APARTMENT STANDARDS

MINIMUM REQUIREMENTS

FOR PLANNING, CONSTRUCTION

AND MATERIALS FOR

APARTMENT BUILDINGS

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Division of Building Research
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Table of Contents

Index

Index

Index

Index

Index

Index

Index

Index

Index

FOREWORD

This document has been published by the Division of Building Research, National Research Council, to take the place of the 'Apartment Building Standards' previously issued by Central Mortgage and Housing Corporation. The technical contents are basically those of the 1956 edition with the amendments issued by the Corporation in 1960 now included. References to the National Building Code now refer to the 1960 edition of the Code and the references to various standards and specifications have been changed to the most recent editions of these documents.

The material is issued in this form pending a detailed review of these standards by the Associate Committee on the National Building Code which will assume responsibility for the preparation of such standards in future. The Advisory Housing Group of the Associate Committee on the National Building Code will initiate this review during its next meeting in the Spring of 1963. With the completion of this work, the Associate Committee on the National Building Code will have available standards for both apartment and house construction which will be in accordance with the requirements of the National Building Code. In the interim these 'Apartment Standards 'will be used by the Central Mortgage and Housing Corporation in their operations under the National Housing Act 1954.

SPECIAL ADMINISTRATIVE SECTION

THE NATIONAL HOUSING ACT, 1954
CENTRAL MORTGAGE AND HOUSING CORPORATION

These Standards together with the following General Conditions are the Standards for Apartment Buildings in respect of which Loans may be made, as prescribed pursuant to Section 12, 2(a) of Part I and Section 18, 2(a) and (b) of Part II of the NATIONAL HOUSING ACT, 1954.

GENERAL CONDITIONS

A. Where the term "authority having jurisdiction" is used in these Standards, it shall mean Central Mortgage and Housing Corporation.

B. Materials, equipment and construction methods other than those referred to in these Standards or listed in "Acceptable Building Materials, Systems and Equipment" may be employed only when it has been established to the satisfaction of CMHC that the material, equipment or method proposed is at least equal to that required by these Standards. The publication "Acceptable Building Materials, Systems and Equipment" is available for examination at any CMHC office.

C. Notwithstanding the provisions of these Standards, every construction not generally considered conventional, such as a prefabricated or patented building system, will require special consideration and approval in writing, based on the merits of the proposal prior to installation.

D. "Acceptable Building Materials, Systems and Equipment" lists the resistance to heat flow for a number of building materials in general use. For material not so listed, resistance values shall be based on information contained in the latest issue of the "ASHRAE Guide and Data Book" published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, or on values established by actual test at an acceptable laboratory.

E. Acceptable forms of construction which provide the required fire resistance and/or a sound transmission loss of not less that 45 decibels are listed in "Acceptable Building, Materials, Systems and Equipment".

F. The Corporation shall not issue an undertaking to insure a loan on any housing project if construction, other than excavation, has commenced.

G. Three sets of plans and specifications, in addition to the outline specification form CMHC 24, shall be submitted for approval and one of these approved sets shall be used on the job during construction. All supplementary drawings used in the work shall comply with approved plans, specifications and these Standards.

H. No changes from the approved plans and specifications will be permitted without first obtaining the written consent of CMHC and the Approved Lender.

I. Items of equipment to be built-in such as those listed below shall be described in the Specifications accompanying the application. State details including type and sizes.

(i) Oil burner installation. State type, manufacturer's name and catalogue number for burner, furnace or boiler, fan, filter, controls and capacity of storage tank.

(ii) Gas burner installation. State kind of gas, type, manufacturer's name and catalogue number for burner, furnace or boiler, draft hood, flue and controls.

(iii) Stoker fired coal burning installation. State type, manufacturer's name and catalogue number for stoker, furnace or boiler and controls.

(iv) Electrical panel or radiant heating. State type, manufacturer's name, catalogue number and capacities.

(v) Humidifiers.

(vi) Fully air conditioned systems.

(vii) Refrigerators.

(viii) Kitchen Stove.

(ix) Automatic dishwasher.

(x) Automatic clothes washer.

(xi) Automatic clothes dryer.

(xii) Packaged water heater (gas, oil or electric).

(xiii) Water softener.

(xiv) Ventilating fan.

(xv) Garbage disposal unit.

(xvi) Decorative metal work.

J. A plumbing certificate from the appropriate authority may be required by CMHC for any installation.

K. The Corporation may require a certificate from the installer of the heating equipment guaranteeing that the system will maintain an inside temperature of 70°F. under the conditions described in Section 46 of these Standards.

APARTMENT STANDARDS

Minimum Requirements for Planning, Construction and Materials for Apartment Buildings.

1. GENERAL CONDITIONS

A. Wherever municipal by-laws or provincial legislation require higher standards than those set forth herein, such higher standards shall govern.

B. Materials, equipment and construction methods, other than those referred to in these Standards, and including prefabricated or patented building systems and component parts, may be employed where special acceptance for their use is obtained from the authority having jurisdiction.

C. Adequate precautions shall be taken at all times during construction to provide safety of the public and workmen as required by Part 8 of the National Building Code, 1960. Where municipal by-laws or provincial legislation provide higher standards of safety, such higher standard shall govern.

D. Compliance with the minimum requirements of these Standards with regard to materials and methods of assembly and with drawings and specifications will not, in itself, assure acceptance of the construction. Workmanship of a standard equal to good building practice is also required, the lack of which will be sufficient cause to refuse acceptance of construction.

E. When in these Standards such terms as adequate, suitable, necessary and the like, or derivatives thereof, are used, they shall be understood to mean adequate, suitable and so forth in the considered opinion of the authority having jurisdiction.

2. DEFINITIONS

A. "Acceptable" shall mean acceptable to the authority having jurisdiction.

B. "Air Well" shall mean a space, within the building, enclosed by walls, partially or totally open to the outside air at the roof; and intended solely as a means of ventilation for bathrooms, kitchens and like service rooms.

C. "Alley" shall mean a narrow serviceway or passageway providing a secondary means of public or private access to a street, lane, or abutting property.

D. "Apartment Building" shall mean a type of multiple dwelling comprising three or more family and/or bachelor housing units with shared entrances and other essential facilities and services. This includes what is sometimes termed a "triplex".

E. "Attic" or "roof space" shall mean the space which is between the top floor ceiling and the roof, and between a dwarf wall and the sloping roof.

F. "Bachelor housing unit" shall mean a unit, with or without one standard bedroom, providing therein living, sleeping, eating, food preparation and sanitary facilities for one or two adults. Other essential facilities and services may be shared with other housing units.

G. "Basement" shall mean that portion of the building between two floor levels which is partially underground but which has at least one-half of its height from finished floor to finished ceiling above the average level of the ground (finished surface) adjacent to the building, and in which the height from finished grade to ceiling is less than 6'0".

H. "Cellar" shall mean that portion of a building between two floor levels which is partially or totally underground, but which has more than one-half of its height from finished floor to finished ceiling below the average level of the ground (finished surface) adjacent to the exterior walls of the building.

I. "Combination room" shall mean a room which is designed to serve appropriately the functions of two or more habitable rooms.

J. "Court" shall mean an open space, unoccupied from the ground or intermediate floor to the sky, contiguous with the building and on the same lot, intended primarily for the provision of light and air, but which may serve for entrance to the building. It shall be entirely enclosed by walls or enclosed on three sides having one side partially or totally open to a street, yard or abutting property.

K. "Egress, means of" shall mean facilities such as doors, halls, passageways, lobbies, ramps, stairways, fire-escapes or combinations thereof providing the means of escape for persons from housing units or other space(s) in a building to a public street or lane, or to another acceptable open space.

L. "Exit" shall mean any door or doorways in a means of egress.

M. "Family housing unit" shall mean a unit providing therein living, sleeping, eating, food preparation, at least one standard bedroom and sanitary facilities for one family, with or without other essential facilities and services shared with other housing units.

N. "Fire resistive construction" shall mean the types of fire resistive construction described in Part 3 of the National Building Code, 1960.

O. "Habitable room" shall mean a room designed for living, sleeping, eating or food preparation, and including a den, library, sewing room, enclosed sunroom or recreation room.

P. "The height of a building in feet" shall mean the vertical distance in feet between a horizontal plane through the average level of the ground (finished surface) adjacent to the building and a horizontal plane through:

1. The highest point of the roof assembly, in the case of a building with a flat roof or a deck roof;
2. The average level of a one-slope flat pitched roof;
3. The average level between eaves and ridge in the case of a pitched, gambrel, mansard, or hipped roof;

provided where any main exterior wall which is combustible extends above the roof in the form of a false front, façade, parapet, or parapet wall, the highest point of such construction shall be considered the highest point of the building.

Q. "The height of a building in storeys" shall mean the number of storeys contained between its roof and the floor of its first storey.

R. "Non-combustible materials" shall mean those which neither burn nor give off vapours which burn under the conditions and methods specified in C.S.A. Specification B54.1-1960.

S. "Multiple Housing Project" shall mean a housing project, together with the land upon which it is situated, comprising one or more Apartment Buildings together with any public space, recreational facilities, commercial space and other buildings appropriate thereto.

T. "Private" when used with respect to a room or other space within a building, shall mean that such room or space is intended solely for the use of an individual tenant or family and their guests.

U. "Public" when used with respect to a room or other space within a building, shall mean that such room or space is intended to be used in common by the occupants of the building, their guests and/or tradesmen.

V. "Standard room" shall mean a living room, a bedroom, a dining room, or a kitchen.

W. "Shall" where used, indicates a mandatory feature.

X. "Should" where used, shall mean a feature which is desirable but not mandatory.

Y. "Storey, First" shall mean the lowest storey in which the height from the average level of the ground (finished surface) adjacent to the exterior walls of the building to the ceiling is 6'0" or more.

Z. "Wall, Common" shall mean a vertical separation completely dividing a portion of a structure from the remainder of the structure and creating in effect a building which from its roof to its lowest level is separate and complete unto itself for the purpose for which it is designed, intended, or used, such wall being owned by one party but jointly used by two parties one or both of whom is entitled to such use by provision of a prior arrangement.

AA. "Wall, Party" shall mean a wall jointly owned and jointly used by two parties under easement agreement or by right in law and erected at or upon a line separating two parcels of land each of which is, or is capable of being, a separate real estate entity.

BB. "Yard" shall mean that part of the property or lot on which the building is located, which is outside the perimeter of the building.

CC. "Lane" shall mean any passageway or right-of-way, open from ground to sky, not constituting a street, but laid down upon a registered plan and dedicated to public use.

3. SITE PLANNING REQUIREMENTS

A. *General*

1. Acceptance of a submission comprising one or more Apartment Buildings depends largely on its relationship to neighborhood facilities such as transportation, roads, drainage and water services, schools, churches, shopping centre, business and industrial locations, and parks and playgrounds.
   Sufficient information shall be provided to show the relationship of the project to such facilities.
2. No work on any part of the project shall be commenced until such community relationship for the entire project has been accepted by the authority having jurisdiction.
3. All yards, courts, entrance approaches and distances between buildings shall conform to the requirements of Sections 5. and 6.

B. *Community Plan*

The site shall be developed to integrate efficiently the apartment buildings, shopping centres, school grounds, streets and their relationship to existing traffic routes and undeveloped land and topographical characteristics, parking compounds and garages, pedestrian walks and green areas. All detailed features necessary to any of the main elements noted above, shall be coordinated with the whole.

C. *Water and Drainage*

Relationship of storm and sanitary sewer facilities and water supply within the project to existing facilities of which the new services will become a part shall also be shown on plot plan.

D. *Plot Plan*

Arrangement of Buildings and Facilities. The plot, including buildings and all site improvements, shall be harmoniously and efficiently organized in relation to the shape of the plot, topography, and the shape, size and position of buildings. Plot planning shall provide for safe, comfortable, efficient and sanitary use by the occupants under all weather conditions. Services shall be appropriate to the needs of the occupants. Full advantage shall be taken of favorable views and other desirable features.

E. *Land Coverage*

1. No building or buildings shall cover more than 50% of the area of an interior lot nor more than 60% of the area of a corner lot. For purpose of this coverage a corner lot shall not exceed 22,000 square feet.
2. Modification of this requirement may be considered by the authority having jurisdiction where the following circumstances prevail:
   (a) An existing residential area, to agree with present land uses, as established and stabilized by the presence of older Apartment Buildings with more than 50% and 60% coverage for interior and corner lots respectively.
   (b) Where areas are subject to redevelopment or rebuilding by reason of advanced obsolescence, and where residential use at more than 50% and 60% coverage is justified by reason of market demand for such housing to be considered. Such areas shall be in the immediate proximity of excellent facilities for shopping, transportation and other community services.
   (c) Where the amount of area for high density housing is greater than the demand, only the most favorably located portions shall be considered for modification of the maximum coverage clause.

F. *Yards*

1. LOCAL BY-LAWS
   In general, front, side and rear yards shall conform to local zoning by-laws and to the requirements of this Subsection. Where these regulations conflict, the more stringent or restrictive requirement shall be followed.
2. EFFECTIVE YARD DIMENSION
   The effective dimension of a yard (front, rear or side yard) shall mean the least dimension from the wall of the building, or any projection thereto except a 2 ft. eave or chimney projection, to the lot or property line.
3. FRONT YARD
   The distance from the front line (building line) of the building to the building line on the opposite side of the street, as determined

by occupation or set-back regulations, shall be not less than 70 ft. Modification of this requirement will be considered by the authority having jurisdiction in existing residential areas, to agree with present land uses, but in no case shall it be less than 35 ft. from the centre line of the street.

Increased distances may be required by the authority having jurisdiction where apartment buildings are proposed on land adjacent to major highways, arterial roads, and similar situations where a considerable traffic flow is experienced or anticipated.

4. YARD DIMENSION REQUIREMENTS

(a) Where a yard provides light and/or ventilation to any window or windows (including skylights) the effective dimension of such yard shall be 7'6" or one quarter of the average height of the wall containing the window or windows, whichever is the greater. Such dimension need not exceed 12'0".

(b) Where the windows in (a) preceding include a window or windows to one or more habitable rooms the effective dimension of the yard shall be increased to 12'0" or one half of the average height of the wall containing the window or windows, whichever is the greater. Such distance need not exceed 25'0".

(c) Where the distance between the centre of a required window and the nearest end of the wall in which it is located exceeds 25'0", the effective yard dimension as required in (a) or (b) preceding shall be increased by not less than 10% of the amount that such distance exceeds 25'0".

(d) Where a yard adjoins a street or lane, half the width of such street or lane may be considered to be a portion of the lot or property for purposes of computing the effective dimension of such yard.

(e) Where the wall of the building and the lot or property line, which form a yard, are not parallel, the minimum effective dimension of the yard, when windows occur in such wall, shall be not less than 7'6" at any point, and at the centre line of every window in such wall, the effective yard dimension shall be not less than as required in (a), (b) and (c) preceding.

(f) Where a wall without windows faces a yard, (other than a front yard), the effective yard dimension shall be 4'0" and 1'0" for each storey above the first.

(g) The requirement in (f) preceding may be waived and a wall without openings permitted on the lot line where an adjoining existing building also presents a wall without openings at the lot line. Such planning shall conform to local Zoning By-laws, Building Codes and the Land Coverage and Fire Requirements of these Building Standards, whichever is more exacting. In no case shall such wall have less than 2 hour fire-resistive construction.

(h) In exceptional circumstances, modification of the requirements of (a) to (g) preceding may be considered by the authority having jurisdiction where the character of adjoining property is such that, in the opinion of the authority having jurisdiction the requirements need not be met in full.

Increased distances may be required where, in the opinion of the authority having jurisdiction such increases are necessary. See Section 5. L. for distances between Buildings on the same property.

G. *Playgrounds*

Where the location and design of an Apartment Building indicates that

children will be occupying the housing units, a play space of adequate area and suitable location should be provided on the property.
Where there are more than 40 housing units with more than one bedroom contained in one or more Apartment Buildings on the property, a play space of at least 25 sq. ft. per housing unit shall be provided in one location. In projects of over 100 such housing units, the required space may be separated into two or more areas provided no one space is less than 2,500 sq. ft. Play spaces shall be located in rear areas, at ends of buildings or in other suitable locations on the property which will not impair views from living rooms or front entrances, and permit easy access from the housing units without encountering traffic hazards. For additional requirements see Section 50.
The authority having jurisdiction may permit a reduction in the above requirements where alternative facilities are provided in or near the Apartment Building.

4. PLANS AND SPECIFICATIONS

A. ***General***

Structures more than three storeys high or with a gross area exceeding 6,000 square feet including all storeys, shall be designed by a Registered Architect or, in a Province where a Registered Engineer may so act, then either by a Registered Architect or by a Registered Engineer skilled in such design. (See also Section 9.)
In such structures, heating, ventilating, plumbing and electrical work shall also be designed by a Registered Architect or Engineer skilled in such design.

B. ***Site Plans***

The following plans and information of a community and site-planning nature shall be provided.

1. A location map showing all relevant features and influences in the area within at least one mile radius of the project. This map shall show transport routes; shopping areas; schools; libraries; hospitals; commercial, industrial and residential areas; parks, playgrounds and other open areas; and current zoning.
2. A current dated survey plan of the proposed site prepared and signed by a Registered Land Surveyor and drawn to a scale sufficiently large to indicate clearly the legal description of the land and the following:
   (a) Area and principal dimensions of the property.
   (b) Existing topographic elevations of the property and adjacent streets.
   (c) Easements, deed restrictions, encroachments or public regulations which may limit the use of the land.
   (d) Existing buildings on adjacent property including height, use, distance from the common boundary, and a brief description.
   (e) Location and elevation of water, sewer and other services.
3. A plot plan of the site showing proposed topographic elevation and finished grades of the property in relation to adjacent streets and properties; location and elevation of proposed water, sewer and other services; location, elevation and height of all proposed buildings. (See also Section 3 and Section 50. B.) This plan may be omitted if the information is shown on the survey plan. Size and scale must be sufficient to show adequate detail.
4. A landscaping plan drawn to a scale not less than 40′ to 1″, showing planting and other details. (See Section 50. B. 2.) This information

may be shown on the plot plan (or on the grading plan required by Section 4. C. 2 *(a)* following) when the project consists of only one apartment building neither more than three storeys high nor over 6,000 square feet in gross area. The authority having jurisdiction may require the employment of a Landscape Architect or other qualified person to design the landscaping in any apartment project.

C. *Plans, Building and Miscellaneous Structural*

1. Drawings of building plans, elevations, sections and details shall be provided to indicate materials, and all methods of construction, equipment and facilities which are intended to form part of the mortgage security. No drawing shall be to a scale which is smaller than ⅛" equals 1 foot. Larger scale drawings shall be provided to indicate all detail necessary to describe completely the proposed structure or structures.
2. The following drawings are the minimum that shall be provided to obtain conformance with 1. preceding:
   (a) Grading, drainage, and site improvement plan (see Section 50. B). This plan is not essential when information is shown on plot plan.
   (b) Basement or foundation plans—minimum scale ⅛" equals 1 foot.
   (c) General floor plans—minimum scale ⅛" equals 1 foot. One plan only is required for floors which are typical.
   (d) Floor plan of each type of housing unit—minimum scale ¼" equals 1 foot. These are not required where the general floor plans are drawn at ¼" scale.
   (e) Roof plans—minimum scale ⅛" equals 1 foot. Roof plans are not essential where all information pertinent to the roof is shown on other drawings.
   (f) General elevations of each face of the building—minimum scale ⅛" equals 1 foot.
   (g) Typical elevations—minimum scale ½"equals 1 foot, when the general elevations have detail which can not be adequately shown at the smaller scale.
   (h) Outline cross sections—minimum scale ¼" equals 1 foot. Such sections shall include at least 1 complete cross section of each building type and typical stairways.
   (i) Assembly of materials, structural parts and equipment, strucral steel and reinforced concrete, where not clearly shown in the general drawings, shall be detailed at not less than a scale of ½" equals 1 foot.
   (j) Schedules of doors and windows, storm sash and screens, interior finish, etc., where this information is not included elsewhere on the drawings or in the specifications.
   (k) Mechanical trades—schematic drawings of heating, plumbing and electrical work including fixture locations at the same scale as corresponding plans, if this information it not incorporated on the main working drawings.

D. *Specifications*

Outline specifications, and Architect's or Engineer's specifications where applicable, shall be provided to describe the construction, materials, methods, finishes, and equipment. These together with the working drawings shall contain sufficient information for determination by the authority having jurisdiction, acceptability, cost estimation, and construction.

5. SPACE REQUIREMENTS

Every housing unit shall provide suitable accommodation including storage space and facilities ordinarily considered necessary to a permanent house. The accommodation and space provided for these purposes shall be not less than the following:

A. ***Types of Unit***

1. **A FAMILY HOUSING UNIT shall contain not less than one bathroom and one standard bedroom in addition to living, dining, and kitchen accommodation.**
2. **A BACHELOR HOUSING UNIT shall consist of one bathroom, and not more than two habitable rooms providing therein living, dining, sleeping and kitchen accommodation in appropriate individual or combination room or rooms as in B. 1. and 2. following. Only one such room may be a standard bedroom.**
3. **THE NUMBER OF BACHELOR HOUSING UNITS to be included in any project may be limited by the authority having jurisdiction.**

B. ***Room Sizes***

No part of a room less than the minimum widths given below, shall be included in the required area. The areas and dimensions listed in 1. and 2. following shall be measured from the interior faces of the studs or furring, provided that the wall cladding is not greater than 1″ thick. When claddings are greater than 1″ thick, the dimensions shall be measured from the interior faces of the studs or furring less the thickness of each cladding in excess of 1″.

1. **STANDARD ROOM SIZES**

	Area	Width
Living Room	150 sq. ft.	10′0″
Dining Room	80 sq. ft.	8′0″
Kitchen	50 sq. ft.	5′0″
First Bedroom	110 sq. ft.	9′0″
Additional Bedrooms	80 sq. ft.	7′0″

The second bedroom should be at least 90 sq. ft. of 9′0″ width.

2. **COMBINATION ROOM SIZES**

(no other combinations are permissible):	Area	Width
Living and Dining Room	190 sq. ft.	10′0″
Living and Bedroom	200 sq. ft.	10′0″
Kitchen and Dining Room	90 sq. ft.	7′0″
Living, Dining and Bedroom	230 sq. ft.	10′0″
Living, Dining and Kitchen	230 sq. ft.	10′0″
Living, Dining, Sleeping, Kitchen Accommodation (Bachelor Housing Units Only)	250 sq. ft.	10′0″

OR

		Area	Width
Living and Dining Room		150 sq. ft.	10′0″
	plus	40 sq. ft.	7′8″
Living and Bedroom		150 sq. ft.	10′0″
	plus	50 sq. ft.	8′0″
Living, Dining and Bedroom		150 sq. ft.	10′0″
	plus	80 sq. ft.	8′0″
Living, Dining and Kitchen		150 sq. ft.	10′0″
	plus	80 sq. ft.	8′0″

(a) **A combination room shall not be divided, other than by a beam in the ceiling and/or cabinets not over 4 feet high.**

(b) **The above combinations will also be accepted where the individual areas, if divided by partitions, would constitute Standard Rooms or one of the above combinations and a Standard Room.**

3. CEILING HEIGHTS

Ceiling heights shall be not less than the following:

Standard or combination rooms (except bedrooms):

Horizontal ceilings ..... 8'0"

Sloping ceilings ..... 8'0" average, 7'0" minimum

Bedrooms and other habitable rooms:

Horizontal ceilings ..... 7'6"

Sloping ceilings ..... 50% of required area, 7'6"
Remainder of required area, 4'6" to 7'6"

Bathrooms ..... 7'0"

Halls and passageways ..... 7'6", or equal to the ceiling height in rooms or areas served, whichever is the greater.
In basements or cellars, the ceiling height of halls and passageways not serving housing units may be reduced to 7'0" in areas used by tenants and to 6'4" to underside of beams, etc., in other areas.

Basements and Cellars:

Housing Unit Areas ..... as above

Areas used by tenants (including laundries, storerooms, etc.) ..... 7'0"

Other areas ..... 6'4" to underside of beams, etc.

Note:

The minimum clear height beneath beams (except basements as noted above) shall be 7'0". In addition, the distance from any ceiling surface to the underside of any exposed beam shall not be greater than permited by the following table:

Beam Spacing in feet	Distance from ceiling surface to underside of beams in inches.
2	6
3	9
4	12

C. *Kitchen Alcoves (For Bachelor Housing Units Only)*

The kitchen accommodation may be in an alcove opening off a habitable room other than a Standard Bedroom and be considered part of the area of such room subject to the following conditions:

1. The ceiling height in the alcove should be not less than the height of the room from which it opens and in no case less than 7'0".
2. The area of the unobstructed opening between the alcove and the adjoining room shall be not less than 80% of the cross-sectional area of the alcove (measured in the plane of the opening).
3. The depth of the alcove shall not exceed the width unless adequate and acceptable mechanical ventilation and artificial lighting are provided. The depth of the alcove shall be measured from the open side to the side opposite the open side.
4. Where the area of the alcove is less than 40 sq. ft., the area of the adjoining habitable room, together with the area of the alcove shall equal the required area for this habitable room combined with a kitchen.
5. See Section 6. A for Light and Ventilation requirements.

D. *Halls and Vestibules*

1. The front entrance hall, or vestibule, of every housing unit shall be not less than 3'6" in the least dimension between finished wall faces.
2. Any other hall or passageway within a housing unit shall have a clear width of not less than 3'0".
3. For public corridors and halls, see Section 7. H.

E. *Closets*

1. EVERY BEDROOM OR COMBINATION ROOM containing sleeping facilities shall be provided with at least one clothes closet which shall have an area of not less than 6 square feet. The master bedroom should be provided with a clothes closet area of not less than 12 square feet and where more than one clothes closet is provided for such bedroom the area of one of the clothes closets shall be not less than 6 square feet. The clear distance between the interior faces of the wall framing of all clothes closets prior to application of the interior cladding shall be not less than 24 inches.
2. THE CEILING HEIGHT above the required floor area of each clothes closet shall be not less than 6'0". Over stairways 50% of the clothes closet floor may be raised parallel to and not more than 8" above the adjoining floor level provided the required ceiling height of 6'0" is maintained over such raised floor. The remaining area may slope in conformance with the stairway underneath.
3. A LINEN CLOSET shall be provided. Such closet should open into either a hall, a bedroom, or a combination room containing sleeping accommodation. The floor of such closet may be raised not more than 2'6" above the adjoining floor level.
4. A COAT CLOSET or suitable space for hanging outer garments shall be provided in close proximity to, and accessible from, the front entrance. The area of such closet or space shall be not less than 6 square feet, and the height shall at least meet the requirements of 2. preceding. The clear distance between the interior faces of the wall framing of all coat closets prior to the application of the interior cladding shall be not less than 24 inches. Alternatively, a coat closet with adequate access, and an area of not less than 6 square feet, is acceptable provided the depth is not less than 14 inches. When this depth is less than 24 inches between the interior faces of the wall framing, adequate suitably spaced hanging rods shall be installed perpendicular to the rear wall face.

F. *Bathrooms and Water-Closet Rooms*

1. *(a)* Access to a required bathroom shall not be through a standard kitchen.
   (b) Except in bachelor housing units, access to a required bathroom shall not be through a bedroom.
   (c) A second entrance to a required bathroom may be from a bedroom.
2. ADDITIONAL BATHROOMS OR WATER-CLOSET ROOMS. Access to additional rooms for toilet facilities may be direct from any hall or bedroom.
3. PUBLIC WATER-CLOSET ROOMS. (See also Section 44. B. 3.).
   (a) When grouped laundry facilities are installed in buildings exceeding two storeys in height a public water-closet and one wash basin or slop sink shall be provided adjacent to the room housing the laundry facilities.
   (b) When a housing unit is not provided for a janitor, a separate

room equipped with at least a water-closet and a wash basin or slop sink shall be provided adjacent to the boiler room or other workroom.

4. LAUNDRY FACILITIES. When grouped laundry facilities are installed, a drying room or mechanical dryer shall be provided. See also Section 6. D. 2. (a) and 44. B. 2.
   (a) In such drying room, space for at least 100 linear feet of clothes drying line shall be provided for each twenty housing units or part thereof. Drying lines shall be at least 18″ apart.
   (b) If a mechanical dryer is supplied in lieu of *(a)* preceding, then one mechanical dryer shall be supplied for each 20 housing units or part thereof. Mechanical Washers and Dryers shall have a minimum clearance of 3′0″ in front.
   (c) When laundry facilities are located in each housing unit without a mechanical dryer, drying facilities as in *(a)* or *(b)* preceding shall be provided in the basement or cellar, or other appropriate location in the building.
5. FIXTURE CLEARANCE
   (a) A clear distance of at least 1′6″ shall be provided in front of the water-closet, bath, and wash basin measured from the fixture to the face of any other fixture or wall.
   (b) A room or recess to receive a toilet fixture (except bath) shall be not less than 2′6″ wide.
   (c) Adequate access shall be provided for maintenance of fixture plumbing.
   (d) Bath tubs shall be not less than 5′0″ long x 2′4″ wide x 1′2″ average depth, unless specially approved by the authority having jurisdiction.

G. *Storage Space.*

1. Bachelor housing units and family housing units with not more than one bedroom shall be provided with at least 150 cu. ft. of storage space. Family housing units with more than one bedroom shall be provided with at least 150 cu. ft. of storage space plus an additional 30 cu. ft. for each bedroom in excess of one. This storage space shall be not less than 6′0″ in height, nor 3′0″ in width or depth and shall be in addition to required closets. Within a housing unit such storage space shall be entirely enclosed and separated from all other space by full height partitions.
   Such storage space may be located in a basement, cellar or other general storage area, provided there is a lockable enclosure for each housing unit, and provided access thereto is direct and convenient. (See also Section 7. E. 4.)
2. In addition to all other storage requirements, a room or space not less than 120 sq. ft. in area for buildings with up to twenty family housing units, shall be provided for communal rough storage of bicycles, baby carriages, etc. An additional 6 sq. ft. of such storage shall be provided for each such housing unit in excess of twenty. Such storage space may be in the basement or cellar.

H. *Attic Space*

1. When an attic space is capable of conversion into storage space, all incorporated work shall comply with the requirements for such space, including the following:
   (a) Joists to receive flooring for such space shall be floor joists.
   (b) Stairs to such space shall comply with the requirements of Section 36.

2. When an attic space is capable of conversion into habitable rooms, all incorporated work shall comply with the requirements for such space, and shall be considered as an additional storey for the classification of the building.

I. *Habitable Rooms in Basements and Cellars*

1. CELLARS: No habitable room shall be constructed in any cellar.
2. BASEMENTS: Habitable rooms may be located in a basement, provided that all work relating to such rooms shall be in accordance with all requirements in these Standards pertaining to habitable rooms.
3. HOUSING UNITS. Where site conditions warrant, housing units may be located in basements. Adequate and acceptable space shall first be provided for laundry, storage, mechanical equipment and all other required facilities.

J. *Access to Housing Unit*

Access to every housing unit shall be provided without the necessity of passage through any part of any other housing unit.

K. *Courts*

1. OUTER COURT shall mean a court partially or totally enclosed on three sides by the walls of the Apartment Building, having one open side facing directly on an open space provided by a street or yard.
   When any court does not fulfil all of the requirements for an outer court it shall be deemed to be an inner court.
   (a) The width of any outer court for computing purposes shall be the shortest clear unobstructed distance between opposing side walls or any projections from such walls.
   The possible maximum width of such court may not be reduced by projections by more than 25%. 2 foot eave or chimney projections are excluded, and also any entrance steps, porch, stoop or platform, covered but not enclosed, located up to first storey floor level.
   (b) The depth of the court shall be the shortest clear unobstructed distance between the rear wall of the court and the vertical plane through the end of the shortest enclosing wall clear of all projections except those as allowed in *(a)* preceding.
2. INNER COURT shall mean a court totally enclosed by the walls of the Apartment Building and/or abutting property on three sides and more than 25% on the fourth side.
3. OUTER COURT DIMENSIONS
   (a) The clear width of an outer court shall be:
      (i) Twice the depth of such court where windows to habitable rooms occur in opposing walls except that the width need not exceed 50 ft. or the average height of the enclosing walls whichever is the greater. No such outer court shall have a width less than 12 ft.
      (ii) Not less than 6 ft. when windows other than those to habitable rooms occur in opposing walls provided the depth does not exceed the width. The width need not exceed requirements in (i) preceding.
4. OUTER COURT AT LOT OR PROPERTY LINE. An outer court formed at the corner of a building by two walls of the building and a lot or property line is acceptable when the width of such court fulfils the requirements for sideyards.

5. **INNER COURT DIMENSIONS.** Inner courts are not recommended. When used they shall comply with the following requirements:
   (a) The shortest clear dimension of an inner court shall be either 50 ft. or the average height of the enclosing walls, whichever is the greater, when any wall contains a window to a habitable room.
   (b) The minimum access from a building to an inner court shall be through a doorway. Where the appropriate municipal or provincial authority requires additional access to an inner court, such additional access shall be provided.
   (c) When windows other than from habitable rooms open into an inner court then the inner court dimensions shall be at least as required for Air Wells, see Section 6. F.

L. *Distance Between Buildings on the Same Property*

1. The objective of requirements for distance between buildings is to provide adequate natural light and ventilation to all rooms with windows facing the opposing building without impairment of privacy, and to provide for the movement of fire-fighting apparatus.
2. The minimum distance between such buildings shall conform to local by-laws or comply with the following requirements, whichever is the more stringent or restrictive requirement.
3. Where the walls of any two buildings face and overlap each other, the clear distance between such walls shall be not less than the following:—
   (a) Twice the overlap or 24′0″, whichever is the greater, when the overlapping portion of either wall contains a window or windows to habitable rooms. Such distance need not exceed 50′0″ or the average height of the buildings, whichever is greater.
   (b) Equal to the overlap or 15′0″, whichever is the greater, when the overlapping portion of either wall contains a window or windows to other than habitable rooms. Such distances need not exceed 24″0″.
   (c) 15′0″ when no windows occur in the overlapping portion of either wall.
4. When a group of Apartment Buildings located on the same property forms a quadrangle the following requirements shall apply:
   (a) The least cross dimension of such quadrangle shall be not less than 50′0″.
   (b) The clear distance between buildings in at least two corner locations shall be not less than 15′0″.
5. When an accessory building is located opposite to a wall of an Apartment Building in which a required window to a habitable room occurs, the clear distance between the buildings shall be not less than as required in 3. *(a)* preceding, except that in the case of a single storey garage, the distance need not exceed 30 ft.

6. LIGHT AND VENTILATION

A. *Rooms*

1. **EVERY HABITABLE ROOM** shall be provided with one or more windows opening directly on a street, yard, court or lane. In a kitchen combined with a habitable room or in a kitchen alcove, such window may be an opening window located in the adjoining habitable room provided the distance from the rear wall of such kitchen space to the opening window, measured at right angles to the window, does not exceed 25′0″. For the purpose of this

requirement, the rear wall shall be the wall opposite the open side. Where this rear wall does not face the opening window the authority having jurisdiction may require the provision of a system of mechanical ventilation in accordance with Section 6.A.3. following. In a kitchen, kitchen space combined with a habitable room, or kitchen alcove, one or more skylights, fixed windows, or artificial lighting may be used in lieu of the required opening window.

2. **EVERY BATHROOM OR WATER-CLOSET ROOM** shall be provided with one or more windows opening directly on a street, yard, court, lane, or air well, or with one or more skylights, fixed windows, or with artificial lighting.
3. **A SYSTEM OF MECHANICAL VENTILATION** shall be provided in kitchens, kitchens combined with habitable rooms, kitchen alcoves, bathrooms, and water-closet rooms where skylights, fixed windows or artificial lighting are used in lieu of the required opening windows in 1. and 2. preceding. See also F. and G. following. The design and installation of all parts of the system including fans, ducts, inlets, outlets, etc., shall be acceptable to the authority having jurisdiction. Wind driven ventilators are not acceptable as mechanical ventilation.
   Plans and Specifications covering this installation approved by an appropriate Registered Engineer or authority may be required by the authority having jurisdiction on large installations where a single or multiple unit serves several locations or where multiple units discharge into a common duct or air well.

B. *Windows and Skylights, Areas of*

1. **EXCEPT AS STIPULATED** in D.1. and 2., the aggregate unobstructed glass area of any required window or windows shall be not less than 1/10 of the floor area of the room served, provided:
   (a) A window in a bathroom or water-closet room shall be not less than 4 square feet.
   (b) The glass area of a glazed door opening directly on a street, yard, court, or lane may be considered as a window.
   (c) Any other type of glass including glass block may be used in place of clear glass provided that the amount of light transmitted by any such installation shall not be less than the light transmitted by the required area of clear glass.
2. **SKYLIGHTS** shall have an unobstructed glass area at least as great as that required for the window or windows replaced.
3. **GLASS AREA.** Except in bathrooms or toilet rooms glass area shall be computed on the basis of clear glass having a light transmission value of not less than 88%.

C. *Windows and Skylights, Openable Areas*

1. **REQUIRED WINDOWS** shall open so that the aggregate open area should equal 1/20 of the floor area of the room served but in no case shall it be less than the following minimum requirements:
   (a) A room with a floor area not exceeding 200 sq. ft. shall have an aggregate opening sash or casement window area of not less than 4 sq. ft.
   (b) A room with a floor area exceeding 200 sq. ft. but not exceeding 400 sq. ft. shall have an aggregate opening sash or casement window area of not less than 6 sq. ft.
   (c) A room with a floor area exceeding 400 sq. ft. but not exceeding 600 sq. ft. shall have an aggregate opening sash or casement window area of not less than 8 sq. ft.

(d) A room with a floor area exceeding 600 sq. ft. shall have an aggregate opening sash or casement window area of not less than 1/60 of the floor area of the room served.

(e) A kitchen, bathroom or water-closet room with a floor area not exceeding 80 sq. ft. shall have an aggregate opening sash or casement window area of not less than 2 sq. ft.

Required opening sash or casement window area in excess of 6 sq. ft. in *(c)* and *(d)* preceding may be replaced by either equivalent louvred area, or by French Windows or a door opening directly from the room to the exterior of the building.

2. A SKYLIGHT in a kitchen, kitchen combined with a habitable room, or kitchen alcove should be equipped with movable sash or otherwise arranged to open.
3. All openable windows or skylights shall open directly to the exterior.

D. *Windows in Basements and Cellars*

1. For all housing units in basements the light and ventilation shall be as required in Section 6, A., B., and C., preceding.
2. All other habitable rooms in basements including special purpose rooms for the use of tenants, and recreation rooms shall have a glazed and ventilating area not less than 4% of the floor area. Adequate and acceptable ventilation and artificial lighting may be used instead of windows.
3. All laundries, storerooms and other rooms in basements or cellars provided for the use of the tenants shall have a glazed and ventilating area not less than 4% of the floor area. Adequate and acceptable ventilation and artificial lighting may be used instead of windows.
4. Other areas, garage space and rooms, (other than those listed in 1., 2. or 3. preceding) in a basement or cellar shall have a glazed and ventilating area not less than 1% of the floor area. Adequate and acceptable ventilation and artificial lighting may be used instead of windows.
5. Adequate artificial lighting shall be provided in all basement and cellar areas. (See Section 47. D.).
6. Acceptable ventilation to meet requirements of 2., 3. and 4. preceding may be mechanical or may be natural ventilation through screened, louvred vents opening directly to the outside.
7. Where a furnace, or other heating or incinerating equipment requiring combustion air is located in a basement or cellar, or portions thereof, the space in which the equipment is located shall be supplied with means of ventilation capable of supplying the required combustion air. This may require the provision of additional ventilation to that required in 4. preceding.
   The combustion air supply may be provided by mechanical or natural ventilation through screened, louvred openings either directly from the outside or through a duct between the outside and the space containing the equipment.
8. Where the sill of a window is below the finished grade at the window, an areaway shall be provided. Areaways shall be drained.
9. The authority having jurisdiction may require that any mechanical ventilating system be designed by a Registered Engineer skilled in such design or by some other acceptable authority. (See also Section 6. A. 3.)

E. *Storm Sash*

1. FOR SAFETY OF LIFE. Storm sash provided for required win-

dows or skylights shall be so installed that at least one such storm sash per habitable room may be opened from within.

2. **FOR VENTILATION.** Storm sash for windows which provide required ventilation shall have an aggregate net area, arranged to open, of not less than 50% of the required opening glass area in C. preceding.

F. *Air Wells*

1. **AREA.** The cross sectional area of any air well shall be not less than 100 square feet and its minimum dimension shall be not less than 6'0". Where an air well serves rooms in more than two storeys, this area shall be increased throughout by 10% for each storey served above the second.
   Access shall be provided to the bottom of any air well by means of a scuttle as required for roofs in Section 7. H. 6. or other acceptable means. Access shall not be by means of a window.
   No opening window from a habitable room shall be located in an air well (See A. 1 and 2. preceding).
2. VENTILATING OPENINGS
   (a) Every air well shall be provided at its lowest level with a fresh air inlet and at its upper limit with a free air outlet, each of which shall have a minimum effective cross sectional area equivalent to 10% of the cross sectional area of the well. Such inlets and outlets shall be so installed as to ensure a free and continuous current of air.
   (b) The bottom inlet may be omitted provided an acceptable mechanical exhaust unit is installed at the upper limit of the air well above all openings such as entry of ventilating ducts, louvres, vents, etc. Such exhaust unit shall be rated for continuous operation.
   The area of such mechanical exhaust air well shall be not less than 9 sq. ft. and this area shall be increased by 3 sq. ft. for each additional storey above the lowest storey served.
   No window or skylight, fixed or opening, shall face into such mechanical exhaust well. The authority having jurisdiction may require plans and specifications of such a system approved by an appropriate Registered Engineer or other authority.

G. *Mechanical Ventilation*

1. **AIR INTAKE.** Air for ventilating purposes shall be drawn from the exterior of the building. The intake shall be located so as to avoid contamination in concentrations greater than normal for air of the locality in which the building is situated.
2. **EXHAUST TYPE.** Every mechanical system serving a bathroom, kitchen, kitchen alcove or water-closet room shall be of an acceptable exhaust type.
3. **CIRCULATION.** No air from any housing unit shall be circulated directly or indirectly to any other housing unit, public hallway or stairway.
4. **WINDOWS, ETC.** No window or skylight, fixed or opening, shall face into any such system.

7. FIRE PROTECTION

The objective of these requirements is to obtain construction which will provide reasonable assurance of safety to life by making provisions to retard the progress and spread of fire, and by providing means of egress which will minimize danger to life from fire, smoke or resulting panic.

A. *Protected Combustible, etc.*

The terms Protected Combustible, Non-Protected Combustible, Non-Combustible, etc., shall have the same meaning as found in Part 3, Use and Occupancy, of the National Building Code, 1960.

B. *General*

1. NATIONAL BUILDING CODE. The requirements of the National Building Code, 1960, in respect of Fire-Protection, shall apply to every building which is more than 35 feet in height above average finished grade adjacent to the building, or which is more than three storeys in height, or which exceeds 6,000 sq. ft. in area for any one floor. In the event that these Standards are more exacting, the greater, or more restrictive requirement shall govern.
2. FIRE-RESISTIVE RATINGS. Notwithstanding the Fire-Resistive Ratings stipulated in specific cases in this Section for load-bearing construction, such ratings shall be not less than the rating required for the general construction throughout the building. For example: In a building of non-combustible construction having a fire-resistive rating of 2 hours, ratings required for load-bearing construction in this section to be ¾ hour, 1 hour, or 2 hour as the case may be, shall all be not less than 2 hour to correspond with the general rating of the construction of the building.
3. SEPARATION WITHIN A BUILDING. When a building is divided into two or more parts by fire walls which provide the separation required under E. 1. following, each such part of the building shall be considered separately in respect of fire protection.
4. EXTERIOR WALL EXPOSURE
   (a) No exterior wall, or part thereof, having a fire-resistive rating of less than 2 hours shall be located within 3′0″ of any lot line.
   (b) When any exterior wall or part thereof is located within 3′0″ of any lot line, the roof covering shall meet the Underwriters requirements for Class "B" Roof.
   (c) The requirements in *(a)* and *(b)* preceding need not apply to an exterior wall facing a public street or lane.

C. *Building Heights*

1. GENERAL. When a building contains two or more types of construction above basement or cellar (foundation wall), the limiting height shall be the least height allowed for the minimum component of any such combination.
   For example, where a building has exterior walls of concrete and stud frame above the basement or cellar (foundation wall), the limiting height of the building shall be that of the minimum component, namely stud frame, and therefore two storeys or 25′ above average finished grade.
2. WOOD STUD FRAME. Apartment Buildings or sections of Apartment Buildings of wood stud frame construction throughout shall not comprise more than two storeys in height above non-combustible foundation walls and shall not be more than 25 feet high above average finished grade.
3. PLANK WALLS. Apartment Buildings of plank (wood) frame construction shall comply with the limitations of 2. preceding; provided that when all planks are at least 3″ thick exclusive of sheathing, such buildings may comprise not more than three storeys in height and shall be not more than 35 feet in height above average finished grade.
4. MASONRY BEARING WALLS AND WOODFRAME. Apartment Buildings of exterior masonry bearing walls and protected wood

frame construction shall not comprise more than three storeys and shall be not more than 35 feet in height above average finished grade line.

5. FIRE-RESISTIVE CONSTRUCTION. Apartment Buildings which comprise more than three storeys or are more than 35 feet in height above average finished grade or which exceed 6,000 sq. ft. for any one floor shall comply with the provisions of the National Building Code, 1960, Sub Section 3.2.1.

D. *Building Areas*

Floor areas in Apartment Buildings or in sections of Apartment Buildings of more than three storeys, or more than 35 feet in height, or more than 6,000 sq. ft. on any one floor shall be limited in accordance with Sub Section 3.2.1. of the National Building Code, 1960.

E. *Fire Separation*

1. BUILDING AREA SEPARATION. Fire walls which divide a building into fire sections shall comply with clause 3.1.3.7. of the National Building Code, 1960. Openings in such fire walls shall also comply with the National Building Code.
2. HOUSING UNIT SEPARATION. The walls and floor separating housing units shall provide a fire resistance rating of not less than one hour (see B.2. preceding) and a sound transmission loss of not less than 45 decibels. See also Section 8. Ceilings, floors and walls between housing units and common attic spaces, roof spaces, crawl spaces or basements shall also provide a fire resistance rating of one hour.
3. MEANS OF EGRESS SEPARATION: The walls, ceiling and floor of every stairway, ramp, hall or passageway serving more than one housing unit and the walls, ceiling and floor of every public stairway, ramp, hall or passageway shall have a fire-resistance rating of not less than one hour (see B.2. preceding). Where such construction abuts a housing unit a sound transmission loss of not less than 45 decibels shall be provided. (See also Section 36.A.2.)
4. SERVICE SPACE SEPARATION. The walls, floor and ceiling of every service room or space such as storage room, laundry, workshop or building maintenance room shall provide a fire-resistance rating of not less than one hour (see B.2. preceding), and where such construction abuts a housing unit a sound transmission loss of not less than 45 decibels shall be provided.
5. LAUNDRY AND REFUSE CHUTES
   (a) Laundry Chutes. Such chutes shall be lined throughout with corrosion resistant sheet metal. Service openings to such chutes shall be equipped with an acceptable self-closing hopper door. Openings to such chutes shall not be located in a stairway. The minimum cross-sectional dimension of the chute shall be 9 inches and the minimum area 1 square foot. There shall be neither offset nor decrease in cross-dimension between the top of the chute and the point of discharge.
   (b) Refuse Chutes. Such chutes which do not also serve as a chimney or flue shall meet the following requirements: (For other refuse chutes see Section 7.E.6. following).
      (i) Construction shall be of non-combustible material having a fire-resistance rating of at least one hour.
      (ii) Chutes shall be lined throughout with corrosion-resistant sheet metal not less than 28 US gauge galvanized copper-bearing sheet metal or 0.019" thick aluminum or equal.

(iii) There shall be neither offset nor decrease in cross-dimension between the top of the chute and the point of discharge.

(iv) Every service opening into such chutes shall be equipped with an acceptable self-closing hopper door. The hopper shall be constructed of metal of sufficient thickness and durability to prevent cracking, breaking or deformation in normal usage. The hopper door assembly shall be so designed and installed that no part projects into the chute; that the opening into the chute is completely closed off by the hopper when the door is fully open; and that the opening into the chute is tightly sealed when the door is closed. The hopper door shall be counterweighted or otherwise designed so that the door closes automatically when released.

A sleeve should be installed in the service opening. Such sleeves shall be constructed of corrosion-resistant sheet metal.

(v) Every service opening into such chutes shall be located in a separate room or compartment with a clear height not less than 7'0" enclosed by walls, floor and ceiling having a fire-resistance rating of not less than one hour. The entrance to such room or compartment shall be equipped with a self-closing door not less than 6'0" in height nor 2'0" in width, having a fire-resistance rating of not less than one hour.

Such room or compartment shall be of sufficient depth to permit the fire door to close with the hopper door in any position.

(vi) No service opening shall be located in a stairway.

(vii) Such refuse chutes shall discharge into a room or compartment enclosed by walls, floor and ceiling having a fire-resistance rating of not less than 2 hours. The entrance to such room or compartment shall be equipped with an acceptable self-closing fire-door. The discharge end of such chutes shall be equipped with a self-closing door or with an automatic fire-damper operated by a fusible link or similar device.

The installation shall be designed so that the normal accumulation of refuse does not hinder the operation of this self-closing door or damper.

(viii) A floor drain shall be provided in the refuse receiving room or compartment. (See Section 15. C.).

6. INCINERATORS: The design and installation of every incinerator system shall be in accordance with Section 6.4 of the National Building Code, 1960 and with the following requirements: (The more stringent or more restrictive requirement shall govern).

(a) Every service opening into a combined flue and chute shall be equipped with an acceptable self-closing hopper door designed and installed in accordance with Section 7. E. 5 *(b)* (iv) preceding.

(b) A combined flue and chute which does not discharge into the combustion chamber of an incinerator shall discharge into a separate room or compartment as required by 5 *(b)* (vii) preceding.

(c) No service opening shall be located in a stairway.

(d) No service opening shall be installed in any part of the combustion zone of an incinerator.

(e) Every incinerator flue shall terminate in an acceptable spark arrester.

(f) Where a flue is divided into two channels, one for feeding refuse and the other for discharging combustion gas, the construction shall meet the requirements for a combined flue and chute; the chute construction shall be in accordance with Section 7. E. 5 *(b)* preceding.

(g) Secondary combustion chambers shall be of equivalent construction to the incinerator combustion chamber. Settling chambers shall be of equivalent construction to the adjoining incinerator chimney.

(h) Where auxiliary fuel is supplied to maintain or assist combustion, a shut-off cock shall be installed in an accessible location on the fuel supply line.

(i) Incinerator rooms shall be supplied with an adequate amount of air for combustion and ventilation (See Section 6. D. *(g)* as amended).

(j) No system for the automatic transfer of waste materials from a refuse receiving room to an incinerator, or for other means of automatic feeding or stoking shall be installed unless special acceptance is first obtained from the authority having jurisdiction. The arrangements for mechanical handling of refuse and for automatic stoking, the presence or absence of automatic sprinkler protection, access for fire-fighting, and ventilation will be factors considered in the assessment of any such system.

(k) Refuse chutes which form part of an incinerator system but which do not also serve as a chimney or flue shall be constructed in accordance with Section 7. E. 5 *(b)* preceding.

7. **SEPARATION OF HEATING PLANT AND INCINERATOR ROOMS.** Every heating boiler, furnace (including fuel storage) or incinerator which serves more than two housing units shall be separated from all other parts of the building by construction (walls and ceilings) having a fire-resistive rating of not less than 1½ hours. Every opening in the enclosing walls or partitions shall be equipped with an acceptable self-closing door having a fire-resistive rating not less than that of the required separation. The floor of every such space shall be concrete. See also B. 2. preceding. Where the combustion chamber of an incinerator is fed through a charging chute, such chute and any opening into it shall be wholly within the incinerator room or shall be separated from all other parts of the building by construction having a fire-resistance rating of not less than 1½ hours.

8. **GARAGE SPACE SEPARATION**

(a) Garage space when located within an Apartment Building shall be completely separated from all other parts of the building by construction (walls, floor and ceiling) having a fire-resistive rating of at least one hour; provided that when such space will accommodate more than five cars the enclosure shall have a fire-resistive rating of not less than 1½ hours. For fire-resistive rating see also B. 2. preceding.

(b) Such separation (walls, floor or ceiling) shall not be pierced by any opening except a single doorway provided with a snug fitting self-closing door having a fire-resistance rating not less than that of the required separation. The door sill shall be set on a concrete curb or step at least 6″ higher than the garage floor.

(c) No stairway which serves housing units on the floor or floors

above the basement or cellar floor level shall enter or open directly upon a garage space.

(d) The floor of every garage space shall be concrete. When garage space is located over basement, cellar or other building space the floor shall be reinforced concrete.

F. *Support of Fire-resistive Construction*

1. The fire-resistive rating of any construction used to support fire-resistive construction shall be at least equal to the rating for the highest rated construction supported.
2. In basements, cellars, and crawl spaces, all load-bearing walls, beams, and all columns or piers shall be of non-combustible materials.

G. *Exterior Entrances*

1. The main, front and rear entrances to a building which serve more than two housing units, shall be at or above finish grade level. No abrupt change in grade shall be made to the ground level within 20 feet of such entrances.
2. An additional entrance to those required in 1. preceding, which serves basement housing units may be below finish grade line adjacent to such additional entrance.
3. Neither a garage nor its entrance shall provide a required means of egress from any part of the building except the garage, however, it may provide an additional means of egress by passing through the fire door in the separating wall and thence to the exterior. The entrance to a garage may be below finished grade line.
4. A service entrance in addition to main front and rear entrances in 1. preceding, may be below finished grade, provided it is not a required means of egress for any floor other than a basement or cellar which it serves.

H. *Means of Egress and Exits*

1. GENERAL

(a) Means of egress shall mean facilities such as doors, halls, passageways, lobbies, ramps, stairways or combinations thereof, providing the means of escape of persons from housing units or other spaces in a building to a yard or lane, or to other acceptable open space. Fire escapes shall not be acceptable as a required means of egress.

(b) Exit shall mean any door or doorways in a means of egress.

(c) Means of egress complying with the requirements of this Section, shall be provided to serve every housing unit and floor space in the building.

(d) Every roof having a slope of not more than 3″ in 12″ shall be provided with means of egress. See also 6. following.

(e) Every hall, passageway or stairway which is used in common to serve two or more housing units shall be deemed to be a means of egress or a part thereof, and shall comply with all the requirements of this Section which pertain to means of egress.

(f) An elevator shall be considered as being additional to the required means of egress. See also Section 36. B.

(g) An entrance lobby or foyer may form part of a means of egress provided:

(i) The floor of such space shall not be above the first storey floor level, except in so far as may be necessary due to the floor level of the first storey being below finished grade.

(ii) The length of such lobby shall not exceed 50 feet.

(iii) Such lobby shall serve no purpose other than ingress and egress and the supervision and control of the entrance.

(h) Except as permitted in *(g)* preceding, no part of a means of egress shall be used for any purpose other than ingress or egress.

2. EXIT REQUIREMENTS

(a) In all buildings at least two separate means of egress shall be provided from each storey or floor. Such means of egress shall be located in opposite directions from the entrance of every housing unit served. Access from any housing unit to such means of egress shall not be through any other such means of egress. Every stairway, stairwell, or ramp, being part of a means of egress, shall be separated from other parts of such means of egress, such as an exit passageway, corridor, hallway, etc., by a self-closing door having the applicable fire rating for the building.

(b) As an alternative to *(a)* preceding for bachelor housing units or family housing units with not more than one bedroom, each such unit may be provided with a ground level exit directly to the exterior.

(c) The distance of travel from the entrance door of any housing unit to an exit on that floor level shall not exceed 75′, except that the distance shall not exceed 20′ when the housing unit entrance door opens to a dead-end hallway, where access to the exit is in one direction only and no other means of egress is accessible from the housing unit.

(d) Where there is one full storey or more below the exit to a street, the stairway leading up to the exit shall be closed off at the exit level by a door or doors complying with the requirements of this Section.

(e) A means of egress, such as an exit passageway, shall be provided to an exterior exit from every stairway which does not terminate at an exterior doorway. The floor of such exit passageway shall be at or above finished grade level, except as stated in H. 1. *(g)* (i) preceding.

(f) Every basement or cellar shall have two safe means of egress and one of the exits, serving the basement or cellar only, may be at this floor level provided it opens directly to the exterior by means of an area stairway, ramp, etc. Such means of egress shall not pass through any garage space, furnace room, incinerator room, storage room, laundry room, or like service areas unless that is the only space served by such exit.

3. WIDTH OF MEANS OF EGRESS

(a) Except as required in *(b)* and *(e)* following, every means of egress (halls, corridors, stairs, doors) shall be at least 36″ in width.

(b) Except as requirements are increased in *(d)* following, buildings which are three storeys or more in height, a means of egress shall be not less than 44″ in width.

(c) In order to determine the occupant load or number of people occupying any floor in an Apartment Building, each standard bedroom and each combination room with sleeping facilities shall be considered to accommodate two persons to each such room.

(d) The aggregate number of persons shall not be accumulative from floor to floor. The occupant load shall be the greatest number of persons given sleeping accommodation on any one storey.

(e) Minimum permissible widths of means of egress, into which width handrails only may project a maximum of 3½", shall be as follows:

Minimum Width	Occupant Load in Number of Persons given Sleeping Accommodation
36"	Less than 50
44"	50—74
66"	75—104
88"	105 and over

Where more than two separate means of egress are provided from each floor, the sum of the widths of such means of egress need not be more than double the minimum permissible width, subject to the requirements of *(a)* and *(b)* preceding.

(f) Every exterior door shall be not less than 3'0" wide, provided that where an entrance comprises two or more doors, each door or leaf, shall be not less than 2'4" wide.

(g) The maximum width of any swinging single exit door shall be 4'0".

(h) No means of egress shall become narrower in the direction of progress towards the exit opening to the exterior of an Apartment Building.

(i) A window or windows shall not be considered an exit or means of egress within the meaning or requirements of this Section.

4. DOORS

(a) The following requirements do not apply to doors within a housing unit, except that *(c)* following shall apply to any door.

(b) Every door in means of egress shall open in the direction of exit travel, provided that this requirement shall not prohibit the use of doors swinging both inwards and outwards.

(c) Where a door opens from or into a stairway there shall be a landing or level floor area on each side of such door. Neither the length nor the width of such landing or floor area shall be less than the width of the stairs. Where stair risers occur at right angles to the wall in which such door is located, there shall be a distance of at least 1'0" from the first riser to the jamb of the door.

(d) No hangings nor drapery shall be placed over exit doors or otherwise to conceal or obscure any exit. No mirror shall be placed on any exit door.

(e) Fastenings of any exit door shall permit the door to be readily opened from the inside without the use of a key.

(f) Where revolving doors are used, a swinging door, constituting at least one-half of the required exit width, shall be provided beside each revolving door. Such revolving door shall be of the collapsible type. See also 3. *(f)* preceding.

(g) No part in the construction of an enclosing wood door and frame shall be less than 1¾" thickness. Doors shall fit snugly and shall have the least possible clearance at the finished floor, threshold or sill. Where applicable Section 35. B. shall govern. Hollow core doors do not normally qualify for this purpose unless accepted by the authority having jurisdiction as having a fire resistance rating of at least one hour.

5. STAIRS

All stairs shall be designed and constructed as stipulated in Section 36. of these Standards.

6. ACCESS TO ROOF

In every building which has a flat roof (slope not more than 3″ in 12″) at least one means of access to such roof shall be provided. Such access shall be through a scuttle not less than 2′0″ x 3′0″ or by a stairway continued to and through the roof.

8. SOUND INSULATION

Walls and floors separating housing units shall provide for a sound transmission loss of not less than 45 decibels (see also Section 7. E.). These separations shall also provide fire resistance as required in Section 7.

Acceptable forms of construction which provide fire resistance and/or a sound transmission loss of not less than 45 decibels are listed in Supplement No. 5 to the National Building Code, 1960, "Housing Standards". Other constructions are permitted if accepted by the authority having jurisdiction.

THE REQUIRED SOUND INSULATION CAN NOT BE OBTAINED IF AIR LEAKS EXIST IN ANY LAYER OF THE INTERVENING CONSTRUCTION.

9. STRUCTURES AND PROFESSIONAL SERVICES

A. *General*

1. Structures may be erected by the use of bearing walls of skeleton and truss work or a combination of these methods. Their employment shall be in accordance with sound building practice and shall at least satisfy the requirements set forth elsewhere in these Standards.
2. For purposes of these Standards, requirements of the National Building Code, 1960 are considered to constitute sound building practice. In case of question, the authority having jurisdiction shall determine what constitutes sound building practice.
3. All structural members and loaded parts covered by this Section shall be designed by a Registered Architect or, in a province where a Registered Engineer may so act, then either by a Registered Architect or by a Registered Engineer skilled in such design.

B. *Professional Services*

The professional services as required in A. 3. preceding, shall be employed in the design of:

1. Every structure more than three storeys high or where the gross floor area of all storeys in the building exceeds 6,000 square feet.
2. Any reinforced concrete beam, other than a lintel having a non-supported length less than 7′0″.
3. Every truss and all fabricated structural steel.
4. Every Apartment Building structure, the exterior walls of which are non-bearing walls.
5. All structures not supported on conventional foundation walls (see Section 12).

C. *Professional Services May Be Required*

The authority having jurisdiction may require the employment of a Registered Architect or a Registered Engineer as required by Section 4. A. and A. 3. preceding, under the following circumstances:

1. Where the drawings and specifications for any Apartment Building do not clearly indicate the size of the structural members and the method of their attachment to contiguous structural parts.
2. If the size of any structural member or method of attachment appears inadequate.

3. Where the design of any building, or any part of any building, or the design of the services within or to the building, appears inadequate. (See also Section 4. D.)

D. *Supervision*

If so required by the authority having jurisdiction, all structures or portions of structures designed by a Registered Architect or Registered Engineer as provided by Section 4. A. and A. 3. preceding, shall be supervised during construction by such Architect or Engineer as the case may be, or by his authorized representative.

10. EXCAVATION AND BACKFILLING

A. *Protection*

Adequate protective measures shall be taken to safeguard the public from mishap or injury in any excavation on the site of the building, the lot or property, and areas adjacent to the lot or property. Excavations shall be adequately barricaded; and during the hours of darkness shall be guarded by adequate warning lights for the prevention of accidents. See also Section 1. I.

B. *Soil Bearing Values*

In the absence of authoritative tests, well established local experience and practice, or professional advice, the allowable bearing values given in the following table may be used provided that in buildings more than three storeys in height, authoritative tests shall be made. Subject to authoritative tests, the values given in the following table shall not be exceeded:

ALLOWABLE BEARING VALUES FOR SOIL AND ROCK

Column 1	Column 2
Material	Allowable Bearing Value (tons/sq.ft.)
Rock and Cemented Material:	
Massive crystalline bedrock without laminations or defects	50
Laminated rocks such as sandstone or limestone (not shale) in sound condition	20
Residual deposits of shattered and broken bedrock, and hard shale; cemented material	10
Dense Non-Cohesive Soil:	
Gravel; sand and gravel (at least 90 per cent retained on No. 10 sieve)	5
Coarse sand (at least 90 per cent retained on No. 40 sieve)	4
Fine sand (at least 90 per cent retained on No. 200 sieve)	3
Very fine sand, silt (dry lumps easily pulverized by the fingers)	2
Cohesive Soil:	
Soft shale; hard glacial till	5
Soft shale or clay which can be readily indented with the thumbnail	3
Clay which can be indented with strong thumb pressure but remoulded by hand only with great difficulty	2
Clay which can be indented with moderate thumb pressure	1
Clay which can be penetrated several inches with the thumb	½

C. *Shoring and Bracing*

Earth excavations shall be shored and braced as may be necessary to prevent the caving in of the side banks.

D. *Depth of Excavation*

1. EXCAVATION shall extend to undisturbed soil, provided that when soil at the required depth is found to be disturbed or otherwise unsatisfactory, the extent of excavation and necessary procedure shall be determined by a competent authority.
2. DISTURBED SOIL. Soil which subsequently becomes disturbed shall be removed before the placing of footings or other construction.
3. EXTEND TO BELOW FROST LEVEL. Excavation, except where solid rock bearing is encountered, shall extend below the frost penetration line established for design purposes in the area.

E. *Backfilling*

Backfilling shall consist of suitable soil containing no debris, boulders larger than 8″ in greatest dimension or frozen material.

1. PLACING. Earth backfilling shall be placed against foundation wall in layers not more than 3′ in depth and shall be well compacted.
2. DAMAGE TO WATERPROOFING OR DAMP-PROOFING shall be repaired before backfilling is completed.
3. TRENCHES. Where the excavation of trenches for sewers, water-mains, etc., extends below the level of footings, backfill shall be consolidated by tamping, where possible, otherwise such excavation shall be filled with low grade concrete (1,500 p.s.i. minimum) to provide adequate bearing for such footings.

F. *Protection From Frost*

The bottom of trenches for footings shall be protected against freezing. Frozen soil shall not be accepted as bearing, and shall be removed by excavating to unweathered soil.

G. *Water in Excavations*

Excavations shall be kept reasonably clear of water at all times.

11. FOOTINGS

A. *Footings shall be provided* for all walls, pilasters, columns, piers and chimneys which bear on soil, except that footings are not required for tapered foundation walls of poured concrete provided the soil bearing area is not less than as required for conventional footings. Where bearing is on solid rock, footings may also be omitted.

B. *Footings which bear on filled ground* such as backfilling of trenches for sewers, and the like, shall be specially designed except when such backfilling has been adequately compacted and consolidated.

C. *Footings shall be of poured concrete* of sufficient width to ensure safe distribution of the loads. The width of each footing shall be determined by the relationship of the load to the bearing capacity of the soil upon which it rests (see Table Section 10). Thickness of footings shall be not less than the projection of the footings beyond the faces of foundation walls or other supported members. In no case shall the projection be less than 4″ and the thickness less than 6″ unless evidence is provided that a reduction in these dimensions is warranted.
The quality and strength of the concrete for footings shall be at least equal to that of the concrete for the wall or structure supported.

D. *Unstable Soil Conditions.* The design and installation of all footings in areas considered by the authority having jurisdiction as having unstable soil conditions, such as those in the Red River Valley, shall be approved by a Registered Architect or Registered Engineer in accordance with Sections 4. A. and 9. A. 3.

E. *Design.* A Registered Structural Engineer or Registered Architect in accordance with Section 4. A., shall design footings for any structure where vertical loads are transmitted through more than three storeys above the foundation wall or where unusual conditions occur requiring stepped, offset or cantilevered footings or piling.

12. FOUNDATION WALLS

A. *General*

1. UNSTABLE SOIL CONDITIONS. The design and installation of all foundation walls in areas considered by the authority having jurisdiction as having unstable soil conditions, such as those in the Red River Valley, shall be approved by a Registered Architect or Registered Engineer in accordance with Sections 4. A. and 9. A. 3.
2. TYPES OF CONSTRUCTION. The foundation walls of every Apartment Building shall be of poured concrete or unit concrete masonry.
3. HEIGHT ABOVE GRADE
   (a) Foundation walls supporting wood frame construction shall extend not less than 12″ above the adjacent outside finish grade; except that when the supported wall is finished with masonry veneer, the bottom plate of such wall shall be not less than 6″ above the finish grade line.
   (b) When the foundation walls at any point extend more than 6′0″ below the adjacent outside finish grade line, such walls shall be designed by a Registered Architect or Registered Engineer in accordance with Section 9.
4. FINISH ABOVE GRADE. The exterior of foundation walls above grade shall be rendered, parged, or otherwise finished in an acceptable manner.
5. CHIMNEY FOUNDATIONS. Every masonry chimney shall be entirely supported on a foundation of concrete or unit concrete masonry which shall extend down to the chimney footing. This footing shall be at the same level as the main foundation wall footing when located adjacent thereto.

B. *Thickness of Wall*

1. GENERAL
   Foundation wall thickness shall be not less than that of the wall supported except that, foundation walls supporting buildings of masonry veneer and wood frame not more than one storey high may be 8″ thick provided wall construction does not project more than ¾″ beyond exterior face of foundation walls before parging and provided the wood studs are not larger than 2″ x 4″.
2. POURED CONCRETE WALLS
   A minimum concrete strength of 2500 lbs is required in all poured concrete foundation walls less than 10″ thick. In walls of 10″ thickness or more this concrete strength may be reduced to 2000 lbs. All such foundation walls shall be carefully backfilled. See also C. and D. following.
   Where there is no basement or cellar and the difference in elevation between the exterior and interior ground levels is not greater than

3'0", poured concrete foundation walls shall at least comply with the following:

Max. Number of Storeys	Max. Height Supported by Foundation Wall	Minimum Thickness
2	25' - 0"	8"
3	———	10"

Where there is a basement or cellar, or where the difference in elevation between the exterior and interior ground levels is greater than 3'0", poured concrete foundation walls shall at least comply with the following:

Max. Number of Storeys	Max. Height Supported by Foundation Wall	Max. Unsupported Length of Wall	Minimum Thickness
2	25' - 0"	35' - 0"	8"
2	35' - 0"	50' - 0"	10"
3	———	50' - 0"	12"

3. CONCRETE BLOCK WALLS (HOLLOW UNITS)

(a) Foundation walls of concrete blocks shall be at least 10" thick if supporting wood stud frame construction one or two storeys in height or masonry construction one storey in height. If two storeys of masonry construction are carried, the foundation wall shall be not less than 12" thick. If three storeys of masonry construction are carried, the foundation wall shall be not less than 16" thick. No concrete block wall supporting three storeys over basement or cellar shall be less than 12" thick.

(b) Where the difference in elevation between the exterior and interior ground levels is not greater than 3'0", foundation walls supporting a building not exceeding one storey shall be not less than 8" thick provided the requirements of B. 1 preceding are met. When two or three storeys are carried, the foundation wall shall be not less than 10" thick. All such foundation walls shall be carefully backfilled on both sides.

C. *Lateral Stability*

1. LATERAL SUPPORT

(a) Every foundation wall for a basement, cellar, or other excavated area, shall be supported at right angles to the wall face by means of intersecting transverse walls, or buttresses. Floor beams and joists are also acceptable as a means of lateral support provided the ends of which frame into, and are imbedded in a foundation wall with depth below grade not greater than 6'0".

(b) Such lateral support shall have sufficient strength and stability to transfer to the ground all the lateral forces that they are assumed to resist.

(c) The distance between such lateral support shall not exceed the following:

Solid Walls ..... 20 times thickness
Hollow Walls ..... 18 times thickness

2. LATERAL THRUST

When indicated by the character of the soil, or height of backfill, intersecting transverse walls, pilasters, buttresses or additional wall thickness may be required to resist lateral thrust. Determination of the necessity for such additional support shall be made by the authority having jurisdiction in accordance with Section 9. A. 3.

3. BEAM SUPPORT. Beams shall be supported on solid masonry or concrete not less than 8" deep. Ends of beams shall be protected with not less than 2" of concrete or parging.

4. BEARING. See Section 23. E. 2 *(b)*.

5. **BONDING OF INTERSECTING WALLS.** Internal load-bearing basement or cellar walls of unit masonry or concrete shall be bonded or tied into the exterior foundation walls by overlapping the alternate courses of masonry or by metal ties at least equal to 3/16″ round rods looped or hooked into each wall. Such ties shall be spaced at vertical intervals not exceeding 18″.

D. *Poured Concrete Wall Construction*

Except as stipulated, concrete shall conform to the requirements for Ordinary Concrete, Section 14. C. 1.

1. **FORM WORK**

   (a) Form work shall be provided to completely enclose and support all concrete.

   (b) Form work shall have sufficient strength and rigidity, and shall be supported to prevent deflection under the pressure or weight of wet concrete. Forms shall be sufficiently tight to prevent leakage of cementitious or other material.

   (c) Form work shall not be removed until the concrete has developed its working stress and has sufficient strength to support any immediate loads to be imposed thereon.

2. **PLACING**

   In general, concrete should be mixed and poured in accordance with C.S.A. Specification A 23.1 - 1960.

   (a) Concrete shall be poured continuously without interruption.

   (b) Concrete shall not be subjected to any loading until sufficient strength has developed to support such loads.

   (c) Plums. The use of stone "plums" or fillers of sound quality, clean and free from all foreign matter, will be permitted except in 8″ walls and provided the plums are completely imbedded in the concrete. "Plums" shall be kept at least 2″ from the face of the forms and from other "plums".

E. *Concrete Block Wall (Construction)*

1. CONCRETE BLOCK for foundation walls shall be the product of a manufacturer who regularly submits his blocks to an acceptable testing and inspecting authority for testing and inspection. All results and details of such tests shall be furnished to the authority having jurisdiction on demand. Such tests shall be conducted in accordance with the procedure of A.S.T.M. C 140-56. Blocks shall be of load-bearing quality in accordance with the requirements of Section 19. A. 1. The authority having jurisdiction may select blocks from those on a building site for testing by an approved testing and inspection authority at the expense of the builder.

2. MORTAR FOR CONCRETE BLOCK WALLS. Mortar for concrete block walls shall comply with Section 19. B. The first course of concrete blocks shall be laid in a full bed of mortar with end joints including end cavities of the blocks completely filled with mortar. This first course shall then be parged and the parging coved over the footing before further concrete blocks are laid. Blocks forming the balance of the wall shall be laid up with all vertical and horizontal joints on all webs completely filled with mortar.

3. BEARING FOR FLOOR JOISTS. In all concrete block bearing walls, the course directly carrying the floor joists or other framing members shall be a course of solid concrete blocks, 4″ of poured concrete or other solid masonry, such as two courses of brickwork full thickness of wall. If poured concrete is used it shall be reinforced with wire mesh (expanded metal lath not acceptable). Special

capping blocks may be used if accepted by the authority having jurisdiction.

When concrete block is used for foundation wall construction the final three courses of block (not exceeding 2 feet in height) can be made up of 4" face brick and hollow concrete block backing, bonded with 1" x 3/16" corrosion-resistant metal ties or equivalent placed at 8" on centres vertically and at 3 feet on centres horizontally. The space between the brick and the block shall be filled with mortar. The thickness of such foundation walls shall remain constant throughout.

4. PARGING. Concrete block walls shall be parged on the exterior face to at least the finish grade line with cement mortar as described in Section 19. B. The mortar shall be ½" average thickness with a minimum of ⅜" at any point, and shall be dressed to a smooth surface to receive waterproofing or damp-proofing.

F. *Cold Weather Requirements*

1. POURED CONCRETE WALLS

No frozen materials or materials containing ice shall be used. See Section 14. B. 4. for admixtures. During freezing or near-freezing weather, concrete shall not be poured unless the following precautions are taken:

(a) Equipment shall be provided for heating the concrete materials and protecting the concrete while mixing, pouring and curing.

(b) Concrete when mixed and when deposited shall have a temperature of not less than 50°F. nor more than 100°F.

(c) Temperature of concrete shall be maintained at not less than 50°F. nor more than 80°F. for at least 72 hours after placing.

2. CONCRETE BLOCK WALLS

(a) Adequate equipment shall be provided for heating the masonry materials and for protecting the masonry during freezing weather. No frozen materials, nor materials containing ice shall be used.

(b) During freezing or near-freezing weather, mortar and masonry materials shall be maintained at a temperature of not less than 40°F. during laying and for at least 48 hours after laying.

(c) Uncompleted masonry which is exposed to the weather shall be covered completely on the top surface with an adequate waterproof cover except when construction is in progress.

13. UNEXCAVATED AREAS

A. *Topsoil*

The topsoil and all vegetable matter in all unexcavated areas under a building shall be removed.

B. *Crawl Space*

The ground level shall be at least 12" below the bottom of all joists and beams. Where equipment that requires servicing such as plumbing cleanouts, traps, burners, etc., is located in such crawl spaces, an access way with a minimum height and width of 2'0" shall be provided from the access door to the equipment and for a distance of 3 feet on all sides of such equipment. Such access ways shall be graded and if necessary drained to prevent water from collecting in them.

Where necessary, crawl spaces shall be drained or sloped to a drain.

C. *Access to Crawl Space*

When piping, duct work, etc., are located in unexcavated areas, an

opening, with door or suitable cover, of not less than 28″ x 28″ shall be provided for access to each such isolated area.

D. *Ventilation of Crawl Space*

Unexcavated areas shall be vented through the foundation walls to the outside air. There shall be at least one square foot of vent area for every one thousand square feet of excavated area. Vents shall be at least twenty square inches in free cross-sectional area and shall be spaced to provide the optimum circulation and change of air. Non-corrodible screening of not over ¼″ mesh shall be installed in each vent opening. These vents may form part of the exterior access doors or covers in C. preceding.

Where an unexcavated area is to be used as part of the heating system the required vents shall be fitted with tight-fitting covers to control air-leakage in winter.

E. *Vapour Barriers in Crawl Spaces*

The earth in the crawl space shall be evened to receive a vapour barrier of 4 mil polyethylene film or 45 or 55 pound roll roofing lapped four inches at all joints. Where the surface of the crawl space consists of crushed rock, gravel or other coarse material, a layer of building paper shall be placed under the polyethylene film. Lapped joints in the vapour barrier shall be weighted with brick bats, stones or aggregate. A pad of 2″ thick asphaltic concrete, or 1500 lb. ordinary concrete, adequately damp-proofed, is acceptable as a vapour barrier.

A continuous damp-proof course shall be placed between the top of the foundation walls and piers and the construction supported. 45 or 55 pound roll roofing or other acceptable material shall be used. A vapour barrier shall be placed between the finished flooring and the floor insulation.

14. CONCRETE

A. *General*

1. Ordinary concrete with a compressive strength at the age of 28 days not less than 2,000 p.s.i. shall be used except where other strengths of concrete are specifically required or described.
2. Concrete with a compressive strength at the age of 28 days not less than 2,500 p.s.i. shall be used where reinforced concrete is required.
3. The quality and proportions of water, cement and aggregate affect the strength and durability of concrete. Proportions to be used in concrete mixes should therefore be determined by a Registered Architect or Registered Engineer in accordance with Section 9. Ordinary concrete may be obtained by using procedures outlined in C. following and reinforced concrete as outlined in D. following. These procedures are intended only as a guide for use in the absence of the professional services mentioned above.
4. Concrete construction not specifically regulated by these Standards shall at least comply with Section 4.5 of the National Building Code, 1960.
5. Testing at no expense to the authority having jurisdiction may be required to determine if the concrete provided has at least the minimum strength prescribed in the applicable section of these Standards or Section 4.5 of the National Building Code, 1960.

B. *Materials*

1. CEMENT. All cement shall be Portland Cement, High Early Strength Portland Cement or Alkali-sulphate Resisting Cement or such other cement accepted by the authority having jurisdiction.

Such cements shall at least comply with the provision of C.S.A. Specification A 5-1961.

2. AGGREGATES

(a) Concrete aggregates shall consist, in general, of natural sands and gravel, crushed rock, crushed air-cooled blast furnace slag, or other acceptable inert materials accepted by the authority having jurisdiction.

(b) Aggregates shall be free from injurious amounts of organic matter or other deleterious substances and shall at least comply with the provisions of C.S.A. Specification A 23. 1-1960.

(c) Aggregates Size

(i) Fine aggregates should be graded within the limits shown in the following table:

FINE AGGREGATE

Sieve Size	⅜	No. 4	No. 16	No. 50	No. 100
Total Passing (% by Weight)	100	95-100	45-80	8-30	0-8

(ii) Coarse Aggregate

Coarse aggregate should be graded within the limits set forth in following table:

COARSE AGGREGATE

Designated Sizes	Percentage by Weight Passing Laboratory Sieves Having Square Openings										
	4″	3½″	2½″	2″	1½″	1″	¾″	½″	⅜″	No. 4	No. 8
No. 4-½″	.....	.....	.....	.....	.....	.....	100	90–100	40–75	0–15	0–5
No. 4-¾″	.....	.....	.....	.....	.....	100	90–100	.....	20–55	0–10	0–5
No. 4-1″	.....	.....	.....	.....	100	90–100	.....	25–60	.....	0–10	.....
No. 4-1½″	.....	.....	.....	100	95–100	.....	35–70	.....	10–30	0–5	.....
No. 4-2″	.....	.....	100	95–100	.....	35–70	.....	10–30	.....	0–5	.....
¾-1½″	.....	.....	.....	100	90–100	20–55	0–15	.....	.....	.....	.....
1-2″	.....	.....	100	90–100	35–70	0–15	.....	.....	.....	.....	.....
2-3½″	100	90–100	.....	0–15	.....	.....	.....	.....	.....	.....	.....

NOTE: Maximum size of aggregate for ordinary concrete shall be not larger than one-fifth of the narrowest dimension between the forms of the member for which the concrete is to be used; and for reinforced concrete shall be not larger than two-thirds of the minimum clear spacing around reinforcement.

3. REINFORCEMENT

(a) Quality of Reinforcement

All metallic reinforcement shall at least comply with the requirements of one of the following classes, provided that other types of reinforcement may be used if accepted by the authority having jurisdiction.

(i) Billet-steel bars ..... C.S.A. Specification G30.1-1954

(ii) Rail-steel bars ..... C.S.A. Specification G30.2-1954

(iii) Cold-drawn wire ..... C.S.A. Specification G30.3-1954

(iv) Fabricated bar or rod mats C.S.A. Specification G30.4-1954

(v) Welded wire fabric ..... C.S.A. Specification G30.5-1954

Hard grade billet-steel or rail-steel shall not be used for stirrups, column or beam ties or spirals.

4. ADMIXTURES AND INTEGRAL COMPOUNDS. Admixtures and integral compounds are not recommended. If used in concrete then

detailed conditions of use shall be specified in documents bearing the seal of a Registered Architect or Registered Engineer in accordance with Section 9, and provided that mixing and placing of such concrete shall be supervised by the applicable specifying authority.

5. WATER. Water for concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic or other deleterious substances.

C. *Ordinary Concrete*

The quality and proportions of water, cement and aggregate all affect the strength and durability of concrete.

1. 2,000 LB. CONCRETE. Assuming employment of graded aggregates as specified in B. preceding, the proportions given below should produce 2,000 lb. concrete (28 days), provided just sufficient water is used in the mix to produce a plastic mass, with a slump not exceeding 4 inches. See slump test in F. following.

   One part cement, two parts sand and four parts crushed stone up to 2″ in size. (Measured by volume.)

   or

   One part cement with six parts of gravel. (Measured by volume.)

2. 2,500 LB. CONCRETE. Assuming employment of graded aggregates as specified in B. preceding, the proportions given below should produce 2,500 lb. concrete (28 days), provided just sufficient water is used in the mix to produce a plastic mass, with a slump not exceeding 4 inches. See slump test in F. following.

   One part cement, two parts sand and three and one-half parts crushed stone up to 1½″ in size. (Measured by volume.)

   or

   One part cement mixed with five and one-half parts gravel. (Measured by volume.)

D. *Reinforced Concrete*

1. Reinforced concrete shall conform to the requirements for Ordinary Concrete in C. 2. preceding.
2. REINFORCEMENT shall be accurately placed, and shall be securely fastened against displacement by annealed wire ties or suitable clips at intersections, and shall be supported by acceptable concrete or metal supports, spacers, or hangers.

E. *Typical Reinforced Concrete Slabs*

Where applicable professional services as provided in Section 9. A. 3. are not available, the following table of slab thicknesses and reinforcing is given as a guide for minimum requirements in ordinary floor slabs of simple span (without beams).

REINFORCED CONCRETE SLAB

Span	Slab thickness	Reinforcing steel (round rods)
Up to 8′6″	4″	⅜″ rods at 5″ c/c.
8′7″ to 10′0″	4½″	⅜″ rods at 4″ c/c.
10′1″ to 11′0″	5″	½″ rods at 7″ c/c.
11′1″ to 12′0″	5½″	½″ rods at 6″ c/c.
12′1″ to 13′0″	6″	½″ rods at 5″ c/c.
13′1″ to 14′0″	6½″	½″ rods at 4″ c/c.

NOTE: To prevent cracking of slabs, temperature rods ⅜″ diameter and 20″ to 24″ centres shall be laid in the slab at right angles to that of the main reinforcing.

F. *Slump Tests*

Slump tests are required in the absence of laboratory testing. They shall be conducted as follows:

1. THE CONE FOR SLUMP TEST shall be 4″ diameter at the top, 8″ diameter at the bottom and 12″ high. Rod shall be ⅝″ round, 2′0″ long and bullet-shaped at rodding end.
2. THE SAMPLE OF CONCRETE for testing shall be representative of the concrete being placed.
3. THE SLUMP CONE shall be placed on a horizontal surface and filled with concrete in three layers of equal depth. Each layer shall be rodded with 25 well-distributed strokes of the ⅝″ rod. After the top layer has been rodded the surface of the concrete shall be levelled off with a trowel so that the cone is exactly filled.
4. THE CONE shall be immediately removed from the concrete by raising it carefully and slowly in a vertical direction.
5. THE SLUMP shall be measured immediately by determining the difference in inches between the height of the cone and the height of the slumped concrete.
6. THE RESULTING SLUMP shall not exceed 4″.

G. *Form Work*

1. FORM WORK shall be provided to completely enclose and support all concrete until it has set sufficiently to be self-supporting.
2. FORM WORK shall have sufficient strength and rigidity to prevent any movement after the concrete has been placed and shall be supported to prevent deflection under the pressure or weight of wet concrete. Forms shall be sufficiently tight to prevent leakage of cementitious or other material.
3. FORM WORK shall not be removed until the concrete has developed its working stress and has sufficient strength to support any immediate loads to be imposed thereon.

H. *Procedure*

1. STORAGE OF MATERIALS ON THE SITE
   - *(a)* Cementitious materials shall be kept dry by adequate protection from moisture and the weather whilst in storage on the site.
   - *(b)* Aggregates shall be segregated and care taken to prevent mixing with earth or other foreign matter.
2. COLD WEATHER REQUIREMENTS. The requirements set forth in Section 12.F.1. shall be strictly adhered to.
3. WATER CEMENT RATIO

   (a) Ordinary Concrete

   The water content per 87½ lb. sack of cement shall not exceed 5¾ gallons (Imperial).

   Allowance shall be made for presence of water in the aggregate. The amount of such water may be estimated from the following:

   (i) Very wet sand ..... ¾ gal. per cu. ft.
   (ii) Moderately wet sand ..... ½ gal. per cu. ft.
   (iii) Moist sand ..... ¼ gal. per cu. ft.
   (iv) Moist gravel or stone ..... ⅛ to ¼ gal. per cu. ft.

   NOTE: The coarser the aggregate, the less water it will carry.

   (b) Controlled Concrete

   Water shall be accurately measured. The proportioning of

water to cement shall be strictly in accordance with the directions of the professional services obtained in accordance with Section 9. A. 3.

4. MIXING. Ingredients shall be thoroughly mixed in dry state. Water shall then be added and the whole shall be mixed until there is uniform distribution of the ingredients and the mass is uniform in color and consistency.

(a) Machine Mixing

(i) Operating time shall be not less than one minute and not more than 10 minutes at mixing speed after water has been added. Any further mixing shall be done at agitator speed.

(ii) Concrete shall be poured in place within one hour of the time of addition of the water.

(iii) Concrete which has partially set shall not be remixed or retempered.

(b) Ready-Mix Concrete

Ready-mix concrete shall be proportioned and mixed in accordance with the requirements of A.S.T.M. Specification C. 94-61.

5. PLACING

(a) Conveying. Concrete shall be conveyed from place of mixing to place of depositing by a method which will prevent segregation or loss of ingredients.

(b) Depositing. Precautions shall be taken to prevent undue spread in depositing and resulting segregation of ingredients.

(c) Compacting. Concrete shall be thoroughly compacted to eliminate voids by rodding, limited mechanical vibration, or other acceptable method.

6. WATER CONDITIONS

(a) Drainage. The immersion of any part of freshly poured concrete shall be prevented by the provision of adequate drainage and pumping equipment.

(b) Concrete in Alkali Soils or Water. In areas where alkali soils or water are prevalent, a rich mix, alkali resistant cement, protective covering or other acceptable means of ensuring durability shall be employed. The precautions taken must be adequate for the conditions existing.

15. DRAINAGE

A. *Weeping Tile Drains*

1. WEEPING TILE shall be placed in a continuous row around the perimeter of exterior foundation walls except where colloidal clay is encountered or where, in the opinion of the authority having jurisdiction, the site conditions warrant omission of the weeping tile. Tiles shall be accurately graded and shall be covered with not less than 6" of broken stone or coarse gravel.

2. THE TILE shall be laid on undisturbed or well-compacted soil, parallel with the base of the wall footing or where no footing is required (see Section 11. A.) parallel with the base of the foundation wall.

3. TILES with butt joints shall be placed with gaps of from ¼" to ⅜" between tiles. At least the top half of the gap shall be covered with

a strip of 45- or 55-pound roll roofing or at least 15-pound asphalt or tar saturated felt, at least 3″ wide, or other material accepted by the authority having jurisdiction. Cover strips shall be installed so they will not be dislodged during backfilling.

4. **WEEPING TILES** shall drain to a sewer or to an adequate dry well.
5. **DRAIN TILE** shall at least meet the requirements of A.S.T.M. Specification C 412-60 for concrete tile and C 4-59 T for clay tile. Other types of drain tile may be used if accepted by the authority having jurisdiction.

B. *Ground Water Level*

In areas where ground water levels cause flooding of basements or cellars, weeping tile as in A. preceding, shall be installed and connected to a sewer or sump. Drainage tile shall also be installed under the basement or cellar floor and connected to the sump or sewer outlet. When a sump is provided and natural drainage to a sewer or municipal ditch cannot be obtained, then an automatic pump shall be provided to discharge the water into a sewer, municipal ditch or dry well. If a dry well is provided it shall be located on the lot so that natural drainage is away from the foundation and shall be not less than 15′ away from the foundation wall.

C. *Floor Drains*

1. **WHERE REQUIRED.** Floor drains shall be installed in at least the following: Laundry rooms, boiler and heating rooms, garage space, garbage or incinerator rooms, and unoccupied areas of basements and cellars.
2. **INSTALLATION.** Floor drains as in 3. following shall be connected directly to a sewer or drainage sump. They shall not be connected by means of the weeping tile.
   Every floor drain shall be provided with a drum or running trap, at least 3″ in diameter, which shall be provided with a removable wrought or cast iron grating or cover, set flush with the floor. The floor in each space in which a drain is installed shall be sloped to the floor drain.
3. **MATERIALS.** Drain lines below basement floor shall be either extra heavy (XH) cast iron, medium weight cast iron, vitrified socketed clay tile, acceptable asbestos cement, or bituminized fibre pipe. See also Section 44. A.

16. COLUMNS

This Section covers any column whose footing is at, or below, grade level. Columns in basements, cellars, and first storeys (without basements or cellars) are therefore included.

A. *Column Footings*

Each column shall bear on a footing designed to support the superimposed loads. See Section 11., also Section 7.F.2.

B. *Minimum Size of Masonry Columns*

Brick or block columns shall be not less than 12″ x 12″ or 10″ x 16″. Monolithic concrete columns shall be not less than 10″ x 10″ and the concrete shall at least conform to the requirements of Section 14. C. 1.

C. *Steel Pipe Columns*

Steel pipe columns used to support wood or steel beams shall be fitted with a steel plate at top and bottom. When located in basements or

cellars, such columns shall bear on solid concrete bases raised at least 3″ above the level of the basement or cellar floor. This plate shall be at least 3″ thick for support of wood beams and at least ¼″ thick for support of steel beams. Where used to support a wood beam, the length and width of the plate shall at least equal the width of the beam. The plate shall be welded or screwed to the column and bolted or spiked to the beam. Welded, bolted, or riveted connections shall be used between steel columns and steel beams. Columns shall not be less than 4″ in diameter, 0.226″ in wall thickness, and shall be treated on outside surfaces with at least one coat of rust-inhibitive paint. Proprietary columns may be used if accepted by the authority having jurisdiction. Boiler tubes, or used material are not acceptable. See also Section 7. F. 2.

17. BASEMENT AND CELLAR FLOORS

A. Basements and Cellars shall have concrete floors.

B. The ground under such floors shall be levelled but otherwise undisturbed then covered with at least 5″ of cinders, broken stone or broken bricks. As an alternative where the subsoil at the building site will provide adequate drainage, 5″ of gravel, free of all loam, clay, or organic matter and containing not more than 15% of coarse sand, is acceptable. This fill may be omitted in dry locations where the ground is gravel, compact sand or rock. Metal pipes passing under or through cinders or other corrosive materials shall be protected by a heavy coating of bituminous material, or be encased in concrete.

C. Concrete floors shall be not less than 3 inches thick or as required in Section 18. B. Concrete shall be of the same mix as described for Ordinary Concrete, Section 14. C. 1. Floors may be finished with an additional ¾″ topping consisting of one part of cement to 2½ parts of clean sand. The finished surface shall be trowelled to an even and smooth surface. Dusting with dry cement when trowelling is not permitted. When floor drains are provided floors shall be sloped to such drains.

D. For additional finishes of concrete floors see Section 33. B. 4.

18. DAMP-PROOFING AND WATERPROOFING MASONRY BELOW GRADE

A. *General*

A dry basement, cellar, or first storey shall be provided.

1. BELOW GRADE all exterior walls enclosing excavated areas shall be damp-proofed or waterproofed as may be necessary to provide a dry interior.
2. EXTERIOR BASEMENT WALLS or first storey walls which enclose one or more habitable rooms, and all exterior basement, cellar, or first storey walls of all other rooms provided for the use of the tenants of the building shall be waterproofed below grade, except where, in the opinion of the authority having jurisdiction, the site conditions warrant damp-proofing only.
3. THE PROVISIONS of 2. preceding shall also apply to all floors of such spaces.
4. HYDROSTATIC PRESSURE. When site or soil conditions exist which are calculated to cause hydrostatic pressure, waterproofing

shall be applied to all exterior foundation walls below grade and to floors on ground.

B. *Waterproofing*

Waterproofing shall consist of a system of membrane waterproofing applied at the exterior surfaces of the foundation walls enclosing the basement, cellar, or first storey areas below grade. Floors of these areas shall also be protected by applying a system of membrane waterproofing between two pourings of concrete, each of which shall be at least 3″ thick. This membrane shall be carefully mopped to form a complete seal with the membrane of the exterior walls which shall enter the basement, cellar, or first storey area between the footings and the foundation.

The above installation shall at least conform to the requirements of C.G.S.B. Specifications 37-GP-3 and 37-GP-12.

C. *Damp-Proofing*

Basement, cellar, or first storey walls shall be damp-proofed by treating them on the exterior from finish grade to outside edge of footing in the following manner:

1. CONCRETE BLOCK WALLS. The first course of masonry units shall be laid in a full bed of prescribed mortar with end joints including end cavities of the units completely filled with mortar. The first course shall be then parged with mortar described in Section 19. B. 3. (c) or (d) and the parging coved over the footing before further masonry units are laid. Over the parging apply at least one heavy coat of bituminous material as described in D. following.
2. POURED CONCRETE WALLS. Apply a bituminous material as described in D. following.

D. *Materials and Methods*

Bituminous materials shall at least conform to and be applied in accordance with the requirements of the appropriate Canadian Government Specifications Board Specification listed in the following table:

Emulsified Asphalt Compounds; Soap-Type, for Waterproofing and Damp-proofing	37-GP- 1
Emulsified Asphalt Compounds; Mineral Colloid Type, for Waterproofing and Damp-proofing	37-GP- 2
Schedule of Recommended Methods for Surface Application of Asphalt Emulsions	37-GP- 3
Asphalt Cutback; Unfilled, for Damp-proofing and Waterproofing	37-GP- 6a
Recommended Methods for Application of Unfilled Asphalt Cutback Foundation Coating	37-GP-12
Asphalt Cut-Back; Filled, for Damp-proofing and Waterproofing	37-GP-16a
Asphalt; Hot Application, for Damp-proofing and Waterproofing	37-GP-17
Cutback; Distilled Tar, Unfilled, for Waterproofing and Damp-proofing	37-GP-18
Recommended Methods for Application of Unfilled Tar Cutback Foundation Coating	37-GP-22

Other materials and methods of damp-proofing and waterproofing may be used if accepted by the authority having jurisdiction.

E. *Formwork Ties.*

All formwork ties shall be removed or broken off as applicable in such a manner that the end of the tie is either recessed or flush with the wall surface before the application of the damp-proofing or waterproofing. Any holes or recesses thus formed in the wall surface shall be filled and sealed with the asphaltic material used during the damp-proofing or waterproofing treatment of the wall. Alternatively, such holes or recesses may be sealed with a cement mortar prior to the application of the damp-proofing or waterproofing material.
All formwork ties shall be removed or broken off from the interior of basement or cellar walls.

19. MASONRY CONSTRUCTION ABOVE GRADE

(for Masonry Veneer applied on wood frame construction see Section 20.).

A. *Masonry Materials*

1. THE QUALITY OF MASONRY UNITS shall at least comply with the requirements of the following specifications:

Type of Unit		
Clay or Shale Building Brick	C.S.A.	A82.1–1954
Clay or Shale Face Brick	C.S.A.	A82.7–1954
Concrete Masonry Units:		
Hollow Non-Load Bearing	A.S.T.M.	C129–59
Hollow Load Bearing	A.S.T.M.	C90–59
Solid Load Bearing	A.S.T.M.	C145–59
Concrete Building Bricks	A.S.T.M.	C55–55
Sand-lime Bricks	C.S.A.	A82.3–1954
Structural Clay Wall Tile:		
Load Bearing	C.S.A.	A82.4–1954
Non-Load Bearing	C.S.A.	A82.5–1954

2. FACE BRICK AND BACKING MATERIAL

(a) Face bricks shall be new and of load-bearing quality. They shall be free from defects and shall be composed of clay, shale, concrete or sand-lime of makes accepted by the authority having jurisdiction.

(b) Face bricks to be painted shall be new or clean second hand brick of load-bearing quality and free from defects. Brick from old chimneys or brick coated with soot or creosote shall not be used. After pointing and before painting, brick construction shall be wire brushed to remove all loose mortar. The wall shall then be treated with zinc sulphate solution (3½ lbs. per gallon of water), brushed to remove excess sulphate, and primed according to paint manufacturers' directions.

(c) Backup material shall be of load-bearing quality and composed of concrete brick, concrete block, terra-cotta tile, sand-lime

brick or block, or hard burnt and clean second hand bricks; provided such backup material complies with the respective specification listed in A. 1. preceding.

3. STONE EXTERIOR

(a) Where stone is used for the outside facing of a masonry wall, it shall be of a sound, hard, and relatively non-porous quality. It shall be at least 6" thick on the bed if in the rough, or 4" if sawn.

(b) Backup material shall be as in 2. *(c)* preceding, or stone of load-bearing quality.

(c) Backup composed of Ordinary Concrete poured in forms as the building of the walls proceeds is acceptable, provided the total thickness of the wall is not less than 12 inches.

B. *Mortar Materials and Mixing*

1. CEMENTITIOUS MATERIALS AND AGGREGATES for mortar shall comply with the specifications in the following table:

Materials for Mortar:		
Quicklime for Structural Purposes	C.S.A.	A82.42–1950
Hydrated Lime for Masonry Purposes	C.S.A.	A82.43–1950
Portland Cement	C.S.A.	A5–1961
Natural Cement	A.S.T.M.	C10–54
Masonry Cement	C.S.A.	A8–1956
Gypsum Plaster	C.S.A.	A82.22–1950
Keene's Cement	C.S.A.	A82.26–1950
Aggregate for Masonry Mortar	C.S.A.	A82.56–1950

Aggregate shall consist of clean sand or other material accepted by the authority having jurisdiction. Water for use in mortar shall be clean and free from deleterious amounts of acids, alkalis, salts or organic matter.

2. STORAGE OF MATERIALS ON THE SITE. Cementitious materials shall be adequately protected from the weather whilst in storage on the site. Aggregate shall be segregated and precautions taken to prevent mixing with earth or other foreign matter.

3. COMPOSITION AND TYPES OF MORTAR

(a) All mortars shall consist of one of the following types:

Lime Mortar
Lime-cement mortar
Cement mortar

or other mortars accepted by the authority having jurisdiction.

(b) Lime mortar shall consist of one part lime and not more than three parts of aggregate. Mortar consisting of one part of masonry cement or natural cement with not more than three parts of aggregate may be substituted for lime mortar.

(c) Lime-cement mortar shall consist of not less than one-half part nor more than two parts lime putty, with one part of Portland cement, and with not more than three parts of aggregate for each part of cementitious material (lime and cement).

Mortar consisting of one part of masonry cement or natural cement with not more than three parts of aggregate, and having a compressive strength at 7 days of not less than 500 p.s.i. may be substituted for lime-cement mortar.

(d) Cement mortar shall consist of one part of Portland cement with a lime addition of not less than 10 per cent and not more than 25 per cent by volume of the cement content, and not more than three parts of aggregate to each part of cementitious material (lime and cement).

(e) Cement grout shall consist of one part of Portland cement and not more than two parts of sand.

4. MEASURING OF COMPONENTS

(a) Portland cement, masonry cement and natural cement shall be measured dry by volume

(b) Aggregates shall be measured dry by volume.

(c) Lime, whether delivered as hydrated or quicklime, shall be measured in the form of wet paste by volume.

5. PREPARATION OF LIME. Quicklime shall be slaked with care to avoid overheating and shall be stored in the wet condition without addition of other material for not less than 7 days before mixing; hydrated lime shall be stored in the wet condition for not less than 12 hours.

6. MORTAR MIXING. Water for mixing shall be measured and shall be sufficient in quantity to produce a workable mortar, without leeching. Mixing shall be done by a power mixing machine or shall be done on a watertight platform. Such platform shall be cleaned between batches.

Each batch of mortar shall be mixed to a uniform consistency and color.

After mixing, mortar shall be held for at least one-half hour before placing.

7. TEST FOR QUALITY. All mortars shall be subject to standard testing. Except as provided by their alternatives in 3. *(c)* and *(d)* preceding, mortars shall develop the following compressive strengths when tested according to an acceptable standard method:

Lime Mortar	100 p.s.i.
Lime-cement mortar	800 p.s.i.
Cement mortar	2,000 p.s.i.

8. MORTAR USES

(a) Masonry exposed to the weather shall be laid up in lime or lime-cement mortar. All chimney masonry shall be laid up in lime-cement mortar.

(b) Load-bearing masonry constructed of hollow units, and masonry exposed to soil, shall be laid up in lime-cement or cement mortar.

(c) Non-load bearing interior walls and partitions constructed of clay or shale masonry units shall be laid up in mortar as in 3. preceding. When such walls and partitions are to receive plaster finish Gypsum mortar way be used. (See Q. following).

9. COLD WEATHER REQUIREMENTS. The requirements set forth in Section 12. F. 2. shall be strictly adhered to.

C. *Permissible Stresses in Unreinforced Masonry*

Masonry construction shall be such that the compressive and shear stresses set forth in the following table shall not be exceeded.

Maximum Allowable Stresses for Unit Masonry in Pounds Per Square Inch of Gross Area*

Column 1	Column 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9
		Mortar						
		Cement			Lime — Cement			Lime
Type of Masonry	Ultimate compressive strength lb./sq. in. average of 5 tests	Axial Strength	Transverse Strength		Axial Strength	Transverse Strength		Axial Strength
		Compression	Shear	Mod. of Rupture	Compression	Shear	Mod. of Rupture	Compression
Solid rubble stone	—	140	15	15	100	10	10	70
Solid concrete blocks	1800 +	175	15	15	125	10	10	100
Solid masonry composed for any solid unit except as above.	1500–2499	125	15	15	100	10	10	50
	2500–4499	250	20	20	175	15	15	100
	4500–7999	300	20	20	200	15	15	100
	8000–9999	400	25	25	300	18	18	100
	10000 or over	500	25	25	350	18	18	100
Cavity walls (net area) composed of any solid unit except rubble stone	2500 +	125	—	—	100	—	—	50
Solid walls composed of:								
(a) Load-bearing structural clay tile	1500 +	125	15	15	100	10	10	not allowed
(b) Load-bearing hollow concrete blocks or hollow sand-lime blocks	1000 +	100	12	12	80	10	10	not allowed
Solid masonry composed of solid units of cellular concrete	450 +	—	—	—	45	10	10	not allowed

* Read "net area" for cavity walls.

D. *Bearing of Structural Members on Masonry*

1. BEARING FOR COLUMNS. A masonry bearing supporting a steel or other column that requires anchor bolts shall consist of a proper concrete cap (or pad) not less than 12″ in thickness.

2. BEARING FOR FLEXURAL MEMBERS. In calculating the stresses in the masonry bearing to support the end of a flexural member the deflection of which exceeds 1/360 of its clear span, it shall be assumed that the end reaction is applied eccentrically at a distance in from the bearing edge of the masonry equal to one-third of the total length of bearing measured parallel to the length of the member. If the allowable stresses in the masonry would be exceeded, a bearing of steel or other adequate method of distributing the load over the required area of the masonry shall be provided.

3. BEARING ON HOLLOW MASONRY UNITS. When a concentrated load is imposed on hollow masonry units, such as by beams, girders, columns, etc., the bearing shall consist of solid units for a depth of not less than 8″.

   To receive joists or other framing members, the course directly carrying such members shall be a course of solid concrete blocks not less than 4″ in depth, 4″ of poured concrete or other solid masonry, such as two courses of brickwork full thickness of wall. If poured concrete is used, it shall be reinforced with wire mesh (expanded metal lath not acceptable). Special blocks may be used when accepted by the authority having jurisdiction.

E. *Support for Masonry*

1. SUPPORT ON COMBUSTIBLE MATERIAL. Masonry shall not bear on combustible material.
2. THICKNESS OF WALL SUPPORTING MASONRY WALL. Every wall directly supporting a masonry wall shall be not less in thickness than the wall supported.
3. BEARING OF MASONRY WALLS ON STRUCTURAL MEMBERS. The distance from the outer face of any masonry wall supported on a structural member, to the outer edge of the member, shall not exceed two-thirds of the distance between the outer face of the wall and its centre of gravity.
   The distance from the face of the wall to the edge of a supporting member attached to the structure such as a shelf angle or the flange of a beam, shall not exceed 1¼".

F. *Lateral Support of Masonry Walls*

1. Every masonry wall or partition shall be supported at right angles to the wall face by means of intersecting walls, buttresses, or by floor or roof construction; except that when any wall or partition is free standing and has been shown by stress analysis or test to be adequate to withstand, as a cantilever, all lateral forces to which it may be subjected, such lateral support need not be provided.
2. Where lateral support is provided by intersecting walls or buttresses, such walls or buttresses shall have sufficient strength and stability to transfer to the ground all the lateral forces that they are assumed to resist. When lateral support is provided by floor or roof construction, such construction shall be adequate to function safely as a horizontal beam or truss under the conditions imposed.
3. When masonry walls depend on structural members, such as walls, beams, and buttresses for lateral support the distance between such supports shall not exceed the following:

Solid Walls	20 times wall thickness
Hollow Walls	18 times wall thickness

G. *Anchorage*

1. ANCHORAGE TO STRUCTURAL FRAME. Every masonry wall that abuts or adjoins the structural members of a skeleton building shall be anchored thereto at vertical intervals not exceeding 2'. Such anchors shall consist of galvanized steel or wrought iron having a cross section at least equal to ¼" round rod with a minimum thickness of 3/16" or acceptable equivalent. They shall be of sufficient length to adequately anchor the masonry. Such ties shall be hooked for anchorage in masonry walls. Each tie shall be mechanically secured to columns so as to develop the full working strength of the tie under stress.
2. ANCHORAGE TO FLOOR AND ROOF CONSTRUCTIONS. Where required to provide lateral support, masonry walls shall be anchored to each tier of joists, beams, girders or floor construction bearing on such walls at maximum intervals of 6'8". Every wall anchor shall be of galvanized steel or wrought iron with minimum thickness of 3/16" and minimum cross sectional area of 9/32 sq. in. or approved equivalent. The abutting ends of all members end-anchored to masonry walls shall be strapped, lapped or otherwise fastened together so as to form a continuous tie from wall to wall. In walls parallel to joist construction, anchors spaced not more than 6'8" o.c. shall engage the tops of at least three joists.
   Rafter plates shall be not less than 2" nominal thick material and the same nominal width as the supporting masonry wall. Such

plates shall be levelled, shimmed up and bedded in cement mortar under their entire bedding areas, and anchored as required for sills to a foundation wall (see Section 23. B.). Alternatively, anchorage to the wall may be by means of attachment to the furring strips (see Section 19. L. 1. *(c)* following). Each furring strip shall be nailed to the side of the plate. In addition, where the spacing of the ceiling or roof joists coincides with that of the furring strips, each strip shall also be nailed to the corresponding joist. In sloping roof construction, furring strips may be nailed to rafters.

3. ANCHORAGE OF PROJECTING MASONRY. All cornices, belt courses, sills, or other trim of stone or other non-combustible material which project beyond the wall face shall have not less than 65 per cent of its mass with a minimum bearing of 3¾" in the wall, shall be adequately anchored to the wall, or shall be carried on steel lookouts adequately anchored to the wall or to the structural frame.

H. *Bonding*

1. GENERAL. In all unit masonry walls, the vertical joints shall be staggered; provided that special variations acceptable to the authority having jurisdiction may be permitted. Material used to form the outer side of solid, faced or cavity walls shall be bonded or otherwise tied to the back-up or inner material by one of the methods described in the appropriate portion of the following.
2. SOLID BRICK WALLS. All solid brick walls (except faced walls) shall have a header course, at least every sixth course on each side of the wall or there shall be at least one full header in every 80 sq. in. of each wall face. In walls 12" or more in thickness, headers shall overlap headers to provide a continuous tie through the wall. Every course shall break joint with the course below except that other methods of jointing acceptable to the authority having jurisdiction may be permitted.
3. FACED WALLS
   (a) Facing units shall have a portion of bonding units extending not less than 3¾" into the backing. Such bonding units shall be uniformly distributed and shall constitute not less than one-sixth of the face area of the wall.
   (b) The thickness of facing units shall be not less than 3⅝" or not less than one-tenth of the height of the unit, whichever is the greater.
   (c) Facing units exceeding one foot in height, other than bonding units, shall be anchored to the backing by at least two approved metal anchors. There shall be not less than one top anchor for each 2' in length or portion thereof, and there shall be not less than one anchor for each 3 square feet, of superficial area or portion thereof, of each such unit. In addition, there shall be an equal number of anchors at or near the bottom of all such facing units that exceed 30" in height. The metal anchors may be omitted where each alternate course consists of bonding units having a face area of not less than one-third of the superficial face area of the wall.
   (d) Stone facing shall be backed with masonry of load-bearing quality; and when by reason of unit size the facing units require anchors, the backing shall be not less than 8" in thickness.
   (e) Every anchor required for facing units shall be at least equal to a 1" by 3/16" flat bar of steel. The ends of every anchor shall be bent not less than 1" into both the facing unit and the backing and be completely imbedded in mortar joint. All

corrodible anchors shall be either coated with asphaltum or galvanized after fabrication.

4. SOLID BLOCK WALLS. Where any wall comprises two or more units in thickness, the units forming the inner and outer faces of the wall shall be bonded together by bonding units which extend through the wall or which provide a bond by overlapping at least 3⅝″ unit by unit. The face area of such bonding units shall be not less than one-sixth of the face area of the wall, and the interval, horizontally and vertically, between such bonding units shall not exceed 34″.
5. SOLID WALLS OF HOLLOW UNITS. Where two or more hollow units are required in the thickness of any masonry wall, bonding units which overlap not less than 3⅝″ shall be provided at vertical intervals not exceeding 34″, or bonding units which overlap not less than 2″ shall be provided at vertical intervals not exceeding 17″, provided that the bonding units shall be not less than 50 per cent greater in thickness than the unit below.
   One-sixth of the face area of the wall shall be bonding units. When the shells and webs of the units will not be in alignment, such bonding units shall be solid.
6. CAVITY WALLS. The inner and outer wythes of cavity walls shall be bonded together by acceptable corrosion-resistant metal ties at intervals vertically and horizontally not exceeding 18″. Ties shall be crimped or otherwise formed to function as a drip in the centre of the wall cavity. Additional bonding ties shall be provided at all openings. These shall be spaced not more than 3′ apart around the perimeter of and within 12″ of the opening. Alternatively the inner and outer wythes of cavity walls shall be bonded together by overlapping bonding units at intervals, vertically and horizontally not exceeding 24″.
7. RUBBLE STONE WALLS. The bond stones in rubble stone walls shall be uniformly distributed and shall constitute at least 16 per cent of the face area of the wall. Bond stones shall extend through the wall or the bonding effect shall be extended through to the opposite face of the wall by bond stones which overlap at least 6″.
8. PIERS AND BUTTRESSES. Piers and buttresses shall be bonded in a similar manner to that specified for solid walls in 4. preceding. Buttresses shall be bonded to the supported wall to the same extent in both directions.
9. WALLS THAT MEET OR INTERSECT. When masonry walls meet or intersect, they shall be bonded or anchored together at vertical intervals not exceeding 18″.

I. *Corbelling*

1. MATERIAL. All units used in corbelling shall be solid.
2. HORIZONTAL PROJECTION. The maximum horizontal projection of any unit shall be 1″ for every 2″ of vertical projection. The total projection of any corbel shall be not more than one-third the thickness of the supporting wall.
3. THICKNESS OF BEARING WALLS. Corbelling shall be permitted only in construction which is at least 12″ in thickness.
4. CORBELS IN HOLLOW UNIT WALLS. Corbels of solid units, in hollow unit walls, shall be supported on solid masonry equal in height to one full course of the hollow units.

J. *Thickness of Masonry Walls*

1. GENERAL
   (a) The provisions of this subsection shall only apply to walls above foundations.

(b) Thickness shall be measured exclusive of parging or furring. (See also, Section 20., Veneered Walls.)

(c) The provisions of Section 7. may require an increase in the otherwise allowable thickness prescribed herein.

(d) Thickness of walls composed of two or more types of units which differ as to strength, shall be determined on the basis of the lesser of the types used.

(e) The top of the wall shall be used as the height reference point in computing permissible thickness.

2. LOAD-BEARING WALLS. The following thicknesses apply to walls not exceeding 35'0" in height in buildings in which the live load does not exceed 50 pounds per sq. ft. For buildings in which the walls exceed 35'0" in height or the live load exceeds 50 pounds per sq. ft. the requirements of Section 4.4 of the National Building Code, 1960, shall govern.

(a) Solid Walls of Solid Units. The upper 25'0" of such wall shall be not less than 8" thick. In walls exceeding 25'0" in height the section of wall supporting such 8" wall shall be not less than 12" thick.

(b) Solid Walls of Hollow Units. The upper 25'0" in height of such wall shall be not less than 10" thick. In walls exceeding 25'0" in height, the section of wall supporting such 10" wall shall be not less than 12" thick.

(c) Solid Walls of Combined Solid and Hollow Units. The design of such wall shall comply with the requirements of *(b)* preceding, and Section 9. A. 3., subject to the approval of the authority having jurisdiction.

3. LOAD-BEARING PARTITIONS. The thickness of load-bearing partitions of unit masonry which support frame construction only shall be not less than 8" and shall also conform to the requirements in F. 3. and G. 2. preceding.
When such partition exceeds 10'0" in height or when it supports masonry, it shall be considered to be a solid wall and shall comply with the requirements of 2. preceding.

4. NON-LOAD-BEARING PARTITIONS. The height of any unit masonry partition between horizontal lateral supports shall not exceed thirty-six times its thickness except that where lateral support is provided by means of walls, pilasters, buttresses or columns at horizontal intervals not exceeding thirty-six times its least thickness, the height may extend to seventy-two times the wall thickness.
The height of any unit masonry partition which is not supported laterally at its top, shall not exceed eighteen times its least thickness except that where lateral support is provided by means of walls, pilasters, buttresses, or columns at horizontal intervals not exceeding thirty-six times its least thickness, the height may extend to thirty-six times the wall thickness.

5. CHANGE IN THICKNESS AT FLOOR LEVELS. Walls shall not vary in thickness between their lateral supports except for permissible chases and recesses.
When a change in thickness due to minimum thickness requirements occurs between floor levels, the greater thickness shall be carried up to the next higher floor level.

6. BUTTRESSED WALL THICKNESS. When buttresses are employed to laterally support solid masonry load-bearing or non-load-bearing walls, the wall thickness which would be required if these supports were not provided, may be reduced by half of the thickness added

by the buttress to the required thickness of the wall before reduction, provided that no part of a buttressed wall shall be less than 8″ in thickness. The dimensions of such buttresses measured in a line parallel to the wall, shall be not less than one-eighth of the distance centre to centre of buttresses. The distance between buttresses shall not exceed twenty-five times the reduced wall thickness.

7. ISOLATED PIERS. The unsupported height of any isolated pier shall not exceed ten times its least horizontal dimension.
8. FACED WALL THICKNESS. When masonry facing is used, it shall not be considered in computing either the thickness or the strength of the wall unless it is at least 3⅝″ in thickness and is bonded to the backing as required in H. 2. preceding.
9. CAVITY WALL THICKNESSES. The net cross-sectional area shall be not less than as required for solid masonry walls of the same material. The thickness of the inner and outer wythes shall be not less than 3⅝″. The cavity between wythes shall be not less than 2″ nor more than 3″. In no event shall the overall thickness of such wall be less than 10″, or its height exceed 35′.
   Where cavity walls support floor or roof assemblies provision shall be made for the distribution of the loads from such assemblies over the full cross-section of the cavity wall by bridging with not less than 5″ of solid masonry or by other acceptable means.
10. OPENINGS IN MASONRY WALLS. When spandrels are so proportioned that the lateral dimension is greater than the height, or when the area of windows equals more than 50 per cent of the area of the wall, or when either the lateral or vertical dimension exceeds twice the other dimension, the masonry shall be capable of supporting the resulting concentration of loads without damage or distortion.

K. *Chases and Recesses*

1. DIMENSIONS AND LIMITATIONS. There shall be no chases in 8″ load-bearing walls or within the required area of any buttress or pier, and no chase in any wall or pier shall reduce by more than one-third the thickness of such wall or pier. No horizontal chase shall exceed 4′ in length nor shall the horizontal projection of any diagonal chase exceed 4′. No vertical chase shall be closer than 2′ to any pilaster, or other stiffener required for lateral support.
2. CHASES AND RECESSES IN HOLLOW UNIT MASONRY. Every chase or recess in hollow unit masonry shall be built in as construction proceeds. Cutting of hollow units for chases, recesses, bearings, or other purpose after the units have been built in place is not permitted.
3. ALCOVES. Recesses in unit masonry walls for alcoves and similar purposes shall be not more than 8′ in width and shall have not less than 8″ of masonry at the back. Such recesses shall have acceptable masonry arches or shall be spanned with adequate lintels or beams.
4. NON-LOAD-BEARING PANELS. Non-load-bearing panels not exceeding 25 square feet in area, and reinforced at the edges with 1/16″ x 2″ strap iron, horizontally placed at vertical intervals not exceeding 9″ and extending not less than 9″ into the adjoining masonry on each side, may be 4″ in thickness. The inner surface of such panels shall be rendered with at least ½″ of appropriate mortar.

L. *Damp-Proofing Above Grade*

1. INTERIOR FACE OF WALLS. Every exterior unit masonry wall shall be treated at the interior face to arrest moisture travel by the following or other acceptable method.

(a) Continuous wood nailing strips $\frac{3}{8}$" x $1\frac{5}{8}$", or approved mechanical devices to receive furring strips shall be built into such walls at vertical intervals not exceeding 24".

(b) The interior face of such walls shall be parged or back-plastered and then covered with one ply of 15 lb. asphalt saturated felt lapped 4" at joints. Such felt shall at least conform to C.G.S.B. 9-G.P.-2.

(c) Continuous wood furring strips, not less than 1" x 2" nominal, shall then be applied vertically at 16" o.c.

(d) In cavity walls, bonded only with metal ties having an incorporated drip and in solid masonry walls, 12" or more in thickness, the preceding requirements shall apply, except that the parging and saturated felt may be omitted.

2. DAMP-PROOF COURSES

(a) Damp-proof courses shall be installed in all exterior masonry walls, to bar the passage of moisture from any part of the structure to another, as follows:

(i) Immediately under the first floor joists or sill when the bottom surface of such joists is less than 16" above grade level adjacent to foundation wall.

(ii) Under the full length of wood, concrete, stone, brick masonry or other jointed window sills. See Section 31. B. 1. *(b)* for method of installation.

(iii) Over the heads of all window and door openings in cavity walls, masonry veneered walls, or solid walls of hollow units.

(iv) At the junction of the foundation wall and the cavity wall, masonry veneered wall, or solid wall of hollow units. In cavity walls this damp-proof course shall be built into the inner leaf or wythe, and slope downward as it crosses the cavity and shall extend through the outer wythe.
In masonry veneered walls this damp-proof course shall extend from a point under the building paper or felt on the sheathing at least 4" above the foundation wall or head of the opening in a downward slope and then be carried through a mortar joint to within $\frac{1}{2}$" of the outer face of the wall.

(v) Through parapet walls, immediately under a coping of concrete or other impervious material.

(b) Weepholes. Weepholes through the outer wythe or veener shall be provided immediately above the damp-proof course at not more than 2' intervals.

(c) Materials for Damp-proof Courses.

(i) Soft sheet lead not less than 4 lbs. per square foot. Soft tempered copper not less than $7\frac{1}{2}$ oz. per square foot. Acceptable bituminous material weighing not less than 45 lbs. per square or other material accepted by the authority having jurisdiction.
See Section 31. for coping and flashing.

(ii) Mastic caulking compound at least equal to C.G.S.B. 19-GP-6 Compound; Caulking, Oil Base, Gun Grade, shall be applied at junction of exterior door and window frames with masonry.

M. *Parapet Walls and Balustrades*

1. MATERIAL. Every parapet wall and masonry balustrade shall be constructed of solid masonry units laid in lime or lime-cement mortar.

2. **THICKNESS OF PARAPET WALLS.** Parapet walls of unit masonry shall be not less than 12″ in thickness, except that a parapet wall entirely supported by the wall below shall be not thicker than such supporting wall.
3. **HEIGHT OF PARAPET WALLS.** The height of a parapet wall or balustrade shall be not more than four times its thickness.
4. **CAPPING.** Every parapet wall or masonry balustrade shall be capped with an impervious coping of metal, vitrified tile, stone or other approved material. A drip having a projection of not less than 1″ shall be formed at the base of the capping.
   Copings of concrete or other permeable masonry shall be flashed on the top and back with corrosion-resistant metal or other acceptable material, or through flashing under such coping shall be provided as required in L. 2. preceding.
5. **PROTECTION OF BACK FACE OF WALL.** The back face of every parapet wall shall be completely covered by corrosion-resistant sheet metal flashing extending from the roof to the underside of the coping or to a line at least 3′ above the adjacent roof level. See also Section 31. C. 2.
6. **BONDING OF BALUSTRADES.** All parts of a masonry balustrade shall be securely dowelled or clamped together.

N. *Monolithic Concrete Walls*

Exterior walls of monolithic concrete will be considered when both the building and the structural design have been prepared by a Registered Architect or Registered Engineer in accordance with Section 4. A. and Section 9. A. 3. to at least conform to the requirements of Section 4. 5. of the National Building Code, 1960, and the applicable portions of these Standards.

O. *Use of Wood in Masonry Construction*

Wood or other combustible material shall not be built into any masonry except as provided herein:

1. **ENDS OF WOOD JOISTS** or other structural members.
2. **WOOD PLUGS** may be used in any masonry wall.
3. **WOOD BLOCKS AND WOOD STRIPS** not exceeding 8″ in length and not less than 32″ apart on centres horizontally and vertically.
4. **IN SOLID UNIT MASONRY** not exceeding three storeys in height, wood nailing strips not exceeding 1¾″ by ⅜″ may be used.
5. **WOOD NAILING BLOCKS, PLATES, AND BOARDING** may be used in and on parapet walls for the purpose of attaching metal copings provided they are securely attached to the wall.
6. **FOR ANY OPENING NOT MORE THAN 4 FEET IN WIDTH** in a wall of any building of other than fire-resistive construction, any cambered wood lintel that is used as centring for a masonry arch may be left in place provided such lintel does not extend more than 2″ into the wall at either end.
7. **IN HOLLOW UNIT MASONRY PARTITIONS** not exceeding 4″ in thickness, wood lintels may be used over openings which do not exceed 3′4″ in width, provided the bucks extend to the ceiling.

P. *Glass Block Construction*

1. **GENERAL.** Glass block construction shall be limited to panels in the walls of a building for purposes of natural lighting and/or decorative effect.
   Glass block panels shall not be subjected to any loads other than those imposed by wind and weather.

All glass block shall be installed in accordance with the manufacturer's instructions.

2. MATERIALS. Glass blocks should conform to British Standard Institute Specification B.S.-1207-1953. Mortar shall be composed of 1 part Portland cement, 1 part lime putty and not more than 4 parts of sand.

3. DIMENSION LIMITATIONS. Every exterior glass block panel shall be supported against lateral movement by either horizontal or vertical supports, spaced not farther than 8′ apart. Any panel that is so supported on four sides, may be 144 square feet in area without intermediate bracing.

4. EXPANSION JOINTS. All glass block construction shall have expansion joints at the head and jambs of every panel, and at intervals not exceeding 20′ in any continuous construction. Expansion joints shall consist of packed oakum or approved resilient materials, and shall be pointed on both sides with not less than ¼″ of non-hardening waterproof caulking material. The thickness of such joints shall be not less than ½″. All expansion joints shall be kept free of mortar.

5. BONDING OF PANELS. A recess not less than 1½″ in depth shall be formed in the masonry jambs to receive the glass block panels, or corrosion-resistant metal ties extending not less than 9″ into the joints of the masonry and the panels shall be installed at vertical intervals of not more than 24″.

6. REINFORCEMENT. Horizontal joints shall be reinforced with expanded metal strips of the continuous edge type not less than 3″ in width. Strips shall either extend the full length of the joint or be overlapped at least 6″ to form a continuous tie from end to end. Reinforcement shall be spaced at vertical intervals of not more than 24″, except that where the glass blocks exceed 8″ in height the reinforcement shall be placed in every horizontal joint.

7. FLASHING. In all exterior walls, through flashing of corrosion-resistant sheet metal or other acceptable material, shall be installed over the head of all glass block panels and over all horizontal shelf angles.
The outside edge of such flashing shall form a drip having a projection of at least 1″.

Q. *Gypsum Masonry*

1. LIMITATIONS OF USE. Gypsum masonry shall not be used in any construction directly exposed to the soil, weather, or dampness. Unreinforced gypsum masonry shall be limited to furring or fireproofing and to non-load-bearing partitions.
All gypsum masonry units shall be laid in gypsum mortar.

2. MATERIALS
   (a) *Quality.* All gypsum masonry materials shall conform to the provisions of C.S.A. Specification A 82.25-1950.
   (b) *Gypsum Mortar.* Gypsum mortar shall consist of 1 part calcined gypsum with not more than 3 parts of aggregate by weight.

3. GYPSUM BLOCK PARTITIONS
   (a) *General.* Gypsum block partitions shall be supported on non-combustible material such as masonry, plain or reinforced concrete, or structural steel.
   All blocks shall be laid plumb and true with all joints completely filled with mortar.

All nailing blocks, anchors, ties, and inserts shall be built in place as the work proceeds.

All gypsum block partitions shall be plastered both sides with not less than ½″ of gypsum plaster.

(b) Base Course. Where the base of a partition is likely to be exposed to water or moisture the first course of masonry above the floor level shall be terra cotta block set in lime-cement mortar.

(c) Loading. No gypsum block partition shall be subjected to any load other than the dead load of the gypsum blocks above.

(d) Lateral Bracing. Partitions shall be securely wedged or otherwise anchored to the floor and ceiling construction above at intervals of not more than 4′.

(e) Lintels. The lintel over an opening not more than 1′10″ wide may consist of a single gypsum block having a 4″ bearing at each end.

Where other support is not provided the lintel over an opening not more than 4′ wide may consist of three unreinforced gypsum blocks cut to form a jack arch. The bearing at each end shall be not less than 1′3″ and the bottom side of the key block shall be not more than 1′6″.

The lintel over an opening not more than 6′ wide shall consist of gypsum blocks having the upper and lower core holes filled with gypsum mortar and reinforced with ⅜″ diameter steel bars. The minimum bearing at each end shall be 4″.

Lintels over an opening more than 6′ in width shall consist of structural steel shapes having a bearing of not less than 4″ at each end.

(f) Height Limitations. Gypsum block partitions shall conform to J. 4. preceding.

20. VENEERED WALLS

A. *General*

Veneer shall not be considered to be part of the wall when computing the strength or required thickness of the wall.

B. *Unit Masonry Veneer*

1. MATERIALS
   - *(a)* Masonry units for veneering shall be solid and of load-bearing quality, and shall comply with the requirements of Section 19. A.
   - *(b)* Stone units for veneering shall have bearing surfaces tooled or sawn flat (horizontal).
   - *(c)* Brick shall be concrete, clay, shale or sand-lime.
   - *(d)* Other materials accepted by the authority having jurisdiction.
   - *(e)* Mortar shall comply with the requirements of Section 19. B.
2. HEIGHT LIMITATIONS. Veneer shall not be applied to the exterior face of a wall at a height of more than 35′ or three storeys above finished grade.
3. LOADING. Masonry veneer shall not be subjected to any load other than the dead load of the veneer above.
4. BEARING
   - *(a)* Unit masonry veneer above openings shall be supported upon lintels of non-combustible materials.

(b) Unit masonry veneer shall bear on a masonry or concrete wall or other non-combustible structural member.

(c) No unit used in masonry veneer shall support another unit with a bearing surface greater than its own.

5. THICKNESS OF VENEER

(a) Brick veneer or veneer of glazed or enamelled terra-cotta shall be not less than 3⅝" in thickness.

(b) Stone units for veneer on masonry walls shall have bearing surfaces not less than 3⅝". The bearing surfaces of stone veneer on wood-frame construction shall be not less than 6" or one-half the height of each unit, whichever is the lesser, provided the bearing is not less than 3⅝" in any case.

6. ATTACHMENT TO MASONRY WALLS. When masonry walls are veneered with brick, stone, or other masonry units, such veneer shall be securely tied into the backing by a bonding unit or header in each 300 square inches of wall face, or by acceptable corrosion-resistant metal ties spaced at intervals not exceeding 1' vertically and 2' horizontally. Bonding units and headers shall extend not less than 3⅝" into the backing.

7. ATTACHMENT TO WOOD-FRAME CONSTRUCTION

(a) To receive veneer, the wood-frame shall be sheathed in accordance with the requirements of Section 23. C. 3. Such sheathing shall be covered with building paper, lapped 4" at edges and around openings. Building paper shall comply with the requirements of Section 25.

(b) Veneer shall be secured to the studs or other framing members with 3/16" corrosion-resistant steel rods, 1" x 7"—28 gauge corrugated galvanized sheet steel ties, or with other types of ties accepted by the authority having jurisdiction. The ties shall be placed at intervals not exceeding 16" horizontally and vertically.

(c) Veneer should be separated from the sheathing by a distance of 1".

(d) Weepholes, spaced at approximately 2'0" intervals are required and may be formed by having an open joint between units in the bottom course or by other suitable methods. For dampproofing see Section 19. L. 2.

(e) Mastic caulking compound shall be applied at junction of exterior door and window frames with masonry.

C. *Tile, Glass, and Marble Veneer*

1. MATERIALS. The requirements of this Subsection apply to all materials such as tile, glass, vitrolite and other like products accepted by the authority having jurisdiction, and to marble, brick or stone units which are less than 3⅝" in thickness.

2. BEARING. No dependence shall be placed on any veneer unit to support other veneer units.

3. HEIGHT LIMITATIONS. Such veneer shall not be applied to the face of a masonry wall at a height of more than 25' nor to wood-frame construction at a height of more than 18' above the finished grade.

4. THICKNESS OF VENEER UNITS. Stone and marble units shall be sufficiently thick or shall have adequate backing reinforcement to withstand the stresses imposed by handling and setting.

5. DIMENSION LIMITATIONS. Such veneer units shall be not more than 8 square feet in area nor more than 4' in width or height.

6. MASONRY BACKING. Masonry to receive veneer shall, if neces-

sary, be brought to a true and even surface by a coating of Portland cement mortar.

7. WOOD-FRAME BACKING. The face of the wood-frame construction shall be covered with metal lath weighing not less than 3 pounds per square yard and attached to the frame at intervals of 6″ by nails or staples having a penetration of at least 1″.
The metal lath shall be covered with a coating of Portland cement plaster not less than ¾″ in thickness finished to a true and even surface.
8. ATTACHMENT. In accordance with the supplier or manufacturer's instructions, every unit shall be secured to the backing with an acceptable adhesive and shall be wired in place or otherwise supported by special clips, brackets or other suitable devices supplied for the purpose.

21. CHIMNEYS AND FLUES

A. *General*

Any chimney may be erected free standing; as the integral part of a wall; or may be enclosed within a building without being considered a component part of the structure.

B. *Free Standing Chimneys and Engaged Chimneys (in Fire-Resistive Construction)*

All free standing chimneys and engaged chimneys in fire-resistive construction shall be designed and the construction supervised by a Registered Architect or Registered Engineer in accordance with Sections 4. A. and 9. A. 3. The design of such chimneys shall be in accordance with Part 6 of the National Building Code, 1960.

C. *Chimneys (Other than in Fire-Resistive Construction)*

1. SUPERIMPOSED LOADS. No chimney shall support any load except its own weight. Any other load shall be transferred to the supporting construction in a manner to prevent the shearing, cracking or falling off of any part of the chimney.
2. SUPPORT. Every chimney shall be supported by masonry or reinforced concrete or by construction having a fire-resistive rating of at least 4 hours. Supports, foundations and footings for chimneys shall be designed and constructed to carry the chimney without settlement or deflection sufficient to cause cracking of chimney walls or flue linings. (See Section 12. A. 5.)
3. HEIGHT. Every chimney shall extend at least 3′0″ above the highest point at which it comes in contact with the roof of a building, and at least 2′0″ higher than any ridge, parapet wall, or roof structure within 10′0″ of the chimney.
The chimney shall be suitably braced and anchored to the roof framing when the height above the roof is greater than four times its least horizontal dimension. Alternatively when the chimney height exceeds four times its least dimension, the bracing may be omitted, provided the design of such chimney is prepared by a Registered Architect or Registered Engineer in accordance with Sections 4. A. and 9. A. 3. of these Standards and at least meets the requirements for wind loading in Section 4. 1 of the National Building Code, 1960.
No radio or T.V. antenna or mast shall be attached to or otherwise supported by a chimney.
4. CLEARANCES. In no case shall combustible framing material be placed closer than 2″ to any chimney, nor within 6″ of any inlet

opening to such chimney. Any such space between combustible material and the chimney shall be left unfilled but shall be sealed off by a sheet metal or other non-combustible draft stop. Finished flooring shall have not less than ½" clearance from the chimney walls. Wood trim may be placed against a chimney if insulated therefrom by at least ⅛" of asbestos paper or asbestos board, and may be secured to the chimney by only non-combustible devices. In every case clearances and construction shall be such as to ensure that there will be no temperature in excess of 160°F. on any adjacent combustible material when the chimney is operating at full capacity.

5. CAPS AND CLEANOUT OPENINGS. Every chimney shall be capped with stone, concrete, tile, or other approved non-combustible weatherproof material. A sloped surface shall be provided from the outside of the chimney cap upwards to the projecting chimney liner. A drip shall be formed in the overhang of such cap or by metal flashing immediately under the cap extending not less than 1" beyond the walls of the chimney.

   Every chimney, other than those serving fireplaces, shall be provided with a cleanout opening at the base of each flue, or at least 8" below the breeching. Such opening shall be equipped with a tight-fitting metal door.

6. WALL CONSTRUCTION

   (a) Materials.

   For quality of materials and construction see Section 14. and Section 19.

   (b) In one and two storey buildings, walls of chimneys shall be constructed of solid unit masonry or reinforced concrete not less than 3⅝" in thickness when a vitrified clay tile liner is provided, and of solid unit masonry not less than 8" in thickness, or reinforced concrete not less than 6" in thickness when chimney liners are not installed. A mortar liner is not permitted.

   Special units or systems may be used if they are accepted by the authority having jurisdiction.

   (c) In buildings of three storeys or more walls of chimneys shall be constructed of:

Solid unit masonry (except stone)	not	less	than	8" thick
Solid dressed stone masonry	"	"	"	12" thick
Reinforced Concrete	"	"	"	6" thick
Rubble stone masonry	"	"	"	16" thick

   Every such chimney shall be provided with a chimney liner.

   (d) Any chimney serving a building not exceeding three storeys in height and built in connection with exterior, party or common walls of hollow units, may be constructed of two thicknesses of 4" hollow masonry units (load-bearing quality) laid with staggered joints. Every such chimney shall be provided with a chimney liner.

   (e) All mortar shall be lime or lime-cement mortar. See Section 19. B. 8.

   All unit masonry in chimney construction shall be laid with full mortar joints which shall be struck smooth where exposed to weather.

   (f) Corbelling in any chimney shall comply with the requirements of Section 19. I.

7. FLUES

   (a) Flues for units fired with solid or liquid fuel.

      (i) There shall be a separate flue for each heating unit fired with solid or liquid fuel such as furnace, stove, fireplace,

etc., except, that the smoke pipe from a jacket hot water heater supplying not more than four housing units, may be connected into a heating unit flue, provided such connection is made below the main breeching.

(ii) In chimneys containing more than two flues, each group of two flues shall be separated from a single flue or other group of two flues by brick partitions not less than 3⅝" thick. Where two flues are grouped without partitions, the joints in the respective flue linings shall be staggered.

(iii) No change shall be made in the size or shape of any chimney or flue within 6" of any part of a floor or roof assembly.

(iv) No flue shall be offset to a greater angle than 30° from the vertical.

(v) The required effective area of a flue shall be maintained throughout.

(vi) Size of flues — Flues for solid fuel burning fireplaces shall be not less than 8½" x 13" outside dimensions, if rectangular, nor less than 10" inside diameter if round. Flues for other heating units except gas fired shall be not less than 8" x 8" outside, 7" x 7" inside or 7" inside diameter if round. Every smoke pipe inlet (thimble) to a flue shall be located at least 18" below wood joists or other combustible material.

(b) Flues for gas fired appliances.

(i) The gas fired appliances of one housing unit, including a furnace, water heater and range may all be connected into the same flue provided each appliance, except a range, is equipped to automatically shut off the gas supply when the pilot light goes out accidentally. Such gas fired appliances with automatic shut-off may also connect to a flue serving a solid fuel fired unit, provided the connection is at least 8" above the breeching. Every appliance (other than a range) not so equipped shall be provided with a separate flue. Gas flues shall be in the form of pipe with bell and spigot, screw, or other equally gas-tight joints, or they shall be in the form of special flue blocks or flue linings of clay or concrete built into a masonry chimney. Such blocks or linings shall be laid with full mortar joints. The materials employed in forming any gas flue shall be non-combustible and corrosion-resistant. The types, thickness and arrangement shall obviate temperatures in excess of 160°F. on adjacent combustible materials. No sheet metal flue shall be permitted. Where gas flues extend through combustible walls or partitions, they shall have a full 1" air space between their exterior walls and any combustible material.

(ii) Flues for gas fired appliances must be accepted by the authority having jurisdiction.

(iii) Gas flues in a common or party wall shall be built into a chimney.

(iv) No flue shall have connections thereto in more than one storey.

8. CHIMNEY LINING

Except as stipulated in 6. (b) preceding, every chimney shall be lined throughout as follows:

(a) Every flue serving a high pressure steam boiler shall be lined with units of fireclay not less than 4" in thickness laid in fire-

clay mortar or high temperature cement, extending from at least 2'0" below the flue inlet, or breeching, to not less than 25'0" above such flue inlet or top of the chimney or stack, whichever is the lower.

(b) Flues for other heating units shall be lined throughout with 5/8" glazed clay (not shale) liners. Such chimney liners shall extend from not less than 8" below the lowest point of smoke-pipe intake, or in the case of open fireplaces from the apex of the smoke chamber, and shall be continuous to a point not less than 2" above the chimney cap.

(c) Chimney liners shall be built in as the outer walls of the chimney are constructed. Every joint and space between masonry and liner shall be thoroughly grouted with cement mortar as each course of masonry is laid. In every concrete chimney the chimney liners shall be firmly set in the concrete.

22. FIREPLACES

A. *Solid Fuel Burning Fireplaces*

1. The back and sides of every fireplace from the hearth level to the flue shall be not less than 8" thick when constructed of solid clay or shale brick or natural cut or cast stone. When constructed of hollow clay or concrete masonry units or of rubble stone, the thickness shall be not less than 12" provided the walls of hollow units are at least two units thick with joints staggered.
   All fireplace walls shall be lined with firebrick at least 2" in thickness, or other acceptable material. Alternatively, the minimum wall thickness preceding shall be increased by not less than 4". Firebrick shall be laid in fireclay mortar or high-temperature cement. Where the firebrick lining is 4" or greater in thickness, it may be included as part of the required minimum wall thickness.
2. Every fireplace shall be connected to a chimney flue through a smoke chamber and damper. Every ash dump shall empty into an enclosed chamber of incombustible material provided with a cast iron cleanout door.
3. Every fireplace shall have a hearth projecting at least 16" from the fireplace breast and extending at least 8" beyond each side of the fireplace opening. Support for such hearths shall be provided either by masonry trimmer arches haunched against a trimmer joist, or by masonry or reinforced concrete construction corbelled or cantilevered from the chimney base or otherwise carried by acceptable fire-resistive construction. The minimum thickness of non-combustible material composing the hearth and its support shall be 6".
4. No wood shall be placed within 8" of the jambs or arch of any fireplace opening. Combustible formwork used for the construction of a hearth shall be removed.

B. *Imitation Fireplaces*

1. Fireplaces for gas heaters shall not be constructed to imitate solid fuel burning fireplaces unless they conform in all respects, including chimney flues, to the requirements of A. preceding. Acceptable gas space heaters may be installed in recesses not more than 6" in depth, provided such recesses are constructed entirely of non-combustible materials. Such installations shall be in accordance with the requirements of the Canadian Gas Association and equipment shall carry the Association's label.

2. Imitation fireplaces for electrical appliances may be constructed provided the recess is lined on sides, back, and top with at least 1″ of non-combustible material. No flue or vent shall enter such recess. Equipment shall carry a label of the Canadian Standards Association.

23. WOOD-FRAME CONSTRUCTION

A. *General*

1. A building, any load bearing components of which are wood-frame, shall not exceed 35′0″ in height above the average finished grade, and shall be not more than 3 storeys in height.
2. Wood-framed walls shall include bearing walls constructed of studding, sills, plates and sheathing or plank-framed walls with or without sheathing.
3. Skeleton construction comprising a structural frame of wood columns and girders shall not be considered as being within the meaning of Wood-Frame Wall Construction; such skeleton construction shall be considered non-conventional requiring specific acceptance by the authority having jurisdiction based on individual merit.
4. Wood-framed or laminated bearing walls, wood columns or beams shall not be used in basements, cellars, or crawl spaces.
5. All members in wood-frame construction other than finish and millwork shall be so framed, anchored, tied and braced together as to develop the strength and rigidity necessary for the purpose for which they are used.
6. If framing members are notched to accept furring, plywood edge supports, purlins, etc., the depth of the framing members as required in this Section shall be increased by at least the depth of the notch.
7. See also Section 7.

B. *Anchorage to Foundation Wall*

The wood-frame shall be securely anchored to the foundation wall to resist any movement imposed by wind loading.

Beams and wall sills bearing on masonry shall be levelled, shimmed up, and bedded in cement mortar. The bearing end of beams shall be suitably anchored to the masonry, and sills shall be secured in place by ⅝″ anchor bolts imbedded not less than 4″ in the masonry at intervals not exceeding 8′0″ and at all corners; or ½″ anchor bolts similarly imbedded at intervals not exceeding 6′0″ and at all corners; or, an alternative acceptable method having equivalent resistance to lateral or upward movement; bolts shall be of such a form or fitted with special washers so that the nuts may be tightened without turning the bolts, or withdrawing the bolts from the foundation.

C. *Stud Wall Construction*

1. GENERAL

(a) Materials

For acceptable grades of lumber for studs, see Section 24. A.

(b) Height of Building

A building, any part of which contains exterior stud wall construction, shall not exceed two storeys in height throughout, and shall not be more than 25′ above average finished grade.

2. STUD FRAME WALLS

(a) Size of Studs

(i) The size and spacing of studs in exterior walls shall be as required in the Table of Minimum Requirements for Wall Framing and Sheathing Applications at the end of Section 23. C.

(ii) The studs in interior bearing partitions supporting two storeys shall be not less than

2″ x 4″ @ 12″ o.c.
or two 2″ x 4″ @ 16″ o.c.
or 3″ x 4″ @ 16″ o.c.
or 2″ x 6″ @ 16″ o.c.

(b) Length of Studs between floors or between floor and roof shall not exceed the following: 2″ x 4″ studs.....14′0″;
3″ x 4″ studs.....16′0″;
2″ x 6″ studs.....20′0″

(c) Studs may extend from bearing to roof line provided they are continuous from bearing to top support without splicing.

(d) Studs shall be set with the wide face at right angles to the wall face.

(e) Sole Plates or Sills

A sole plate (or sill) consisting of not less than 2″ material equal in width to the studs supported shall be provided for bearing of studs.

(f) Top Plates and Ribbon Boards

Studs shall be capped with a top plate consisting of two members of 2″ material equal in width to the studs and lapped at all corners and intersecting partitions. Laps shall be securely spiked. Joints in top plates shall be staggered at least 4′0″ and shall be made over a stud. When studs extend through a floor construction, ribbon boards not less than 1″ x 4″ let-in their full thickness into the studs shall be installed to provide bearing for joists. (See also E. 3. *(b)* (iii) following.)

(g) Corners and Intersections

(i) External and Internal corners in exterior walls and intersections of bearing partitions with exterior walls shall be formed with at least three studs.

(ii) Where non-load bearing partitions intersect exterior walls, such intersections shall be formed with at least three studs or alternatively by cutting-in 2″ x 4″ girths at 2′ intervals in the height of the wall between two studs and extending the base of the interior cladding behind the first stud of the partition. The first stud of the partition shall then be nailed securely to the sole and top plate of the partition and to the girths in the exterior wall.

(h) Windows and Door Openings

(i) Studs shall be doubled at all openings. Inner studs shall extend in one piece from header to bearing on sole plate and shall be nailed to outer studs. Outer studs shall extend in one piece from sole to top plate. Where the load transferred through the doubled studs at a door or archway opening in load bearing partitions is taken at a point between two floor joists, a header shall be cut-in between the joists to provide adequate support.

(ii) Lintels.

For uniform loading conditions lintels shall be in accordance with the following Table:

ALLOWABLE SPANS FOR HEADERS OR LINTELS

Header or lintel	Supporting two floors, ceiling and roof (feet)	Supporting one floor, ceiling and roof (feet)	Supporting roof and ceiling only (feet)
2—2" x 4"	2	2	4
2—2" x 6"	4	5	6
2—2" x 8"	6	7	8
2—2" x 10"	7	8	10
2—2" x 12"	8	9	12

NOTE: (a) Lintels consisting of two pieces shall be placed on edge and shall be securely fastened together.

(b) Solid lintels providing the same cross-sectional area are permitted.

(c) Framing over larger openings or for unusual conditions shall be designed by a Registered Architect or Registered Engineer in accordance with Section 9. A. 3.

3. SHEATHING AND BRACING

(a) **All exterior stud frame walls and plank framed walls as required in D. 4. following shall be sheathed on the exterior. Sheathing is not required on gable ends of attics or roof spaces where the exterior cladding is lapped or tongue-and-grooved wood, or plywood, or other material acceptable to the authority having jurisdiction. Where sheathing is omitted building paper (breather type) shall be applied to the exterior face of the studs prior to the application of cladding.**

(b) **Sheathing materials shall at least conform to the relevant requirements of Section 24. Minimum thickness requirements are as follows:**

Fibreboard	**7/16"**
Gypsum Board	**½"**
Lumber either T & G, square edge or Shiplap	**⅝"**
Plywood	**5/16"**

(c) **The bracing and sheathing for exterior walls shall be as required in the table at the end of this Subsection and subject to the following requirements:**

No imperfect or damaged material shall be erected.

Material which becomes damaged after erection shall be removed and replaced with sound material.

DIAGONAL BRACING:

Diagonal bracing shall consist of a minimum of 1" x 4" braces let into the faces of the studs at each wall corner at the required storey and shall extend across at least 3 stud openings and where possible shall extend the full height of the storey wall.

The brace shall be carefully notched into the studs and into the lower of the doubled top plates and should be accurately fitted against the top of the sole plate and the underside of the top wall plate.

When openings occur near corners, 1" x 4" knee braces shall be let into the studs at an angle of 45° to the studs. Knee braces shall be installed above and below such openings and shall extend across as many studs as possible.

Intermediate diagonal bracing similar to the foregoing shall be installed where the distance between corner braces exceeds 15'.

As an alternative to 1" x 4" let-in bracing, 2" thick cut-in braces, the same width as the studs, may be installed between the studs at each wall corner at the required storey in a continuous line from the bottom wall plate to the top wall plate and shall extend across at least three stud spaces.

LUMBER SHEATHING:

Lumber sheathing shall not be more than 12″ in width and shall be nailed to the studs with at least two common nails per bearing for boards of 8″ or less width and three common nails per bearing for boards wider than 8″. Nails shall be at least 2½ times the actual thickness. Joints shall be staggered and shall occur directly over supports. Diagonal sheathing shall be applied at 45° angle to the studs.

FIBREBOARD SHEATHING:

Fibreboard sheathing shall be fastened with at least 1¾″ long, 10-gauge, 7/16″ head diameter steel wire nails. In no case shall the length of nails be less than twice the thickness of the sheathing. Nails shall be spaced not more than 3″ o.c. along the edges and 6″ o.c. along the intermediate supports. When sheets are applied horizontally the intermediate horizontal edges of the sheathing should be nailed to blocking between the studs, except that if manufacturer's directions are more restrictive, they shall be followed.

GYPSUM BOARD SHEATHING:

Gypsum board sheathing shall be fastened with 1¾″ long, 10-gauge, 7/16″ head diameter steel wire nails spaced not more than 4″ o.c. along the edges and 8″ o.c. along intermediate supports. When sheets are applied horizontally, the intermediate horizontal edges of the sheathing board should be nailed to blocking between the studs, except that if the manufacturer's directions are more restrictive they shall be followed.

PLYWOOD SHEATHING:

Plywood sheathing shall be fastened with common nails of the same size and spacing as required in Subsection 28. C. 2. *(a)*. The intermediate horizontal edges of plywood should be nailed to blocking placed between the studs. Panels shall be separated by not less than 1/16″, and should be applied with the surface plies at right angles to the studs. The panels shall not be applied to form a tie between bottom wall plate and the floor framing system.

SHEATHING PAPER:

Twelve pound or better tarred or asphalted felt or other acceptable sheathing paper, lapped 4″ at joints, shall cover the exterior sheathing of all wood-frame walls. This sheathing paper shall be a breathing type and shall meet the requirements of C.G.S.B. Specification 9-GP-2.

4. INTERIOR STUD PARTITIONS

(a) General. Bearing walls or bearing partitions of stud frame shall not be constructed in basements, cellars, or crawl spaces. In these areas load bearing walls or partitions shall be constructed of concrete, unit masonry, or other acceptable noncombustible materials. See also subsection 7. F. 2.

(b) Load-Bearing Partitions. The construction of stud frame load-bearing walls and partitions shall at least conform to the provisions of C. 1. and 2. (*(a)* to *(h)* inclusive) preceding, and to the requirements of the following:

(i) Girths. Stud partitions shall be braced by cutting-in horizontal girths between the studs at the mid point between floor and ceiling. The width of such girths shall be the same as the studs and not less than 2″ nominal in thickness.

In one and two storey buildings where the partition height does not exceed 10′0″ girths may be omitted provided the studs are spaced at not more than 12″ o.c.

MINIMUM REQUIREMENTS FOR WALL FRAMING[1] AND SHEATHING APPLICATIONS AT VARIOUS STUD SPACINGS

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
Group No.	Type of Wall and Load Supported	Minimum Sizes of Studding, [2] Lumber Dimensions Nominal	Permissible Wall Sheathing [2] at Various Stud Spacings					
			Studs @ 12 in. o.c.		Studs @ 16 in. o.c.		Studs @ 24 in. o.c.	
			Braced	Unbraced	Braced	Unbraced	Braced	Unbraced
1	Load Bearing Wall Supporting Roof and Ceiling	2" x 4"	Bracing not required	1" Wood Diagonal 5/16" Plywood 7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal	Bracing not required	1" Wood Diagonal 5/16" Plywood 7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal	7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal 1" Wood Diagonal 3/8" Plywood	1" Wood Diagonal 3/8" Plywood
2	Load Bearing Wall Supporting one Floor, Roof and Ceiling	2" x 4"	7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal 1" Wood Diagonal 5/16" Plywood	1" Wood Diagonal 5/16" Plywood	7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal 1" Wood Diagonal 5/16" Plywood	1" Wood Diagonal 5/16" Plywood	Not Permitted	Not Permitted
3	Load Bearing Wall Supporting two Floors, Roof and Ceiling.	2" x 4"	7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal 1" Wood Diagonal 5/16" Plywood	1" Wood Diagonal 5/16" Plywood	Not Permitted	Not Permitted	Not Permitted	Not Permitted
		2 — 2" x 4" 3" x 4" 2" x 6"	7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal 1" Wood Diagonal 5/16" Plywood	1" Wood Diagonal 5/16" Plywood	7/16" Fibreboard 1/2" Gypsum Board 1" Wood Horizontal 1" Wood Diagonal 5/16" Plywood	1" Wood Diagonal 5/16" Plywood	Not Permitted	Not Permitted

NOTES: (1) For walls not subjected to racking loads, stud sizes and spacings shall be as listed in above Table except that bracing may be omitted.
(2) All lumber dimensions noted above are nominal dimensions while all sheet sheathing dimensions are actual dimensions.

(ii) Cutting of studs shall not reduce their effective depth to less than 1¾". No reduction in the width of studs is permitted.

(iii) Where either a sole or top plate is cut to provide for a pipe or a heating or ventilating duct, such member shall be cross-tied by strap iron at least 3/16" by 1¼" or by steel angles of equal cross-section.

(iv) Where two or more heating or ventilating ducts are located in a stud bearing partition at less than 4' intervals, and one or more rises in excess of 2' from the sole plate, that portion of the partition shall be increased to provide continuous sills and plates having an unbroken and undamaged width of at least 2".

(c) Dwarf Partitions—shall be constructed of 2" x 4" studs with a sole plate and top plate with studs spaced at the same interval as, and in alignment with, the rafters. See also F. 2. *(d)* following.

(d) Non-Load-Bearing Partitions. The construction of non-load-bearing partitions shall conform to *(b)* preceding except that, in partitions not exceeding 8'0" in height, studs may be 2" x 3". 2" x 4" studding with the greatest dimension parallel to the face of the partition may also be used provided the length does not exceed 6' between laterally supporting cross walls.

D. *Plank Wall Construction*

1. GENERAL. Plank wall construction shall consist of a solid frame composed of wood plank uprights, horizontally placed framing members laid on edge and filler planks, with or without sheathing and protected from the weather by an acceptable exterior finish described elsewhere in these Standards.
2. MATERIAL. Planks shall at least conform to the grading for plank wall construction in Section 24. A. 1. provided that the planking for structural members shall be sound throughout and shall not contain defects which would impair its strength.
3. HEIGHT. Plank walls shall not exceed three storeys in height. A building comprising plank wall construction shall not exceed 35'0" in height above the finished grade.
4. PLANK WALL THICKNESS. In walls three storeys high, the thickness of the planking shall be not less than 3" exclusive of exterior sheathing. Thickness of planking in walls not more than two storeys high, shall be not less than 2" when sheathed on the exterior nor 3" when exterior sheathing is omitted. Planks shall be uniform in thickness throughout.
5. STRUCTURAL FRAMING. Vertical and horizontal members shall be of the same thickness. All members shall be securely spiked together.

(a) Vertical Structural Members.

(i) Bearing requirements.
No vertical structural member shall bear on any horizontally placed wood member. Vertical structural members shall bear on the foundation (sill plate) and shall be continuous one over the other.

(ii) Minimum Width of Vertical Structural Members.
Vertical structural members shall be not less than 10" nominal width.

(iii) Maximum spacing of Vertical Structural Members.
Maximum centre-to-centre spacing of vertical structural members shall not exceed 8'0".

(iv) Openings and Corners.
Vertical structural members shall be placed at both sides

of all openings. Exception: a window opening 2'6" or less need only be supported on one side by a vertical structural member. In such case the opposite jamb of the window or short upright to which it is attached shall bear on the filler wall plank immediately below, which in turn shall be notched into the vertical structural members on each side.

Corner vertical structural members shall consist of two planks set at right angles and securely spiked together. Joints in such adjacent members shall be staggered at vertical intervals not less than 4'.

(b) Load-Bearing Horizontal Members.
Horizontal planks carrying loads shall be joined to the vertical structural members with dovetail joints or other joints of equivalent strength.

(c) Non-Load-Bearing Horizontal Members (filler members).
Non-load-bearing horizontal planks shall be securely toe nailed to the vertical structural members and to each other.

6. SHEATHING. Quality and application of all sheathing employed shall at least comply with requirements of C. 3. preceding.

7. SHEATHING PAPER
Sheathing paper as described in C. 3. *(c)* preceding shall be applied:
(a) Over both the exterior and the interior sides of planking of all plank frame walls whether sheathed or not sheathed.
(b) Over the exterior face of any sheathing applied to any plank frame construction. Such paper shall be in addition to that required by *(a)* preceding.

8. WALL COVERING. A wall covering which at least meets the requirements of Section 20., Section 28., or Section 29., shall be applied on the exterior side of all plank frame wall construction.

E. *Floor Framing*

1. GENERAL
(a) All floor framing shall be designed to safely support the total superimposed loading to which it may be subjected. The minimum live load is assumed to be 40 lb. per square foot and the maximum deflection shall not exceed 1/360 of the span.

(b) Lateral Support.
When floor framing is required to provide lateral support for the walls, the joists shall be in alignment across the building, and where they meet shall be adequately lapped and lagged to safely transmit the lateral stresses.

(c) Concrete or Steel Joists.
Floors constructed with steel joists or reinforced concrete joists shall be designed by a Registered Architect or Registered Engineer in accordance with Section 9. A. 3.

(d) All floors and their supports shall at least conform to the appropriate requirements of Section 7.

2. BEAMS
(a) Material.
Beams shall be structural steel, solid wood, built-up wood, acceptable glue-laminated wood, or reinforced concrete.

(b) Steel bearing plates shall be used where necessary to distribute imposed loads to supporting structural parts.
Structural parts supporting beams shall be of sufficient size and strength to distribute the imposed loads.
Masonry supporting the end of a beam shall provide bearing for at least the end 6" length of the beam except that a minimum bearing length of 4" may be provided for steel beams

when such beams are bedded to provide an even bearing surface.

(c) Wood Preservatives.

Other than in basements, cellars or crawl spaces (see A.4. preceding), the ends of wooden beams shall be provided with not less than ½" air space between pockets and the sides and ends of the beams or alternatively, the ends shall be treated with two soaking coats of an acceptable wood preservative. At or below the outside finished grade line, the ends of such beams shall be treated with two soaking coats of an acceptable wood preservative regardless of whether an air space is provided.

3. WOOD FLOOR JOISTS

(a) Floor Joist Sizes and Spacing.

The size and spacing of wood floor joists shall be as set forth in the following table:

MAXIMUM CLEAR SPANS FOR FLOOR JOISTS

Species	Actual Size (in.)	Spacing of Joists			
		12"	16"	20"	24"
Douglas Fir (Coast)	1⅝ x 5½	10′ 2″	9′ 4″	8′ 7″	8′ 1″
	1⅝ x 7½	13′ 11″	12′ 8″	11′ 10″	11′ 1″
	1⅝ x 9½	17′ 7″	16′ 0″	14′ 11″	14′ 0″
	1⅝ x 11½	21′ 5″	19′ 5″	18′ 0″	17′ 0″
Pacific Coast Hemlock	1⅝ x 5½	9′ 10″	8′ 11″	8′ 2″	7′ 10″
	1⅝ x 7½	13′ 4″	12′ 1″	11′ 2″	10′ 7″
	1⅝ x 9½	16′ 11″	15′ 4″	14′ 5″	13′ 5″
	1⅝ x 11½	20′ 5″	18′ 7″	17′ 2″	16′ 2″
B.C. Yellow Cypress Balsam Fir Red Pine Englemann Spruce Sitka Spruce Eastern Spruce Eastern Hemlock	1⅝ x 5½	9′ 4″	8′ 5″	7′ 10″	7′ 2″
	1⅝ x 7½	12′ 8″	11′ 6″	10′ 8″	9′ 11″
	1⅝ x 9½	16′ 0″	14′ 7″	13′ 6″	12′ 6″
	1⅝ x 11½	19′ 5″	17′ 7″	16′ 5″	15′ 1″
Jack Pine	1⅝ x 5½	9′ 0″	8′ 2″	7′ 7″	7′ 2″
	1⅝ x 7½	12′ 4″	11′ 2″	10′ 5″	9′ 10″
	1⅝ x 9½	15′ 7″	14′ 2″	13′ 1″	12′ 5″
	1⅝ x 11½	18′ 11″	17′ 1″	15′ 11″	15′ 0″
Western Red Cedar Eastern White Pine Lodgepole Pine Ponderosa Pine Western White Pine Poplar	1⅝ x 5½	8′ 8″	7′ 11″	7′ 2″	6′ 6″
	1⅝ x 7½	11′ 11″	10′ 10″	9′ 8″	8′ 11″
	1⅝ x 9½	15′ 1″	13′ 8″	12′ 4″	11′ 4″
	1⅝ x 11½	18′ 4″	16′ 7″	15′ 0″	13′ 8″
Red Pine Eastern Spruce Balsam Fir Eastern Hemlock	1 11/16 x 5¾	9′ 10″	8′ 11″	8′ 4″	7′ 8″
	1 11/16 x 7¾	13′ 4″	12′ 0″	11′ 2″	10′ 5″
	1 11/16 x 9¾	16′ 8″	15′ 1″	14′ 1″	13′ 1″
	1 11/16 x 11¾	20′ 1″	18′ 2″	16′ 11″	15′ 10″
Jack Pine	1 11/16 x 5¾	9′ 6″	8′ 8″	8′ 1″	7′ 7″
	1 11/16 x 7¾	12′ 11″	11′ 8″	10′ 11″	10′ 2″
	1 11/16 x 9¾	16′ 2″	14′ 8″	13′ 8″	12′ 10″
	1 11/16 x 11¾	19′ 6″	17′ 8″	16′ 6″	15′ 6″
Eastern White Pine Poplar	1 11/16 x 5¾	9′ 2″	8′ 5″	7′ 7″	7′ 0″
	1 11/16 x 7¾	12′ 6″	11′ 4″	10′ 4″	9′ 5″
	1 11/16 x 9¾	15′ 8″	14′ 2″	12′ 11″	11′ 10″
	1 11/16 x 11¾	18′ 11″	17′ 2″	15′ 7″	14′ 2″

(i) The spacing of wood floor joists shall not exceed 24" o.c.

(ii) Joists shall be bridged with 1½" x 2" or 1" x 3" diagonal cross bridging. There shall be one row of bridging in each span over 7'0" and up to 12'8" and two rows in spans exceeding 12'8". Acceptable prefabricated bridging may be used in lieu of wood bridging.
Alternatively, 1" x 4" continuous wood strapping or 1" x ⅛" continuous metal strapping fastened to the bottom of the joists by two 2½" nails per joist may be used in lieu of diagonal bridging. Metal strapping shall be secured at either end. Ceiling furring shall also be acceptable in lieu of diagonal bridging.

(iii) The spaces between the joists of the upper floor under dwarf partitions shall be filled in with solid bridging. A vapour barrier shall be applied on the inner side of this bridging if the dwarf partition is insulated.

(b) Support for Wood Joists.
Wood joists shall not be notched over supports, or bored in a manner that will reduce the bearing or shear strength.

(i) Beam Support.
Wood joists shall be supported for their full depth; on the top of a wood or steel beam; on acceptable metal joist hangers; or on a ledger board. Ledger boards shall be not less than 2" x 4" spiked to the side of a wood beam with at least two 3½" nails for each joist supported. The end bearing of wood joists supported on top of steel beams shall be not less than 3 linear inches. Wood joists framing into steel beams shall be supported on ledgers not less than 2" x 3" bolted to the web and such joists shall project not less than 2" above the beam. Joists so supported shall be tied, either to the steel beam with a hook over the top flange, a 3/16" x 1¼" steel tie to opposing joists, or with a 2" x 2" wood splice to opposing joists, securely spiked to and lapping each by at least 1'. Wood floor joists supported directly on the top flange of steel beams shall have at least 1" x 4" blocking located along the flange of the beam and wedged in on the flat between the joists. This blocking shall be toe-nailed to joists. Alternatively, continuous strapping attached to the bottom of each joist with not less than two 2½" nails and located on each side of the beam, shall be acceptable. Such strapping shall be not less than 1" x 4".

(ii) Support on Masonry.
Wood floor joists framing into masonry walls shall have not less than 4" end bearings. If the end bearing surface of floor joists frame into masonry walls at or below the outside finish grade then the ends of such joists shall receive a soaking coat of acceptable wood preservative. Wood joists or beams framing into a masonry party wall or fire wall shall be separated from the opposite side of the wall and from the ends of joists or beams entering the opposite side of the wall by at least 4" of masonry. Wood joists entering 8" masonry shall be staggered on opposite sides, and separated from each other by at least 4" of masonry.

(iii) Support on Wood Frame.
In balloon construction, where the wall studs extend through the floor construction, joists shall bear on ribbon boards (see C. 2. *(f)* preceding) and overlap the full

width of the studs and shall be securely nailed to studs with at least two 3½″ nails. In platform construction, joists shall bear on the top plate and shall be securely nailed in place.

(c) Doubled Joists

Wood floor joists shall be doubled under all partitions which run parallel to the floor joists. (This does not apply to non-load-bearing partitions 6′0″ or less in length). Doubled joists shall be separated and blocked at 4′0″ intervals where piping or duct work occurs. Headers and trimmers shall be doubled except that headers 4′0″ or less in length may be of single thickness provided the header is supported in acceptable metal joist hangers. When joist hangers are not used, all headers and trimmers shall be doubled, and shall be securely spiked together. Tail joists shall be end-nailed to the adjacent header member by at least three 4″ nails. Each end of each header shall be end-nailed to the adjacent trimmer by at least three 4″ nails.

4. WOOD CEILING JOISTS

(a) Sizes and Spacing.

Except as required in *(b)* following, the sizes and spacing of wood ceiling joists shall be as set forth in the following table:

MAXIMUM CLEAR SPANS FOR CEILING JOISTS

Species	Actual Size (in.)	Spacing of Joists			
		12″	16″	20″	24″
Douglas Fir (Coast)	1⅝ x 3⅝	9′ 10″	8′ 11″	8′ 4″	7′ 10″
	1⅝ x 4⅝	12′ 4″	11′ 3″	10′ 5″	9′ 10″
	1⅝ x 5½	14′ 11″	13′ 7″	12′ 7″	11′ 11″
	1⅝ x 7½	20′ 5″	18′ 6″	17′ 2″	16′ 2″
Pacific Coast Hemlock	1⅝ x 3⅝	9′ 5″	8′ 7″	7′ 11″	7′ 6″
	1⅝ x 4⅝	11′ 11″	10′ 9″	9′ 11″	9′ 4″
	1⅝ x 5½	14′ 4″	13′ 0″	12′ 0″	11′ 4″
	1⅝ x 7½	19′ 6″	17′ 8″	16′ 5″	15′ 6″
B.C. Yellow Cypress Balsam Fir Red Pine Englemann Spruce Sitka Spruce Eastern Spruce Eastern Hemlock	1⅝ x 3⅝	8′ 11″	8′ 1″	7′ 6″	7′ 1″
	1⅝ x 4⅝	11′ 3″	10′ 2″	9′ 6″	8′ 11″
	1⅝ x 5½	13′ 7″	12′ 4″	11′ 5″	10′ 10″
	1⅝ x 7½	18′ 6″	16′ 10″	15′ 7″	14′ 8″
Jack Pine	1⅝ x 3⅝	8′ 8″	7′ 11″	7′ 4″	6′ 11″
	1⅝ x 4⅝	10′ 11″	9′ 11″	9′ 2″	8′ 8″
	1⅝ x 5½	13′ 2″	12′ 0″	11′ 1″	10′ 6″
	1⅝ x 7½	18′ 0″	16′ 4″	15′ 2″	14′ 4″
Western Red Cedar Eastern White Pine Lodgepole Pine Ponderosa Pine Western White Pine Poplar	1⅝ x 3⅝	8′ 5″	7′ 8″	7′ 1″	6′ 8″
	1⅝ x 4⅝	10′ 7″	9′ 8″	8′ 11″	8′ 4″
	1⅝ x 5½	12′ 10″	11′ 7″	10′ 10″	10′ 1″
	1⅝ x 7⅝	17′ 5″	15′ 10″	14′ 8″	13′ 10″
Red Pine Eastern Spruce Balsam Fir Eastern Hemlock	1 11/16 x 3¾	9′ 5″	8′ 6″	7′ 11″	7′ 5″
	1 11/16 x 4¾	11′ 11″	10′ 9″	10′ 0″	9′ 5″
	1 11/16 x 5¾	14′ 5″	13′ 1″	12′ 1″	11′ 5″
	1 11/16 x 7¾	19′ 5″	17′ 7″	16′ 4″	15′ 5″
Jack Pine	1 11/16 x 3¾	9′ 1″	8′ 4″	7′ 8″	7′ 2″
	1 11/16 x 4¾	11′ 7″	10′ 6″	9′ 9″	9′ 2″
	1 11/16 x 5¾	14′ 0″	12′ 8″	11′ 10″	11′ 1″
	1 11/16 x 7¾	18′ 10″	17′ 1″	15′ 11″	14′ 11″
Eastern White Pine Poplar	1 11/16 x 3¾	8′ 10″	8′ 0″	7′ 5″	7′ 0″
	1 11/16 x 4¾	11′ 2″	10′ 2″	9′ 5″	8′ 10″
	1 11/16 x 5¾	13′ 6″	12′ 4″	11′ 5″	10′ 8″
	1 11/16 x 7¾	18′ 2″	16′ 7″	15′ 5″	14′ 6″

NOTE: Wood ceiling joists that support dwarf partitions transferring partial roof loads shall be at least 1″ greater in depth than as stipulated above.

(b) **Wood ceiling joists shall comply with the provisions of 3. *(a)* preceding when;**

(i) The area above (Attic Space) comprises usable space for habitable rooms or storage.

(ii) The ceiling joists support a flat or flat pitched roof.

F. *Roof Framing*

1. FLAT AND FLAT PITCHED ROOFS

(a) Wood Roof Joists

Roof joists supporting a roof with an attached or suspended ceiling of plaster or gypsum board shall be considered as floor joists of equal span and shall be determined from the table of "MAXIMUM SPANS FOR FLOOR JOISTS" in E. 3. *(a)* preceding. Such joists shall be bridged as for floor joists. Roof joists supporting a flat roof with no attached or suspended ceiling shall be determined from the table of "MAXIMUM SPAN FOR ROOF RAFTERS" in F. 2. *(a)* following.

(b) Roof Construction.

Flat or flat pitched roofs may be framed by one of the following methods.

(i) By cant strips applied to the upper edges of ceiling joists to provide a slope. Cant strips shall not be considered as contributing to the strength of the ceiling or roof joists.

(ii) By dwarf walls with 2″ x 4″ plates at top and bottom and 2″ x 4″ struts at same spacing as rafters.
Where pitch is 3″ in 12″ or less the ceiling joists shall be determined from the table of "MAXIMUM SPANS FOR FLOOR JOISTS" in Section 23. E. 3. *(a)* preceding.
Where pitch exceeds 3″ in 12″ but is less than 5″ in 12″ and dwarf walls transfer a partial roof load to the ceiling joists, the ceiling joists shall be at least 1″ greater in depth than the sizes set out in the table of "MAXIMUM SPANS FOR CEILING JOISTS" in Section 23. E. 4. *(a)* preceding.

(iii) Alternatively, the details of such roof framing may be prepared by a Registered Architect or Engineer in accordance with Section 9. A. 3.

2. PITCHED ROOFS

(a) Size and Spacing of Rafters.

The size and spacing of rafters shall be as set forth in the following table:

MAXIMUM SPANS FOR ROOF RAFTERS (PITCHED ROOFS)

Species	Actual Size (in.)	Spacing of Roof Joists and Rafters			
		12″	16″	20″	24″
Douglas Fir (Coast)	1⅝ x 3⅝	7′ 11″	7′ 2″	6′ 8″	6′ 4″
	1⅝ x 4⅝	9′ 11″	9′ 0″	8′ 4″	7′ 11″
	1⅝ x 5½	12′ 0″	10′ 11″	10′ 1″	9′ 6″
	1⅝ x 7½	16′ 5″	14′ 11″	13′ 10″	13′ 0″
	1⅝ x 9½	20′ 10″	18′ 11″	17′ 6″	16′ 5″
Pacific Coast Hemlock	1⅝ x 3⅝	7′ 7″	6′ 11″	6′ 5″	5′ 10″
	1⅝ x 4⅝	9′ 7″	8′ 8″	8′ 0″	7′ 4″
	1⅝ x 5½	11′ 6″	10′ 6″	9′ 8″	8′ 10″
	1⅝ x 7½	15′ 8″	14′ 4″	13′ 2″	12′ 0″
	1⅝ x 9½	19′ 11″	18′ 0″	16′ 8″	15′ 2″
B.C. Yellow Cypress Balsam Fir Red Pine Englemann Spruce Sitka Spruce Eastern Spruce Eastern Hemlock	1⅝ x 3⅝	7′ 2″	6′ 6″	5′ 10″	5′ 4″
	1⅝ x 4⅝	9′ 0″	8′ 2″	7′ 4″	6′ 8″
	1⅝ x 5½	10′ 11″	9′ 11″	8′ 11″	8′ 1″
	1⅝ x 7½	14′ 11″	13′ 6″	12′ 1″	11′ 0″
	1⅝ x 9½	18′ 11″	17′ 1″	15′ 4″	14′ 0″
Jack Pine	1⅝ x 3⅝	7′ 0″	6′ 5″	5′ 10″	5′ 4″
	1⅝ x 4⅝	8′ 9″	8′ 0″	7′ 4″	6′ 8″
	1⅝ x 5½	10′ 7″	9′ 7″	8′ 11″	8′ 1″
	1⅝ x 7½	14′ 6″	13′ 2″	12′ 1″	11′ 0″
	1⅝ x 9½	18′ 4″	16′ 8″	15′ 4″	14′ 0″
Western Red Cedar Eastern White Pine Lodgepole Pine Ponderosa Pine Western White Pine Poplar	1⅝ x 3⅝	6′ 10″	5′ 11″	5′ 4″	4′ 10″
	1⅝ x 4⅝	8′ 7″	7′ 5″	6′ 7″	6′ 1″
	1⅝ x 5½	10′ 4″	8′ 11″	8′ 0″	7′ 4″
	1⅝ x 7½	14′ 0″	12′ 2″	10′ 11″	10′ 0″
	1⅝ x 9½	17′ 10″	15′ 6″	13′ 10″	12′ 7″
Red Pine Eastern Spruce Balsam Fir Eastern Hemlock	1 11/16 x 3¾	7′ 6″	6′ 11″	6′ 1″	5′ 7″
	1 11/16 x 4¾	9′ 6″	8′ 8″	7′ 9″	7′ 1″
	1 11/16 x 5¾	11′ 7″	10′ 6″	9′ 5″	8′ 7″
	1 11/16 x 7¾	15′ 7″	14′ 2″	12′ 8″	11′ 7″
	1 11/16 x 9¾	19′ 7″	17′ 10″	16′ 0″	14′ 7″
Jack Pine	1 11/16 x 3¾	7′ 4″	6′ 8″	6′ 1″	5′ 7″
	1 11/16 x 4¾	9′ 3″	8′ 5″	7′ 9″	7′ 1″
	1 11/16 x 5¾	11′ 2″	10′ 2″	9′ 5″	8′ 7″
	1 11/16 x 7¾	15′ 1″	13′ 10″	12′ 8″	11′ 7″
	1 11/16 x 9¾	19′ 1″	17′ 4″	16′ 0″	14′ 7″
Eastern White Pine Poplar	1 11/16 x 3¾	7′ 1″	6′ 2″	5′ 7″	5′ 1″
	1 11/16 x 4¾	9′ 0″	7′ 10″	7′ 1″	6′ 5″
	1 11/16 x 5¾	10′ 11″	9′ 6″	8′ 6″	7′ 10″
	1 11/16 x 7¾	14′ 8″	12′ 11″	11′ 6″	10′ 6″
	1 11/16 x 9¾	18′ 6″	16′ 2″	14′ 6″	13′ 2″

NOTE: The span of the rafter is expressed in terms of the horizontal projection of the rafter.

(b) Trussed Roofs.

A pitched roof may be supported on trusses. Such trusses shall be designed by a Registered Architect or Registered Engineer in accordance with Section 9, and capable of spanning full length without intermediate support. Such trusses shall be securely anchored to end supports. When the spacing of such trusses exceeds 2'0", roof joists or purlins to receive roof sheathing shall be provided and laid at right angles to the trusses; or purlins shall be provided to support the roof rafters; otherwise the thickness of the roof sheathing shall be increased as detailed in F. 3. *(b)* following;

(c) Wall Bearing.

Wood roof rafters or trusses shall bear directly over the supporting wall. Such rafters shall be notched over wall plates, or over rafter plates not less than 2" x 4", and shall be securely spiked to the ceiling joists.

When the wall studs extend above the ceiling joists the top of such wall shall be supported laterally in an acceptable manner.

(d) Dwarf Partitions.

Rafters may be supported by dwarf partitions.

For construction of dwarf partitions see C. 4. *(c)* preceding.

(e) Rafter Ties.

Floor and ceiling joists shall, where possible, be used to tie together the lower ends of opposing rafters. Where such a tie is not provided, collar ties located within the middle third of the rafter length shall be installed to support all opposed rafters.

(f) Collar Ties.

Collar ties shall be installed on each pair of rafters. They shall be at least 2" x 4"; or of 1" x 5" material bridged by a continuous 1" x 4" wood strip nailed to the upper or lower edge of each tie at mid-span. Ceiling joists shall be acceptable as collar ties if connected to rafters within the middle third of the rafter span.

(g) Trimmer Rafters and Headers.

Trimmer rafters and headers shall be doubled around all dormers and/or other openings wherever the header receives more than one cut rafter. Tail rafters shall be end-nailed to the adjacent header member by at least three 4" nails. Each end of each header shall be end-nailed to the adjacent trimmer by at least three 4" nails.

(h) Hip and Valley Rafters.

Hip and valley rafters shall be adequate in size to support the roof load, and to provide full bearing for the rafters which frame into them.

(i) Ridge Board.

Ridge board shall be sufficiently wide to provide full bearing for the rafters. When opposed rafters are staggered the ridge board shall be at least 2" in thickness.

(j) Workmanship.

All cutting shall be accurate. There shall be full contact at the bearings of all members.

3. ROOF SHEATHING

Roof Sheathing shall be one of the following:

(a) Lumber Sheathing over Rafters or Roof Joists.

Such sheathing shall be at least ¾" thick for spacings up to

24″ o.c. and shall be fastened to each support with at least two nails for boards 8″ and less in width and three nails for boards wider than 8″. Nail length shall not be less than 2½ times the board thickness. Joints shall be staggered and all ends shall be supported.

(b) Lumber Sheathing over Trusses or Dwarf Walls.

Quality, width and nailing of such sheathing shall conform to *(a)* preceding, provided that when spacing of supports or bearing members exceeds 24″ o.c., the sheathing shall be T and G or splined plank and its thickness and the length of common nails shall be not less than indicated in the following table:

LUMBER SHEATHING

Thickness	¾″	1¼″	2″	3″
Maximum Spacing of Supports	24″ o.c.	30″ o.c.	48″ o.c.	84″ o.c.
Minimum Nail Length	2¼″	3″	4″	6″

Joints in sheathing shall be staggered and shall be over supports or bearing members.
See Section 30. C. 1. *(e) (i)* for additional sheathing requirements.

(c) Plywood Roof Sheathing.

Plywood Roof Sheathing panels (see Section 24. B. 1. for quality) shall be placed with the face grain at right angles to the rafters or other supports. The abutting edges shall be separated by not less than 1/16″ nor more than ⅛″. Panels shall be nailed to supports with common nails at intervals not exceeding 6″ along all edges nor 12″ along the intermediate bearings. Thickness of the plywood panels and length of the common nails shall be not less than that indicated in the following table. If the Roofing Manufacturer's Specifications are more restrictive, then they shall govern. Other methods of fastening may be used if accepted by the authority having jurisdiction.

PLYWOOD ROOF SHEATHING

	Thickness	5/16″	⅜″	½″
Spacing of Supports or Bearings	Panel edges supported by 2″ x 4″ headers fitted between each rafter or other framing member.	16″ o.c.	24″ o.c.	
	Panel edges not supported by headers (as preceding)	12″ o.c.	16″ o.c.	24″ o.c.
Nail Length		1¾″	2″	2½″

NOTE: In lieu of 2″ x 4″ blocking, other methods for supporting panel edges shall be permitted if accepted by the authority having jurisdiction.

G. *Nailing*

Nails shall not be driven closer together than one-half their length, nor closer to the edge of the timber than one-quarter their length. Except where otherwise stated in these Standards, nails shall be of such length that, when joining one timber to another, the penetration of the nail into the second or farther timber shall be not less than one-half the length of the nail. The following schedule shall be used as a guide for nailing specific joints in wood-framing using common nails.

NAILING SCHEDULE

	No. or Spacing of Nails	Length of Nails in Inches
Joist to stud face (balloon framing)	2	3½
Joist to sill or girder, toe-nail	3	3½
Bridging to joist, toe-nail each end	2	2½
2" plank floor to joist or girder	2	4
Sole plate to joist or blocking	16" o.c.	4
Top plate to stud, end-nail	2	3½
Stud to sole plate, toe-nail	4	2½
Doubled studs	30" o.c.	3½
Top plates, spike together	24" o.c.	3½
laps and intersections	3	3½
Ceiling joists, to plate, toe-nail	2	3½
laps over partitions	3	3½
to parallel alternate rafters	3	3½
Rafter to plate	3	3½
1" brace to each stud, plate and sill	2	2½
Corner studs and angles	30" o.c.	3½
Other joints, nail to provide proportionate strength.		

NOTE: Nails of special design may be used for purposes and in sizes specifically acceptable to the authority having jurisdiction.

H. ***Miscellaneous Rough Carpentry***

1. **Overhanging cantilevered construction, bay windows, overhanging floors, and all projections carrying floor and roof loads which are not supported directly by a foundation shall be fully detailed on the drawings submitted with the application.**
2. **The spaces between floor joists under dwarf partitions shall be filled in with solid bridging. A vapour barrier shall be applied on the inner side of this bridging if the dwarf partition is insulated.**
3. **All roof spaces between insulation and roofing shall be ventilated to the outside air by screened openings or by an alternative method acceptable to the authority having jurisdiction. These openings, if vertical, shall be louvered. The unobstructed or net area of such vents shall be not less than 1/300 of the insulated ceiling area. Vents shall be located to provide cross-ventilation. Screening shall be other than ferrous metal not more than 16 nor less than 8 mesh per inch. All material used for such screening shall be acceptable to the authority having jurisdiction.**
   - **(i) Gable-end vents shall be as near the ridge as possible.**
   - **(ii) Hip roofs shall either have a vent at each end of the ridge or at least one vent installed near the summit to provide one-half the required ventilating area with complementary vents at the eaves to supply the balance of the required ventilating area.**
   - **(iii) The spaces between all roof joists in flat roof construction shall be vented by continuous screened openings at opposite ends of the spaces or by an alternative method acceptable to the authority having jurisdiction.**
4. **Access hatches shall be provided to attics or roof spaces. The clear opening for such hatches shall be not less than 20" x 28". Where this opening also provides access to the roof it shall comply with Section 7. H. 6. Access hatches shall be located in public areas when possible.**
5. **Fire stops shall be provided at floor and ceiling levels in partitions, stud walls, and in furring spaces, to cut off completely all spaces between basement and each upper storey. Fire stops shall be not less than 2" thick solid lumber, the same width or depth as the space to be blocked.**

MINIMUM ACCEPTABLE LUMBER GRADES FOR FRAMING, SHEATHING AND SUB-FLOORING

Species	Grading Authority	Engineered Structural Timber	Floors and Ceiling Joists and Rafters; Plank Frame Construction (Horiz. Members)	Stud Walls Framing (Bearing); Plank Frame Construction (Vert. Members)	Plank Frame Construction (Filler Members)	Sub-Flooring	Wall and Roof Sheathing
Douglas Fir Pacific Coast Hemlock Western Red Cedar Pacific Coast Cypress (Yellow Cedar)	B.C. L.M.A.		Construction	Standard	Utility	Standard Boards & Sheathing	Utility Boards & Sheathing
Eastern Spruce & Balsam Fir	C.L.A.	For all species, refer to C.S.A. Specifications 043-1953, (Revised 1960) Structural Timber and 0122-1959 for Glued Laminated Timber Construction	C.L.A. No.1	C.L.A. No. 2	C.L.A. No. 3	C.L.A. No. 2	C.L.A. No. 3
	M.L.B.		M.L.B. No. IV	M.L.B. Select V	M.L.B. No. V	M.L.B. Select V	M.L.B. No. V
Jack Pine	C.L.A.		No. 1	No. 2	No. 3	No. 2	No. 3
Red Pine	C.L.A. W.P.B.		No. 1 Dimension	No. 2 Dimension	No. 4 Commoh	No. 3 Common	No. 4 Common
White Pine	C.L.A. W.P.B.		Less than 8″ in width No. 2 Common 8″ and wider No. 1 Common	No. 2 Common	No. 4 Common	No. 3 Common	No. 4 Common
Eastern Hemlock	C.L.A.		No. 1	No. 2	No. 3	No. 2	No. 3
Ponderosa Pine Lodgepole Pine Englemann Spruce Western White Spruce	W.P.A.		No. 1 Dimension	No. 2 Dimension	No. 3 Dimension	No. 3	No. 4 Common
Where local grading rules for these species differ from Western Pine rules, lumber shall be assessed by an acceptable authority.							

NOTE: B.C.L.M.A. British Columbia Lumber Manufacturer's Association
C.L.A. Canadian Lumbermen's Association
M.L.B. Maritime Lumber Bureau
W.P.B. White Pine Bureau
W.P.A. Western Pine Association

NOTE: Eastern white cedar may be used for studs if graded according to the grading rules of the Eastern Spruce Grading Committee as adopted by the C.L.A., M.L.B., and the Quebec Lumber Manufacturer's Association. The minimum acceptable grade for Eastern white cedar is No. 2 (standard).

24. ROUGH CARPENTRY MATERIALS

A. *Lumber*

1. Lumber for framing, sheathing and sub-flooring shall be one of the species mentioned in the table on page 75. The lumber selected for any particular portion of the structure shall be at least the grade indicated in the table. Superior grades are acceptable but inferior grade material is considered just cause for rejection.
2. Sound used lumber may be employed for framing, sheathing and sub-flooring if the material used conforms to the grading mentioned in the preceding table. The authority having jurisdiction shall be the judge of what used lumber is satisfactory for use in the building.
3. All new or used lumber, 2" thick or less should be well seasoned and kept well protected on site from adverse weather conditions in order that the moisture content does not exceed 19% when the house framing is completed and ready to receive the interior finish. Where plastering is specified, finished wood flooring should not be laid until 7 to 14 days after such work is completed and the sub-flooring is thus given sufficient time to dry out under well ventilated conditions. Necessary heating should also be used when the outside air temperature is 50°F. or less or when there is a high humidity.

B. *Fibreboard, Gypsum Board and Plywood*

1. Fibreboard, Gypsum Board and Plywood may be used as wall sheathing provided the specific product is acceptable to the authority having jurisdiction. The quality of these products shall be at least equal to the requirements of the following relevant specifications:
   Fibreboard—C.G.S.B. 11-GP-2
   Gypsum Board—C.S.A. A82.28-1950
   Plywood—C.S.A. 0121-1961 or C.S.A. 0151-1961
2. Plywood which at least meets C.S.A. Specification 0121-1961 or C.S.A. 0151-1961 may also be used as sub-flooring, underlay beneath flexible flooring and roof sheathing.
3. Fibreboard which at least meets the requirements of C.G.S.B. Specification 11-GP-3 may also be used as underlay beneath flexible flooring when accepted by the authority having jurisdiction.

C. *Other Materials*

Other materials may be used if accepted by the authority having jurisdiction for the purpose.

25. BUILDING PAPERS (Other than Vapour Barriers)

Building papers required by these Standards for application to the exterior face of sheathing on exterior walls, on the exterior and interior faces of planking in plank framed exterior walls, on the interior face of exterior masonry walls (excepting veneer), on roof boarding and between sub-flooring or underlay and finish flooring (except as otherwise permitted by Section 33) shall be accepted by the authority having jurisdiction and shall meet the requirements of C.G.S.B. Specification 9-GP-2 (Paper, Building, Sheathing, Water Repellent, Breather Type).

26. INSULATION (THERMAL)

A. *General*

1. Construction materials together with thermal insulation, shall provide an over-all heat transmission coefficient "U" not greater than 0.15 B.T.U. per hour per square foot in the locations listed

in B. following. Conversely, the resistance to heat flow of any such assembly shall be at least 6.66.

2. Resistance values shall be based on information contained in the latest issue of American Society of Heating, Refrigerating, and Air Conditioning Engineers' "Guide", or on values established by actual test at the National Research Council or other acceptable laboratory.

B. *Where Required*

Construction requiring minimum resistance to heat flow as in A. 1. above:

1. Exterior Walls.
2. Roof construction which is also part of an enclosure of a finished room or other heated space.
3. Ceilings and walls of finished rooms or other heated space exposed to unheated attic or roof space.
4. Floors, the undersides of which are exposed to the exterior or to unheated areas.
5. Outside walls in a heated crawl space or in a crawl space used as a plenum chamber shall be insulated, with the exception of a strip, not more than 6" wide, located immediately above the level of the crawl space floor.
6. Where a heating equipment room or an incinerator room or a chimney or flue abuts a housing unit, the construction between the housing unit and such room or chimney shall be insulated to prevent excessive heat in the housing unit.
7. Where supported on a foundation wall in a basement or cellar, any exterior wall framing of a height in excess of the depth of the floor joists shall be insulated. Such framing need not receive interior cladding except in habitable or other rooms used by tenants or in public areas.

C. *Materials*

Materials designed specifically as thermal insulants, combined sheathing and insulation or plaster base and insulation shall at least conform to the requirements, including those for thickness, contained in the following specifications:

Mineral Wool	C.S.A.	Specification A101-1952
Fibreboard	C.G.S.B.	Specification 11-GP-2
Gypsum Lath (Foil Back)	C.S.A.	Specification A 82.24-1950
Gypsum Wallboard (Foil Back)	C.S.A.	Specification A 82.27-1950

D. *Application*

1. Insulation shall be applied in accordance with manufacturers printed directions or as may be required by the authority having jurisdiction.
2. Any imperfect, damaged or otherwise impaired material shall be removed and replaced with sound material to provide continuous protection.
3. Loose fill insulation shall not be used in walls, or other vertical spaces.

27. VAPOUR BARRIERS

A. *Necessity*

1. VAPOUR BARRIERS SHALL BE USED:
   (a) Where reflective insulation is a type which does not cover, in installed position, the interior edges of studs, plates and sills, headers, joists or rafters in exterior walls, ceiling and roof construction.

(b) Wherever loose fill insulation is used.

(c) Wherever wool type batts or blankets which do not have the required vapour barrier qualities in the back or wrapping are used.

(d) Around windows, doors or openings, or where studs are not standard spacing, or where any other exposed framing is not already covered by the vapour barrier backing of the batts or blankets.

(e) Where exterior sheathing is plywood unless such plywood construction is vented or plywood interior finish is also used.

(f) Where the insulating medium of the exterior walls consists of an insulating plaster base (non-vapour barrier type).

2. VAPOUR BARRIER SHOULD BE USED:

(a) At the joints of the sheets where the insulating medium of exterior walls consists of an insulating plaster base (acceptable vapour barrier type).

(b) To reduce passage of vapour through joints between vapour barrier-backed wool batts or blankets.

B. *Vapour Barrier Quality*

Vapour barriers shall at least conform with requirements of C.G.S.B. Specification 70-GP-1 "Vapour Barriers"; Sheet, for use in above-grade Building Construction and shall be acceptable to the authority having jurisdiction.

C. *Erection*

1. Vapour barriers shall be applied as near as possible to the interior finish on exterior walls, ceilings and other insulated construction. All edges or joints shall be lapped and should be sealed. Horizontal joints shall be backed up with a plate, header, or other bearing to obtain sealed joints. The barrier shall be brought up tight against electrical outlets, door and window frames, and other similar openings. Where lath requiring a plaster key is used, the barrier should be applied loosely to permit formation of a proper key without damage to the vapour barrier.

2. Vapour barrier paper backing on wool batts or blankets used between studs, ceiling joists and rafters shall be nailed or stapled to the inside faces of the studding, ceiling joists, and rafters. The adjoining flange shall be lapped over and nailed or stapled so that all interior faces of wood-framing members are covered.

3. Any damaged material shall be removed and replaced with sound material to provide a continuous vapour seal.
A POORLY INSTALLED OR APPLIED VAPOUR BARRIER WILL FAIL TO FUNCTION EFFICIENTLY.

28. EXTERIOR FINISH

A. *Stucco and Masonry Veneer*

1. Cement stucco is acceptable when applied as described in Section 29.

2. Masonry veneer shall be as detailed in Section 20.

B. *Wood Siding*

1. Wood siding shall be not less than No. 1 White Pine; "C" F.G. and/or V.G., Drop Siding and Rustic, Douglas Fir or Pacific Coast Hemlock; "C" Bevel and Bungalow Western Spruce or Western Red Cedar. Equivalent grades in other suitable wood will be acceptable. Special

decorative wood siding may be used if accepted by the authority having jurisdiction.

2. The exposed portion of any piece of wood siding shall be not less than 3/16" thick at any point.
3. Wood siding shall be nailed through the sheathing to the studs or directly to the sheathing if the sheathing consists of lumber.
4. Vertical siding shall be at least ¾" thick and not more than 12" wide. Siding shall have interlocking joints or shall be provided with battens over joints. Siding shall be nailed to blocking between studs or to 1" x 2" furring strips spaced not more than 24" o.c. or to lumber sheathing.

C. *Plywood*

1. Plywood used as an exterior finish shall comply with the following specifications or must be accepted by the authority having jurisdiction.
   (a) Douglas Fir Plywood and Western Softwood Construction Plywood Specifications C.S.A. 0121-1961 or C.S.A. 0151-1961 — Select sheathing grade or better.
   (b) Hardwood Plywood C.S.A. Specification 0115-1959 — Exterior Type.
2. APPLICATION
   (a) Over sheathing. — Plywood may be applied over furring strips or directly over the sheathing. When applied over furring strips, the furring strips shall be not less than ⅜" x 1¼" and shall be placed over the building paper and sheathing, parallel to the studs, and nailed through the sheathing to the studs. When lumber sheathing is used, furring may be attached to the sheathing. When the plywood is applied directly over the sheathing a vapour barrier having a permeance rating not exceeding 0.25 perms shall be installed near the interior finish, adjacent and additional to the vapour barrier normally used. Plywood finish shall be not less than ¼" thick on spacings up to 16" o.c. and ⅜" thick on spacings up to 24" o.c. and shall be fastened with corrosion resistant, common, casing or finishing nails spaced not more than 6" o.c. along the edges and 12" o.c. along intermediate bearings. The size of nails shall be as follows:

Plywood Thickness	Nail Length
¼"	1 ½"
5/16"	1 ¾"
⅜"	2"
½"	2"

Other methods of fastening may be used if accepted by the authority having jurisdiction.

(b) With no sheathing. — When applied directly over the studs, plywood siding shall have the following minimum effective thickness.

Stud Spacing	Plywood Thickness (face grain parallel to studs)	Plywood Thickness (face grain right angles to studs)
16"	⅜"	⅜"
20"	½"	⅜"
24"	½"	⅜"

Nailing shall be as described in *(a)* preceding except that when finishing or casing nails are used they shall be spaced at not more than 4" o.c. along edges of the plywood and 8" o.c. along intermediate bearings. Panel joints shall be filled with mastic,

ship lapped or covered with mouldings to ensure weather-tight joints.

3. JOINTS

(a) All edges of every panel except those being applied to eave soffits shall be coated prior to erection with a paint filler, in the proportions of 100 lbs. of paste white lead, 1¾ gallons of raw linseed oil and 1 pint of dryer or alternatively an acceptable sealer recommended by the plywood manufacturer.

(b) Details for all joints and intersections shall be acceptable to the authority having jurisdiction.

D. *Shingles*

1. WOOD SHINGLES. Wood shingles used as an exterior wall finish shall be at least equal to Clear Walls in Eastern Cedar, or No. 3 Grade XXXXX in Western Red Cedar, conforming to C.S.A. Specification 0118-1960.

	MAXIMUM EXPOSURE	
Shingle Length	Single Course	Double Course
24″	8″ to 11½″	12″ to 16½″
16″	6″ to 7½″	8″ to 12″
18″	6″ to 8½″	9″ to 14″

Where double course shingle finish is to be employed, the under course may be of a lower grade than stated above if such is recommended by the manufacturer.

2. Asbestos-cement shingles shall at least conform to C.G.S.B. Specification 31-GP-4a (Shingles Asbestos-cement, Siding). Asbestos-cement shingles may be applied directly over the sheathing paper where the wall sheathing is lumber or plywood. The shingles shall be securely fastened with not less than 2 nails per shingle, placed at least one inch above the butt line of the succeeding course. Non-corrosive shingle nails shall be used. Vertical joints of succeeding courses of shingles shall be staggered.

3. When wood or asbestos-cement shingles are applied over fibreboard or gypsum board sheathing, not less than 1″ x 2″ nailing strips, spaced as required, shall be nailed through the sheathing to the studs.

E. *Siding*

Siding other than wood, may be used when accepted by the authority having jurisdiction.

The distance between finished grade and lower edge of any siding or shingles shall be not less than 12″.

F. *Wood Trim*

1. QUALITY. Trim shall be not less than No. 1 White Pine, "C" F.G. and/or V.G. Finish Douglas Fir, Western Hemlock or Western Red Cedar, or wood of equal quality and grading.

2. DIMENSION.

(a) Trim (smaller pieces, such as casing) shall be of sufficient thickness to provide a full cover for abutting material such as siding, and in no case shall be taken from less than 1″ stock.

(b) Verge boards shall be not less than 1¼″ in thickness if suspended nor ¾″ in thickness if applied to walls.

(c) Ceilings for galleries, porches and eave soffits may be ⅝″ T & G material with V or beaded joint, or acceptable types of Plywood or Hardboard.

G. *Flashing*

Metal flashing shall be installed over the heads of door and window openings (see Section 31). Exceptions are over the heads of door and window openings immediately beneath an eave projection which is 16″ or more. However, flashing shall not be omitted where the vertical distance between the edge of the eave and the head of a door or window opening exceeds $\frac{1}{4}$ of the horizontal dimension of the eave projection.

Mastic caulking compound shall be applied to the vertical joint between the siding or shingles and door or window frames, also between door and window sills and exterior finish.

In the case of small decorative panels of plywood or other material acceptable to the authority having jurisdiction installed between openings as an exterior cladding over unit masonry, caulking may be omitted providing Section 20. B. 7.*(e)* is followed. Flashing on horizontal joints may be required depending on construction details.

H. *Miscellaneous Exterior Construction*

Verandahs, canopies, and other miscellaneous exterior constructions shall be detailed on the drawings.

29. STUCCO (EXTERIOR)

A. *General*

Exterior stucco shall be prepared and applied in a manner which will provide an exterior covering which will protect the structure from the weather.

1. LOADS AND STRESSES. No dependence shall be placed on stucco to support any load or to resist any stress incident in or to the wall of a building.
2. VERTICAL SURFACES ONLY. Exterior stucco shall be applied to vertical surfaces only.
3. CLEARANCE ABOVE GRADE. There shall be a clear height of not less than 12″ between the bottom edge of exterior stucco and the finished grade level.
4. TEMPERATURE. Stucco shall not be applied when the ambient temperature is freezing or near freezing, nor if such temperature is normally encountered within one month of the completion.

B. *Exterior Stucco Bases*

1. MASONRY.
   - *(a)* Stucco shall not be applied directly to soft-burned clay tile or brick or sand-lime brick, or to backing of lower strength than the stucco.
   - *(b)* Stucco on chimneys shall be reinforced with a self-furring metal fabric or metal lath.
   - *(c)* Copings and sills shall project a minimum of $1\frac{1}{2}$″ beyond the face of the stucco, and shall be provided with undercut water drips or flashings.
   - *(d)* Grounds for exterior stucco applied to masonry shall be not less than $\frac{1}{2}$″ and not more than $\frac{3}{4}$″ in thickness.
   - *(e)* Masonry surfaces shall be clean and sufficiently rough to provide a mechanical key.
2. FRAME CONSTRUCTION.
   - *(a) Sheathing Paper.* All forms of exterior sheathing shall be completely covered with one ply of asphalt breather type

sheathing paper (see Section 25.) lapped not less than 4″ at all edges. Tar saturated felt or paper shall not be used.

(b) Sheathing. All wood-frame exterior walls to receive stucco shall be completely covered with exterior sheathing. Such sheathing shall comply with the requirements of Section 23. C. 3.

C. *Materials*

1. STUCCO REINFORCEMENT AND LATH

(a) All metal reinforcement for stucco and fastenings shall be galvanized, or accepted by the authority having jurisdiction. Galvanized expanded sheet metal, or welded or woven fabric is acceptable in the following weights or gauges:

(i) Expanded, galvanized sheet metal reinforcement shall weigh not less than 2.5 pounds per square yard.

(ii) Welded or woven wire fabric shall weigh not less than 1.2 pounds per square yard before galvanizing. Wire gauge shall not be smaller than No. 18 for meshes up to 1″ and not smaller than No. 16 gauge for meshes wider than 1″. No mesh shall be greater than 4 square inches.

(iii) Metal reinforcement may be either flat or self-furring.

(b) Western Red Cedar lath, No. 2 or better grade, will be permitted for stucco work on Vancouver Island and the lower mainland coastal region of British Columbia. Other species of wood will not be acceptable for stucco lath.

2. STUCCO MATERIALS. Materials for stucco shall at least comply with the materials Specifications as listed in Section 19. B. 1.

3. STUCCO MIXES. Stucco shall be made with Portland cement and sand or other acceptable aggregate and with just sufficient plasticizer to make the mix readily workable. If aggregate other than sand is used, stucco quality shall at least equal the strength requirement in *(a)* following. Stucco shall be applied in three coats, except that two coat work applied directly to masonry is acceptable.

(a) Scratch coat prepared by the tradesmen shall consist of one part Portland cement, with a lime addition of not more than 10% (by volume) of the cement content, and 3½ to 4 parts of sand or other acceptable aggregate. Stucco shall have a compressive strength of 2,000 p.s.i. (2″ cube at 28 days). Prepared (brand name) stucco cements mixed in accordance with the manufacturer's directions are acceptable provided the stucco produced will meet the foregoing strength requirement. Grout coat over monolithic concrete shall consist of one part Portland cement to 1½ parts of sand.

(b) Second or brown coat shall be same composition as scratch coat.

(c) For finish coat the mix shall be as for first and second coat, except, that the proportion of sand aggregate shall be not less than 3 parts, and not more than 3½ parts to each part of cementitious content, by volume, and except that:

(i) White Portland cement should be used in lieu of grey Portland cement.

(ii) Pigments may be added only to finishes prepared by tradesmen. Such pigments shall be pure mineral oxides not affected by lime or sun. The amount of pigment shall not exceed 6% by weight of the Portland cement.

(iii) Prepared (brand name) finish coats mixed strictly in accordance with manufacturer's directions are acceptable under the same conditions as *(a)* preceding.

D. *Application*

1. STUCCO REINFORCEMENT AND LATH

(a) Stucco reinforcement shall provide at least ⅜″ stucco key. This key shall be obtained by the use of furring strips, self-furring reinforcement, or furring nails.

(b) Reinforcement shall be nailed with either large headed (7/16″ heads) roofing nails, self-furring nails, or staples having shanks of 10 gauge wire. No dependence shall be placed on gypsum sheathing or fibreboard sheathing for the nailing support of furring or metal lath. Nails or other fastenings shall be spaced as required in *(c)* and *(d)* following.

(c) When reinforcement is applied by driving nails through the sheathing into studs, nails shall be spaced not more than 6″ apart vertically and 16″ horizontally. When sheathing is gypsum or fibreboard, nails shall penetrate into the studs at least 1¼″.

(d) When reinforcement is applied by fastening in patterns different from *(b)* and *(c)* preceding, or over horizontal furring, at least 16 nails shall be used for fastening each square yard of reinforcing material.

(e) Wood lath shall be applied over ⅜″ thick wood furring strips spaced not more than 16″ o.c. Nails shall be galvanized and shall be not less than 16 gauge with 1½″ long shanks.

2. MIXING

(a) Cement stucco mixed by tradesmen shall be prepared by proportioning materials exactly alike for all batches. Dry materials shall be thoroughly mixed to uniform colour before adding water. Machine mixing requires 5 minutes initial mixing after water is added. Hand preparation requires 15 minutes mixing of batch after water is added.

(b) Stucco should stand 1 hour after mixing before it is applied.

(c) After a batch is prepared it shall be remixed frequently without adding water, until it is all applied.

(d) Mixes shall not be used if aged more than 3 hours.

(e) Admixtures shall not be used to hasten set.

(f) Brand name stucco shall be prepared and applied strictly in accordance with manufacturer's instructions.

(g) All moistening of applied stucco shall be done evenly, with a very fine spray. At no time shall the applied stucco be soaked so that water runs down the wall.

3. SCRATCH OR FIRST COAT APPLICATION

(a) Masonry walls shall be dampened evenly before application of scratch coat. First coat on masonry shall approximate ⅜″ in thickness, except that a grout coat on monolithic concrete is acceptable.

(b) Scratch coat over metal lath shall completely embed and cover the reinforcement. The minimum thickness, including reinforcement, shall be ½″.

(c) The scratch coat applied to wood lath shall be pressed onto the lath so that continuous keys will be formed. Minimum thickness shall be ⅜″ from the face of the lath.

(d) The scratch or first coat shall be moist-cured for two days and allowed to cure a total of at least four days before second coat is applied.

4. BROWN OR SECOND COAT APPLICATION

(a) Scratch or first coat shall be sprayed with clean water a few hours before application of second, or brown coat. Scratch and second coats combined shall have a minimum thickness of ¾″ over all bases except masonry or monolithic concrete.

(b) Second coat shall be moist-cured for two days, then allowed to dry at least five more days before application of finish coat.

5. FINISH COAT APPLICATION

(a) The preceding coat shall be moistened as in 4. preceding, before application of finish coat.

(b) No trueing up or straightening shall be effected during the application of the finish coat.

(c) Scratch or first coat, together with second (finish) coat on masonry or monolithic concrete shall be at least ½″ thick.

30. ROOFING

A. *Roof Designation*

1. A flat roof shall be considered as a roof which does not slope more than 3″ in 12″.
2. A flat pitched roof shall be considered as a roof which slopes more than 3″ in 12″ but less than 5″ in 12″.
3. A pitched roof shall be a roof sloping not less than 5″ in 12″.

B. *Usage for Roof Covering Types*

1. Gravel, crushed stone or crushed slag is permissible as surfacing, on bituminous composition roof coverings on flat roofs only.
2. Bituminous composition roof coverings shall be nailed to the decks of all flat pitched roofs.
3. Shingles shall be used only on pitched roofs, except as permitted in C.1. *(e)* following.
4. Sheet metal roof coverings are acceptable on any roof, provided that all seams on flat and flat pitched roofs are soldered.

C. *Minimum Roof Surfaces*

1. FLAT AND FLAT PITCHED ROOFS

(a) Bituminous roof coatings shall at least comply with the requirements of the following specifications:

Canadian Government Specification Board
37-GP-4a Cement; Lap, Asphalt Roofing
37-GP-7a Roof Coating; Asphalt cutback, unfilled
37-GP-8a Roof Coating; Asphalt cutback, filled
37-GP-9a Asphalt Primer; Asphalt Roofing

Canadian Standards Association

A 123.6 -1953	Asphalt-saturated Roofing Felt for use in waterproofing and in constructing Built-up Roofs.
A 123.8 -1953	Coal-tar saturated Roofing Felt for use in waterproofing and in constructing Built-up Roofs.
A 123.9 -1953	Asphalt-saturated Asbestos felts for use in waterproofing and in constructing Built-up Roofs.
A 123.10-1953	Coal-tar saturated Asbestos Felts for use in waterproofing and in constructing Built-up Roofs.
A 123.13-1953	Coal-tar pitch for Roofing, damp-proofing and waterproofing.
A 123.14-1953	Coal-tar pitch for steep Built-up Roofs.

(b) For the roof coverings described in B. 1. or B. 2. preceding, a roof bond need not be supplied provided that the roof covering is applied in accordance with the roofing manufacturer's specification for a 20-year, 5 ply, asphalt or coal tar pitch, rag felt and gravel roof over wood, or other nailable type deck, when such specification is more restrictive than the following:

Specification for 20-year, 5 ply, asphalt, rag felt and gravel roof. The materials to be used shall at least comply with the requirements of the following specifications:

Sheathing Paper ..... C.G.S.B. 9-GP-2
Asphalt-saturated felt ..... C.S.A. A 123.6-1953
Asphalt ..... C.S.A. A 123.7-1953

First Application—over the roof deck, apply one layer of 5 lb. sheathing paper, lapping the sheets not less than one inch and nailing sufficiently along the edge to hold in place.

Second Application—lay two plies or 15 lb. asphalt-saturated felt, lapping each sheet 19″ over the preceding sheet, end laps to be not less than 6″. Nail along the bottom edge of each sheet, spacing nails at not more than 12″ o.c.

Third Application—mop the entire surface with asphalt using not less than 25 lb. per 100 sq. ft. Into this mopping, while hot, lay three plies of asphalt-saturated felt, lapping each sheet 24½″ over the preceding one and mop the full width under each lap with asphalt so that in no place shall felt touch felt. Mopping shall be done from 3 to 5 feet only ahead of each roll of felt as it is laid. Felt shall be laid without wrinkles or buckles and shall be rolled directly into the hot asphalt, and broomed forward and outward from the centre to ensure complete adhesion.

Nail along the top edge of each sheet at 24″ o.c. so that all nails shall be covered by not less than three plies of felt.

Surface—over the surface of the felts laid as above, pour a uniform coating of asphalt, using not less than 60 lb. per 100 sq. ft. Thoroughly and uniformly embed into the same, while hot, not less than 400 lb. of clean gravel ranging from ¼″ to ½″ in diameter, per 100 sq. ft.

Not less than 135 lb. of asphalt shall be applied in the construction of each 100 sq. ft. of roof measurement.

Flashing—shall be installed in accordance with the manufacturer's specifications.

Nails—all nails used in this application shall be as specified by the manufacturer.

Specification for 20-year, 5 ply, coal-tar pitch and gravel roof. The materials to be used shall at least comply with the requirements of the following specifications:

Sheathing Paper ..... C.G.S.B. 9-GP-2
Coal-tar saturated felt ..... C.S.A. A 123. 8-1953
Coal-tar Pitch ..... C.S.A. A 123. 13-1953

First Application—over the roof deck, apply one layer of 5 lb. sheathing paper, lapping the sheets not less than one inch and nailing sufficiently along the edge to hold in place.

Second Application— lay two plies of 15 lb. coal-tar saturated felt, lapping each sheet 19″ over the preceding sheet, end laps to be not less than 6″. Nail along the bottom edge of each sheet, spacing nails at not more than 12″ o.c.

Third Application—mop the entire surface with coal-tar pitch using not less than 25 lb. per 100 sq. ft. Into this mopping, while hot, lay three plies of coal-tar saturated felt, lapping each sheet 24½″ over the preceding one and mop the full width under each lap with coal-tar pitch so that in no place

shall felt touch felt. Mopping shall be done from 3′ to 5′ only ahead of each roll of felt as it is laid. Felt shall be laid without wrinkles or buckles and shall be rolled directly into the hot coal-tar pitch, and broomed forward and outward from the centre to ensure complete adhesion. Nail along the top edge of each sheet at 24″ o.c. so that all nails shall be covered by not less than three plies of felt.

Surface—over the surface of the felts laid as above, pour a uniform coating of coal-tar pitch, using not less than 75 lb. per 100 sq. ft. Thoroughly and uniformly embed into the same, while hot, not less than 400 lb. of clean gravel ranging from ¼″ to ½″ in diameter, per 100 sq. ft.

Not less than 150 lb. of coal-tar pitch shall be applied in the construction of each 100 sq. ft. of roof measurement.

Flashing—shall be installed in accordance with the manufacturer's specifications.

Nails—all nails used in this application shall be as specified by the manufacturer.

(c) As an alternative to *(b)* preceding a ten-year roof bond shall be provided for each roof covering type described in B. 1. or B. 2. preceding. The bond shall be issued by the manufacturer of the roofing material for production by the builder.

(d) Sheet metal for roofs shall be not less than 28 U.S. gauge galvanized copper bearing sheet metal, 14 oz. copper, 14 oz. zinc, or aluminum having a minimum thickness of 0.019″. At least one layer of not less than 12 lbs. breather type building paper or 14 lbs. asbestos paper shall be laid between the roofing and sheathing.

(e) On flat pitched roofs which slope less than 5″ in 12″ but not less than 4″ in 12″, 3 in 1 strip shingles weighing not less than 210 lbs. per 100 sq. ft. of roof surface, may be used provided they are laid in the following manner:

(i) Roof Boards

210 lb. 3 in 1 strip square butt asphalt shingles shall be laid over asphalt paper on roof boards not less than ¾″ thick. Alternatively plywood roof sheathing conforming to the table in Section 23. F. 3. can be used. Roof boards or plywood sheathing shall be applied in accordance with Section 23. F. 3. The roof sheathing shall be dry at the time shingles are applied.

(ii) Preparation

(aa) Before shingles are applied, a layer of acceptable asphalt building paper (water repellant breather type) at least conforming to the requirements of Canadian Government Specifications Board Specification 9-GP-2 (see Section 25.) shall be laid horizontally (length parallel to eaves and ridges) over the entire surface of the roof sheathing and nailed just sufficiently to hold it in place. The paper shall be lapped in a manner which will lead water away from the roof sheathing. Width of the overlap shall be not less than 2″. End laps shall be not less than 4″.

(bb) A starter strip of 36″ wide roll roofing shall be laid in one piece along the eaves with the outer edge flush with the drip edge and shall be extended up the roof slope to a point not less than 1′0″ beyond the intersection of a line projected vertically from the finished inside wall surface of the exterior wall

to the roof sheathing. The starter strip shall be nailed along each edge at not less than 16″ intervals. Where wide roof overhangs require a greater width of roll roofing than 36″, overlaps in the side or length of sheets shall be not less than 2″ wide and laid in a manner which will run water away from the roof sheathing.

(cc) A strip of roll roofing not less than 12″ wide shall be laid in one piece vertically over the sheathing flush with the outside edge of the roof along the rake of gable ends and nailed at not less than 16″ intervals on each edge. Alternatively a double course (two layers) of shingles may be laid along the rake edges provided the "cut-outs" are staggered to not occur one above the other and the second or top course is fastened to the lower shingle with 1″ diameter spots of lap cement under each edge of the top course.

(dd) A sheet metal drip edge not less than 12″ wide should be provided at roof edges overhanging the eaves by ¼″ to ⅜″. This strip shall be not less than 28 U.S. gauge galvanized copper bearing sheet steel painted on both sides, 16 oz. copper, 11 oz. zinc or 0.020″ aluminum. Where such a metal drip edge is employed, the starter strip and the tabs of the first three courses of shingles shall be fastened to the material immediately beneath with a 1″ diameter spot of lap cement.

A metal strip of material similar to that described in the preceding paragraph may be used along the rake of roofs provided it is not more than 4″ wide and applied beneath a roll roofing edge strip or doubled course of shingles. Where such a metal strip is employed, the roll roofing strip or the first course of the doubled course of shingles shall be spot adhered to the metal with 1″ diameter spots of lap cement.

(iii) Valleys

An acceptable type of 36″ wide roll roofing shall be cut lengthwise of the roll to form two strips, one 12″ wide, the other 24″ wide. The 12″ wide strip shall be laid in the valley first and 24″ wide strip shall then be laid on top and cemented to the lower strip with lap cement after dust and any other foreign substance has been removed. These strips shall be placed in the valleys and nailed at 16″ o.c. on each outer edge before shingles are applied. End seams in the lower sheet may be butted but the top sheet should be in one piece. If not in one piece, the end lap shall be not less than 24″ and shall be carefully cemented with lap cement and nailed only on the outer edges. When the shingles are applied not more than 8″ of the valley strip at the top and 10″ at the bottom shall be left exposed. All shingles laid over valley strips shall have the top valley corner of the shingle cut at an angle sufficient to prevent water catching and backing up in the valley. These shingles shall be laid in a thin bed of lap cement not less than 3″ in width measured from the cut edge of the shingle. Shingles laid over the valley strip shall be nailed through the shingle, the cement and the valley strip. Alternative-

ly, valleys may be of sheet metal not less than 15″ wide over 12 lbs. or better, building paper.

(iv) Hips and Ridges

Hips and Ridges shall be covered with 3 in 1 strip shingles cut into individual units from the "cut-outs", 8″ x 12″ units cut from roll roofing or specially manufactured capping units of the same weight, colour and finish as the shingles and laid with an exposure of not more than 5″ to the weather. On ridges, shingle butts shall be exposed opposite to the prevailing wind direction. Each ridge and hip shingle shall be nailed on each side, 1″ from the side edges and 5½″ from the end of the exposed butt. The first and last shingle on each hip and on each ridge shall be fastened to the material beneath with a 1″ diameter spot of lap cement. The adjoining edges of shingles at each intersection of a ridge with another portion of the roof and all intersections of hips shall be fastened to the material beneath with a thin layer of lap cement extending the full width or length of the intersecting joint.

(v) Exposure

Shingle exposure shall not exceed 5″ to the weather.

(vi) Nailing

Six 1″ galvanized or aluminum large head roofing nails at least conforming to C.S.A. Specification G 111-1952 shall be used for each shingle. Nails shall be placed 1½″ from the centre line of the "cut-outs" and from each edge. All six nails shall be ½″ above the upper line of the "cut-outs". The nails shall not be driven at an angle nor into cracks, knot holes, be counter sunk nor left exposed.

(vii) Cementing

In areas where in the opinion of the authority having jurisdiction severe wind conditions are experienced each shingle tab shall be cemented down by placing a 1″ diameter spot of lap cement under the centre of each tab 1½″ up from the butt. *The whole tab shall not be cemented.*

(viii) Cement

The lap cement mentioned in the preceding paragraphs shall be a type which at least conforms to requirements of the Canadian Government Specifications Board Specification 37-GP-4a — Cement, Lap, Asphalt Roofing.

(ix) Roll Roofing

Roll roofing mentioned in the preceding paragraphs shall be the same colour as the shingles and a type which at least conforms to C.S.A. Specification A 123. 2-1953. Asphalt Roofing Surfaced with Mineral Granules. Weight shall be not less than 90 lbs. per 100 sq. ft.

(x) Shingles

210 lb. 3 in 1 strip asphalt shingles shall at least conform to the requirements of C.S.A. A 123. 1-1953—Asphalt Shingles Surfaced with Mineral Granules.

(xi) Cold Weather Application

Shingles should not be applied when the exterior temperature is lower than 40°F. Shingles, roll roofing, underlayment and lap cements should be stored in a dry space at a temperature not less than 60°F. Materials should be used as quickly as possible after removal from

storage in an attempt to retain a flexible state at least until applied.

2. PITCHED ROOFS. Pitched roofs shall be covered and left watertight by the employment of one of the following materials laid strictly in accordance with the manufacturer's directions.

Roof covering should be applied over building paper as described in Section 25.

Proprietary roof covering shall be fastened as recommended by the manufacturer.

(a) Sheet Metal Roofing. Sheet metal for roofs shall be not less than 28 U.S. gauge galvanized copper bearing sheet metal, 14 oz. copper, 14 oz. zinc or aluminum having a minimum thickness of 0.019″.

(b) Slate and Tile. Roofing slate, hard-burned tile or similar roof covering may be used. Valleys, hips and ridges shall be protected by not less than 28 U.S. gauge galvanized copper bearing sheet metal, 14 oz. copper, 14 oz. zinc or aluminum having a minimum thickness of 0.019″.

(c) Asphalt felt shingles shall weigh not less than 210 lbs. to 100 sq. ft. of roof surface and shall at least conform with C.S.A. Specification A 123.1-1953, "Asphalt Shingles surfaced with Mineral Granules". Special 180 lb. asphalt felt shingles may be used if accepted by the authority having jurisdiction. Valleys, hips and ridges shall be slate surfaced roof material as recommended by the shingle manufacturer, or sheet metal as described in *(a)* preceding, and Section 31.

(d) Rigid asbestos-fibre Portland Cement base shingles shall weigh not less than 250 lbs. per 100 sq. ft. of roof surface. Such shingles shall at least comply with Canadian Government Specifications Board Specification 34-GP-3a, "Shingles; Asbestos-Cement, Roofing". Flashing of valleys, hips, and ridges shall be of sheet metal as described in *(b)* preceding, and Section 31.

(e) Wood Shingles (Random and Dimension Widths). Western Red Cedar Shingles shall at least conform with requirements of C.S.A. Specification 0118-1960. Main requirements are listed in the following table under the headings "5X", "Perfection" and "Royals". Shingles manufactured from Eastern Cedar shall comply with requirements of the last three entries in the table, where trade designations are given. Flashing of valleys, hips, and ridges shall be of sheet metal as described in *(b)* preceding, and Section 31.

Grade	Thickness in Inches	Length	Maximum Exposure	Minimum Width	Maximum Width	Amount of Clear Butt
No. 1–5X	5/2	16″	5″	3″	14″	all clear
No. 2–5X	5/2	16″	5″	3″	14″	12″
No. 3–5X	5/2	16″	5″	2½″	14″	6″
Perfection						
No. 1 Grade	5/2¼	18″	5½″	3″	14″	all clear
No. 2 Grade	5/2¼	18″	5½″	3″	14″	12″
No. 3 Grade	5/2¼	18″	5½″	3″	14″	6″
Royals						
No. 1 Grade	4/2	24″	7½″	4″	14″	all clear
No. 2 Grade	4/2	24″	7½″	3″	14″	16″
No. 3 Grade	4/2	24″	7½″	3″	14″	10″
No. 1–3X	6/2	16″	4½″	3″	.....	all clear
Eastern Extras	5/2⅛	16″	5″	3″	.....	all clear
Eastern Clears	5/2⅛	16″	5″	3″	.....	7″

Machine-Grooved Western Red Cedar Shakes are acceptable only when produced from No. 1 Grade for "5X", "Perfection" and "Royals".

Dimension shingles shall conform with requirements in above table, and the specified widths shall fall within the width limitations specified for the grade. Thickness represented as 5/2 shall mean that 5 butts placed together shall measure not less than 2", etc. Only shingles measuring 5 butts to 2" or thicker and conforming to grade specification for all clear shingles should be used.

Hot-dipped zinc coated copper or other corrosion resistant nails should be used for the application of wood shingles. Nails shall be not less than 1¼" long and with 14 gauge shank.

Application of wood shingles on tight or spaced sheathing shall be in accordance with the manufacturer's directions.

31. SHEET METAL WORK

A. *Material*

Copings, flashings, ornamental work, gutters and downspouts etc., shall be not less than 28 U.S. gauge galvanized copper-bearing sheet metal, 14 oz. copper, 14 oz. zinc, 4 lb. sheet lead or aluminum having a minimum thickness of 0.019". Wood gutters of Douglas Fir or Western Red Cedar, or treated wood gutters accepted by the authority having jurisdiction may be used in lieu of sheet metal gutters.

At least 12 lb. building paper (see Section 25.) shall be placed under all flashings. Nails, screws or other fastening devices shall be of the same material as the flashing or of a compatible material. Aluminum shall not come in direct contact with masonry unless protected with a coating recommended by the manufacturer.

B. *Openings*

1. Sheet metal or membrane waterproofing material shall be installed at heads and sills of openings in cavity walls or solid masonry walls.
   (a) Head flashing shall extend from front edge of lintel up and over top of lintel through wall and be turned up at least 1" on the inside surface.
   (b) Sill flashing shall be installed under jointed sills unless damp-proofing has already been provided (see Section 19. L. 2. *(a)* (ii)). Such flashing shall extend under and behind the masonry sill.
2. Sheet metal or membrane waterproofing material shall be installed above the heads and beneath the sills of openings in masonry veneered wood-frame walls.
   (a) Head flashing shall extend from front edge of lintel up and over top of lintel and up on sheathing and under the building paper for at least 2".
   (b) Sill flashing shall be installed under jointed masonry sills unless damp-proofing has already been provided (see Section 19. L. 2. *(a)* (ii)). Such flashing shall extend under the sill up on sheathing and under the wood sill.
3. Sheet metal flashing shall be installed over the heads of openings in wood-frame walls. Flashing shall form a drip at the outside edge of the drip cap and extend over the cap and up behind the building paper for at least 2"

C. *Intersections*

1. Sheet metal flashing shall be installed at all junctions (except vertical) between two different exterior finishes.

2. Intersections of roof and wall, or roof and parapet, shall be flashed. If walls are masonry or masonry veneer, sheet metal counterflashing shall be installed.
   (a) On flat roofs, flashing shall be sheet metal or material similar to roof covering. When sheet metal is not used, install 45° wood cant strip at roof and wall intersections.
   (b) On pitched and flat pitched roofs, flashing shall be sheet metal.
3. Masonry and wood intersections (except vertical) shall be flashed with sheet metal to completely separate wood from masonry.

D. *Chimney*
1. All chimney and flat or flat pitched roof intersections shall be flashed then counterflashed with sheet metal.
2. All chimney and shingled roof intersections shall be step flashed, then counterflashed with sheet metal.
3. Cricket or saddle covering shall be sheet metal, same material as roof covering or other acceptable material of equivalent weight and quality. When other than sheet metal is used, the material shall be flashed then counterflashed at the chimney with sheet metal.

E. *Downspouts*

Where downspouts are provided and are not connected to sanitary or combination sewers, extensions should be provided to carry rain water free of the soft back fill. These should spill on a stone or concrete slab sloping away from the building.

32. PLASTERING AND DRYWALL FINISH

A. *General*
1. EXTENT OF THE WORK. All walls, ceilings, stair and other soffits, and such parts of basements or cellars as may be stipulated in the plans and specifications, which are not otherwise finished, shall be plastered.
2. FIRE SEPARATION. The work of this section shall comply with the applicable requirements of Section 7.
3. EXPANSION/CONTRACTION JOINTS. Where expansion/contraction joints are made in the building structure, provision shall also be made for expansion/contraction in the furring, lathing and plastering.

B. *Definitions*

The following definitions give the meaning of special terms used in this Section.
1. CONTACT. Contact as applied to ceiling construction means that the lath is attached in direct contact with the construction above without the use of runner channels or furring.
2. CROSS FURRING. Cross furring as applied to metal construction, means the furring members which are attached at right angles to the underside of main runners or other structural support.
3. FURRED. As applied to ceiling construction, means that the furring members are attached directly to the structural members of the building.
4. MAIN RUNNERS. As applied to metal construction, means the runners which are attached to or suspended from construction above for the support of cross furring.
5. SUSPENDED. Suspended, as applied to ceiling construction, means that the furring members are suspended below the structural members of the building.

C. *Interior Furring*

1. GENERAL. Furring shall be used on walls, attached and suspended ceilings in the locations, sizes and widths designated. The maximum spacing centre-to-centre of both wood and metal furring shall not exceed limitations imposed by the plaster base used as shown in Table 1.

2. WOOD FURRING

(a) Nailing or Anchor Blocks shall be provided in solid masonry, reinforced concrete, or other monolithic exterior wall construction to provide nailing facilities for the wood furring. Other methods accepted by the authority having jurisdiction may be used.

(b) (i) Continuous Nailing Strips shall be not less than ⅜″ x 1⅝″ (See also Section 19. L. 1. *(a)*)

(ii) Wood furring. When lath is applied to furring over spaced supports such as ceiling joists or wall studs, the furring strips shall be at least the following sizes:

Spacing of Supports	Min. Size of Furring
16″ o.c. or less	1″ x 2″
24″ o.c.	1″ x 6″

Other sizes may be used if they provide at least the equivalent strength and stiffness as those sizes shown.

(c) Furring Support. The furring shall be nailed to anchor blocks or other wood members with not less than 2″ common nails, or tied to steel joists or other metal supports with not less than two loops of No. 16, Imperial Wire gauge, galvanized soft-annealed wire. Anchor blocks and furring shall be spaced to comply with the requirements of Table 1.

TABLE 1

MAXIMUM SPACING OF SUPPORTS AND FURRING FOR VARIOUS TYPES OF LATH

Type of Lath	Thickness (Ins.)	Width (Ins.)	Maximum Spacing of Lath Supports (Inches)				
			Wall Supports		Ceiling Supports		Solid Plaster Partitions
			Wood (a)	Metal	Wood (a) and Concrete	Metal	
Gypsum Lath							
Plain	3/8	16	16	16	16	16	NA
Plain	1/2	16	24	24	24	24	NA
Plain Long Length	3/8	16	16	16	NA	NA	No permanent supports required
	1/2	24	24	24	NA	NA	
Perforated	3/8	16	16	16	16	16	NA
Insulating	3/8	16	16	16	16	16	NA
Insulating Long Length	3/8	24	16	16	NA	NA	NA
Fibreboard Lath							
Plain or Laminated	7/16	16	16	16	12	NA	NA
	1/2	16	16	16	12	NA	NA
	5/8	16	16	16	12	NA	NA
	1	16	16	16	16	NA	NA
Metal Lath	Weight per Square Yard (Lbs.)						
Diamond Mesh	2.5		12	12	12	NA	12
Diamond Mesh	3.0		16	12	12	12	12
Flat Rib or 1/8-inch Rib	2.5		16	12	12	12	12
Flat Rib or 1/8-inch Rib	3.0		16	12	16	12	12
3/8-inch Rib Lath	2.5		16	16	16	16	NA
3/8-inch Rib Lath	3.0		19	19	19	19	NA
3/8-inch Rib Lath	3.5		24	24	24	24	No permanent supports required
Wood Lath(b)	Thickness (Ins.)	Width (ins.)					
Minimum	5/16	1	16	NA	16	NA	NA
Maximum	3/8	1 5/8					

(a) Wood supports should have a maximum moisture content of 16 per cent as installed.

(b) Not recommended as a plaster base for gypsum plaster.

NA—Not Applicable.

3. METAL FURRING

(a) *Channels* shall be hot or cold-rolled steel, free of rust, of the following minimum weights per thousand feet:

Size Inches	Weight Pounds per thousand lineal feet	
	Hot-rolled	Cold-rolled
¾	300	300
1	410	.....
1½	1,120	475
2	1,260	.....

NOTE: Coating with rust-inhibitive paint is recommended.

(b) *Tie Wire* shall be No. 16 Imperial Wire gauge of galvanized, soft-annealed steel, or of a material and size having superior corrosion resistance and equivalent strength to galvanized steel wire specified.

(c) *Wall Anchors.* Attachment shall consist of corrosion-resistant masonry nails or short pieces of ¾" channels used as anchors both driven into holes of slightly smaller diameter in the concrete, masonry or joints. They shall be spaced not to exceed 2' on centre horizontally. Vertical spacing shall be in accordance with the spacing of horizontal channels. Anchors shall project a proper distance from the face of the wall to permit ties to be made.

Where damp-proofing has been damaged in installation of attachments, it shall be repaired with the same material before proceeding with the installation of the furring.

(d) *Horizontal Members* shall be not less than ¾" hot or cold-rolled channels. They shall be spaced not to exceed 4'6" o.c. with the lower and upper channels not more than 6" from the floor and ceiling, respectively, and not less than ¼" from the face of the wall. They shall be securely tied to attachments with three loops of No. 18 or two loops of No. 16 Imperial Wire gauge, galvanized soft-annealed wire.

(e) *Vertical Furring Members* shall be not less than ¾" hot or cold-rolled channels. They shall be spaced in accordance with requirements for spacing of supports in Table 1. They shall be securely saddle-tied to horizontal members with three loops of No. 18 or two loops of No. 16 Imperial Wire gauge, galvanized soft-annealed wire at each crossing, and securely anchored to the floor and ceiling construction. Where furring is a considerable distance from the face of the wall, channel braces to the wall shall be provided approximately 2'0" on centre. Where the height exceeds 16'0", special truss bracing shall be provided to prevent concentration of load on the floor construction.

(f) *Band-Iron Furring* shall be not less than ¾" wide crimped and painted band iron not lighter than No. 22 U.S. gauge metal. Such furring shall be stapled to the wall with brick staples not more than 24" o.c. Spacing of band-iron furring shall not exceed 16" o.c. The metal lath shall be stapled over such band-iron furring staples providing a penetration of not less than ¾" into the masonry.

4. STEEL STUDS FOR SOLID PLASTER PARTITIONS. Steel studs for solid plaster partitions shall be of such size and number and so located as to provide solid backing at all vertical corners. They shall be set to the required dimensions, properly aligned, made

plumb and true, securely anchored to the floor and ceiling construction, and temporarily braced. Studs adjacent to openings shall be doubled and securely anchored to the frames or bucks. Heads of openings shall be adequately reinforced.

5. CEILING HANGERS

(a) Hangers which support main runners of suspended ceilings shall comply with the requirements of Table 2.

TABLE 2

Minimum Sizes	Maximum Area Supported
3/16″ rounds, rods or No. 8 wire (Imperial wire gauge)	16 square feet
1″ x 3/16″ Flats	25 square feet

(i) Rods and Flats shall be of mild steel.

(ii) All rod hangers should be protected with a coating of zinc or cadmium. Flat hangers should be similarly coated, or protected with a coating of rust-inhibitive paint.

(b) Holes in Flats shall be centred 7/16″ diam., and the end hole shall be at least ⅜″ from the end of the hanger.

(c) Hangers shall be of ample length.

(d) End Hangers shall be spaced not more than 6″ from the perimeter of the suspended area.

(e) Hangers should be installed so that they are plumb. When this is not feasible and sloping hangers are used, they shall be installed in pairs in such a manner that the lateral resolute of the one is balanced by the other.

(f) Hangers Without Inserts

(i) In cinder or other light-weight aggregate concrete, the hangers shall be secured to the steel reinforcement.

(ii) In stone aggregate concrete, the hangers shall be either secured to the reinforcement, or looped and embedded not less than 2″ in the concrete.

(g) Flat Steel Hangers (With Inserts). Flat steel hangers shall be bolted to inserts with ⅜″ diam. round-head stove bolts. The nuts shall be drawn up tight.

(h) Attachment to Main Runners

(i) Lower ends of flat hangers shall be bolted to main runners, or bent tightly around the runner and bolted to the main part of the hanger above the runner with ⅜″ diam. round-head stove bolts.

(ii) Wire or rod hangers shall be saddle-tied or securely and tightly wrapped around main runners. Wire shall be galvanized.

6. INSERTS

(a) Every insert shall be capable of developing the full strength the hanger supported.

(b) In cinder or other light-weight aggregate, or in tile arch construction, inserts shall be toggled with 7″ cross pieces bearing on top of the reinforcement or on top of the tile arch construction as the case may be.

(c) In stone aggregate concrete, inserts shall be secured to the reinforcement or looped and embedded at least 2″ in the concrete.

(*d*) Inserts shall project at least 3" below the bottom of the floor or slab construction.

(*e*) Holes in flat inserts shall be 7/16" diam., punched on the centre line at the lower end. Such hole shall be at least ⅜" from end of the insert.

7. MAIN RUNNERS

(*a*) *The span* of main runners between hangers shall not exceed 5'0".

(*b*) *The spacing* of main runners shall not exceed 5'0".

(*c*) *The size* of main runners for various spacings of hangers shall be as required in Table 3.

TABLE 3

Maximum Distance Centre to Centre of Hangers	Size of Main Runners
Up to 3 feet	1½" cold-rolled channels
Up to 4 feet	1½", 1.12 pounds, hot-rolled channels
Up to 5 feet	2" hot-rolled channels or 1½" x 1½" x 3/16" angles.

(*d*) *Main runners* shall be protected with a coating of zinc or cadmium or with two coats of a rust-inhibitive paint.

(*e*) *The ends* of main runner sections which meet shall be overlapped not less than 12", and at 2" from each end of such overlap shall be bound together with two loops of No. 16 Imperial gauge galvanized wire.

8. CROSS FURRING

(*a*) Cross furring for various spacings of main runners shall be at least the sizes shown in Table 4. The maximum spacings of cross furring for various types of lath shall not exceed those shown in Table 1.

TABLE 4

Maximum Distance Centre to Centre of Main Runners	Maximum Spacing of Cross Furring (in.)	Size of Cross Furring
2 feet	12	¼-inch pencil rods or ¾-inch channels.
2 feet	19	⅜-inch pencil rods or ¾-inch channels.
2 feet 6 inches	12	⅜-inch pencil rods or ¾-inch channels.
3 feet	24	¾-inch cold- or hot-rolled channels.
3 feet 6 inches	19	¾-inch cold- or hot-rolled channels.
4 feet	16	¾-inch cold- or hot-rolled channels.
4 feet	24	1-inch hot-rolled channels.
4 feet 6 inches	19	1-inch hot-rolled channels.
5 feet	12	1-inch hot-rolled channels.

(*b*) Cross furring shall be securely attached to the main runners by special clips, or by not less than two loops of No. 16 Imperial gauge galvanized wire.

(*c*) Ends of cross furring sections which meet shall be overlapped not less than 8"; and at 1" from each end of such overlap shall be bound together with two loops of No. 16 Imperial gauge galvanized wire.

9. WIRE FOR ATTACHING RUNNERS AND FURRING

Wire for attaching runners and furring directly to beams and joists shall be of the gauge sizes shown in Table 5.

TABLE 5

GAUGE SIZES OF WIRE FOR ATTACHING RUNNERS AND FURRING DIRECTLY TO BEAMS AND JOISTS

For Supporting Runners			For Supporting Furring without Runners		
			Wire Loops at Supports		
Area Supported, Maximum Square Feet	Single Hanger between Beams	Double Wire Loops at Beams or Joists	To Concrete	To Steel	To Wood
8	12	14	14	16	16
12	10	12	....	....	....
16	8	11	....	....	....

10 UNIT MASONRY FURRING. Unit masonry furring, including clay tile, shall be of sizes and shapes acceptable to the authority having jurisdiction.

D. *Interior Lathing*

1. SPACING OF SUPPORTS. Lath shall be supported at distances not exceeding the limitations prescribed in Table 1.

2. GYPSUM LATH

(a) Materials

(i) Gypsum lath shall at least conform to C.S.A. Specification A82.24-1950 "Gypsum Lath".

(ii) Nails shall be steel wire 1¼" long, 13 gauge, 19/64 inch head, blued, complying with Table 10 of C.S.A. Specification G111-1952 "Wire Nails, Spikes and Staples".

***(b) Application.* Refer to Section 7. for special requirements relating to Fire-resistive ratings.**

(i) Gypsum lath shall be securely nailed to wood supports at intervals not exceeding 5" along all supports on walls, and not exceeding 4" along all supports on ceilings.

(ii) Where spacing of wood supports exceeds 16", gypsum lath (½" thick) shall be nailed at intervals not exceeding 4" along all supports.

(iii) Nails shall be driven with the underside of the head flush with the face of the lath, and shall be at least ⅜" from the edge or end of the lath.

(iv) When ⅜" gypsum lath and sand aggregate plaster is used in fire-resistive rated ceiling construction, the joints shall be covered with striplath.

(v) 16" x 48" lath shall be applied with its face exposed to the room, and with the long dimension at right angles to the framing or furring members.
On walls the end joints shall be staggered. On ceilings either the end joints shall be staggered as for walls or shall be made continuously on one support and the long or edge joints shall be staggered. In the latter case continuous end joints shall be covered with 3" wide strips of metal lath. In all cases the lath shall be butted together.

(c) *Insulating Gypsum Lath.* Insulating gypsum lath shall be applied in the same manner as plain gypsum lath except that the foil side shall face the furring or framing members.

(d) *Cornerites.* Continuous cornerites of metal lath or wire fabric shall be installed at all internal angles except where special clip systems are used for installing the lath and the manufacturers of such systems do not recommend cornerites. Prefabricated cornerite with a machine cut or finished edge shall be at least 4″ in width, applied 2″ on each surface of internal angles. Where cornerites are cut from sheets of metal lath or wire fabric with hand tools it shall be at least 5″ in width applied 2½″ on each surface.

(e) *Corner Bead.* An acceptable type of corner bead shall be securely fastened to the full height of supports forming the external angles of all interior walls and partitions.

3. FIBREBOARD LATH

(a) *Materials*

(i) Fibreboard lath shall at least conform to Class B of the C.G.S.B. Specification 11-GP-2 for Fibreboard.

(ii) Nails shall be steel wire, 13 gauge, 19/64″ head, blued; complying with Table 10 of C.S.A. Specification G111-1952, "Wire Nails, Spikes and Staples". Length of nails shall be not less than 1¼″ for lath ½″ or less in thickness, and 1¾″ for lath more than ½″ but less than 1″ in thickness.

(b) *Nailing.* Nails shall be placed at intervals not more than 4½″, not less than ⅜″ from the ends, and not less than ½″ from shiplapped, tongued and grooved, or interlocking edges.

(c) *Joints*

(i) End joints (except interlocking type) shall be approximately 3/16″ to ¼″.

(ii) Shiplapped, tongued and grooved, or interlocking edges shall be fitted to moderate contact.

(d) *Cornerites.* Continuous cornerites of metal lath or wire fabric shall be installed at all internal angles except where special clip systems are used for installing the lath and the manufacturers of such systems do not recommend cornerites. Prefabricated cornerite with a machine cut or finished edge shall be at least 4″ in width, applied 2″ on each surface of internal angles. Where cornerites are cut from sheets of metal lath or wire fabric with hand tools it shall be at least 5″ in width applied 2½″ on each surface.

(e) *Corner Bead.* An acceptable type of corner bead shall be securely fastened to the full height of supports forming the external angles of all interior walls and partitions.

4. WOOD LATH

(a) *Material*

(i) Wood lath shall be not less than No. 2 Grade Douglas Fir or White Pine, reasonably clear, evenly manufactured and free from detrimental defects.

(ii) A few worm holes, small pitch pockets, well set or firm knots, not more than ¾″ in diameter and not bunched, and wane not more than one-third the thickness and one-third the width for one-third the length on one side of the lath, or its equivalent otherwise located, when not in combination with any other defect, shall be permitted.

(iii) Wood lath shall conform to the following dimensional requirements:

	Minimum Inch	Maximum Inch
Thickness	5/16	3/8
Width	1	1 5/8
Length	47 1/2 31 1/2	48 32

(b) Application

(i) Wood lath shall be spaced 3/8" apart at the edges, 1/4" at the ends, and shall be nailed securely at right angles to wood supports (spacing not to exceed 16" on centre) with No. 16 gauge blued nails, full driven.

(ii) Joints shall be broken every seventh lath.

(iii) Lath shall not run through from one room to another.

(iv) Cornerites. Continuous cornerites of metal lath or wire fabric shall be installed at all internal angles except where special clip systems are used for installing the lath and the manufacturers of such systems do not recommend cornerites. Prefabricated cornerite with a machine cut or finished edge shall be at least 4" in width, applied 2" on each surface of internal angles. Where cornerites are cut from sheets of metal lath or wire fabric with hand tools it shall be at least 5" in width applied 2 1/2" on each surface.

(v) Corner Bead. An acceptable type of corner bead shall be securely fastened to the full height of supports forming the external angles of all interior walls and partitions.

5. METAL LATH AND ACCESSORIES

(a) Materials

(i) Metal lath shall be one of the types listed in Table 1. All expanded or ribbed metal lath, fabricated from either copper-bearing or zinc-coated steel sheets, shall be given a rust-inhibitive coating after fabrication.

(ii) Metal accessories such as corner beads, base screeds, concealed picture molds, etc., shall be fabricated from copper-bearing or zinc-coated steel sheets of not lighter than No. 26 U.S. gauge steel, with perforated or expanded flanges or clips shaped so as to permit complete embedment in the plaster. All such accessories shall be given a rust-inhibitive coating after fabrication.

(b) Application

(i) General. Lath shall first be applied to ceilings and the sheet carried 6" onto the walls and partitions. Application of diamond mesh (flat expanded) metal lath shall be started one support away from a corner and be bent into or around the corner and carried onto the support on the abutting surface. If metal lath is not used on ceilings, the lathing may be started at the top of the wall and may be bent and carried 6" onto the ceiling joists. Wherever possible the ends of the sheets of lath shall be staggered. Ribbed lath shall be butted at internal corners. Cornerites, applied 4" on each face shall be provided at all interior angles where ribbed lath is used and where

diamond mesh has been butted. It shall be fastened only sufficiently to retain position during plastering.

Corner Bead. An acceptable type of corner bead shall be securely fastened to the full height of supports forming the external angles of all interior walls and partitions.

(ii) To All Supports. All attachments for securing metal lath shall be spaced not more than 6″ apart.

(iii) Lapping. Side laps of metal lath shall be secured to supports and be tied between supports at intervals not exceeding 9″.

Diamond mesh (flat expanded) metal lath shall be lapped ½″ at the sides and 1″ at the ends. Ribbed lath shall be lapped at the sides by nesting, and 1″ at the ends. Lapping of end joints between supports is permissible providing that such end laps are laced together with not less than No. 18 gauge galvanized tie wire.

(iv) To Wood Supports. Metal lath (except ⅜″ ribbed) shall be attached to horizontal wood supports with not less than 1½″, No. 10 gauge, 7/16″ head, barbed, bright or blued roofing nails driven home, and shall be attached to vertical wood supports with not less than 1¼″ common nails or 1″ large head asphalt roofing nails driven to a penetration of at least ¾″, or 1″ No. 14 Imperial Wire gauge wire staples driven home.

The ⅜″ rib lath shall be attached to horizontal and vertical wood supports with nails or staples ⅜″ longer than required for the metal lath mentioned in the preceding paragraph. If attachments are through the ribs, nails or staples shall be long enough to provide at least 1⅜″ penetration in horizontal wood supports and ¾″ penetration in vertical wood supports. Common nails shall be bent over to engage at least three strands of lath.

(v) To Concrete Joists. Rib metal lath in contact ceilings on concrete joists shall be attached to the joists either by loops of not lighter than No. 14 gauge galvanized, annealed steel wire with the ends of each loop twisted together, or by not lighter than No. 10 gauge galvanized wire hangers with the exposed end struck over the lath without twisting.

(vi) To Open Web Steel Joists. Rib metal lath in contact ceilings on open web steel joists shall be attached to the joists by single loops of not lighter than No. 16 gauge galvanized annealed steel wire, or by double loops of not lighter than No. 18 gauge galvanized, annealed steel wire, with the ends of each loop twisted together.

(vii) To Metal Furring. Metal lath shall be securely attached to horizontal and vertical metal supports with No. 18 Imperial Wire gauge galvanized, annealed wire ties. All attachments for securing metal lath shall be spaced not more than 6″ apart.

E. *Solid Plaster Partitions*

1. STUDLESS PARTITIONS, GYPSUM LATH

(a) Materials. Gypsum lath shall be plain "V" joint or square edge, ½″ in thickness, 24″ in width, and in ceiling height lengths.

(b) Application

(i) Floor runners of wood or metal and ceiling runners of

metal (cornerite) shall be firmly secured to floor and ceiling construction. Sides of grooves in floor runners shall overlap both faces of lath not less than ½" and metal base shall be grouted or wood runner routed out to provide for centering for the ½" lath so as to provide ¾" ground on each face.

(ii) Gypsum lath shall be of such length as to allow ¼" minimum, 1¼" maximum, top clearance in the ceiling runner, and shall be erected vertically, engaging bottom end in the groove of the wood floor runner or grouted metal base and wire tied or otherwise adequately fastened to the ceiling runner.

(iii) In erecting lath, the vertical edges shall be aligned in accordance with the lath manufacturer's directions.

(iv) Temporary bracing shall be provided. The erection of the bracing, and the method of attaching the lath to the braces, shall be done strictly in accordance with the proprietary specifications of the system employed.

2. STUDLESS PARTITIONS, METAL LATH

(a) Materials. Metal lath shall be ⅜", 3.5 lb. ribbed lath, 24" wide, ceiling height length maximum 8'4" using a 2½" high flush metal base, or 1⅝" x 2" wood floor runner, milled according to the lath manufacturer's detail. Wood shall be resistant to splitting and prime coated. Ceiling runners shall be of metal (cornerite).

(b) Application. Where metal lath is used for studless solid partitions, the long dimension of the sheet shall be vertical. Lath shall be secured to ceiling runners or to ceiling lath by wire ties spaced not more than 6" apart, and shall be suitably anchored to floor runners or base. At vertical corners, cornerite shall be used to which the metal lath shall be attached. Rib metal lath shall be lapped by nesting and all side laps shall be wire-tied at intervals not exceeding 9". Temporary horizontal bracing shall be installed just below mid-point height and temporary vertical bracing installed every 6' or fraction thereof.

3. STEEL STUDDED PARTITIONS, METAL LATH

(a) Material. Weight of lath shall comply with the requirements of Table 1.

(b) Application. Lath shall be applied in accordance with the applicable requirements of D.5.*(b)* preceding.

F. *Plastering*

Where a space is formed between roof decks and thermal insulation supported by contact, furred, or suspended lath and plaster ceilings, such space or spaces should be vented to the outside and a vapour barrier provided below the interior side of the thermal insulation, as close as possible to the interior ceiling surface.

1. GROUNDS

Grounds shall be installed so as to provide thicknesses of plaster, from face of plaster base to finish plaster surfaces as shown under Table 6. (See F.7. following.)

2. PREPARATION OF SURFACES

(a) All surfaces to which plaster is to be applied shall be carefully examined before proceeding, and the supervising authority shall be notified of any and all unsatisfactory conditions. Application of the plaster shall not proceed until such unsatisfactory conditions have been rectified.

(*b*) Plaster shall not be applied to surfaces which have been coated with bituminous compounds.

(*c*) Gypsum and fibreboard lath shall not be wet down.

(*d*) Wood lath shall be thoroughly wet down from 12 to 24 hours, and, in very dry weather, again from 1 to 3 hours before plaster is applied.

(*e*) Unit masonry (except gypsum tile and concrete unit masonry) shall be properly wet down immediately before the plaster is applied.

(*f*) Monolithic concrete surfaces and unit concrete masonry shall be cleaned of all dust, loose particles, grease, oil, and other foreign matter. Laitance and efflorescence shall be removed by washing first with a 10 per cent solution of commercial hydrochloric acid (muriatic acid) and water and then with clean water to remove all traces of acid.

Concrete surfaces shall have sufficient roughness to provide proper bond; if necessary, the surface shall be evenly wetted, but not saturated, to provide proper suction. If surfaces are not rough, they shall be hacked or bush-hammered, or a dash-coat of Portland cement grout, composed of 1 part of cement to 1½ parts of fine sand mixed to a mushy consistency, shall be applied. The Portland cement grout shall be forcibly dashed on the concrete surface, using a stiff fibre brush, with a whipping motion. This coat shall be kept damp for at least two days immediately following its application and then allowed to dry. Before application of plaster, the surface shall be evenly dampened, if necessary, to provide proper suction. As an alternative to a dash-coat of Portland cement grout, flat expanded metal lath may be attached to the concrete with concrete nails.

3. METAL GROUNDS AND OTHER ACCESSORIES

Metal grounds and other accessories, such as cornerites, corner beads, screeds, picture molds, etc., shall be carefully examined to see that they are straight, curved, plumb, level, square, or true to the required angles, as the case may require, before the plaster is applied.

4. TEMPERATURE AND VENTILATION

(*a*) *Temperature.* Plaster shall not be applied to surfaces that contain frost. In cold weather the temperature of the air in the building shall be maintained in a uniform range of 50°F. to 70°F. for a period sufficient to raise the surface temperature of the plasterbase to a temperature of 50°F. prior to the application of the plaster. This uniform range of temperatures shall be maintained while all plastering is being done, and after plastering has been completed. The heat shall be well distributed in all areas with deflectors or protective screens used to prevent concentrated or irregular heat on plaster areas near heat source.

(*b*) *Ventilation.* Ventilation shall be provided to properly dry the plaster during and subsequent to its application. In a glazed building this shall be accomplished by keeping windows open approximately 2 inches top and bottom (or side pivoted windows approximately 4 inches) to provide air circulation, and in enclosed areas or buildings lacking opening for natural ventilation by use of temporary circulators.

If glazed sash are not in place and the building is subjected to hot, dry winds or temperature differentials from day to

night of 20°F. or more, openings shall be screened with cheesecloth or similar material.

5. PLASTERING OVER/UNDER RADIANT HEATING

(a) General. When gypsum materials are used in conjunction with radiant heating systems, the design of such systems shall provide that in their operation the surface temperatures of the gypsum material shall not exceed 115°F., and where pipes are embedded in gypsum plaster, the water temperature in the pipes in contact with the gypsum shall not exceed 125°F.

(b) Support of Pipes and Coils. The pipes or coils shall be supported by the framing and not by the lath. Where the pipes are to be embedded in plaster applied to metal lath or gypsum lath, a minimum cover of ⅜" of plaster shall be maintained over the pipes or coils.

(c) Operation of Heating System. The heating system shall be turned on before plastering and inspected for leaks, then turned off and shall not be turned on during plastering or after plastering until such time as the plaster is dry.

6. MATERIALS

(a) Sand. Sand for use in basecoat plastering shall comply with the requirements of C.S.A. Specification A82.57-1954, "Inorganic Aggregates for Use in Interior Plaster". Fine sand having rounded particles uniform in size (frequently called "quicksand") shall not be used.

(b) Perlite. Perlite shall be volcanic rock properly expanded by a heating process and shall conform in particle size to the requirements of C.S.A. Specification A82.57-1954, "Inorganic Aggregates for Use in Interior Plaster". The weight shall be not less than 7½ nor more than 15 pounds per cubic foot, as determined by measurement in a cubic foot box, using the shovelling procedure as outlined in C.S.A. Specification A82.55-1950, "Standard Method of Test for Unit Weight of Aggregate".

(c) Vermiculite. Vermiculite shall be a mica mineral properly expanded by a heating process and shall conform in particle size to the requirements of C.S.A. Specification A82.57-1954, "Inorganic Aggregates for Use in Interior Plaster". The weight shall be not less than 7½ nor more than 10 pounds per cubic foot, as determined by measurement in a cubic foot box, using the shovelling procedure as outlined in C.S.A. Specification A82.55-1950 "Standard Method of Test for Unit Weight of Aggregate".

(d) Water. Water for plaster shall be clean and free from injurious amounts of oil, acid, alkali, organic or other deleterious substances.

(e) Basecoat Plasters

(i) Gypsum Neat Plaster (Hardwall), gypsum mill-aggregated plaster, and gypsum wood-fibre plaster shall at least conform to the requirements of C.S.A. Specification A82.22-1950.

(ii) Bond Plasters for use on Portland cement concrete shall be specially prepared for use as a basecoat on monolithic concrete and on concrete unit masonry. No aggregate shall be added.

(f) Finish Coat Plasters. Materials and plaster mixes for Finish Coat shall comply with the following specifications:

(i) **HYDRATED FINISH LIME**
Hydrated finish lime shall conform to C.S.A. Specification A82.44-1950, "Normal Finishing Hydrated Lime".

(ii) **QUICKLIME**
Quicklime shall conform to C.S.A. Specification A82.42-1950, "Quicklime for Structural Purposes".

(iii) **GYPSUM-LIME PUTTY TROWEL FINISH**
Calcined gypsum (gauging plaster) for finish coat shall conform to C.S.A. Specification A82.22-1950, "Gypsum Plasters" and lime shall be as required in (i) and (ii) preceding.

(iv) **PREPARED GYPSUM TROWEL FINISH**
Prepared gypsum trowel finish shall conform to C.S.A. Specification A82.22-1950, "Gypsum Plasters".

(v) **KEENE'S CEMENT-LIME PUTTY FINISH**
Keene's cement shall conform to C.S.A. Specification A82.26-1950, "Keene's Cement". Lime shall comply with (i) and (ii) preceding.

(vi) **SAND FLOAT FINISHES**
When a sand float finish is required, fine white sand shall be added to one of the preceding plasters.

(vii) **ACOUSTICAL PLASTERS**
Acoustical Plasters shall be a standard brand acceptable to the authority having jurisdiction.

7. APPLICATION

(a) Thickness of Plaster. Thickness of plaster measured from the face of the plaster base shall be not less than that required over any specific plaster base shown in Table 6.

TABLE 6
THICKNESS OF PLASTER

Plaster Base	Basecoat Inch	Finish Inch	Total Inch
Metal Lath	½ min.	⅛ max.	⅝ min.
All Other Types of Lath	⅜ min.	⅛ max.	½ min.
Gypsum Tile	⅜ min.	⅛ max.	½ min.
Unit Masonry (except Gypsum Tile)	½ min.	⅛ max.	⅝ min.
Monolithic Concrete Ceilings	⅛ min. 3/16 max.	⅛ max.	5/16 max.
Monolithic Concrete and Unit Concrete Masonry Walls	5/16 max.	⅛ max.	7/16 max.

(b) Basecoat Plasters. Basecoat plasters shall be used as manufactured or with the addition of an aggregate in accordance with the requirements of Table 7.

TABLE 7

PROPORTIONING PARTS OF PLASTER TO PARTS OF AGGREGATE
(Plaster and Sand Quantities by Weight; Perlite and Vermiculite Quantities by Volume)

Plaster Bases and Plaster Coats	Plasters and Aggregate							
	Neat (Hardwall)			Mill Aggregated			Wood Fibre	Bond Plaster
	Sand lb.	Perlite lb./cu.ft.	Vermiculite lb./cu.ft.	Sand	Perlite	Vermiculite		
Gypsum Lath								
Three Coat Work								
1st (Scratch) Coat	1-2	100-2	100-2	A.M.	A.M.	A.M.	A.M.	N.A.
2nd (Brown) Coat	1-3	100-2	100-2	A.M.	A.M.	A.M.	A.M.	N.A.
Two Coat Work	1-2½	100-2	100-2	A.M.	A.M.	A.M.	A.M.	N.A.
Fibreboard Lath								
Three Coat Work Only								
1st (Scratch) Coat	1-2	100-2	100-2	A.M.	A.M.	N.A.	A.M.	N.A.
2nd (Brown) Coat	1-3	100-2	100-2	A.M.	A.M.	N.A.	A.M.	N.A.
NOTE: Plaster applied to fibreboard lath shall have a maximum set of 2½ hours.								
Metal Lath								
Three Coat Work Only								
1st (Scratch) Coat	1-2	100-2	100-2	A.M.	A.M.	A.M.	A.M.	N.A.
2nd (Brown) Coat	1-3	100-3	100-3	A.M.	A.M.	A.M.	A.M.	N.A.
Wood Lath								
Three Coat Work Only								
1st (Scratch) Coat	1-2	100-2	100-2	A.M.	A.M.	A.M.	A.M.	N.A.
2nd (Brown) Coat	1-3	100-2	100-2	A.M.	A.M.	A.M.	A.M.	N.A.
Monolithic Concrete Ceilings								
Two Coat Work Only	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	A.M.
Monolithic Concrete Walls and Concrete Unit Masonry								
Three Coat Work								
1st (Scratch) Coat	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	A.M.
2nd (Brown) Coat	1-3	100-3	100-3	A.M.	A.M.	A.M.	A.M.	N.A.
Two Coat Work	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	A.M.
Gypsum Tile								
Two Coat Work Only	1-3	100-3	100-3	A.M.	A.M.	A.M.	1-1(x)	N.A.
Other Unit Masonry								
Two Coat Work Only	1-3	100-3	100-3	A.M.	A.M.	A.M.	1-1(x)	N.A.
Solid Plaster Partitions See above for type of lath specified								

NOTES: Two Coat Work—(double up method) one basecoat and finish coat.
Three Coat Work—Scratch and brown basecoats, and finish coat.
A.M.—As manufactured.
N.A.—Not applied to plaster base or underlying plaster coat concerned.
(x)—Sand Aggregate.

8. MIXING

(a) General. **Material that has partially set shall not be retempered or used. Frozen, caked, or lumpy material shall not be used.**

(b) Hand Mixing. **The mixing boxes shall be watertight and thoroughly cleaned of all set or hardened material. If mixing is done in the building, waterproof protection shall be provided**

under the mixing boxes and water barrels. Tools shall be cleaned after mixing each batch.

When used without aggregate, the plaster shall be placed at one end of the box, hoed into the water at the opposite end and thoroughly mixed to the proper consistency. When aggregate is added, the plaster and aggregate shall be mixed dry to a uniform colour at one end of the box, then hoed into the water at the opposite end and thoroughly mixed to the proper consistency.

(c) Mechanical Mixing. The mixer shall be cleaned of all set or hardened material before materials for a new batch are loaded. Each batch shall be mixed separately. The following cycle of operations shall be followed while the mixer is in continuous operation:

Put in the approximate amount of water;

When aggregate is to be added, add approximately half of the aggregate;

Add all the plaster;

When aggregate is to be added, add the remainder of the aggregate;

Mix to the proper consistency, adding water or plaster if necessary;

Dump the entire batch and use.

Plaster shall not be left in an operating mixing machine any longer than is necessary to become thoroughly mixed.

(d) Equivalent Mixes for Basecoat Plasters. The proportions given in Table 7 and the equivalent mixes provided in Table 8, are by weight for plaster and sand and by volume for perlite and vermiculite. (Equivalents of the specified mixes in Table 7 are provided in Table 8 in some of the units of measure commonly used in the field.)

TABLE 8

EQUIVALENT MIXES
BASECOAT PLASTERS

Mix (a)	Materials		
	Plaster (50-lb. bags)	Sand (No. 2 shovels)	Perlite or Vermiculite (4 cu.ft. bags)
1-2	1	7	....
1-2	4	....	1
1-2½	2	17	....
1-2½	16	....	5
1-3	1	10	....
1-3	8	....	3

(a) In each instance under "Mix" the first figure pertains to gypsum plaster and the second figure pertains to the aggregate.

9. BASECOAT APPLICATION

(a) Two-Coat Work

(i) Gypsum lath and unit masonry (other than concrete unit masonry). Base (first) coat shall be applied with sufficient material and pressure to form good bond to

the plaster base and to cover well. Then before this application has set, and without raking its surface, material of the same proportions shall be doubled back to bring the plaster out to grounds, struck to a true surface with rod and darby, and left rough, ready to receive the finish (second) coat. Slow setting plaster shall be accelerated to provide a set (mixed material) of less than 4 hours.

(ii) Monolithic concrete ceilings. Concrete ceilings shall have a thin coat of bond plaster scratched in thoroughly with the trailing edge of the trowel, on which the following coat shall be doubled back before the first coat has set, and filled out to a true even surface and left rough, ready to receive the finish coat. If the area to be plastered is so large that the doubled back coat cannot be completed before the scratch coat starts to set, the scratch coat should be roughened and allowed to fully set before the second coat is applied.

(b) Three-Coat Work

(i) Gypsum, fibreboard, wood and metal lath. Scratch (first) coat shall be applied with sufficient material and pressure to form good bond or form good full keys as the plaster base requires, and to cover well, and then be scratched horizontally to a rough surface. Slow-setting plaster shall be accelerated to provide a set (mixed material) of less than 2½ hours for fibreboard lath and 4 hours for other plaster bases.

Brown (second) coat shall be applied after the scratch (first) coat has set firm and hard, brought out to grounds, straightened to a true surface with rod and darby, and left rough, ready to receive the finish (third) coat. To ensure full plaster thickness plaster screeds should be applied to the scratch coat prior to the application of the brown coat.

(ii) Monolithic concrete interior walls and columns and concrete unit masonry, after proper preparation shall have a scratch coat of specially prepared bond plaster followed by a second (brown) coat of gypsum plaster with aggregate, trowelled into the scratch coat of bond plaster before the latter has started to set. The brown coat shall be brought out to grounds, straightened to a true surface with rod and darby, and left rough, ready to receive the finish (third) coat.

(c) Solid Plaster Partitions

(i) Studless solid partitions (½″ gypsum lath and plaster) shall be not less than 2″ in thickness and shall have scratch, brown, and finish coats on both sides.

Scratch coat, approximately ⅜″ in thickness with a maximum set of 3 hours, shall be applied first to the side opposite the temporary bracing with sufficient pressure to form a good bond and before the plaster has set, followed by a ⅜″ thick scratch coat applied to the side on which the temporary bracing occurs. Scratch coats shall be scratched horizontally to form a rough surface.

Brown coat shall be applied to the side opposite the bracing, after the scratch coat has set firm and hard and is partially dry. When the brown coat on the unbraced

side has set firm and hard and is partially dry, temporary bracing shall be removed and brown coat applied to the previously braced side. Brown coat shall be straightened to a true surface with rod and darby and left rough, ready to receive the finish coat, allowing 1/16″ to ⅛″ on each side for finish coat to bring over-all partition thickness to not less than 2″.

(ii) Studless Solid Partitions (metal lath and plaster) shall be not less than 2″ in thickness. Scratch coat approximately ⅜″ thick shall be applied first to the side opposite to the temporary bracing (unbraced side) and permitted to set and partially dry. The brown coat shall then be applied to the unbraced side and permitted to set. The temporary braces shall then be removed from the previously braced side and the brown coat applied to the scratch coat which was formed by the penetration of the plaster through the metal lath when the scratch coat had been applied to the unbraced side. The finish coat shall then be applied to each side.

(iii) Solid Plaster Partitions with Steel Studs. Gypsum or metal lath and plaster partitions shall be not less than 2″ in thickness and shall have scratch, back-up, brown, and finish coats.

NOTE: The side of the lath which is in contact with the metal studs is referred to as the "stud side". The other side is referred to as the "unobstructed side".

Scratch coat shall be applied first to the lath on the unobstructed side with sufficient material and pressure to form good keys on metal lath and good bond on gypsum lath, to cover well, and then be scratched horizontally to a rough surface. Temporary bracing of studs shall be furnished on the stud side of the partition and maintained until the scratch coat on the lath on the unobstructed side has set. Back-up coat shall be applied on the stud side of the lath; after the scratch coat on the unobstructed side has set firm and hard; and in two operations. When metal lath is used, the keys of the scratch coat shall be adequately covered in the first operation. The second operation shall consist of applying coat or coats required to bring the plaster out to the stud side grounds. It shall then be straightened to true surface with rod and darby and left rough, ready to receive the finish coat.

Brown coat on the unobstructed side shall be applied over the scratch coat, after the back-up coat on the stud side has set, and shall be rodded, darbied, and left rough, as specified for the back-up coat.

Plaster shall extend to the floor runner. All spaces between grounds shall be filled. Wherever possible plaster shall be commenced at the bottom of partitions.

10. FINISH COAT PLASTERS

(a) Materials and Mixes

(i) Lime Putty. Hydrated finish lime shall be prepared strictly in accordance with the manufacturer's printed directions. The soaking period recommended by the manufacturer shall be followed.

Pulverized quicklime shall be slaked by sifting it into the required amount of water and then allowed to

become cool to a temperature of between 50°F. and 80°F. The putty shall then be aged within this temperature range for two weeks before using.

Lump quicklime shall be thoroughly slaked, run through a No. 8 (2380-micron) sieve made of No. 16 Imperial Wire gauge steel wire, and allowed to stand at least two weeks.

(ii) Gypsum-Lime Putty Trowel Finish. Gypsum-lime putty trowel finish shall be mixed in the proportions of one part of calcined gypsum for finish coat (gauging plaster) to not more than three parts of lime putty by volume.

(iii) Prepared Gypsum Trowel Finish. Prepared gypsum trowel finish shall be mixed with water only, to the proper consistency in accordance with the manufacturer's directions.

(iv) Keene's Cement-Lime Putty Finish. When mixed mechanically the water shall be put in the mixer first, then the lime, and if used, the sand, and finally the Keene's cement.

Medium hard finish shall be mixed in the proportions of 100 pounds of Keene's cement to not more than 1¼ cubic feet of lime putty.

Hard finish shall be mixed in the proportion of 100 pounds of Keene's cement to not more than ½ cubic foot of lime putty.

(v) Prepared Gypsum-Sand-Float Finish. Prepared gypsum-sand-float finish shall be mixed with water to the proper consistency in accordance with the manufacturer's directions.

(vi) Gypsum-Sand-Float Finish. Gypsum-sand-float finish shall be mixed in the proportions of one part of gypsum neat unfibred plaster to not more than two parts of sand by weight.

(vii) Keene's Cement-Lime Putty-Sand Float Finish. Keene's cement-lime putty-sand float finish shall be mixed in the proportions of two parts of lime putty, and one-half part of Keene's cement and four and one-half parts of sand by volume.

(viii) Acoustical Plasters shall be mixed and applied strictly in accordance with the conditions of acceptance.

11. FINISH COAT APPLICATION

(a) General. The finish coat shall be applied to a thoroughly dry base coat which has been evenly wetted by brushing or spraying. The use of excessive water shall be avoided in the application of all types of finish coat plastering.

(b) Trowel Finishes

(i) Gypsum-lime putty trowel finish shall be applied over the base coat, scratched in thoroughly, laid on well, doubled back and filled out to a true, even surface. The general thickness shall be 1/16" to ⅛". The finish shall be allowed to draw a few minutes and then it shall be well-trowelled with water to a smooth finish, free from blemishes or irregularities.

(ii) Prepared gypsum trowel finish shall be applied in accordance with the directions of the manufacturer. The general thickness shall be 1/16" to ⅛". It shall be well-trowelled with water to a smooth finish, free from blemishes or irregularities. A prepared gypsum finish

coat must be finished before it sets. It should be applied from tops to bottoms of walls without a break, or if tops of walls applied first, joining should be formed by cutting clean and straight, with the point of the trowel and straight edge, and removing the selvage. The bottoms of walls should be finished up to the joining, using the set plaster on the tops of walls as a screed.

(iii) Keene's cement-lime putty finish shall be applied over the basecoat, scratched in thoroughly, laid on well, doubled back and filled out to a true, even surface. The general thickness shall be from 1/16″ to ⅛″ unless the finish coat is to be marked off or jointed, in which case the thickness may be increased as required by the depth of the marking or joint. The finish coat shall be allowed to draw a few minutes and then it shall be well-trowelled with water to a smooth finish, free from blemishes or irregularities. Trowelling shall be continued until the finish sets. Keene's cement should be allowed time to buck on the mixing board, then be broken down with the trowel and retempered without adding water, before applying.

The Portland cement plaster basecoat should be allowed to draw to the point that water and Portland cement are not pulled to the surface when floating. The surface shall be scratched lightly but at close intervals as by a nail projecting slightly through the wood float. The basecoat should be allowed to cure for at least 7 days before applying Keene's cement. Application of Keene's cement to an improperly cured (minimum 7 days) Portland cement basecoat or to a weak gypsum (vermiculite) basecoat is not acceptable.

(c) Float Finishes. The following sand-float finishes shall be applied over the basecoat, scratched in thoroughly, laid on with a trowel to an even surface, and then floated (with wood, carpet, cork, rubber or other type floats, depending on the texture desired) to a true, even surface free from slick spots or other blemishes:

Prepared Gypsum—Sand-Float Finish;
Gypsum—Sand-Float Finish;
Keene's Cement-Lime Putty—Sand-Float Finish.

(d) Acoustical and Other Special Plasters. Acoustical and other special plasters shall be applied in accordance with the conditions of acceptance.

G. *Gypsum Wallboard Finish*

1. GENERAL. All framing and furring shall be checked for trueness and alignment and any defects shall be corrected before beginning the application of the gypsum wallboard.

2. SPACING OF SUPPORTS. Maximum spacing, centre to centre of both wall and ceiling supports shall be 16″ for ⅜″ thickness and 24″ for ½″ thickness gypsum wallboard or two layers of ⅜″ thickness.

3. MATERIALS

(a) Gypsum Wallboard. Gypsum wallboard shall conform with C.S.A. Specification A82.27-1950. Board should be ½″ thick but shall not be less than ⅜″ thick.

(b) Nails. Nails for either plain, insulating or special fire-rated gypsum wallboards shall be blued, galvanized or cement coated

steel wire 13 gauge, 7/32" countersunk head complying with C.S.A. Specification G111-1952, Table 19. The lengths of nails shall be 1¼" for ⅜" thick board, and 1½" for ½" and ⅝" thick boards. Special types of nails may be used if accepted by the authority having jurisdiction. Nails for pre-decorated board shall be as recommended by the manufacturer of the wallboard.

(c) Joint Treatment and Adhesive. Material for treatment and adhesive for finishing joints, covering nails, and laminating multiple plies of wallboard shall be as provided by the manufacturer of the wallboard or shall be accepted by the authority having jurisdiction.

4. SINGLE LAYER APPLICATION

(a) Plain Gypsum Wallboard

(i) Plain gypsum wallboard shall be applied with the long dimension either at right angles to or parallel with the framing or furring. All edges and ends of the wallboard shall be butted. Ceilings shall be applied first. On walls up to 8'4" in height, application of the wallboard shall be with the long dimension horizontal to the framing or furring. Nailing headers or girths are not required behind the edges of wallboard so applied.

(ii) Nails shall be spaced 5" to 7" on ceilings and 6" to 8" on walls. All nails shall be driven home with heads slightly below the surface of the wallboard without cutting the paper. A nail set shall not be used.

(b) Insulating Gypsum Wallboard. Insulating gypsum wallboard shall be applied in the same manner as plain gypsum wallboard provided that the side with the reflective surface shall be applied next to the framing or furring. For insulation purposes the reflective surface shall face an air space not less than ¾" wide.

5. MULTIPLE LAYER APPLICATION

(a) Multiple layer application shall consist of two or more layers of gypsum wallboard, the first layer being nailed to the supports and the succeeding layer or layers being applied with an adhesive over the preceding layer.

(b) The first layer may be plain or insulating gypsum wallboard, and shall be applied in the same manner as for single layer application.

(c) Second and succeeding layers shall be bonded with adhesive. Such layers shall be applied at right angles to the first or preceding layer when horizontal. When all layers are applied vertically the joints of each layer shall not occur over the joints of the preceding layer.

(d) Temporary support shall be used until the adhesive has set. Temporary support may be in the form of gypsum wallboard nails driven at 12" intervals into the boards or wood framing applied to the face of the boards. After the adhesive has set, temporary wood bracing shall be removed or supporting nails shall be countersunk to a depth equal to the thickness of the face layer of wallboard.

6. JOINT AND NAIL HEAD TREATMENT. All joints shall be finished to receive paint or other applied finish, if the boards do not include their own decoration. The nail holes shall be carefully filled. Joints shall be covered with battens, tape or other acceptable materials. An acceptable metal bead shall be installed at all external

corners. Tape joints shall be produced in accordance with the manufacturer's specifications when such specifications are more restrictive than the following:

(a) Surfaces to receive tape joints shall be free from dust and dirt. Torn paper and loose material shall be removed to a firm base. Nail heads shall be set slightly below the level of the board surface.

(b) Openings greater than ⅛" between sheets of wallboard shall be filled with a patching plaster and allowed to dry before joint tape cement is applied.

(c) An even layer of joint cement about 5" wide shall be centred along the joint sufficiently thick to imbed the tape. Tape shall be run without delay over the cement, the application tool being drawn firmly over the joint to remove excess cement and eliminate bulges. After drying, a thin layer of joint cement shall be applied to bed the tape. The cement shall be feathered at the edges to make a band 7" to 8" wide. A third coating of cement shall then be applied and feathered at the edges to produce a band approximately 15" wide.

(d) After cement has dried, any rough and uneven areas shall be made smooth and level by sandpapering.

H. *Fibreboard Finish*

1. GENERAL. All framing and furring shall be checked for trueness and alignment, and any defects shall be corrected before starting the application of the fibreboard.
2. SPACING OF SUPPORTS. The maximum spacing centre-to-centre of both wall and ceiling supports shall be 16" for 7/16" and ½" insulating fibreboard.
3. MATERIALS
   (a) Fibreboard. Fibreboard shall be accepted by the authority having jurisdiction and shall be at least 7/16" thick, and shall at least conform with C.G.S.B. Specifications 11-GP-2 and 11-GP-3.
   (b) Nails. Nails for application of insulating fibreboard shall be 12 gauge by ⅜" head by 1¼" for 7/16" and ½" board and in no case shall the length of the nail be less than twice the thickness of the board. All nails shall comply with C.S.A. Specification G111-1952, "Wire Nails, Spikes and Staples".
4. APPLICATION
   (a) Insulating Fibreboard. Insulating fibreboard shall be applied in accordance with the manufacturer's instructions, or as may be required by the authority having jurisdiction.
   (b) Nails. Nails as in 3.*(b)* preceding shall be spaced at intervals not exceeding 4" along all edges nor 6" along all intermediate bearings.
   (c) Joints. Joints shall be finished in accordance with G.6 preceding.

I. *Plywood*

1. GENERAL. Plywood interior finish may be employed where its use does not contravene requirements of Section 7., provided that the plywood is an acceptable type of Hardwood, Douglas Fir or Western Softwood Plywood.
2. MATERIALS.
   (a) Hardwood Plywood shall at least conform to C.S.A. Specification 0115-1959 Hardwood Plywood specification requirements

for So1S grade for paint finish or G1S grade for natural or stained finishes.

(b) Douglas Fir, or Western Softwood Plywood shall at least conform to C.S.A. Specification 0121-1961 Douglas Fir Plywood, or C.S.A. 0151-1961 Western Softwood Plywood, requirements for Solid 1S grade for paint finish and G1S grade for natural or stained finishes.

3. THICKNESS. Plywood for interior finish shall be not less than ¼" thick.

4. APPLICATION

(a) Plywood shall be applied either vertically or horizontally, on studs or other framing members spaced not more than 16" o.c. All panel edges shall be supported on a stud, plate, header or joist. To stiffen wall panels, at least one row of headers, equal in size to the studs, shall be cut in between studs to divide into equal parts the distance between floor and ceiling. On ceilings, headers not less than 2" x 3" shall be let in between joists midway between panel lengths.

(b) Plywood panels shall be secured to framing members with 1½" finishing or casing nails spaced not more than 6" o.c. on the edge bearings and not more than 12" o.c. on intermediate supports.

(c) Glueing of panels is also acceptable provided the bond obtained is at least equivalent in strength and durability to the nailing method described in *(b)* preceding.

33. FLOORING

A. *General*

1. WHERE REQUIRED. Finished flooring shall be provided in all housing units, public and private entrances, corridors, halls, stair landings and all other public space provided that finished flooring need not be installed in laundry rooms, drying rooms, storage rooms or similar space in basements where a concrete floor at least conforming to requirements of Section 17. has been laid.

2. FIRE-RESISTIVE RATING REQUIREMENTS. Finished flooring shall at least conform to requirements in the following and the type installed shall be one which does not conflict with the applicable parts of Section 7. This includes the use of building paper.

3. SUB-FLOORING. All floors shall have sub-flooring provided that sub-flooring is not required where finished flooring is being applied directly to concrete slabs by the method described in the following.

B. *Support for Finished Flooring*

1. WOOD SUB-FLOORING. Materials for sub-flooring shall be uniformly thick, T & G, shiplap or square edge boards, or plywood. These materials shall be used as follows:

(a) Board sub-floors shall be uniformly thick T and G, shiplap, or square edge and not more than 8" wide. Boards shall be at least 11/16" thick if the finished floor is 25/32" or greater and at least ¾" thick if finished floor is less than 25/32" thick. Boards may be laid diagonally at an angle of 67½° or 45° to the joists or at right angles to the joists and the ends of all boards shall be fully supported by joists, headers or other solid bearing. Boards shall be fastened to the joists with nails at least 2½ times the thickness of the boards but not less than 2¼".

Boards 6″ and less in width shall have at least two nails per bearing and boards wider than 6″, three nails per bearing.

(b) Plywood sub-flooring shall conform to the requirements of C.S.A. Specification 0121-1961 or 0151-1961 and shall be at least 5 ply. Other plywood may be used if accepted by the authority having jurisdiction. Plywood shall be applied with the surface plies at right angles to the joists. When the finish flooring is of resilient material such as linoleum, vinyl, asphalt, rubber, etc., the edges of the plywood shall be supported by joists or 2″ x 4″ blocking between joists or by other methods accepted by the authority having jurisdiction. Panels shall be fastened with nails spaced not more than 6″ at edge bearings and 12″ at intermediate bearings. Other methods of fastening may be used if accepted by the authority having jurisdiction.

The thickness of plywood sub-floors and length of nails shall be not less than the following:

Joist Spacing	Plywood Thickness	Length of Nails
16″	½″	2¼″
20″	⅝″*	2¼″
24″	¾″*	2½″

*May be ½″ if the finish flooring consists of matched hardwood strip flooring at least 25/32″ thick laid at right angles to the joists.

2. UNDERLAY FOR RESILIENT FLOORING

(a) Plywood, or other underlay accepted by the authority having jurisdiction shall be laid over lumber sub-flooring as a base for linoleum, asphalt, vinyl asbestos, rubber tile or similar flooring product.

(b) Underlay shall be applied in accordance with requirements of the manufacturers of the resilient flooring.

(c) Underlay is not required if plywood sub-floor is used.

3. CONCRETE BASE. Concrete base placed over combustible or non-combustible floor construction shall be reinforced with wire mesh and shall be not less than 2″ in thickness. Such concrete base when trowelled to a smooth level surface may be used to receive linoleum, asphalt, vinyl asbestos or rubber tile; or ceramic tile, quarry tile or terrazzo; or other material accepted by the authority having jurisdiction.

4. CONCRETE FLOORS. Concrete floors when trowelled to a smooth and level surface may be used to receive finishes described in 3. preceding. Concrete floors in contact with the ground shall at least meet the requirements of Section 17.

Wood strip finish flooring on sleepers not less than 2″ x 3″ at 16″ o.c. may be placed on concrete floors. Such wood strip finish flooring shall be not less than ¾″ in thickness.

Where a concrete floor in contact with the ground is to receive a finish floor a vapour barrier shall be provided as follows:

Where the finished flooring is to be placed directly on a concrete slab a vapour barrier shall be placed under the concrete. The vapour barrier shall consist of 4 mil polyethylene film, or 45 or 55 pound roll roofing, or other material accepted by the authority having jurisdiction. All joints shall be lapped at least 6 inches. Where polyethylene film is used over a base of crushed rock or coarse gravel the film shall be placed on a layer of felt or paper conforming to the strength requirements of C.G.S.B. Specification 9-GP-2.

Where the finished flooring is wood strip flooring or other finish

flooring placed on a wood subfloor on sleepers as above, the required vapour barrier may be placed on top of the concrete. The vapour barrier shall be 4 mil polyethylene film, or 45 or 55 pound roll roofing, or two coats of bitumen acceptable to the authority having jurisdiction applied to the surface of the concrete to form a continuous membrane. Wood sleepers shall be treated with at least a soaking coat of a wood preservative acceptable to the authority having jurisdiction. Spaces between wood sleepers shall be vented to the room air.

(Explanatory Note: The object of these requirements is to provide a continuous and unbroken membrance of material which is highly resistant to water vapour flow. An unlapped and/or punctured installation, will not meet the requirement.)

C. *Building Papers*

1. UNDER WOOD FINISHED FLOORING. Building paper should be used between wood sub-flooring and wood finished flooring except when inclusion of such paper would contravene requirements of Section 7.
2. UNDER RESILIENT FLOORING. Unless otherwise recommended by the flooring manufacturer, paper shall be used under resilient flooring; linoleum, asphalt, vinyl asbestos, rubber and other acceptable types.

D. *Finished Flooring*

All wood finished flooring shall be treated as required by Section 42.

1. MATERIAL TYPES AND GRADES

(a) All wood flooring shall be grade and trade marked. When board sub-flooring is laid at right-angles to the joists, wood strip finish flooring shall be laid at right angles to the sub-flooring.

(b) In living rooms, dining rooms, living-dining rooms, living-dining-bedrooms, kitchen-dining rooms and living-dining-kitchens finished wood flooring, if used, shall be not less than second grade Canadian Birch, Northern Hard Maple or Beech; second grade Quarter-Sawn or Plain-Sawn Oak; "C" V.G. Douglas Fir or "B and Better" V.G. Pacific Coast Hemlock.

(c) In bedrooms, other habitable rooms, hallways and main stair landings finished wood flooring shall be not less than mill run Canadian Birch, Northern Hard Maple or Beech; No. 1 Common Plain Sawn Oak; "C", V.G. Douglas Fir.

(d) No finished wood flooring shall be used in bathrooms, water-closet rooms or laundry areas.

(e) Douglas Fir or Pacific Coast Hemlock shall not be used for finished flooring in kitchens.

(f) Linoleum, asphalt, vinyl asbestos, rubber, cork and flooring of similar nature may be used in any space except furnace rooms.

(g) In bathrooms, rubber, linoleum, asphalt, or vinyl asbestos, ceramic tile, quarry tile or terrazzo flooring shall be laid to manufacturer's specifications.

(h) Carpet accepted by the authority having jurisdiction may be used as a floor covering provided it is applied in accordance with the conditions of acceptance.

2. FINISHED WOOD FLOORING

(a) Wood floors placed over wood sub-flooring shall be not less than ⅜" thick if hardwood, and shall be not less than ¾" if of

Douglas Fir or Pacific Coast Hemlock. 3/8" thick flooring shall be nailed with finishing nails at least 1½" long, spaced 6" to 8". ¾" thick flooring shall be nailed with cut or special flooring nails, not less than 2¼" long, spaced 16" o.c. See Section 24. A. for time of application of finished flooring.

(b) Wood floors placed directly over wood sleepers at not more than 16" o.c. shall be not less than ¾" thick.

(c) Verandah, porch and other exterior wood floors shall be not less than No. 1 Pine, "B and Better" Douglas Fir or Pacific Coast Cypress supported at 16" o.c. and shall be not less than 1⅛" thick if spaced and not less than ¾" thick if tongued and grooved. Exterior wood flooring shall be primed or treated with an acceptable wood preservative before laying.

3. RESILIENT FLOORING

(a) Linoleum shall be not less than 3.20 millimeter thick.

(b) Asphalt and Vinyl asbestos tile floors shall be at least ⅛" thick.

(c) Asphalt tile shall conform to C.S.A. Specification A 100-1949 and vinyl asbestos tile shall conform to C.S.A. Specification A 126-1955. Linoleum shall conform to C.S.A. Specification A 146-1958.

(d) Other materials accepted by the authority having jurisdiction.

34. WINDOWS

A. *General*

Windows complete with hardware shall be installed to at least provide the degree of natural light and ventilation required by Section 6. Whenever practical, windows should be provided to light and ventilate corridors, stairways and similar public space except when such windows are prohibited by any part of Section 7.

Window sash and frames may be of wood, steel, bronze, aluminum or other acceptable metal. The design and quality of all windows shall be commensurate with the character of the building in which they are installed but in no case be less than as required by this Section. All frames and sash shall be manufactured in accordance with good trade practice.

Metal or other weatherstripping acceptable to the authority having jurisdiction should be employed.

Storm sash and screens are optional. When storm sash are provided, their quality shall at least equal that of the permanent sash except that wood sash need not be thicker than 1⅛". Storm sash shall have suitable hardware installed to provide required opening area (see Section 6. E.)

All casement windows other than those in non-habitable space in basements and cellars shall open outward unless designed to a special detail acceptable to the authority having jurisdiction.

B. *Wood Windows*

1. FRAMES

Wood frames shall be made from no less than No. 1 White Pine, "C" F.G. and/or V.G. Finish Douglas Fir or wood of other species known to be for this purpose the equivalent in quality to those named. Before being erected, component parts for frames shall be given the preservative treatment required for sash by part 6 of C.S.A. 0132. 1-1956 (Specifications for Wood Sash and Screen Frames).

Frames of materials other than wood may be employed if accepted by the authority having jurisdiction.

Frames designed to enclose lights of glass not set in sash shall be a type accepted by the authority having jurisdiction. Where such frames are intended to carry building loads other than their own weight, the structural stability of the design shall be established in a manner acceptable to the authority having jurisdiction.

Where sash are not provided the lights of glass shall be set in a weathertight manner acceptable to the authority having jurisdiction.

Frames for all types of windows, except those in which double or other multiple glazed sash are installed, shall be designed to permit the installation of double or other multiple glazing or an acceptable type of storm sash.

2. SASH

(a) Materials and Construction

(i) For wood sash, the type and grade of material together with the member size and methods for their design and construction including preservative treatment shall at least conform to the requirements of C.S.A. Specification 0132.1-1956, Wood Sash and Screen Frames.

All vertical sliding sash shall be of the check-rail type.

(ii) All horizontal sliding sash shall be a type acceptable to the authority having jurisdiction.

(iii) Steel, aluminum, bronze or other metal sash shall be a type acceptable to the authority having jurisdiction.

(b) Methods for Operation

(i) One sash in each pair of check-rail sash shall be fitted with an acceptable type of spiral, spring or other balance. The other sash should also be balanced. Balances shall be a type accepted by the authority having jurisdiction. The lower sash shall not be fixed. Corrosion resistant metal sash lifts shall be installed on the lower sash in each pair of check-rail windows. Sash locks shall be installed on all opening windows.

(ii) All casement type sash, other than those in basements or cellars, shall be side hinged and arranged to open outward. The hinges shall be of an acceptable type. A sash operator designed to hold the sash firmly at any position from fully closed to fully opened shall also be installed.

(iii) Inward opening casements and other designs for sash such as those intended for ready removal for cleaning, painting, etc., may be employed where the specific type is accepted by the authority having jurisdiction.

(iv) Fixed sash shall be installed in their frames in a weathertight manner. They shall also be arranged to permit removal for reglazing without damage to the surround or frame.

C. *Metal Windows*

Metal windows shall be one of those types accepted by the authority having jurisdiction.

35. DOORS

A. *General*

The design and quality of all doors shall be commensurate with the character of the building in which they are installed but in no case be less than as required by this Section.

B. *Where Required*

Doors and their frames complete with hardware, shall be provided at the following locations:

1. IN THE BUILDING (PUBLIC USE). Exterior entrances, vestibules, lobbies or foyers, laundry or drying rooms, storage rooms, public toilet rooms, garbage and incinerator rooms, furnace rooms, recreation rooms (where provided), and any other location where required by Section 7.

2. IN EACH HOUSING UNIT. Entrances to housing unit, vestibules, combination rooms, bedrooms, bathrooms, toilet rooms, storage rooms, utility rooms or combined rooms containing utilities.

C. *Door Dimensions*

Dimensions of doors shall at least conform to the requirements of the following table or to the applicable parts of Section 7. whichever requirement is the most restrictive.

1. TO A BUILDING

Location	Width	Thickness (if wood)
Exterior Building Entrance (single)	3′ 0″	2¼″
Storage, Laundry or Drying Rooms	3′ 0″	1¾″
Vestibule—Building (single)	3′ 0″	1¾″
Housing Unit Entrance (single)	2′10″	1¾″
Other Exterior Door (except Garage and Balcony Doors)	2′10″	1¾″
Recreation Rooms (where provided)	2′10″	1¾″
Garbage and Incinerator Rooms, Furnace Rooms	2′10″	2¼″
Public Water-Closet Rooms	2′ 4″	1¾″
Garage Doors (one car entrance)	8′ 0″	1¾″
(two car width)	14′ 0″	2″

More than 14′0″ width (an acceptable type complete with operating device).

2. IN A HOUSING UNIT

Location	Width	Thickness (if wood)
Vestibule	2′ 8″	1⅜″
Bedroom and Combination Rooms	2′ 6″	1⅜″
Storage, Utility Rooms and combined rooms containing utilities	2′ 8″	1⅜″
Bathrooms and Water-Closet Rooms	2′ 0″	1⅜″

3. HEIGHT OF DOORS

(a) The height of all doors to a building (in 1. preceding), shall be at least 6′8″, except that garage doors shall be designed in height to provide a clear opening of 6′6″.

(b) The height of all doors in a housing unit (in 2. preceding) shall be at least 6′6″, except that doors to bathrooms, water-closet rooms, and coat and clothes closets need not exceed 6′0″ in height.

D. *Material for Required Doors*

1. If of wood, exterior doors and entrance doors to housing units shall be built of solid stock. Material shall be not less than No. 3 cuts White Pine, "C" F.G. and/or V.G. finish Douglas Fir, or wood of equivalent quality and grading.
2. All exterior and interior doors manufactured from wood or wood products shall be accepted by the authority having jurisdiction.

E. *Door Frames*

1. Wood frames shall be not less than No. 1 White Pine, "C" F.G. and/or V.G. finish Douglas Fir, or wood of equal quality and grading, primed or treated with an acceptable wood preservative on all faces before erection.
2. Steel frames or other materials may be used if accepted by the authority having jurisdiction.

F. *Weatherstripping*

Weatherstripping acceptable to the authority having jurisdiction shall be installed on all exterior doors opening directly to the outside from housing units.

G. *Storm or Combination Doors*

Storm or combination doors should be provided for exterior doors opening directly to the outside from housing units if there are no entrance vestibules, or where they open directly to the outside from habitable rooms (including kitchens).

36. STAIRS AND ELEVATORS

A. *Stairs*

1. GENERAL

(a) Planning and Enclosure. The planning, location and enclosure of stairs shall at least comply with the requirements of Section 7. and this Section.

(b) Design. Each staircase shall be of neat construction designed in keeping with the general character of the building, and shall be constructed in accordance with sound construction practice. Space under public stairs shall be left entirely open or shall be entirely closed without possible means of access.

(c) Service Stairs. Stairs which are provided for the use of the employees of the building owner or intended to facilitate deliveries to housing units, and which are not provided for the use of the tenants or as a required means of egress, shall be defined as service stairs. Such stairs shall at least comply with the requirements for Public Stairs, except that the clear width shall be not less than 2'10".

(d) Private Stairs. Stairs that are provided only for private use by each tenant and are contained entirely within one housing unit, shall be defined as private stairs.

(e) Public Stairs. Stairs which do not fall into the category of either *(c)* or *(d)* preceding, shall be defined as public stairs.

2. MATERIALS

(a) Combustible Materials. In buildings not more than two storeys in height comprising wood frame construction, the stairs may be constructed of combustible materials provided

the soffits of stairs and landings are covered with ¾" gypsum plaster not leaner than 1:2, on metal or perforated gypsum lath, or covered with two layers of ⅜" gypsum wallboard cemented together and having the joints staggered.

(b) Non-Combustible Materials. In buildings of fire-resistive construction and in buildings which are three or more storeys in height, stairs shall be constructed of non-combustible materials throughout.

3. DIMENSIONS OF PUBLIC STAIRS

(a) Headroom. The clear headroom over all stairs shall be not less than 7'0". Measurements shall be taken vertically from a line drawn through the outer edges of the nosings of the treads. Clear headroom over landings shall also be 7'0".

(b) Landings

(i) The length and width of any landing shall be not less than the width of the stairs in which it occurs, except in a straight run the length of a landing need not exceed 44".

(ii) A space the equivalent of a landing in dimensions shall be provided at the top and bottom of each flight of stairs.

(iii) The vertically projected height between landings shall not exceed 12'0".

(c) Width. The width of any public stair shall be determined from the requirements for means of egress in Section 7.H.

(d) Treads and Risers

(i) The minimum run (horizontal distance from face of riser to face of riser) shall be not less than 9½". The maximum rise (vertical distance face to face of treads) shall not exceed 7¾".

(ii) The product of the run times the rise shall be not less than 70 nor more than 75 measured in inches.

(iii) The width of treads and the height of risers respectively, shall be uniform in any one flight.

(iv) Where the run is less than 10" the nosing on the treads shall project at least 1" beyond the face of the risers.

(v) There shall be not less than two risers in any flight.

(vi) Winders are not permitted in any stairway.

(vii) All treads and landings, other than wood, shall have non-skid surfaces.

(viii) Wood treads shall be not less than 1½" thick hardwood or vertical grain Douglas Fir of equal species and grade to that required for finish flooring.

(e) Handrails

(i) The open sides of all landings and stairs shall be provided with well secured balustrades or handrails, not less than 2'8" in height above the nosing of the treads.

(ii) A balustrade or handrail shall be provided on both sides of stairs which exceed 44" in width.

(iii) Handrails shall be securely fastened to the wall and shall project not more than 3½".

(iv) Handrails shall be so constructed that there will be no obstruction on or above them that would tend to break a handhold.

(f) Construction

(i) Fire-Resistive Rating. All stairs shall have a fire-resistive rating of at least one hour (see A. 2. preceding). If the supporting materials do not have the required resistance, they shall be protected to provide the required rating to the assembly.

(ii) Stringers. Every flight of wood stairs shall be carried by not less than three stringers, at least 1⅛" thick. Open stringers shall have an effective depth of at least 3½". Full bearing shall be provided at each end of every flight.

(iii) Steel or Concrete Stairs. Every stair shall be designed and constructed to safely support all superimposed loads. Treads and landings shall be supported under their entire area, either by continuous steel plates at least ⅛" thick or by reinforced concrete. Support of such construction shall be of non-combustible construction throughout.

4. PRIVATE STAIRS

(a) General

(i) Each staircase shall be of neat construction designed in keeping with the general character of the housing unit, and shall be constructed in accordance with sound construction practice.

(ii) The clear headroom over all stairs shall be not less than 6'4". Measurements shall be taken vertically from a line drawn through the outer edges of the nosings of the treads. Clear headroom over landings shall also be 6'4".

(iii) A handrail or balustrade shall be provided on at least one side of all stairs, and around the open side of all stairwells, including stairs to attic spaces. On enclosing walls, the handrail shall be continuous and shall extend the full length of the enclosing wall. The vertical height of such handrail or balustrade shall be not less than 2'8".

(iv) Winders should not be employed in any stairs. Winders may be permitted provided they consist of not more than one ninety degree turn in a stair connecting two floors, and shall consist of two angled risers and three winder treads.

(v) A single riser is not permitted between two floor levels. A single riser is permitted between a floor level and an adjacent landing on other than main stairways.

(b) Main Stairs

(i) Clear width between the finished wall faces shall be not less than 3'0", provided that the clear width of stairs to attic storage space may be not less than 2'8".

(ii) Treads and Risers. The minimum run (horizontal distance from face of riser to face of riser) shall be not less than 8½", provided that for service stairs to attic storage space the minimum run shall be 8".
The maximum rise (vertical distance from top of tread to top of tread) shall be 8", provided that for service stairs to attic storage space the maximum rise shall be 9".
The width of treads and height of risers, respectively, in any one flight shall be uniform.

Treads shall be of hardwood or edge grain Douglas Fir and the minimum thickness shall be 1".

(iii) Stringers shall have solid bearing at top and bottom ends. Wooden stair stringers shall be not less than 1⅛" in thickness and 10" in depth. The effective depth of open stringers shall be not less than 3½".

(iv) Other materials may be used in the construction of stairs if accepted by the authority having jurisdiction.

B. *Elevators*

1. GENERAL. Apartment buildings of four or more floors shall be provided with a satisfactory means of vertical transportation necessitating a minimum use of stairs for ingress and egress.
The character and type of elevator service and equipment shall be appropriate to the class of housing provided. The suitability of the elevator installation proposed for any apartment building shall be assessed on the basis of the number, size and speed of the elevators to be provided, the carrying capacity of the installation, the occupant load to be carried, the maximum interval, and other relevant factors.

2. MINIMUM REQUIREMENTS. An elevator installation complying with following minimum requirements is acceptable for low-rental apartment buildings. An elevator installation in medium and high rental apartment buildings shall provide an appropriately higher standard of elevator service.

(a) Not less than one elevator shall be provided in buildings comprising four, five or six floors; not less than two elevators shall be provided in buildings comprising seven or more floors. A basement containing housing units shall normally be considered as a floor.

(b) The elevator installation shall have a carrying capacity of not less than 7% of the total building occupant load in five minutes.

(c) The maximum interval should not exceed 80 seconds.

(d) The occupant load shall be calculated on the basis of two persons to each standard bedroom or combination room with sleeping facilities. The total occupant load to be carried shall be the sum of the occupant loads on all floors, excluding the ground elevator terminal floor.

(e) Elevator speeds shall be designed to provide a satisfactory maximum interval. Speeds less than 200 feet per minute are not recommended for buildings comprising more than ten floors.

(f) An adequate control system shall be provided. In one, two, or three car installations the system shall be not less than simplex, duplex, or triplex down collective control respectively.

(g) The recommended minimum elevator capacity is 2,000 lbs. One of the elevators in each apartment building comprising seven or more floors shall have a minimum capacity of 2,000 lbs.

(h) Where two or more elevators are provided, the installation shall be designed to serve all floors when only one elevator is operating.

(i) The construction, inspection, maintenance, and operation of elevators shall comply with the provisions of the C.S.A. B 44-1960, Safety Code for Elevators, Dumbwaiters and Escalators, and of Section 6.6 of the National Building Code, 1960.

37. INTERIOR TRIM

A. *General*

1. Trim shall be provided at the following locations commensurate with the type of housing being constructed:
   (a) Window stools and, where necessary, aprons at windows.
   (b) At junction of counter top and wall in kitchens.
2. Suitable trim shall also be provided elsewhere for the protection of plaster work or other friable finish, except that architraves around all door openings in walls and partitions may be omitted when wall finishes are suitably returned into jambs.
   A shoe mould shall be provided around all walls and partitions at floor level, however a separate or combined base and shoe mould not less than 2″ in height is recommended for the protection of the wall finish.

B. *Steel trim* shall be primed with a rust-inhibitive paint before installation or otherwise treated to prevent corrosion.

C. *Aluminum Mouldings* shall be treated with a protective coating when in contact with masonry, plaster, mortar or concrete.

D. *Wood Trim* shall be clean, sound stock and sanded smooth suitable for receiving a good paint or varnish finish. Moisture content at time of installation should not exceed 12%.

E. *Other Material* may be used if accepted by the authority having jurisdiction.

38. KITCHEN STORAGE

A. *Shelving*

1. Each kitchen or kitchen combined with a habitable room in a family housing unit shall have in a cabinet or cabinets at least 24 linear feet of shelf space not less than 11″ deep, and with not less than 9½″ between shelves except as qualified hereafter.
2. Where shelving not less than 5″ nor more than 7″ in width is installed approximately one-half way between the shelves in A. 1. preceding, then 50% of the length of any such shelving may be included in the required 24 feet.
3. Where shelving more than 7″ in width is installed, with less than 9½″ between shelves for more than 7″ of their width, then 50% of the length of any such shelving may be included in the required 24 feet.
4. Where shelving more than 7″ but less than 11″ in width is installed, with not less than 9½″ between shelves, then 50% of the length of any such shelving may be included in the required 24 feet.
5. Shelving meeting the full requirements of A. 1. preceding, shall not be less than 12 linear feet.
6. Any shelving higher than 6′6″ from finished floor shall not be considered in computing the required shelf space.

B. *Counter and Work Space*

1. In addition to the above, not less than 8 linear feet of counter-top work space with complementary base cabinets shall be provided except as qualified in 2. following.
2. Built-in dishwashers, laundry units and sinks may be incorporated in this length provided that in no case shall the counter-top with complementary base cabinets be less than 6 linear feet.

3. Required counter-tops shall be at least 22″ wide.

C. *Bachelor Housing Units*

In bachelor housing units with kitchens, the storage shall be provided in a similar manner to A. and B. preceding. In bachelor housing units containing a kitchen alcove rather than a kitchen, the kitchen storage should conform as closely as possible within the space limitations, to the requirements of A. and B. preceding.

39. MEDICINE CABINET, CLOSET SHELVING, ETC.

A. *General*

The fixtures or fittings required in B., C. or D. following, shall be provided where applicable in each bathroom and in each closet in every housing unit.

B. *Medicine Cabinet*

A medicine cabinet not less than 9″ in height or width with an overall minimum size of 1.5 sq. ft., with shelves not less than 3″ wide shall be provided in each required bathroom. The bottom of such cabinet shall be at least 4′0″ above floor level. Alternatively, equivalent space may be incorporated as shelving in a vanity with a door. This door shall be provided with a lock.

C. *Bathroom Mirror*

A plate glass mirror not less than 12″ x 18″ shall be installed over the basin either by securing to the wall or by combining with the cabinet. The mirror shall be not less than 3/16″ thick, mirror glazing quality plate glass with a moisture resistant reflective backing and shall be labelled as to quality and thickness. (See Section 43. B. 4. for venting requirements.)

D. *Coat Rod, and Shelves*

A coat rod, and at least one shelf above the coat rod shall be installed in the entrance coat closet and all bedroom closets. The linen closet shall have at least 6 linear feet of shelf space not less than 14″ in width or depth, and with not less than 12″ between shelves which should be adjustable. Shelves shall be plywood or dressed material sanded smooth suitable for painting or other type accepted by the authority having jurisdiction.

40. BUILT-IN TOILET FITTINGS

Paper holder, soap holder, towel bar and grab bar shall be installed in appropriate locations. When tub shower is provided a shower curtain rod or suitable enclosure shall also be installed. Such fittings shall be securely fastened to backing in the wall structure.

41. HARDWARE

A. *General*

Install hardware commensurate with class of housing. Allowance for finishing hardware shall be stated in specifications.

B. *Material*

Exterior hardware material may be of bronze, brass, or ferrous metals coated with zinc or cadmium or phosphate treated before painting.

C. *Requirements*

1. **EACH EXIT DOOR to the building shall be hung on 1½ pairs of solid butt hinges at least 3½" x 4½".**
2. **REQUIRED INTERIOR DOORS in the building, including entrance doors to each housing unit, shall be hung on 1½ pairs of solid butt hinges at least 3½" x 3½".**
3. **REQUIRED INTERIOR DOORS in each housing unit shall be hung on not less than one pair of 3" x 3" solid butt hinges.**
4. **EVERY WINDOW OR DOOR OPENING to the exterior shall be equipped with an acceptable locking device controlled from within the building. Storage lockers in basement shall at least be equipped with a hasp and eye to receive padlocks.**

42. PAINTING

A. *General*

1. **Quality of ready or site mixed paints and other protective coatings, and materials used in mixing and thinning shall at least equal the requirements of the Paint Specifications issued by the Canadian Government Specifications Board.**
2. **Ready mixed paint delivered in the original, unopened container should be used; the manufacturer's directions concerning application, stirring and thinning shall be followed exactly.**
3. **Nail holes, cracks and other defects shall be puttied or filled with plastic wood after prime coat application.**
4. **Knots and resinous areas shall be sealed with an acceptable sealer before priming.**
5. **No exterior painting shall be done when the temperature is lower than 32°F., or when the surface to be painted is damp or wet. For interior painting the interior temperature shall be maintained at not less than 50°F. immediately before painting and until coating is dry to touch.**

B. *Exterior Painting*

1. **Site mixed paint for exterior work may be prepared from white lead and zinc oxide pigments, linseed oil, turpentine, dryers and colours in oil.**
2. **Exterior wood work to be painted shall be given three coats of exterior oil-based paint. Alternatively, other painting systems accepted by the authority having jurisdiction may be used. Galvanized steel should be primed with rust-inhibitive paint and finished with two coats of exterior oil-based paint.**
3. **Exterior wood work to be stained shall receive one of the following finishes:**
   Oil stain (with or without pigment) followed by two coats of outside (spar) varnish.
   Two coats of oil stain (with or without pigment).
   Two coats of creosote stain.
   Protective coatings accepted by the authority having jurisdiction.
4. **Exterior walls finished with cedar shingles or rough cedar siding shall receive two field coats of penetrating oil, two field coats of creosote shingle stain, or other protective coating accepted by the authority having jurisdiction. Acceptable types of predipped shingles shall be given at least one protective coating after application, unless the manufacturer of such shingles provides sufficient identical material for touch-up purposes.**

5. All exterior doors, including tops and bottoms, shall be finished as required in 2. or 3. preceding.

C. *Interior Painting*

1. Wood panelling, trim, shelving, kitchen cabinets, handrails, sash and doors shall be finished.
2. If painted the minimum acceptable finish shall be one prime coat and two finish coats or other painting system accepted by the authority having jurisdiction; if open grain wood apply one coat of acceptable filler and sealer before prime coat.
3. If stained the minimum acceptable finish shall be stain and one coat of varnish, or stain and one coat of wax. If smooth finish is desired on open grain wood use filler after staining, and before varnish or wax application.
4. If natural wood finish, the minimum acceptable finish shall be two coats of varnish, or two coats of wax, or one coat of varnish and one coat of wax, or other accepted finish applied in accordance with the manufacturer's directions.
5. Wood floors including treads and landings of stairs shall be sanded to a smooth level surface and finished as follows:
   (a) Open grain wood shall be given one coat of filler before finish is applied.
   (b) Apply one of the following treatments:
   Two coats of wax;
   Stain and two coats of wax;
   One coat of shellac, varnish or lacquer and one coat of wax;
   Two coats of varnish;
   Two coats of floor enamel and one coat of wax;
   One coat of sealer and two coats of wax.
   (c) Flooring prefinished at the factory may be used if accepted by the authority having jurisdiction.
6. Interior walls and ceilings shall be decorated with any of the following materials. To provide a thoroughly adequate coverage and satisfactory finish, decorating shall at least be in accordance with the manufacturer's specifications.
   (a) Latex emulsion paint
   (b) Oil paint
   (c) Wall paper
   (d) Other protective coatings accepted by the authority having jurisdiction.

43. GLAZING

A. *Quality and Size of Glass*

1. All sheet glass used in movable or fixed prime window sash, in storm sash, in permanent or storm doors, shall be not less than Grade "B" quality at least conforming to the requirements of C.G.S.B. Specification 12-GP-2. Plate glass shall at least conform to the requirements of C.G.S.B. Specification 12-GP-3. Specially produced double or other multiple glazing units may be employed provided the glass used in their manufacture at least conforms to the requirements of the appropriate C.G.S.B. Specification 12-GP-2 or 12-GP-3, and the type of unit is accepted by the authority having jurisdiction.
2. For wood sash the size of glass shall at least conform to the requirements in clauses 7.1 - 7.8 inclusive of C.S.A. Specification

0132.1-1956 (Specification for Wood Sash and Screen Frames). These maximum sizes are the same as listed in the left-hand column of the table "MAXIMUM SIZES FOR WEIGHT OR THICKNESS OF GLASS"; however to obtain increased strength and safety, glass should not exceed the recommended sizes listed in the right-hand column of this table.

3. For all metal sash, exterior doors, including permanent storm and combination storm and screen doors, and for the glazing of wood structural windows the size of glass installed shall not exceed that indicated for the weight or thickness designated in the following table, "MAXIMUM SIZES FOR WEIGHT OR THICKNESS OF GLASS".

MAXIMUM SIZES FOR WEIGHT OR THICKNESS OF GLASS

(United Inches means the sum of one width and one length measured in inches)

	Maximum Permissible Glass Sizes	Note	Recommended Maximum Glass Sizes
18 oz.	60 United Inches	Glass of this weight is not acceptable for use in any door.	50 United Inches
24 oz.	84 United Inches	Main door lights shall not exceed 36 United Inches. Glass in storm doors shall not exceed 60 United Inches	80 United Inches
32 oz.	120 United Inches		110 United Inches
3/16"	140 United Inches	These sizes are not acceptable in building localities where wind velocities exceed 68.5 M.P.H.	130 United Inches
7/32"	50 Square Feet	These sizes are not acceptable in building localities where wind velocities exceed 68.5 M.P.H.	45 Square Feet
7/32" Window G.L. 1/4" Plate	Up to 140 United Inches for 7/32". Over 140 United Inches to be not less than 1/4" PL. GL.	These sizes are acceptable in building localities where extreme wind velocities are known to recur (extreme wind is considered to be over 68.5 M.P.H. but not greater than 80 M.P.H.)	Up to 130 United Inches for 7/32". Over 130 United Inches to be not less than 1/4" PL. GL.

NOTE: Recommended sizes for 18, 24 and 32 oz. glass found in the right hand column are not based solely on wind velocity.

B. *Installation*

1. All glass in wood sash or structural wood windows shall be installed in accordance with the requirements of clauses 7.9.1-7.9.4 inclusive of C.S.A. Specification 0132.1-1956, Wood Sash and Screen Frames. When installed in doors, the glass shall be back-bedded on the exterior surface in putty or glazing compound and secured with wood or metal stops. Other methods of installing glass may be permitted if accepted by the authority having jurisdiction.
2. Plate glass shall be installed in accordance with the manufacturer's directions including those for support, clearance and fixing.

3. All glass in metal sash shall be bedded in a glazing compound (putty or an acceptable type of mastic) or an acceptable type of natural rubber or synthetic composition glazing strip. The component selected shall be a type formulated for use with the specific metal employed. Specially designed clips to help support the glass may also be employed where recommended by the sash producer.
4. Mirrors shall be installed on wood blocks. Mirrors in doors shall be separated from the door construction by a felt cushion. An air space shall be provided behind each mirror. Other methods of installation accepted by the authority having jurisdiction shall be permitted. For required mirrors in bathrooms see Section 39. C.

C. The following items are optional, but if included shall be listed in the specifications: Mirrors in bedroom doors or other locations; glass blocks, leaded glass, patent double glazing.

44. PLUMBING

A. *General*

All equipment and material shall be new.
Subject to the requirements elsewhere in this Section, equipment and materials and the methods of their installation shall at least conform to the requirements of Part 7 — "Plumbing Services" of the National Building Code, 1960. Plumbing brass such as valves, fixture traps and faucets, etc., shall be certified by the Canadian Standards Association or accepted by the authority having jurisdiction.

B. *Required Facilities*

1. PLUMBING FACILITIES. Every housing unit shall be provided with at least one kitchen sink, one water-closet, one wash basin, and one bath tub.
2. LAUNDRY FACILITIES. Laundry facilities shall be provided either in every housing unit or grouped elsewhere in the building in a location conveniently accessible from every housing unit.
   (a) If the laundry facilities are provided in each housing unit, a combination sink and laundry tray fixture, a separate double laundry tray, or an automatic type of washing machine shall be installed. A mechanical dryer shall also be provided or alternatively a drying room as in *(b)* (i) or (ii) following.
   (b) If grouped laundry facilities are provided, a double laundry tray or automatic type of washing machine shall be installed for each twenty housing units or part thereof. With this arrangement, a drying room or mechanical dryers shall also be provided, as follows:
      (i) In such drying room, space for at least 100 linear feet of clothes drying line shall be provided for each twenty housing units or part thereof.
      (ii) If a mechanical dryer is supplied in lieu of (i) preceding then one mechanical dryer shall be installed for each twenty housing units or part thereof.
      (iii) Laundry trays or mechanical washers and dryers shall have a minimum clearance of 3′0″ in front.
3. PUBLIC WATER-CLOSET ROOMS. Every public water-closet room and every janitor's water-closet room shall be equipped with at least one water-closet and one wash basin. In a janitor's water-closet room, a slop sink may be substituted for the wash basin. (See Section 5. F. 3.)
4. REFUSE DISPOSAL: The refuse disposal system in every apartment building shall be acceptable to the authority having jurisdic-

tion. In larger buildings, refuse chutes and/or incinerators may be required. (See Section 7. E. 5. and 6.)

C. *Fixtures — Clearance*

1. A distance of at least 1'6" shall be provided between the front of the W.C. or the front of the wash basin, and the adjacent surface of any other fixture or wall face.
2. A room or recess to receive a toilet fixture (except bath) shall be not less than 2'6" wide.
3. Adequate access shall be provided for maintenance of fittings, including plumbing brass.
4. Bathtubs shall be not less than 5'0" long x 2'4" wide x 1'2" average depth, unless specially approved by the authority having jurisdiction.

D. *Water Supply and Distribution*

1. WATER SUPPLY. Every Apartment Building shall be supplied with water from a public or community system acceptable to the Provincial Authority. Where such systems are not available a private source of potable water may be employed when such water is tested and approved by the Provincial Department of Health at least three times each year. Water shall be drained from the well for testing immediately following the spring thaw, about the first of August and about the first of January.
2. WATER DISTRIBUTION. Piping for both cold and hot water shall be run to each kitchen sink, wash basin, bath tub and slop sink as well as to grouped or individual laundry equipment. A cold water line shall be run to every water-closet. An adequate number of hose bibs with self draining shut-off valves shall be provided in appropriate locations outside the building to service all landscaped areas on the lot. Unless a laundry tray supply is threaded to permit hose connection, an additional hose bib shall be provided immediately adjoining the laundry tray or other equally suitable location. When automatic type washing machines are provided, at least one hose bib shall be installed in a suitable location in the basement or cellar area.

E. *Sewage Disposal*

1. SEWER CONNECTION. Wastes from every plumbing fixture shall be carried to the building sewer. The building sewer shall discharge into a public sewage system.
2. SEPTIC TANK SYSTEMS. The building sewer of an Apartment Building may discharge into a septic tank and disposal field provided that such installation has the approval of a competent authority. Evidence of such approval shall be submitted to the authority having jurisdiction indicating acceptance of the septic tank and disposal field for the lot or area in question and also the adequacy of the design of the septic tank and disposal field.
   The design of a septic tank and disposal field shall at least comply with the provisions of Part 7 — "Plumbing Services" of the National Building Code, 1960. Where municipal design requirements are more stringent, then the maximum design shall govern.

45. DOMESTIC HOT WATER

A. *General*

1. REQUIRED HOT WATER SUPPLY. Equipment shall be provided to supply every kitchen sink, wash basin, bath tub, laundry tray, automatic clothes washer and slop sink with hot water automatically maintained to a temperature within a range from 140°F.—165°F.

2. DOMESTIC HOT WATER HEATING SYSTEMS

(a) Gravity or Circulated Types. Hot water distribution systems may be either gravity or circulating type. These shall be valved to permit shutoff from the cold water system.

(b) Direct or Indirect Fired Types. Water shall be heated by a direct or indirect fired system supplying the entire building; or, by individual units installed to supply, separately, the hot water needs of every housing unit and every public fixture.

(c) Individual Units. Individual units provided to supply, separately, the hot water needs of individual housing units shall be manufactured and installed to at least conform to the following requirements:

(i) Each housing unit provided with running water as defined in Section 44.D., shall have connected, ready for use, a new durable domestic hot water storage tank complete with an appropriate heating device.

(ii) The heating device employed may utilize electricity, gas or oil but shall be approved by either the Canadian Standards Association or the Canadian Gas Association.

(iii) Tanks shall be constructed of monel metal, copper (silicon bronze), galvanized sheet steel, vitreous enamel or hydraulic cement lined sheet steel or other acceptable material. The tank selected should be a type known to have, or guaranteed to have, at least a 10 year service life with the kind of water encountered.

(iv) For individual housing units the acceptable storage in gallons, recovery capacities in gallons per hour raised 100°F. and watts-input shall be not less than indicated in the minimum columns of the following tables. Recommendations for some types are also shown.

(v) Individual domestic hot water installations shall comply with Subsections 45.B, C, D, E, F, G and H, where applicable.

TABLE I
ELECTRICALLY HEATED STORAGE TYPES

No. of Baths	1				2			
No. of Bedrooms	1 or 2		3 or 4		2 or 3		4 or 5	
	MIN.	REC.	MIN.	REC.	MIN.	REC.	MIN.	REC.
Actual Storage Capacity in Imperial Gallons	20	30	30	40	40	50	50	60
Metered Type Input Watts								
1. Single elements	1000	2000	1500	2500	2000	3000	2500	Not Acceptable
2. Dual elements (arranged for non-simultaneous operation)								
Primary elements	750	750	750	1000	1000	1250	1250	1500
Secondary elements	1000	1250	1250	1500	1500	2000	2000	2500
Flat Rate Input Watts	500	600	600	800	800	1000	1000	1000

Where single element flat rate heaters are installed the tanks shall have provision for future installation of a secondary type of element and thermostat. Wiring capacity for a 1000 watt secondary element shall also be provided to the electrical distribution panel.

MIN.—Minimum REC.—Recommended

TABLE II
NON-ELECTRIC STORAGE TYPES

No. of Baths	1				2			
No. of Bedrooms	1 or 2		3 or 4		2 or 3		4 or 5	
	MIN.	REC.	MIN.	REC.	MIN.	REC.	MIN.	REC.
Actual Storage Capacity in Imperial Gallons	14	18*	18*	22	22	30	30	40
Recovery Imperial Gallons raised 100°F. in 1 hour	12	12*	12*	16	16	21	21	21

MIN.—MINIMUM REC.—RECOMMENDED

*As an alternative to 18 gal. storage and 12 gal. recovery, 16 gal. storage and 14 gal. recovery may be used.

As one of the major causes of premature storage tank failures is over-heating in an effort to compensate for lack of storage capacity, tanks should be larger than the minimum sizes required by these Standards. Faster recovery can also be obtained by using larger heating elements than those described in Table I. Larger tank sizes also provide more satisfactory service particularly if automatic dish or clothes washers are to be installed. Tank manufacturers can provide information respecting proper sizes for particular needs.

3. **NO DIRECT WATER HEATING BY BUILDING HEATING UNIT.** Water heating services shall not be installed in flue passes or combustion chambers of the building heating boiler or furnace.
4. **FLUE CONNECTIONS.** Oil, gas and solid fuel burning units shall be connected to a chimney or flue conforming to the requirements of Section 21.
5. The applicable requirements of Section 7. shall apply.

B. *Hot Water Heaters*

1. **A DIRECT FIRED HEATER** is one in which the water heating coil or surface is exposed directly to flame or hot gases.
2. **AN INDIRECT HEATER** is one in which the water heating coil or surface does not make any direct contact with flame or hot gases, but is exposed to an intermediate heating medium such as water or steam which in turn is heated by flame or hot gases.
3. **CONTINUOUS SERVICE.** An indirect water heating system heated by the building heating boiler is acceptable only when the building heating boiler is fired and controlled to permit winter heating and year round domestic hot water independently of each other and according to demand.
4. **CROSS CONNECTION OF HEATERS.** Where the source of domestic hot water is a heating system supplied by more than one boiler, the installation shall be of such capacity and so interconnected that hot water supply is not dependent upon the operation of any one particular boiler.

C. *Safety Requirements*

Relief valves shall be constructed and rated in conformance with relevant standards of the American Society of Mechanical Engineers. Each shall bear the manufacturer's name or trade mark, the type, style, pressure, temperature or vacuum setting and the relieving capacity.

1. **PRESSURE RELIEF VALVE.** A pressure relief valve set to operate at a pressure not greater than the working pressure of the tank shall be installed in every hot water storage system. This relief valve should be installed near the tank in the cold water line leading to the tank or in the tank tapping, but may be installed near the tank in the hot water line leading from the tank. In addition, copper (silicon bronze) tanks should be equipped with a vacuum relief valve. Pipe connections shall be provided from relief valves to permit discharge without damage to property. The pipe used shall be the same size as the discharge outlet of the relief valve.
2. **UNRESTRICTED FLOW TO RELIEF VALVES.** No valve or other device which could restrict the flow shall be installed between any relief valve and the tank or heater that it serves.
3. **SAFETY TEST LEVERS.** Every relief valve shall be equipped with a safety test lever.
4. **OTHER SAFETY REQUIREMENTS.** The safety requirements in Section 46. shall also apply to domestic hot water installations.

D. *Temperature Control*

Tanks shall be insulated and equipped with a high temperature energy shut-off device designed to shut off the heater when the temperature within the tank reaches 210°F. The temperature sensing element of this control shall be located within the top six inches of the storage tank. Pump and circulating lines shall be thermostatically controlled.

E. *Heater Capacity*

Water heater recovery capacities in Imperial gallons per hour raised through 100°F. for direct and indirect fired systems for both tankless heaters and for heaters with storage capacities shall be not less than that indicated in the following table:

WATER HEATER RECOVERY CAPACITIES
(Gallons (Imperial) per hour — 100°F. rise)

Number of Housing Units	Gallons (Imperial) Storage per Housing Unit		
	0*	15	20
3	292	56.5	52
4	313	75	69
5	338	90	83
6	350	105	97
7	360	120	110
8	371	133	123
9	382	148	137
10	392	162	150
15	430	226	205
20	464	279	257
25	498	324	298
30	535	369	340
40	600	450	415

*Instantaneous or Tankless Heaters.

F. *Storage Tanks*

1. **CAPACITY PER HOUSING UNIT.** The capacity of storage type systems shall be not less than 15 Imperial gallons for every housing unit.
2. **INSULATION.** Storage tanks shall be insulated with a standard covering of mineral wool, cellular asbestos or other material acceptable to the authority having jurisdiction.

3. **MATERIAL FOR TANKS.** Tanks shall be constructed of non-ferrous metal or, not less than extra heavy steel coated with corrosion resistant material such as zinc, vitreous compound or other acceptable material.

G. *Piping and Installation*

All piping in circulating lines between heaters and storage tanks and between indirect heaters and heating boilers shall be maintained throughout at the full size of the heating tappings. Changes in direction of piping shall be kept to a practical minima and shall be made whenever possible with fittings with off-set angles less than 90°.

H. *Regulations of Other Governing Bodies*

1. **CANADIAN STANDARDS ASSOCIATION.** All natural or manufactured gas burning appliances and their installation shall at least conform to the standards of the Canadian Standards Association.
2. **CANADIAN STANDARDS ASSOCIATION.** All oil fired heating devices and methods of their installation shall at least conform with the requirements of the Canadian Standards Association.
3. **CANADIAN ELECTRICAL CODE.** All electrically heated appliances and the manner of their installation shall at least conform to the requirements of the Canadian Electrical Code.
4. **CANADIAN STANDARDS ASSOCIATION OR THE INTERNATIONAL RADIATOR AND BOILER ASSOCIATION.** All water and steam heating equipment shall at least conform to the requirements of the Canadian Standards Association or the International Radiator and Boiler Association.

46. HEATING

A. *General*

1. **TEMPERATURE REQUIREMENTS.** All public space and each housing unit shall be equipped with a heating system guaranteed by the installer or a heating engineer as capable of providing an inside temperature of 70°F. with the normal firing rate established by the producer of the heating device at the outside design temperature established by the authority having jurisdiction for the locality in which the building is located and with a wind velocity of 15 m.p.h. Other interior spaces shall be equipped to provide temperatures suitable to the function of such space but in no case, less than 50°F. under design conditions similar to the preceding.
2. **HEATING SYSTEMS.** Central hot water, forced hot air, steam, or other heating system acceptable to the authority having jurisdiction shall be used.
   (a) Design and installation of water or steam heating systems shall at least conform to the bulletins of the Institute of Boiler and Radiator Manufacturers (See also *(c)* following).
   (b) Design and installation of forced air systems shall at least conform to the bulletins of the National Warm Air Heating and Air Conditioning Association (See also *(c)* following). Recirculation of air between apartments it not acceptable.
   (c) Any water, steam or forced air system or any part of any such system not specifically covered by the bulletins outlined in *(a)* and *(b)* above shall be designed and installed in accordance with current engineering practice as established by the manual approved by the American Society of Heating, Refrigerating and Air Conditioning Engineers.

3. PLANS. The heating system shall be clearly depicted on the building plans or on separate drawings prepared specifically for this purpose.
4. MATERIALS. All materials and equipment shall be new. These should be selected to provide the greatest degree of performance consistent with capital cost and operating and maintenance expenses calculated for the duration of the mortgage amortization period.

B. *Equipment*

1. GAS BURNING APPLIANCES. All natural or manufactured gas burning appliances and their installation shall at least conform to the Standards of the Canadian Standards Association.
2. OIL FIRED EQUIPMENT. All oil fired heating devices including storage tanks, vent and fill pipes, oil gauges, gravity or pressure feed burners and methods of their installation shall at least conform with the requirements of the Canadian Standards Association.
3. WATER AND STEAM HEATING EQUIPMENT. All water and steam heating equipment shall at least conform to the requirements of the Canadian Standards Association or the International Radiator and Boiler Association.
4. FUEL AND ASH HANDLING. Appropriate facilities shall be provided for the receipt and economic handling of fuel and the disposal of solid residue from combustion.
5. ELECTRICAL HEATING EQUIPMENT shall be of a type inspected and approved by the Canadian Standards Association and shall bear the approval label of this Association. Installations shall conform to the Canadian Electrical Code and to Municipal and Provincial regulations. Additional insulation may be required.

C. *Fuel Storage Capacity*

Fuel storage facilities shall be sufficient to provide at least a full calendar month's fuel supply based on the greatest "degree day" month recorded in the last ten-year period.

D. *Guarantees and Instructions*

Manufacturers' and installers' guarantees and servicing agreements shall be provided in writing. Operating and maintenance instructions shall be securely mounted and posted adjacent to heating units.

E. *Fire Prevention*

All installations shall at least conform to the applicable parts of Section 7 of these Standards, to municipal and provincial regulations, to Part 6 of the National Building Code, 1960, and to the following. No coal or other solid fuel burning equipment shall be installed at a level higher than the first storey.

1. STAIRWAYS. No heat producing unit shall be installed in a stairway, beneath a stair, or beneath a stair landing.
2. NON-COMBUSTIBLE SUPPORT. No fuel burning equipment shall be mounted on any floor of combustible construction whether protected or not protected (except as permitted in Part 6 of the National Building Code, 1960).

47. ELECTRICAL WORK

A. *When Required*

1. In districts where public electric power is available, an electric lighting system and, where applicable, power wiring shall be installed.

2. Where public electric power is not available the part of the electric lighting system and, where applicable, power wiring that would be concealed should be installed at the time of construction.

B. *General*

All electrical installations shall at least conform to the Canadian Electrical Code and shall, in addition, satisfy provincial or municipal regulations in respect to electrical work.

1. CAPACITY OF SERVICE AND WIRING

(a) Electrical service and wiring installations shall be of sufficient capacity to provide, without overloading, electric energy for:

(i) required illumination.

(ii) efficient operation of permanent appliances and equipment.

(iii) the use of television, radios, electric irons, heaters, heating pads, electric blankets, etc., as may be permitted by the provincial and municipal authorities concerned.

(b) All materials and equipment shall be new.

2. EQUIPMENT

(a) Electrically operated equipment such as circulating pumps, fans, blowers, stokers, etc., shall be of a type inspected and approved by the Canadian Standards Association and shall bear the "approval label" of this Association.

(b) Location of such equipment shall be shown on the working drawings and the equipment clearly specified to indicate the type of rating of outlets servicing such equipment.

C. *Required Facilities*

Capacity of wiring should conform to recommendations of the Adequate Wiring Bureau.

D. *For Service and Public Area Requirements*

1. REQUIRED ILLUMINATION. Illumination by means of artificial lighting shall be provided to all public and service areas. Ceiling fixtures shall be located to illuminate every portion of such areas in a manner which is safe and convenient to the occupants. When provided by incandescent type lighting, illumination shall be not less than the following:

	Watts per square foot of floor area
Storage Rooms	½
Service Rooms and Laundry Areas	2
Garages	½
Public Water-Closet Rooms	1
Public Hallways and Stairways	1
Service Hallways and Stairways	½
Recreation Rooms	1

Equivalent illumination shall be provided when fluorescent or other types of lighting are employed.

The following intensities of illumination measured in foot-candles are recommended:

	Foot-candles of light
Storage Rooms	5
Work Rooms and Laundry Areas	20
Garages	5
Public Water-Closet Rooms	10
Public Hallways and Stairways	10
Service Hallways and Stairways	5
Recreation Rooms	10

2. ILLUMINATED SIGNS

(a) Access to fire and other exits shall be clearly marked by a red light or other standard device.

(b) Where an exit and its light or sign is not visible from every point in the hallway or undivided floor area served, suitably lighted directional signs shall be provided indicating the location of the exit.

3. CONVENIENCE OUTLETS

(a) Each public hallway and public stairs shall be provided with at least one duplex outlet at intervals of not more than 60 feet.

(b) At least one duplex outlet should be installed for every two cars to be accommodated in unheated garages and carports.

(c) At least one duplex outlet shall be installed in each boiler room and work room.

(d) Grouped laundry equipment shall be serviced by outlets designed to accommodate the equipment to be installed by the building owner or the tenants.

E. *Exterior Illumination*

1. ENTRANCES. Each entrance to an apartment building shall be provided with an exterior lighting fixture.

2. GARAGES. At least one exterior lighting fixture shall be provided for each two garages when in rows and at every entrance to multiple garage space.

3. YARDS. Lighting should be provided for each rear and side yard and for inner courts.

F. *Housing Unit Requirements*

1. LIGHTING OUTLETS

At least one ceiling or wall outlet together with fixtures shall be installed in kitchens, halls, dining rooms, vestibules, bedrooms, and storage space. A third duplex outlet is acceptable as an alternative to a ceiling outlet in a bedroom.

Where a wall outlet and fixture are used in lieu of a ceiling outlet and fixture the outlet shall be 6 feet above the floor surface. The requirements for lighting in basements and cellars are given in Section 6. D. and Section 47. D.

2. IN BATHROOMS, wall outlets together with fixtures shall be installed at the mirrors.

3. CONVENIENCE OUTLETS

(a) Each wall space suitable for furniture and separating two doors in a living room shall be provided with at least one duplex outlet. A duplex outlet shall also be placed between any door or archway and fireplace, when separated sufficiently for placement of furniture. Every living room shall be provided with at least four duplex outlets.

(b) Where ceiling fixtures are installed, the number of duplex outlets to be provided shall be not less than: two in a dining room; one in a dining space; two in each habitable room.

(c) In habitable rooms where ceiling fixtures are neither required nor installed at least three duplex outlets shall be provided.

(d) Required special purpose outlets or cables shall be installed for each unit of equipment such as electric ranges, water heaters, automatic washers, dryers, etc. Cables shall be of sufficient length to service location of equipment.

(e) Polarized outlets shall be provided for washing machines, ironers, etc., not otherwise grounded, if they are to be operated on concrete slabs resting on ground.

(f) Outlets should be provided in closets and attics or other such spaces.

4. SWITCHES

(a) Each ceiling fixture shall be controlled by a wall switch.

(b) Where ceiling fixtures are not installed at least one outlet per habitable room shall be controlled by a wall switch.

(c) Bathroom fixtures shall be controlled by a wall switch.

(d) When a housing unit occupies living space on more than one floor, at least one three-way switch shall be provided on each floor to control at least one light for stair and passage illumination.

(e) Exterior outlets together with fixtures shall be controlled separately from interior lighting by wall switches inside and adjacent to the entrance doors.

(f) Switches shall not be placed behind doors or in any other inconvenient location.

5. LOCATION OF SWITCHES AND OUTLETS. Plans shall show the approximate location of electric outlets and switches.

G. *Supplementary Equipment*

1. If specified, the following items shall be also clearly shown on the working drawings or described in the specifications:
   Electric stove wiring
   Electric domestic hot water heating and wiring
   Electric bells or buzzers
   Radio and T.V. plugs and aerial
   Conduit for telephone
   Electric fireplace and wiring
   Electric panel or radiant heating.

2. Entrance switches, meters, panel boxes, splitter boxes, time clocks, and other like equipment, shall also be clearly shown on the working drawings in locations satisfactory to the authority having jurisdiction. These fixtures shall not be located in any public hallway or stairway so as to reduce the width of the passageway by more than 3½". If such fixtures are located in any public area, adequate precautions shall be taken to prevent interference with the fixtures.

48. GARAGES, CARPORTS, AND PARKING SPACES

A. *General*

Garages or carports, and parking spaces shall be provided in sufficient number to meet the needs of the occupants of an Apartment Building and their guests without interference with normal movement of traffic. Such facilities shall be provided for at least one car for each two housing units per building and shall be located on the property for convenient access to the housing units without impairing views from living rooms, entrances or front yards. In particular, where the floor of a habitable room is at or below grade level, no parking space shall be provided within twenty feet of the windows to such habitable room.

B. *Garages*

1. DIMENSIONS

(a) *Width.* If one car is to be accommodated, a garage shall have a clear inside width of not less than 10'0". Where there is a doorway in a side wall of the garage, with a door swinging into the garage, the clear inside width shall be 11'0". If more than one car is to be accommodated without separating partitions then the clear inside width shall be the same as described for a one car garage plus 8'0" for each additional car.

(b) *Length.* The clear inside length of single car garages shall be not less than 20'0". In multiple car garages, the clear inside length shall be not less than 20'0" plus the length or width of any space required for maneuvering any car from the garage entrance to its parking space.

(c) *Height.* The clear height at any point including that beneath overhead doors in the open position shall be not less than 6'6".

2. FOUNDATIONS

Foundation Walls and Footings. Every detached, attached, or built-in garage shall be supported on foundation walls and footings in accordance with the applicable provisions of Sections 11. and 12. with the exception that detached garages may be erected on floating slab construction provided the soil conditions will permit such construction. Such floating slab construction, if so required by the authority having jurisdiction, shall be designed by a Registered Architect or Registered Engineer to suit the site conditions in accordance with Sections 9. A. 2. and 3.

3. CONSTRUCTION ABOVE FOUNDATIONS

(a) *General.* Walls of attached garages shall be of masonry construction as required by Section 19., or frame construction as required by Section 23. Such walls shall also conform to the provisions of Section 7. Walls and ceilings of built-in garages shall at least conform to the construction of the building proper and as required by Section 7.
Walls of detached garages may be of frame or masonry construction.

(b) *Frame Construction* shall at least conform to requirements of Section 23.

(c) *Masonry Walls.* If masonry walls are used, material and construction shall conform to requirements listed in Section 19.

(d) *Insulation.* Insulation need not be incorporated in wall or roof assemblies of attached or detached garages, but shall be employed if the garages are to be heated during the winter months.

(e) *Doors.* Wood doors shall be not less than 1¾" thick for hinged types nor 1⅜" for overhead types. Steel or aluminum doors shall be acceptable types. The lintel or beam over garage doors shall be sufficiently strong to prevent deflection or sagging beyond 1/240 of the width of the opening.

(f) *Roofing.* Roofing and flashing shall be as required in the applicable parts of Sections 30. and 31.

(g) *Floors.* The floor of an attached garage shall be not less than the standard of construction for the driveway leading to it. Floors of built-in garages shall be of concrete as required by Section 17.

C. *Carports*

1. GENERAL. At least 40% of the perimeter of carports shall be open and unobstructed by walls, doors, posts or piers.

2. DIMENSIONS. Minimum dimensions are those required for garages in B. 1. preceding, except that where there is a doorway in the wall separating the carport from the apartment building, the clear inside width shall be 11'0".

3. CONSTRUCTION

(a) Footings, foundation walls or piers supporting carport structures shall at least meet the appropriate requirements of Sections 10., 11. and 12. Foundation walls or piers shall extend at least 6" above finished grade. Superstructure shall be anchored to the foundation.

(b) Walls separating carports from Apartment Buildings shall conform to requirements for walls separating attached garages from buildings as stipulated in Section 7.

(c) Roofing and flashing shall be as required in Sections 30. and 31.

(d) The floor of a carport shall be not less than the standard of construction for the driveway leading to it.

(e) The roof supporting structure of carports shall be adequately designed to support the loads imposed thereon. When such structure is comprised of wall sections, they shall at least conform to B. 3.*(b)* or *(c)* preceding; if by columns, such columns shall at least conform to Section 16. except that steel pipe columns need not exceed 3" O.D.

D. *Parking Space*

1. IN PARKING LOTS

(a) When parking space is provided, whether parallel or angle to curb, each car space shall be a rectangle at least 9' in width by 20' in length.

(b) Depending on angle of parking, sufficient additional space shall be provided to allow for turnout.

2. IN DRIVEWAYS

(a) Parking space on any required driveway is not recommended; but in any case such parking space shall in no way reduce the required width of the driveway (see Section 49. following).

(b) Depending on angle of parking, sufficient additional driveway width shall be provided to allow for turnout.

(c) No parking space on any required driveway shall be located within 40' of any entrance to the building.

3. GRADIENT AND CONSTRUCTION. The gradient and construction of all parking space shall be as required for "Driveways" in Section 49. following.

49. WALKWAYS AND DRIVEWAYS

A. *Walkways*

1. GENERAL

(a) Main walkways which service more than one building shall at least conform with the requirements of the municipality.

(b) All walkways shall be designed to provide safe usage by pedestrians, furniture movers, and the operators of small wheeled vehicles such as baby carriages and children's tricycles.

2. REQUIRED WALKWAYS

(a) Main walkways shall be provided from the street to all entrances which serve more than two housing units, and from

the Apartment Building to accessory multiple garages and parking areas, or to the driveways serving such garages and parking areas.

(b) Secondary walkways shall be provided from either the street or a main walkway to each entrance serving not more than two housing units; and to all service entrances.

3. MINOR WALKWAYS

Walkways should be provided for convenient access from the building to play areas and as required to prevent the formation of unsightly dirt paths in grassed areas.

4. GRADING

(a) Walkways should blend with the grading and planting layout of the lot.

(b) No walkway shall be used for the conductance of surface water.

(c) Every walkway shall be crowned, or graded crosswise, 2″ in 10′0″. Lengthwise, walkways shall be graded not less than 1¼″ in 10′0″, nor more than 7″ in 10′0″.

5. STEPS IN WALKWAYS. Steps in walkways should be avoided. Where steps cannot be avoided there should be not less than three steps and there shall be not less than two steps at any one location. In such steps the rise shall be not less than 4″ nor more than 7″ and the minimum run shall be not less than 12″. The product of the rise and run in inches shall not exceed 84.

6. WIDTH OF WALKWAYS

(a) Walkways as in A. 1.*(a)* preceding, shall be not less than 5′0″ in width.

(b) For buildings exceeding three storeys in height, main walkways shall be not less than 5′0″ in width and secondary walkways shall be not less than 4′0″ in width.

(c) For buildings not exceeding three storeys in height, main walkways shall be not less than 4′0″ in width and secondary walkways shall be not less than 3′0″ in width.

(d) Minor walkways shall be not less than 2′0″ in width.

7. SUBSOIL. Walkways shall not be constructed over unconsolidated filled soil.

8. MATERIALS FOR WALKWAYS

(a) Materials acceptable for the construction of required walkways are as follows:

(i) Concrete (2,000 lb. quality) not less than 4″ in thickness, with weakened plane joints at intervals not exceeding one and one-half times the walk width.

(ii) Brick, either hardburned clay or shale, or concrete brick.

(iii) Flagging consisting of durable smooth surface stone, or precast concrete. Such flagging shall be square edged and not less than 1½″ in thickness.

(iv) Other acceptable material which will provide a durable monolithic surface.

(b) Materials acceptable for minor walkways are as follows:

(i) Materials listed in *(a)* preceding.

(ii) Surface of fine gravel placed over a bed of coarse gravel, broken stone, broken brick or cinders having a total thickness of at least 3″.

B. *Driveways*

1. GENERAL

(a) Driveways shall be provided from a public street or public lane

to every parking compound and to every garage or carport which is accessory to the Apartment Building.

(b) Driveways shall not be constructed over unconsolidated filled soil.

2. GRADING

(a) Every driveway shall be crowned or graded crosswise with a slope of not less than 2″ in 10′0″ and not more than 5″ in 10′0″.

(b) Lengthwise, driveways should not slope more than 7″ in 10′0″. The minimum permissible slope is ¾″ in 10′0″. The maximum permissible slope is 12″ in 10′0″. Where site conditions will not permit driveway slopes less than 12″ in 10′0″, the proposed grades will require special acceptance by the authority having jurisdiction.

(c) Where the slope of any driveway exceeds 2″ in 10′0″, roll gutters or curbs shall be formed at each side of such driveway and suitable means of drainage shall be provided where necessary to facilitate the removal of surface runoff.

3. WIDTH OF DRIVEWAYS

(a) Every driveway which terminates at both ends on a public lane or street and serves a garage, carport or parking space shall be not less than 10′0″ wide clear of all projections and parking space.

(b) Every driveway which terminates at one or both ends on a public lane or street and which serves a garage, carport or parking space to accommodate not more than three cars shall be not less than 10′0″ wide clear of all projections and parking space.

(c) Every driveway which serves a garage, carport or parking space to accommodate more than three cars and which terminates at one end only on a public lane or street shall be not less than 18′0″ wide clear of all projections and parking space.

4. MATERIALS AND CONSTRUCTION. Driveway construction shall produce an all-weather surface for all driveways, parking compounds and garage aprons. The following methods are acceptable:

(a) Concrete Surfacing. Concrete shall comply with the requirements for 2,000 lb. ordinary concrete (see Section 14. C. 1.). Such surfacing shall be not less than 3″ in thickness, and shall be placed over a compacted base of coarse gravel, cinders, or broken brick or stone not less than 5″ in thickness. Such base may be omitted where the bearing soil consists of gravel, compact sand or rock provided that where base fill is omitted the concrete surfacing shall be not less than 5″ in thickness. Concrete surfacing shall be divided by weakened plane cross joints spaced at intervals not exceeding 1½ times the width of the driveway.

(b) Bituminous surface, not less than 2″ in thickness, rolled over a compacted base of broken stone or gravel not less than 6″ in depth.

(c) Brick, either hard burned clay or shale or concrete, laid in concrete over a 6″ compacted base of broken stone or gravel.

(d) Loose material consisting of compacted gravel, broken bricks or stone, cinders or slag, having a minimum depth of 6″ and topped with a thin layer of fine gravel or crushed stone (not sand).

50. SITE IMPROVEMENT

A. *General*

1. The object of site improvement is to provide an attractive functional setting for the dwellings by means of grading, planting, seeding and sodding which shall be in keeping with the character of the property under consideration and the surrounding area. The quality of the work should insure durability and easy maintenance throughout the life of the project.
2. All desirable site assets such as trees, topsoil and drainage lines shall be retained where practicable. Adequate precautions shall be taken to protect these assets during construction.
3. The services of a Landscape Architect should be procured whenever possible.
4. Grading and drainage shall be arranged to provide drainage of surface water away from the buildings on all sides and off the site in a manner which will ensure freedom from erosion. Walks, driveways and retaining walls shall be installed in a manner that will not interfere with drainage.
5. Sewer and Drainage requirements of this Section apply only to the property drainage systems and not to sewer and water services from the street to the building.

B. *Plans*

1. GRADING AND DRAINAGE. The information required by the following shall be provided either on the plot plan or on the grading and drainage plan drawn to a scale not less than 40′ to 1″.
   (a) All existing and new grade elevations at building corners, new grade elevations at entrances, walks, driveways, parking areas, terraces, play areas, walls and steps; first floor and basement floor elevations. Proposed grading contours at two foot intervals shall be indicated in solid line and existing contours indicated with dotted line. All grades shall be related to established datum from a bench mark.
   (b) Yard drainage, together with controlling grades and dimensions of all tile lines, culverts, catch basins, drain inlets, turf and masonry gutters, and all curbs, drainage disposal and any existing facilities to be used; North point.
2. LANDSCAPING. The following information shall be provided on a separate plan drawn to a scale not less than 40′ to 1″. This information may be shown on the grading, drainage and site improvement plan or on the plot plan, when the project consists of only one apartment building neither more than three storeys high nor over 6,000 square feet in area.
   (a) Outlines of buildings together with physical features of the site required to establish the location and relationship of planting and related construction.
   (b) Distribution of plant material; location, quantity and by key number, the species of plants in each group; outline of all planting beds, primary lawn areas, secondary lawn areas, areas to be seeded and sodded and the kind and size of existing trees to be preserved.
   (c) Details of all items and features pertaining to site improvement such as retaining walls, tree wells and landscaping details not shown elsewhere.
   (d) A list of plant material giving standardized botanical plant names, size and key number of each variety for cross reference to plan shall accompany the plans.

C. *Site Preparation*

1. TREES

(a) All existing trees on the site shall be examined. Where possible every desirable tree shall be preserved. Trees may be removed when they are:

(i) Less than 2″ in diameter at breast height.

(ii) Where they are within 6′ of the proposed building.

(iii) Where the base of the tree is more than 3′ above, or 3′ below finished grade level.

(b) Every tree that is retained shall be protected by fencing, boxing, or planking before grading or any construction operations are commenced. No storage of building materials, stockpiling of soil or other construction activities shall be permitted within 4′0″ of any such tree. (See also F. 7. following.)

(c) Undesirable trees, stumps, brush, and debris shall be removed from the site and property. No boulder or large stone should be within 2′ of finished grade level. Rock outcroppings may be left exposed as a landscaping feature.

2. TOPSOIL. All suitable topsoil which will be required for later use in finished grading and planting shall be carefully stripped from areas to be occupied by buildings, parking areas, driveways and from areas to be regraded or disturbed during construction. Such topsoil shall be piled on the site or property in locations convenient for future use, and kept free of debris and subsoil.

D. *Work During Building Construction*

1. LINES AND LEVELS. All lines and levels for grading and drainage shall be established in relation to the project buildings by reference to a permanent bench mark.

2. EXCAVATED MATERIAL. Required excavated material shall be distributed on the site according to the grading plan. Surplus material shall be removed from the site and property.

3. SEWER, WATER AND LAND DRAINAGE. As soon as practicable, the following services shall be installed to the extent necessary for the completion of rough grading. (See F. following.)

(a) Sewer and Water Mains to Building. The following requirements apply only to the sewer system and water lines from the street to the building including all manholes, catch basins, drainage and rain water leader connections.

(i) When such water and sewage system has been installed and approved, backfilling shall be completed and consolidated in a manner to prevent subsequent settlement.

(ii) The distance between all water and sewer pipe other than field tile and finished grade level shall conform to local requirements for frost protection.

(b) Land Drainage. A land drainage system shall comply with the following:

(i) When such drainage system or the final grading will cause the overrun of water onto adjoining property, the outlets shall be approved in writing by the owners of the properties affected and local authorities having jurisdiction.

(ii) Drains for such systems shall be constructed with not less than medium weight cast iron, bell and spigot, vitrified clay, concrete, asbestos cement, or tar-impregnated fibre pipe. Such drain pipe shall be not less than 6″ diameter

and shall be accurately laid to the lines and levels shown on the drawings.

(iii) Drain pipes shall discharge into a storm sewer manhole, a disposal bed or other acceptable system of disposal.

(iv) Surface Water Pockets. In all locations where surface water will be pocketed, catch basins shall be installed and properly connected to adequate and positive means of water disposal. In such cases, grading shall provide for emergency overflow so as to prevent flooding against the building.

(v) Backfilling over land drainage systems shall be completed and consolidated in a manner to prevent subsequent settlement.

(vi) Sub-surface Drainage. Pipe shall be well burned, good quality agricultural tile, porous concrete tile or other acceptable material. Size shall be as specified or shown on the drawings, but in any event not less than 4″ diameter.

Such tile shall be laid at an even grade with a slope of not less than 3″ in 100′. Tile shall be placed at the bottom of the trench at least 2′ below finished grade. Joints approximately ⅜″ shall be left between the ends of the tiles and shall be wrapped with a strip of tar or asphalt saturated paper or burlap. Such tile drains shall be embedded in at least 6″ of gravel or crushed stone. The trench shall then be backfilled and consolidated in a manner to prevent subsequent settlement, with care being taken not to disturb or break the tiles.

(c) Building Rain Water Leaders. Every rain water leader should be connected to either the land or building drainage system. Where such connections cannot be made, a stone or concrete gutter or spillway shall be provided. Such gutter or spillway shall be sloped away from the building, and extended a sufficient distance to prevent backflow against the building.

E. *Manholes and Catch Basins*

In land drainage systems, manholes shall be installed at intervals not exceeding 400′, at abrupt changes of grade and pipe size in main drains and at junctions of main drains and principal laterals. Manholes shall be constructed on an adequate concrete base, of solid masonry units, concrete or acceptable precast sections with at least an 18″ diameter cast iron cover and frame manufactured for the purpose.

Combined manhole-catch basin installations are permitted.

Catch basins shall be constructed on an adequate concrete base of solid masonry units, concrete, or vitrified tile set on end. Catch basin grille and frame shall be cast iron having a diameter of at least 18″. At the base, a sediment basin at least one foot deep below the invert shall be formed.

Collection area served by each catch basin shall be determined by the site conditions, grades and climates.

F. *Rough Grading*

Rough grading should be started as soon as the work of building construction and weather conditions will permit.

1. SITE CLEARING. All debris resulting from construction shall be removed from the site and property. No construction debris shall be buried.
2. LINES AND LEVELS SHOULD BE CHECKED. Rough grade levels at the buildings should be approximately 16″ below the

bottom line of any exterior cladding. The ground surface shall slope away from the building not less than 1″ in 5′ nor more than 1″ in 2′ for a distance of approximately 30′, except where limited by property or street lines. No ground slope should exceed 1 to 3. Changes of level which would cause a steeper slope than 1 to 3 should be retained by stone revetting or the construction of retaining walls.

3. WHERE REVERSE SLOPES meet, swales or wide shallow grassed gutters shall be carefully formed with a minimum grade of 1″ in 5′ to drainage outlet, or paved gutters at least 2′ wide with minimum grade of 1″ in 30′ to drainage outlet shall be used. Alternatively catch basins connected to a positive means of disposal shall be provided to drain such areas.
4. ALL TERRACE SLOPES shall be rounded at top and bottom to obtain a smooth flowing profile.
5. ROUGH GRADE shall be 4″ to 5″ below finished grade. Planting beds should have a depth of at least 15″.
6. CUT AND FILL. Cut and fill shall be carried out according to rough grading levels detailed on plans.
   (a) In cut areas the resulting ground surface shall be scarified to a depth of not less than 6″ prior to receiving top soil.
   (b) Fill shall be compacted as nearly as possible to the natural consistency of the original undisturbed soil on the site.
   (c) Areas, where no change of level occurs, shall be scarified or plowed and harrowed prior to receiving top soil.
7. TREE PRESERVATION.
   (a) Where fill occurs around existing trees the depth of sandy or light sandy loam cover shall not exceed 9″ over the root area. When heavier soils are used, the depth of cover shall not exceed 6″. Such cover shall be kept at least 12″ away from the tree trunk by a wall of dry stone or unmortared bricks to the depth of the cover.
   (b) When a greater depth of fill is required, the entire root area shall be brought to within 10″ of finished grade by a fill of broken stone blinded at its surface with fine stone. The final 10″ shall be filled with top soil. As in *(a)* preceding, a protective wall of stone or brick shall be provided to the full depth of the fill, including stone.
   (c) Where the grading operation lowers the grade around trees to be retained, the earth around such trees shall be undisturbed for a radius from the tree equal to approximately two-thirds of the branch spread. When such change of level exceeds 10″, the soil around such trees shall be contained by stone revetting or a dry stone wall; or a well formed mound extending to the branch spread.
8. HEAVY EQUIPMENT. Heavy equipment shall be carefully employed to prevent damage to drains or other sub-surface construction.
9. STONE RETAINING WALLS AND CRIBBING. Dry retaining walls or cribbing shall be installed where required to eliminate steep slopes or to prevent erosion. They shall be appropriately designed and built in accordance with sound construction practice to withstand the loading involved, soil conditions and weather. Mortared or concrete retaining walls shall be provided with properly spaced weep holes.
10. GUARD RAILS. Permanently installed guard rails or other suitable barriers shall be provided on retaining walls and around

any other area which because of height or other factors constitutes a hazard to the public. Lawn areas which are subject to heavy wear should also be protected by suitable barriers.

G. *Finish Grading, Seeding and Sodding*

1. MATERIALS

(a) Topsoil shall be of an acceptable quality and shall be handled on the site in a manner to prevent mixing with inferior material.

(b) Grass seed shall be No. 1 government tested and approved, and shall be a type known to be adaptable to local climatic and soil conditions.

(c) Sod shall be an acceptable type containing a good percentage of common turf grasses and shall be not less than 1" nor more than 1½" in thickness.

(d) Fertilizers

(i) Local soil and topsoil for seeding or sodding shall be tested for fertility where the quality is in doubt in the opinion of the authority having jurisdiction. When found to be deficient it shall be treated by the addition of a chemical fertilizer, organic manure or lime as indicated by the tests.

(ii) For seeding, a suitable mixture of low nitrogen high phosphorous content commercial fertilizer shall be evenly applied and cultivated to the full depth of the topsoil at a rate of 20 to 30 lbs. per 1,000 sq. ft. dependent on the fertility.

(iii) For sodding, a 7-7-7, 10-6-4 or equivalent fertilizer shall be evenly applied at a rate of 15 to 20 lbs. per 1,000 sq. ft. and well raked into the surface of the topsoil.

2. TOPSOIL APPLICATION

(a) For seeding the depth of topsoil shall be at least 4". In the more inland regions of British Columbia and in other provinces the depth of topsoil should be at least 5".

(b) For sodding the depth of topsoil may be 1" less than for seeding.

(c) Depth of topsoil should be increased to compensate for any unfavourable local conditions.

(d) Topsoil shall be applied in a uniform layer to the required depth, and cultivated until it is friable, fully settled, and free of depressions and ridges.

3. SEEDING. Grass seed shall be applied at the rate of 4 to 8 lbs. per 1,000 sq. ft. depending on soil conditions, and shall be uniformly spread by a cyclone seeder or other type of mechanical equipment made for this purpose. Seed shall be incorporated by light hand raking and moderate rolling with a light roller. Steep slopes and unpaved drainage gutters or swales should be sodded.

4. SODDING. Prior to laying sod, the ground surface shall be sprinkled with water. Sod shall be laid evenly, tamped in place and brought to an even surface by moderate rolling, and then thoroughly watered. Sod on steep slopes or swales should be pegged.

5. TIME OF SEEDING AND SODDING. Seeding and sodding shall be done during the proper season. Seeding in late August produces superior results in most parts of Canada, except for the dry areas in the Prairie provinces where experience indicates spring seeding to be preferable. Sodding may be carried out at any time during

the growing season except in hot dry weather when it cannot be handled successfully without loss by excessive drying.

6. **PROTECTION OF WORK.** Suitable barriers and "keep off" signs shall be installed strategically to protect seeded and sodded areas until the grass has become well established.

H. *Other Planting*

1. **PLANNING.** Trees, shrubs, vines and other plant material shall be adequate in size, quantities, and character to provide an attractive setting for the Apartment Building or buildings on the property. They shall be placed to provide privacy and pleasant outlooks for housing units, to screen objectionable features both on the site (parking areas, garages, refuse collection stations) and on adjacent properties (such as non-residential uses and rear yards), and to minimize reflected glare and afford summer shade.
   Trees placed along street boundaries of the property shall be suitably located to conform with local practice and spaced at intervals of 50′ to 70′.
2. **MATERIALS.** Plant material shall be adapted to local climatic and soil conditions. Such material shall at least conform to the requirements of the "Canadian Association of Nurserymen's Standards". All evergreen shall have the roots balled and burlapped. The roots of all planting material shall be kept moist at all times until planted.
3. **PLANTING METHODS, WATERING, ETC.** Planting shall be done during the proper season. In most parts of Canada superior results are obtained from spring planting done just prior to the bursting of the buds. In warmer parts of the country, such as the B.C. coastal area, and southwestern Ontario, fall planting can be practiced. When dry weather conditions occur, planting materials that are not balled and burlapped shall be "puddled" (the roots soaked in mud) before distribution to the planting areas.
   Pits for trees shall be provided with topsoil for a depth of at least 24″ and have a diameter in feet equal to the diameter of the tree trunk in inches (measured at breast height), but not less than a diameter providing for 6″ of replaced topsoil beyond the root spread. Pits for free-standing shrubs shall be provided with topsoil at least 15″ deep and at least 6″ replaced topsoil beyond the root spread.
   Each plant shall be thoroughly watered when the hole is ⅔ backfilled with soil. After watering the soil shall be firmed into place and the surface of the ground shall be left at least 1″ lower than the surrounding ground level, with a slight lip at the edge of the hole forming a shallow depression or "rainwell". Each bushel of the soil used for backfill shall be fortified with 4 ounces of bone meal thoroughly mixed.
   After planting, a 3″ mulch of old compost or well rotted manure or 2″ of hyperhumus or peat shall be spread over all planting beds. Watering shall be continued at frequent intervals until planting material is well established.
   All planted trees over 2″ in diameter at breast height shall be suitably guyed by 3 wires encased at the trunk in water hose or other protective material. Smaller trees shall be supported by a 2″ x 2″ wood stake attached to the trunk by hose encased wire.
   Any pruning of planted material or existing trees that is necessary shall be done according to good local practice.
4. **MAINTENANCE OF PLANTING.** Planting beds and areas around trees shall be kept well cultivated, free from weeds and grass, and adequately watered. Fertilizing and pruning shall be done as required.

All planting material shall be guaranteed to be true to name and size and in vigorous growing condition for at least one growing season. Replacements shall be made at the beginning of the first succeeding planting season. In the case of trees over 2″ in diameter at breast height only 50 per cent replacement guarantee shall be provided.

I. ***Playgrounds***

1. **PLAY SPACE shall be provided with an even stable surface which is relatively level but with sufficient pitch to assure adequate surface drainage. At least ⅓ of this area shall be provided with a bituminous surface at least 1½″ in thickness rolled over a well compacted base of broken stone or gravel not less than 3″ in depth.**
2. **ADEQUATE PLAY EQUIPMENT shall be provided. For larger play spaces the equipment should be at least equal to the following:**
   2 benches about 6′ long
   1 small child's bench
   1 sand box (100 sq. ft. minimum)
   2 swings and 1 teeter for pre-school children
   2 swings and 1 teeter for school children
   1 slide.