.**

Clause 4163.—General.

Clause 4164.—Bibcock over Slop Sink.

**Part XI.—Wash Troughs.**

Clause 4165.—General.

Clause 4166.—Support for Lead Waste Pipe.

**Part XII.—Sinks, Baths, and Lavatory Basins.**

Clause 4167.—Fixing Sinks.

Clause 4168.—Galvanized Sheet Iron Baths.

Clause 4169.—Bath Traps.

Clause 4170.—Baths Without Flashing.

Clause 4171.—Venting of Lavatory Basins.

Clause 4172.—Tip-up Basins.

Clause 4173.—Showers.

**Part XIII.—Safes and Overflows.**

Clause 4174.—Safes Required.

Clause 4175.—Lead Safes in Water Closets.

Clause 4176.—Safe Overflows.

**Part XIV.—Existing Fixtures, Fittings, &c.**

Clause 4177.—Existing Fixtures, Fittings, &c.

CHAPTER 41.

PLUMBING.

Part I.—General.

4101. **Flashing.**—Unless otherwise directed by the Authority, all troughs, sinks, baths, and other fixtures which are placed less than 6 inches from any wall, except those provided with wall skirtings as part of the fixture, shall be flashed with 4-lb. lead, 24-gauge copper, bronze, brass, nickel-silver, or monel metal, or other approved material. Galvanized sheet iron may be used for fixtures other than sinks.

All such flashings shall be turned up the walls at least 4 inches, or be tucked 1 inch into a joint and cemented water-tight, except where the walls are tiled, when the flashing shall be carried up at least  $\frac{1}{4}$  inch behind the tiles.

Baths and other fixtures, having turned-up flanges for use against tiled walls in lieu of sheet metal flashing, shall be properly supported to prevent settlement, and the flange shall lap at least  $\frac{1}{4}$  inch behind the tiles, which shall be brought hard down on to the surface of the fixture.

All flashing shall be properly secured and made water-tight, and shall be bedded for a width of not less than 1 inch along the edge nearer the fixture, in red or white lead.

4102. **Pipes Through Roof.**—In all cases where a vent, waste, combined waste, or soil pipe passes through any roof, a suitable lead collar or flashing shall be soldered or otherwise fixed to the pipe and also the roof in such manner as shall make the roof perfectly water-tight.

Part II.—Soil, Waste, and Combined Waste Pipes.

4103. **General.**—All lines of soil, waste, and combined waste pipes shall be as direct as possible.

4104. **Materials.**—No material shall be used for soil or combined waste pipes other than cast iron, lead or brass, or other approved materials, and for waste pipes other than wrought iron, cast iron, lead, brass, copper, or other approved materials.

4105. **Lead Pipes.**—The minimum permissible weight of lead for soil or combined waste pipes shall be 7 lb. per square foot, and for waste pipes 6 lb. per square foot.

4106. **Wrought Iron Pipes.**—All wrought iron pipes and their fittings shall be of approved standard weight and quality and galvanized or lined to the approval of the Authority.

4107. **Cast Iron Pipes.**—All cast iron pipes shall be sound, free from holes and cracks, and coated with approved bituminous composition or lined with glass enamel or other material to the approval of the Authority.

Cast iron pipes and their fittings, where laid in the ground, shall comply with the standard approved by the Authority for cast iron water pipes and their fittings of similar diameters.

Cast iron pipes for use in other situations shall have a minimum thickness of  $\frac{3}{16}$  inch, measured without the enamel or other lining, and their fittings shall correspond with them in weight and quality. All junctions shall be curved; right-angled junctions shall not be made.

4108. **Copper and Brass Pipes.**—Copper or brass waste pipes shall be seamless solid drawn tube, and shall be of a diameter and thickness not less than those given in the following table:—

Nominal Internal Diameter.	Minimum Permissible Actual Internal Diameter.	Minimum Permissible Wall Thickness (S.W.G.).		British Standard Pipe Thread for Screwed Connexions.
		Screwed Connexions.	Braced or Compression Joints.	
Inches.	Inches.			Inches.
$1\frac{1}{4}$	$1\frac{1}{16}$	12	16	$1\frac{1}{4}$
$1\frac{1}{2}$	$1\frac{1}{8}$	12	16	$1\frac{1}{2}$
2	$1\frac{3}{16}$	11	16	2
$2\frac{1}{2}$	$2\frac{1}{8}$	11	14	$2\frac{1}{2}$
3	$2\frac{3}{16}$	10	14	3
4	$3\frac{1}{8}$	8	12	4

4109. **Use of Lead Pipes.**—Lead pipes shall not be used where liable to damage.

4110. **Supporting Lead Pipes.**—Lead pipes shall be supported by cast lead tacks of approved dimensions, wiped on to the pipe or by other approved fastenings, and such fastenings shall be arranged as nearly as possible thus—

	<i>Centres.</i>
4-in. vertical lead pipes .. .. .	2 ft. 6 in.
4-in. inclined lead pipes .. .. .	2 ft. 0 in.
Less than 4-in. vertical pipe .. .. .	3 ft. 0 in.
Less than 4-in. inclined pipe .. .. .	2 ft. 3 in.

Two pairs of tacks, fixed opposite, are sufficient for fixing lead flush pipes from cisterns with lugs.

4111. **Length of Unvented Waste Pipes.**—Except as provided in clause 4171, waste pipes need not be ventilated unless they exceed 7 feet in inclined length and/or 18 feet in vertical length, provided that there is only one fixture attached to the waste pipe, and provided that the water seal of the trap is not reduced by siphonage or other cause.

Where there is more than one fixture or the water seal is reduced, a vent pipe shall be supplied to the fixture trap or traps.

4112. **Junctions.**—Where a soil, waste, or combined waste stack is branched into a graded soil waste, combined waste, or drain pipe, the branch fitting shall have an angle of not less than 45 degrees to the graded pipe, and the length of the branch of the fittings shall be such that the vertical projection of the attached stack will be wholly outside of the area of the junction with the graded pipe. Junctions shall not be built into walls except with the approval of the Authority or its proper officer.

4113. **Sealing of Pipes.**—Wherever a fixture is abolished, the soil, waste, combined waste, vent, and water supply pipes to such fixture shall be removed, or, if allowed by the Authority to remain, the ends of the pipes shall be sealed with water-tight imperishable materials.

Wrought iron pipe may be sealed with a screwed plug; cast iron pipe may have a cast iron plug caulked in with lead; lead pipe may have the end securely closed with a wiped joint; stoneware pipe may have a stoneware disc cemented in.

4114. **Sheet Metal Bends and Offsets.**—All sheet metal bends and offsets, for flush and vent pipes, shall be bent or pressed. Mitred elbows will not be permitted.

4115. **Painting.**—All external plumbing work and all cast-iron cisterns and brackets, woodwork in connexion with plumbing installations, sheet iron flush pipes, and sheet iron storage tanks and trays shall be painted, to the approval of the proper officer. In no case shall painting of any portion of the plumbing work be carried out unless and until such work has been inspected and approved.

### Part III.—Joints.

4116. **Lead Pipe.**—All joints in lead pipe shall be plumbers' wiped joints.

4117. **Wrought Iron Pipe.**—The screwed ends and sockets of each particular size of wrought iron or wrought steel pipe shall be so formed and the threads so cut that the ends of the pipe will butt against each other when screwed home in the sockets; bends, junctions, and similar fittings shall be similarly formed and screwed so that when the pipe ends are screwed home the bore will be continuously uniform and without breaks or pockets.

The burr shall be neatly filed off on the inner edge of all pipe ends. All screwed joints shall be made with approved jointing material.

4118. **Wrought Iron Pipe to Lead Pipe.**—All joints between wrought iron and lead pipes shall be made by means of brass unions screwed to the iron pipe and wiped to the lead pipe.

4119. **Brass or Copper Pipes.**—Joints of brass or copper pipes shall be made by means of brazing to the satisfaction of the proper officer or in accordance with the S.A.A. Specification B.36, "Compression Joints and Copper Alloy Screwed Fittings for Standard Copper Tubes."

4120. **Lead Pipe to Cast Iron Pipe.**—The connexion of lead pipes or traps to cast iron pipes shall be made by means of brass ferrules; the brass ferrule shall be lined with and connected to the lead pipe or trap by means of a wiped joint and connected to the cast iron by inserting the ferrule in socket thereof, and making the joint in the same way as in cast iron pipe.

4121. **Sheet Iron Pipe to Cast Iron Pipe.**—All connexions of galvanized sheet iron to cast iron pipes shall be made with molten lead, lightly but tightly caulked into the cast iron sockets or with other approved material, or with a brass sleeve soldered to the sheet iron pipe and caulked with lead.

4122. **Sheet Iron Pipe to Wrought Iron or Steel Pipe.**—Galvanized sheet iron pipes shall be connected to wrought iron or steel pipes by means of brass unions or sleeves soldered to the sheet iron and screwed to the wrought iron.

4123. **Sheet Iron Pipe to Lead Pipe.**—Connexions of sheet iron pipes to lead pipes shall be made by means of brass sleeves wiped to the lead pipe and soldered to the sheet iron pipe.

4124. **Lead Pipe to Concrete or Stoneware Pipe.**—Connexions of lead pipe to stoneware or concrete pipe shall be made by means of a brass ferrule connected to the lead pipe by means of a wiped joint and connected to the stoneware or concrete pipe by inserting it in the socket thereof and making a cement mortar joint.

4125. **Concrete or Stoneware Traps to Lead Pipe.**—The connexion of a stoneware or concrete trap to a lead pipe shall be by means of a cast lead or brass socket, and the joint made with bitumen or other approved material; the lead pipe shall be connected to the tail end of the brass or lead socket by means of a plumbers' wiped joint.

4126. **Connexion of Closet Pan Traps to Soil Pipe or Drain.**—Connexion of a closet pan to a soil or drain pipe shall be made by means of a bituminous jointing material, consisting of a mixture of approved bitumen and finely graded inert mineral filler in equal proportions, filled in solidly into socket of soil or drain pipe and neatly splayed off, or by other approved method. In the case of lead soil pipes, a cast lead or brass socket shall be used, connected to the lead pipe by means of a wiped joint.

4127. **Cistern Flush Pipe to Closet Pan.**—The flush pipe from cistern shall be connected to the water closet pan by a lead cap piece of not less than 4 lb. lead, packed with red lead or other approved material, or the connexion may be made by other approved method. The cap piece shall be jointed to galvanized sheet iron, copper, brass, or drawn steel pipe by means of a soldered joint, and to lead flush pipe by a wiped or soldered joint.

The connexion of the flush pipe to cistern shall be by means of a brass union, wiped to lead pipe or soldered to sheet iron pipe, or by other approved method. Copper or brass pipe shall be connected to cistern by means of a brass ring, with nut brazed to pipe or by other approved means.

4128. **Vent Pipe to Closet Pan.**—Vent pipes shall be connected to the vent horn of the water closet trap by a lead cap piece with red lead packing, or by other approved methods.

The cap piece shall be jointed to copper or brass pipe by means of a soldered joint, and to lead pipe by a soldered or wiped joint.

4129. **Outlet Fittings to Fixtures.**—Connexions between outlet fittings and such fixtures as baths, sinks, basins, &c., when the latter are constructed of cast iron, sheet iron, ceramic ware, or concrete shall be made with lock-nuts. The outlet fitting shall in all cases be connected to the waste pipe by means of a union. When these fixtures are made of sheet metal lighter than 20 gauge, soldered connexions may be used in lieu of lock-nuts.

4130. **Waste Pipes to Troughs.**—Connexions of waste pipes to wash troughs shall be made as under:—

- (a) Cement troughs, unless otherwise approved, shall have approved cast-in outlets;
- (b) Sheet metal troughs shall be connected to the waste pipes in compliance with clause 4129;



- (c) For wooden troughs, lead, copper, or brass waste pipes shall be connected in compliance with clause 4129, or shall have flanges connected to the waste in accordance with the provisions of these Regulations, and fastened to the underside of the trough with copper tacks. The waste pipe shall then be turned over inside the trough and the plug casting bedded over it with red lead putty and screwed to trough with brass woodscrews.

Where wrought iron or other screwed pipes are used, the plug casting must be connected to the trough by means of a locknut in lieu of flange.

#### Part IV.—Fixture Traps.

4131. **Fixtures to be Trapped.**—Every fixture shall be effectively trapped, except as provided in clause 4132, or unless otherwise specially permitted by the Authority. Separate traps shall be provided for each fixture, except lavatory basins, sinks, or troughs in the same apartment which may be connected in pairs.

4132. **Omission of Traps.**—Baths, lavatory basins, wash troughs, and sinks may remain untrapped where fixed in the open air or in a detached outbuilding not used as a living room, work room, or room for the preparation, cooking, or storage of food and not connected directly by openings with the main building or residence, provided that the length of the waste pipe, measured in the case of wash troughs from centre of furthest inlet to end of waste pipe outlet, does not exceed 6 feet.

4133. **Position of Traps.**—Traps shall be placed as near the fixtures as possible, and in no case shall a trap be more than 2 feet from its fixture, except as provided in clause 4169, unless otherwise specially permitted by the Authority.

4134. **Materials.**—Traps for all fixtures other than water closets, slop sinks, and urinals shall be of copper, brass, or drawn lead.

4135. **Depth of Water Seal.**—Every trap shall have a water seal of not less than 2 inches.

4136. **Closet Pan Traps.**—Outlets from closet pan traps shall be of not less than 3½-in. nor more than 4-in. diameter, except in the case of siphonic pans, which shall be as directed by the Authority.

4137. **Sealed Disconnecter Traps.**—Where approved by the Authority, sealed disconnecter traps may be fixed inside or outside the building, but in such cases breather pipes or fresh air inlets of same diameter as disconnecter trap shall be taken to such height as directed, and where trap is inside shall be led to the outside of the building. The material for such breather pipes shall be the same as for vent pipes, except that sheet iron will not be allowed. Inspection openings to such traps shall be sealed with screwed plugs, or as otherwise approved by the Authority.

4138. **Form of Trap.**—The P form of trap shall be used in preference to the S form where, in the opinion of the proper officer, it is equally suitable for the situation.

4139. **Lead Traps.**—All lead traps must be of the weights specified in clause 4105 for lead pipes of the same class.

#### Part V.—Gratings.

4140. **Gratings.**—Non-corrodible metal outlet gratings of approved design and material in accordance with the S.A.A. Specification No. B.38, "Metal Alloy Sanitary Fittings," shall be provided for all fixtures other than a water closet. If for the fixture in question there is no S.A.A. Specification, the grating shall be to the approval of the Authority.

#### Part VI.—Cleaning Eyes and Inspection Openings.

4141. **Provision for Inspection and Cleaning.**—Inspection and cleaning eyes shall be provided in such positions on all soil, combined waste, and waste pipes as will provide access for proper inspection and cleaning of the entire length of pipe.

Traps for fixtures other than urinals, water closets, and slop sinks shall, in each case, be provided with an approved screwed brass plug for cleaning purposes.

4142. **Inspection Openings on Soil and Combined Waste Pipes.**—In every case where a vertical stack of soil or combined waste pipe provides for a closet or closets 4 feet or more above ground level, measured from floor level of any such water closet to ground level at foot of stack, an inspection opening, 8 inches by 4 inches, having a cover fixed to a flange with non-corrodible bolts or studs, shall be provided near foot of stack in such position as directed by the proper officer.

4143. **Washers for Inspection Openings.**—Inspection openings to soil, waste, and combined waste pipes shall be provided with approved washers.

#### Part VII.—Grease, Petrol, and Oil Traps.

4144. **Provision of Grease, Petrol and Oil Traps.**—Every fixture or area from which grease oil or greasy or oily matter or petrol, benzine, or other inflammable or explosive substance is likely to be discharged or conveyed into waste, combined waste, or soil pipes or house drains, and every sink in all such places as food-packing houses, butchers' shops, lard-rendering establishments, hotels, restaurants, and boarding houses, and such fixtures, areas, apparatus, or appliances, as the Authority may direct, shall first discharge into an approved apparatus for retaining the objectionable matter. Such apparatus shall be of such dimensions, design, and construction and in such positions as the Authority or its proper officer may in each case approve.

4145. **Construction of Grease Traps.**—Grease traps shall be fixed outside buildings or outbuildings wherever practicable. Wherever a grease trap is used inside a building or outbuilding it shall, where not readily accessible for removal of grease, be so constructed and fitted as to be easily portable.

Non-portable grease traps shall be constructed of glazed stoneware, concrete, brick in cement, or other approved material.

Portable grease traps shall be constructed of copper or other approved material, provided with a close-fitting cover, and, if directed, fixed upon a tray. The outlet from any grease trap shall be connected to a disconnecter trap.

4146. **Grease Trap Ventilation.**—Unless otherwise approved, every internal grease trap and all external grease traps which are within 30 feet of any door, window, or other opening into a building shall, unless fitted with an approved air-tight cover, have independent provision made for inlet and outlet ventilation.

Every such vent shall be carried not less than 6 feet above any window, door, or other opening into any building within a distance of 30 feet thereof, and in any case at least 2 feet above the eaves or coping, or to such additional height as may be necessary to prevent effectually the escape of foul air into any building within the vicinity.

In all cases there shall be a difference in height of at least 6 feet between the tops of the inlet and outlet vents.

The size of such vents shall be in compliance with the requirements for main vents in clause 4003, the diameter of waste pipe being taken as that of the outlet from the grease trap, and the number of fixture units equivalent to number represented by the sinks served by the grease trap.

4147. **Size of Grease Trap.**—The dimensions of grease trap to be provided shall be such as to ensure the retention of all grease entering such trap.

4148. **Outlet Pipes.**—The outlet pipe from any grease trap must be at least one size larger than that size of pipe which has a cross-sectional area equivalent to the total area of incoming waste pipes. In no case, except by special permission, shall the outlet pipe be less than 3-in. diameter.

#### Part VIII.—Water Closets and Flushing Apparatus.

4149. **Fixing Closet Pan.**—On concrete floors, or floors of tiles set in concrete, the closet pan shall be securely bedded upon concrete or cement mortar, and fixed with brass screws to approved lead dowels set in the floor, or by other approved means.

Where the floor is of timber, covered with an approved impervious material, the closet pan shall be secured to the timber by means of brass screws as directed, or by other approved means.

4150. **Closet Pans.**—Every water closet shall be furnished with a pan of non-absorbent material of such shape, capacity, and construction as approved by the Authority.

Water closet pans and fittings thereto shall be entirely open to inspection, and without any enclosures.

Vent horns shall be provided on pans where directed by the Authority, even if no anti-siphonage vent is required; if not used for a vent such vent horn shall be sealed with a lead disc, bituminous filler, and a lead cap piece, or by other approved method.

4151. **Closet Pan Seats.**—Where a seat is provided, it shall be of approved construction and material, and fitted with hinges and screws of non-corrodible metal. When constructed of wood, one-piece seats shall be reinforced with two or more wood or brass slips let in flush on the underside, and multi-piece seats shall be glued and dowelled or bolted. Seats shall be provided with approved buffers to prevent damage to the closet pan.

The openings in closet pan seats shall not be larger than  $10\frac{1}{4}$  inches x 9 inches, and seats with holes so large as to cause fouling of the pan must not be used, provided that open-front seats of approved design may be used.

4152. **Flushing Apparatus.**—Approved apparatus shall be provided for the effective application of water to the pan of the water closet, and for the efficient flushing and cleansing of the pan and effective removal therefrom of any solid or liquid matter which may, from time to time, be deposited therein.

Such apparatus shall have a flushing capacity as directed by the Authority, and shall be so constructed, fitted, and placed as to supply water for use in the pan without any direct communication with any service water pipe upon the premises.

4153. **Flushing Cisterns.**—Flushing cisterns shall be fixed at such height as will effectually flush the pan, but, except by special permission, no cistern shall be fixed at a less height, measured from top of seat to bottom of cistern, than 5 feet where  $1\frac{1}{4}$ -in. flush pipe is used, or 4 feet where  $1\frac{1}{2}$ -in. flush pipe is used. There shall be a distance of at least 9 inches between top of cistern and ceiling of closet.

Every cistern shall have a separate stop tap and an overflow of  $\frac{3}{4}$ -in. internal diameter, and shall be fixed to cistern boards not less than 12 inches deep and  $1\frac{1}{4}$  inch thick, or fixed in other approved manner.

Water supply pipes to cisterns shall be adequate to fill any cistern at the rate of not less than  $\frac{1}{2}$  gallon per minute.

4154. **Flush Pipes.**—Flush pipes to closet pans shall be of brass, copper, 6 lb. lead, galvanized iron of not less than 22 gauge, or other approved material, and shall have a minimum diameter of  $1\frac{1}{4}$  inch. Flush pipes shall be fitted with an approved buffer and buffer block where the closet pan is provided with a hinged seat.

4155. **Flushing Apparatus Other than Cisterns.**—Notwithstanding anything contained in these Regulations, closet pans in any building may be flushed by means of any apparatus which—

- (a) automatically controls the amount of water used, and/or
- (b) is approved by the Authority.

4156. **Storage Tanks.**—Except where otherwise allowed by the Authority on the written request of the owner, who shall accept all responsibility in the matter, internal water closets shall be provided with storage tanks capable of holding the equivalent of two flushes of water for each occupant of the building, with a minimum of twenty (20) flushes per closet for all buildings except private residences, which shall have a minimum capacity of ten (10) flushes. These tanks may be constructed of 22-gauge sheet iron or 24-gauge corrugated iron.

Unless otherwise approved by the Authority, the storage tank shall be placed in the water closet apartment itself, on the roof, over a flat or gutter, or in an accessible place between the ceiling and the roof, in which latter case a safe of galvanized iron, lead, or other approved impervious material with overflow, shall be fixed under the storage tank. The storage tank shall be provided with a separate overflow which shall not discharge on to the safe, but may be combined with the safe overflow below the safe.

**4157. Venting Closet Pans.**—Unless otherwise directed or permitted by the Authority, every closet pan on an upstairs floor shall discharge into a soil ventilator pipe or combined waste ventilator pipe, except that where there are no other fixtures connected to the soil stack the pan may be ventilated by an anti-siphonage vent only, in accordance with the requirements of clauses 3925 and 4003, and discharge into a soil pipe or combined waste pipe without extension as a ventilator pipe.

Every external closet pan in which siphonage occurs and every internal closet pan shall be ventilated by an anti-siphonage vent in accordance with the requirements of clause 4003, sufficiently close to prevent siphonage, and in no case more than 18 inches from trap, except in the case where there is only one closet pan on the branch and where such pan is not more than 4 feet from the soil ventilator pipe or combined waste ventilator pipe to which it is connected, measured horizontally between centre of soil ventilator pipe or combined waste ventilator pipe and centre of pan, in which case the anti-siphonage vent may be omitted.

**4158. Grouped External Closets.**—Where there are more than three external water closet pans grouped on the ground floor or in the yard of any premises, the drain, combined waste, or soil pipe shall be separately ventilated for every group, or part of group, of three closet pans. The size of vent shall be in accordance with the requirements of clause 4003.

#### Part IX.—Urinals and Flushing Apparatus.

**4159. Details of Construction, &c.**—Except by special permission of the Authority, only round-backed stall-type urinals made of glazed fire-clay or salt-glazed stoneware and of approved construction shall be used.

The soil or combined waste pipes shall be of lead, stoneware, or glass enamelled or coated cast iron or other approved material, and shall be kept as short and free from bends as possible. Inspection openings shall be provided on soil or combined waste pipes in accordance with the requirements of clause 4141. The urinals shall be provided with approved flushing apparatus, and in every public urinal a hose tap shall be provided in a suitable position for hosing down.

**4160. Flushing Apparatus.**—Chain-operated flushing cisterns, or other approved apparatus operated by hand, shall be fixed on all urinals, except where automatic flushing cisterns are permitted or directed by the Authority.

**4161. Flushing Cisterns.**—The discharge from a cistern shall be as directed by the Authority.

The height of a cistern shall, unless otherwise allowed by special permission of the Authority, be at least 6 ft. 6 in. from the floor to the bottom of the cistern. The cistern shall be so fixed that the ball tap is accessible.

Every urinal flushing cistern shall be provided with a separate stop tap.

**4162. Flush Pipes.**—Flush pipes for urinals shall have a minimum diameter of  $1\frac{1}{4}$  inch, except that flush pipes for automatic flushing cisterns generally shall not exceed—

For 1-gallon cistern,  $\frac{3}{4}$ -in. internal diameter;

For 2-gallon cistern, 1-in. internal diameter;

For  $2\frac{1}{2}$  and 3-gallon cistern,  $1\frac{1}{4}$ -in. internal diameter,

with branches as directed by the proper officer.

#### Part X.—Slop Sinks.

**4163. General.**—Slop sinks shall be made of approved impervious material, and provided with approved flushing apparatus as directed by the Authority.

**4164. Bibcock over Slop Sink.**—A bibcock shall be fixed directly over a slop sink, and at least 18 inches above such sink.

**Part XI.—Wash Troughs.**

4165. **General.**—Wash troughs shall be of approved pattern and material, securely fixed and graded to outlet pipe fitted with brass strainer sunk to level of bottom of trough.

4166. **Support for Lead Waste Pipe.**—Where the distance between outlets on troughs exceeds 21 inches, and lead waste pipe is used, the pipe shall be supported either by a lead tack wiped on the top of the pipe or by a wooden block screwed to the bottom of the trough and clamped to the pipe.

**Part XII.—Sinks, Baths, and Lavatory Basins.**

4167. **Fixing Sinks.**—All new sinks shall be fixed on a frame or on brackets, and traps and wastes left readily accessible.

4168. **Galvanized Sheet Iron Baths.**—The bottoms of galvanized sheet iron baths shall be effectively supported on legs. Such baths shall not be enclosed. Longitudinal joints in the bottoms of baths shall not be permitted.

4169. **Bath Traps.**—Where a bath trap is fixed on the outside of a wall it shall in no case be more than 3 feet from the outlet of the bath, unless by special permission of the Authority.

4170. **Baths Without Flashing.**—Where pedestal baths are fixed, and it is not desired to flash them, they shall be fixed with a space of at least 6 inches clear of walls.

4171. **Venting of Lavatory Basins.**—All lavatory basins, placed singly, shall be provided with anti-siphonage vents. Where the length of waste pipe does not exceed 4 feet, measured from crown of trap to outlet end of waste pipe, and siphonage does not occur, the anti-siphonage vent may be omitted.

In ranges of lavatory basins, ventilation by means of a single vent pipe at the upper end of the range will be permitted, provided that the vent and main waste pipe are sufficiently large to prevent siphonage.

4172. **Tip-up Basins.**—Tip-up lavatory basins shall not be permitted.

4173. **Showers.**—All shower compartments shall be provided with drainage in accordance with the requirements for baths, and every drainage outlet provided with a non-corrodible metal grating.

**Part XIII.—Safes and Overflows**

4174. **Safes Required.**—Unless the floor is constructed of concrete not less than 3 inches in thickness or of other approved impervious material and graded to a suitable outlet or is completely covered with rubber or linoleum  $\frac{1}{8}$  inch in thickness or other approved material, safes of lead or other approved impervious material shall be fitted under all slop sinks and internal water closets and in such other positions as may be directed by the Authority.

4175. **Lead Safes in Water Closets.**—All lead safes shall be laid with sheet lead weighing not less than 5 lb. per square foot, and where the whole floor is not covered with lead, the safe shall extend 12 inches beyond the sides and 15 inches beyond the front of the pan, measured from the outside of the basin, and shall extend back to and 3 inches up the wall. The roll of such safe shall be 2 inches wide and  $\frac{1}{2}$  inch high. In lieu of a roll the safe may be recessed at least  $\frac{1}{4}$  inch below the general floor level and graded to the safe outlet.

4176. **Safe Overflows.**—Unless otherwise permitted by the Authority, every safe shall be drained by a separate 2-in. diameter pipe provided at the inlet with a brass grating and at the outlet into the open air with a flap valve of brass or other approved metal, and shall not connect with any waste pipe, soil pipe, combined waste pipe, drain or sewer.

**Part XIV.—Existing Fixtures, Fittings, &c.**

4177. **Existing Fixtures, Fittings, &c.**—All existing fixtures, fittings, and appliances not in accordance with these Regulations, which the owner may desire to retain unaltered and undisturbed, and which, in the opinion of the Authority will be inoffensive, may remain only at the request of the owner, in writing, until such time as the Authority shall otherwise order. Existing fixtures, fittings, and appliances which, in the opinion of the Authority, are offensive shall be removed at once.

## CHAPTER 42.

## WATER SUPPLY.

Clause 4201.—Supply of Water to Fixtures.

Clause 4202.—Material, Condition, Capacity, &c., of Water Supply Piping.

Clause 4203.—Fixtures not Connected with Sewers.

Clause 4204.—Storage Tanks.

Clause 4205.—Supply Pipe Connexion with Flushing Cistern.

## CHAPTER 42.

## WATER SUPPLY.

4201. Supply of Water to Fixtures.—All water closets and other plumbing fixtures shall be provided by the owner with a sufficient supply of water for flushing purposes to keep them at all times in a proper and cleanly condition.

Every owner of premises who desires, or who has been ordered by the Authority, to provide sanitary appliances for his premises, and to connect his premises with the sewers of the Authority, shall, before or at the commencement of the work of making such connexion, provide piping approved by the Authority for the conveyance of water, and shall cause the piping to be joined to the most convenient water supply main in accordance with the water supply by-laws of the district within which the premises are situated. Such piping shall be of capacity sufficient to supply all sanitary fixtures on the premises freely and continuously, and convey to the flushing cistern, flushing tank, or other flushing apparatus of each water closet upon the premises enough water to fill the same at a rate of not less than one-half ( $\frac{1}{2}$ ) gallon per minute, and the owner shall cause such piping to be connected with the cistern before the completion of the work.

The water supply to any fixture shall be so arranged that there shall be an actual physical discontinuity between the water stored or used in any such fixture and that in the water service pipes.

The water supply for water closets or urinals shall not be taken from a storage tank serving a hot-water system.

4202. Material, Condition, Capacity, &c., of Water Supply Piping.—The entire length of the water supply piping from its connexion with the water supply main to the water closet flushing cistern or other fixture shall be such as is, in the opinion of the Authority, suitable in regard to material, condition, and capacity to convey a sufficiency of water for the sanitary requirements of the particular premises. The owner shall keep the piping from becoming, whether by reason of corrosion or other cause, of insufficient capacity for such requirements.

4203. Fixtures not Connected with Sewers.—No water service pipe shall be laid to supply any fixture in any premises in any sewered area unless such fixture is connected with the sewers of the Authority; or unless special permission, in writing, has been previously given to lay such service pipe.

4204. Storage Tanks.—Water supply pipes to storage tanks for internal closets shall be of not less than  $\frac{3}{4}$ -in. diameter and be provided with stop taps and with high pressure ball valves, except where the available pressure from the water supply system is not sufficient to allow of high pressure ball valves being used. In such cases the permission of the Authority shall be obtained to fix low pressure ball valves.

The water supply pipes from storage tanks to cisterns shall be not less than the following diameters:—

For 1 or 2 cisterns	..	..	$\frac{3}{4}$ -in. diameter
For 3 to 6 cisterns	..	..	1-in. diameter
For 7 to 25 cisterns	..	..	$1\frac{1}{2}$ -in. diameter
For 26 to 50 cisterns	..	..	2-in. diameter

Provided that, where more than 50 cisterns are supplied, or where more than ten cisterns supplied are subject to a head of less than 20 feet—measured vertically from the top water level of the storage tank to the level of the point of discharge into the cistern—the case shall be submitted to the Authority for decision.

The overflow from a storage tank shall be  $1\frac{1}{2}$  inches in diameter. Where the flushing apparatus of more than two fixtures is connected to a storage tank, a full-way gate valve shall be provided on the outlet of the tank.

Where the head of water supply from the storage tank or other source of supply to the flushing cistern is less than 20 feet, a low pressure ball valve shall be provided to the cistern.

Except by special permission of the Authority the head of water supply shall in no case be less than 10 feet measured vertically from the top-water level of the storage tank to the level of the point of discharge into the cistern.

4205. Supply Pipe Connexion with Flushing Cistern.—In all water closets, where directed, a piece of lead or annealed copper pipe not less than 12 inches in length shall be used between the flushing cistern and the stopcock on the supply pipe.

**UNIFORM BUILDING REGULATIONS.**

Clause 207 (c).

**First Schedule.**

Municipality .....

**INSPECTION RECORD.**

**THIS RECORD MUST BE KEPT POSTED ON THE SITE OF THE WORKS.**

Date.	Directions Given as to work to be done.	Signature of Inspector.

Certificate of Occupancy Issued {  
No. ....  
Date .....



UNIFORM BUILDING REGULATIONS.

Clause 208.

Second Schedule.

CERTIFICATE OF OCCUPANCY.

No. \_\_\_\_\_ Municipal Offices,

\_\_\_\_\_19

This is to certify that the building situated at No. \_\_\_\_\_ street \_\_\_\_\_ has been approved as suitable for occupation in accordance with the undermentioned terms of this Certificate.

Floor.	Occupancy.		Maximum Permissible Live Load.	Number for whom exit space provided.
	Class or Classes approved.	If High Fire Hazard.		

The use of any portion of the building for any other class of occupancy or for any occupancy of the same class having a higher fire hazard or involving a greater live load, or for the accommodation of a greater number of persons, than that set out in this Certificate is an offence against the regulations.

\_\_\_\_\_  
Building Surveyor.

UNIFORM BUILDING REGULATIONS.

Clause 502.

Third Schedule.

Municipality.....

APPLICATION FOR PERMIT.

To the Building Surveyor,

\*City of.....  
Town .....

I hereby apply for a permit to { \*Construct  
Demolish  
Remove

a building on \*Allotment No. .... in ..... street.....  
Street

Nature of Construction.—\*New building, alteration, addition, repair.

Owner of Land .. { Name .....  
Address .....

Superintending Architect and/or Engineer { Name .....  
Address .....

Builder .. { Name .....  
Address .....

Purpose for which Building is to be used.....

Estimated Cost of Work .....

I undertake that the \*construction, demolition, or removal will be carried out in conformity with the requirements of the Uniform Building Regulations and of the by-laws of the municipality.

Dated this..... day of ..... 19....

Signature .....

\*Builder  
Owner  
Architect.

Fee.....

Permit .. { Number .....  
Date issued .....

\* Strike out words which are inapplicable.

And the Honorable John Herman Lienhop, His Majesty's Commissioner of Public Works for the State of Victoria, shall give the necessary directions herein accordingly.

C. W. KINSMAN,  
Clerk of the Executive Council.

By Authority: H. E. DAW, Government Printer, Melbourne.