TENTATIVE

NATIONAL RESEARCH COUNCIL OF CANADA

A BUILDING CODE FOR SMALLER MUNICIPALITIES

BASED ON THE

NATIONAL BUILDING CODE
(NRC NO. 1068)

AND THE

MODEL ZONING BY-LAW
(NRC NO 859)

OTTAWA, CANADA

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N.R.C. NO. 1536

NATIONAL BUILDING CODE

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FOREWORD

This Code consists principally of minimum requirements for safety and health in one- and two-family dwellings. Regulations for buildings used for other purposes are included by reference to the National Building Code. Thus this Model Code is complete, even though only the regulations for one- and two-family dwellings are given in extenso. With this arrangement it is hoped that the Code will be acceptable not only to the very small municipality where nearly all construction is of one- and two-family dwellings but also to the somewhat larger town or small city in which there is an appreciable amount of other construction. For large cities the National Building Code is recommended.*

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* The National Building Code is obtainable from the National Research Council, Ottawa, Canada. Price, $1.00.

SECTION 1

ADMINISTRATION

101 Short Title

This by-law may be cited as the "Building By-law" and is hereinafter referred to as "this Code".

102 Application

This Code applies specifically to one- and two-family dwellings and their accessory buildings such as garages. These requirements are based upon the provisions of the National Building Code and the Model Zoning By-law. Buildings used for other purposes shall conform to the requirements of the National Building Code dated 1942. In cases where there is an apparent conflict between the requirements of this Code and those of the National Building Code the requirements of this Code shall govern.

Wherever applicable, the provisions of this Code shall apply to structures other than buildings and the term "buildings" shall be understood to include such other structures.

103 Authority Having Jurisdiction

The provisions of this Code shall be enforced by one or more officials appointed by the Municipal Council, and any official appointed in this manner to enforce any regulation contained in this Code is referred to in this Code as the authority having jurisdiction.*

Neither the authority having jurisdiction nor any member of his staff shall be employed or engaged, directly or indirectly, in any branch of the building business, or have any financial interest in connection with the construction or repair of buildings, or the supply of building materials unless such interest or connection is publicly disclosed.

104 Existing Buildings

Nothing in this Code shall require the removal, alteration, or abandonment of, nor prevent continuance of the use or occupancy of an existing building, unless in the opinion of the authority having jurisdiction such building constitutes a hazard to safety of adjacent property.

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* The term "authority having jurisdiction" is used in preference to a term such as "Building Inspector" since it is considered that some municipalities may find it convenient to authorize different officials to enforce different portions of the Code, for example, Fire Protection requirements might be considered within the jurisdiction of the Fire Chief, whereas Requirements Bearing on Health and Sanitation, might be considered within the jurisdiction of the Health Officer.

105 Building Permits

(a) General

A building permit shall be obtained from the authority having jurisdiction by the owner or his authorized agent for the excavation, erection, alteration, reconstruction, removal, or wrecking of, or repairs to, any building or part of any building which it is proposed to construct, and for any addition or alteration to a building. No such work shall be commenced until the building permit is prominently displayed on the site of the work.

(b) Application for a Building Permit

The applicant for a building permit shall file with the authority having jurisdiction a signed statement as to the use or purpose for which such building is intended, together with duplicate copies of the plans of same, drawn to a scale of not less than one-eighth of an inch to a foot, showing the actual dimensions, including the dimensions of the lot to be built upon, all structures existing upon the said lot with the heights and dimensions of same, the heights and dimensions of the proposed structures, and other such information as may be necessary to provide for the enforcement of this Code.

(c) Granting of Building Permits

The application, plans, and specifications filed by an applicant for a building permit shall be examined by the authority having jurisdiction and if it appears to him that such plans and specifications are in conformity with the requirements of this Code and all other laws or ordinances applicable thereto, the authority having jurisdiction shall issue the building permit upon receipt of the required permit fee.

Neither the granting of a building permit, approval of plans and specifications, or inspections made by the authority having jurisdiction, or his assistants, during the erection of a structure shall in any way relieve the owner, or his agents, from full responsibility for the carrying out of the work in strict accordance with this Code, or for the stability of the structure.

(d) Building Permit Limitations

Any building permit issued by the authority having jurisdiction under the provisions of this Code shall expire when no building construction is started within six months from the date of issuance.

Building permits shall be subject to revocation when construction is discontinued for a period of one year, or when, in the opinion of the authority having jurisdiction, the completion of the construction has been unduly delayed. Such revocation shall not be rescinded until the plans and incomplete construction are made to comply with all the requirements of this Code at the time of rescinding such revocation.

106 Dangerous Buildings

Whenever, in the opinion of the authority having jurisdiction, any building or part thereof, is, by reason of its dilapidated state, faulty construction, or otherwise, in an unsafe condition as regards danger from fire or risk of accident, the authority having jurisdiction may give to the owner of such building, or his agent, notice in writing specifying wherein such unsafe condition exists, and upon receipt of such notice, the said owner, or his agent, shall forthwith put such building, or part thereof, in a safe condition or demolish same.

When, in the opinion of the authority having jurisdiction, any building, or part thereof, is in such condition that immediate precautionary measures must be taken in order to avert an accident, the authority having jurisdiction may pull down, repair or renew any such building, or part thereof, at the expense of the owner, whether or not notice has first been given to such owner or his agent, and such expense may be recovered from such owner by action or may be recovered in like manner as municipal taxes.

107 Enforcement

(a) Enforcement of Provisions of Code

Without prejudice to the operation of any other law, it shall be the duty of the authority having jurisdiction to take the necessary measures to institute proceedings against any person who contravenes any of the provisions of this Code.

(b) Offences and Penalties

Every one who contravenes any of the provisions of this Code or any requirements or obligations imposed on him by virtue of this Code, or who interferes with or obstructs any person in the discharge of his duties under this Code

shall be guilty of an offence and liable on summary conviction to a fine not exceeding fifty dollars and costs, and, in addition, the Justice may order that such person carry out the requirements or obligations imposed on him by virtue of this Code, for the contravention of which he has been convicted, within a time to be fixed by such order.

The conviction of any person for an offense under the provisions of this Clause shall not relieve such person from the duty of carrying out the requirements or obligations imposed on him by virtue of the provisions of this Code, and if such requirements or obligations are not complied with in accordance with an order made under the provisions of this Clause, the authority having jurisdiction, under the provisions of this Code, may, where he deems it necessary and advisable, enter upon the premises in respect of which a conviction has been made and carry out, at the expense of the convicted person, the requirements or obligations referred to in the said order, and the expense, if not paid on demand, may be recovered with costs in a Court of competent jurisdiction, or if such expense is owing to the municipality it may be recovered as aforesaid or in the same manner as a debt due for municipal taxes on the land where the expense was incurred.

The conviction of any person under the provisions of this section for failing to comply with any of the said requirements or obligations shall not operate as a bar to further prosecution under this section for the continued failure on the part of such person so to comply.

SECTION 2

DEFINITIONS

For the purposes of this Code the following definitions and interpretations shall govern:

A.S.T.M. shall mean American Society for Testing Materials.

Aggregate shall mean inert material, consisting of sand, pebbles, gravel, crushed stone, or similar materials, which is mixed with cement and water to produce mortar or concrete.

Aggregate, Coarse, shall mean aggregate, subject to specified tolerances, retained on a No. 4 sieve and of a maximum size generally not larger than three inches.

Aggregate, Fine, shall mean aggregate, subject to specified tolerances, passing through a No. 4 sieve.

Alcove shall mean any portion of a room, the walls, floors, and ceiling of which form a recess thereto, and access to which is either unobstructed or through an arched opening in a wall. The depth of an alcove shall mean the maximum horizontal distance perpendicular to the plane of the opening, from such opening to any wall of such alcove; the width shall mean the mean horizontal distance across such alcove, at right angles to the depth.

Alteration. See Altered.

Altered with reference to any building, shall mean a building in which a change is made from one type of occupancy to another; or to which any addition is made; or in which any partition is erected or structural change made.

Approved shall mean approved by the authority having jurisdiction.

Area of Building shall mean the maximum projected horizontal area of the building above ground including roofed porches and verandahs but excluding terraces, steps, cornices, fire escapes and exterior stairways, ramps and open loading platforms. Such area shall include air wells and all other spaces within a building excepting inner or outer courts.

Area, Gross, in reference to a structural masonry unit, shall mean the total area within the outer periphery, of any section perpendicular to the stress to be resisted.

Area, Net, in reference to a structural masonry unit, shall mean the minimum effective load-bearing area of the material composing the unit, included in any section perpendicular to the direction of the stress to be resisted.

Authority Having Jurisdiction shall mean the Building Inspector, the Fire Chief, the Health Officer, or any other official authorized by municipal enactment to administer any regulation contained in this Code.

Basement shall mean that portion of a building between two floor levels which is partly underground but which has at least one-half of its height from finished floor to finished ceiling above adjoining ground level.

Beam shall mean a structural member intended primarily to resist bending.

Block shall mean a structural masonry unit other than brick, stone or facing-tile, and shall include cast stone and structural tile.

Block, Cellular, shall mean a block having uniformly distributed pores throughout its mass.

Brick shall mean a substantially solid structural unit of maximum dimensions approximately 8 by 4 by 2½ inches.

Building, Accessory, shall mean a subordinate detached building, appurtenant to a main building and located on the same lot, the purpose of which is to provide better and more convenient enjoyment of the main building; and shall include among others private garages and private stables.

C.S.A. shall mean Canadian Standards Association.

Cellar shall mean that portion of a building between two floor levels which is partly or wholly underground and which has more than one-half of its height, from finished floor to finished ceiling, below adjoining ground level.

Cement, when referred to in connection with concrete construction, shall mean Portland Cement, High Early Strength Cement, or such other cement as may be permitted by the authority having jurisdiction.

Chimney shall mean an upright shaft of masonry or reinforced concrete containing and encasing one or more flues.

Combustible as applied to a material, shall mean any material other than incombustible material.

Concrete shall mean a mixture of cement, fine aggregate, coarse aggregate, and water.

Curing (of Concrete) shall mean the maintenance of proper temperature and moisture conditions to promote the continued chemical reaction which takes place between the water and the cement.

Detached shall mean, when applied to a building containing a certain occupancy, that the walls and roof of such a building are independent of any other building and provide shelter for only the one class of occupancy indicated.

Dwelling, One-family, shall mean any building or part thereof designed, intended, or used for a residential occupancy consisting only of one dwelling unit.

Dwelling, Semi-detached. See Dwelling, Two-family.

Dwelling, Two-family, shall mean any building or part thereof designed, intended, or used for a residential occupancy consisting only of two dwelling units.

Dwelling Unit shall mean a room, or a suite of two or more rooms, designed, or intended for use by an individual or family, in which living facilities including cooking facilities are provided.

Existing with reference to a structure, shall mean a structure already erected, or one for which a legal permit has been issued prior to the adoption of this Code; with reference to an occupancy, it shall mean an occupancy in a building, existing prior to the adoption of this Code.

Exit shall mean a channel or means of egress providing passage from any building, storey, or floor-area to a street or other open space of equal safety.

Fire-resistance Rating shall mean the minimum period of time during which an element of a structure may be expected to function satisfactorily whilst subjected to prescribed conditions of heat and load. (These prescribed conditions and the

degree of satisfaction required constitute a specification for a fire test.) This term is sometimes abbreviated to "fire-resistance", e.g., a fire resistance of 2 hours; or again, the term may be implied, e.g., 2-hour construction.

Flammable and its derivatives, "non-inflammable", "very low flammability", and "low flammability" shall have the meanings defined in C.S.A. Specification A54-1940 entitled, "Fire Tests on Building Construction and Materials".

Floor, Laminated shall mean a floor consisting of scantlings or planks placed on edge and securely nailed together.

Floor Panel, or floor panel assembly, shall mean a floor or portion of a floor supported by walls, columns, or beams other than joists; and shall include any joists, ribs, or fillers.

Flue shall mean a confined space provided for the conveyance to the outer air of any product of combustion resulting from the operation of any heat producing appliance or equipment employing solid, liquid, or gaseous fuels; and it shall include chimney flue, gas flue, smoke pipe, and gas vent.

> Flue, Chimney, shall mean a flue contained in a chimney leading directly to the outer air, vertical wherever reasonably possible, and in no case inclined at more than 45 degrees to the vertical.
>
> Flue, Gas, shall mean a permanently installed flue leading directly to the outer air, vertical wherever reasonably possible, intended to serve any gas appliance excepting a gas-fired incinerator, and having flue gas temperatures not in excess of 550° F. at the outlet of the draft hood when operating at maximum rated input.

Flue Lining shall mean a lining applied to the inside of a chimney in order to form a flue having smooth, smoke-tight, crack-free walls which will remain unaffected by the degree of heat and corrosion for which such flue is designed, as well as unaffected by the weather.

Footing shall mean that part of a foundation which is provided to distribute loads to the bearing materials or to piles.

Foundation shall mean that part of a structure which is below grade, which provides support for the superstructure,

and which transmits loads on the superstructure to the bearing materials, and shall include footings, foundation walls, foundation piers, and piles.

Girder shall mean a beam supporting columns or beams other than joists.

Height of Room, shall mean the clear vertical distance between the finished floor and the finished ceiling of such room.

Incombustible. See Non-Combustible.

Inflammable. See Flammable.

Joist shall mean one of a series of floor, roof, or ceiling beams spaced not more than thirty inches on centres.

Joist, Ceiling, shall mean one of a number of beams supporting a ceiling; there being no finished floor immediately above.

Joist, Floor, shall mean one of a number of beams supporting a floor.

Joist, Roof, shall mean one of a number of beams supporting a horizontal roof.

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, or legally dedicated as a right-of-way for use in common by adjacent land owners.

Load, Dead, shall mean the weight of all permanent stationary construction entering into and becoming a part of a structure.

Load, Live, shall mean all loads except dead loads that may be imposed on a structure. Wind loads shall be considered as live loads.

Lot shall mean the minimum area of land used, or intended to be used, as the site of or appurtenant to any building, as described in the application for a building permit, whether such land is shown on a registered sub-division or described by metes and bounds.

Lot Line shall mean the division line between any two or more lots or between any lot and a lane, and shall include any line bounding a lot other than a street line.

Masonry shall mean any of the following types of construction:

(a) Unit masonry, when laid up in mortar.
(b) Plain concrete.
(c) Poured or pre-cast gypsum, plain and reinforced.

Masonry, Hollow, shall mean (i) hollow monolithic masonry, (ii) hollow masonry built of solid units, (iii) masonry built of hollow units, and (iv) masonry built of any combination of hollow and solid units.

Masonry, Solid, shall mean masonry composed entirely of solid units without enclosed air spaces between such units.

Modulus of Rupture shall mean the calculated maximum fibre stress at failure of a rectangular beam, in which failure is primarily due to excessive flexural stress, on the assumption of a linear variation of stress.

Mortar, when referred to in connection with masonry construction, shall mean a plastic material consisting essentially of cement, lime, or gypsum, and aggregate, used to bond masonry units.

Mortar, when referred to in connection with reinforced concrete construction, shall mean a mixture of cement, fine aggregate, and water.

Non-combustible as applied to a material, shall have the meaning defined in C.S.A. Specification A54-1940 entitled, "Fire Tests on Building Construction and Materials".

Non-flammable. See Flammable.

Opening, Vertical, shall mean an opening in a floor between storeys of building, or in a ceiling between a storey and an attic space. It shall include openings for stairs, elevators, air wells, and dumbwaiters, but shall not generally include openings for pipes, heating or ventilating ducts, or electrical conduits.

Partition shall mean an interior wall not more than one storey in height.

Pier shall mean a masonry column whether isolated or bonded at its sides to other masonry.

Pier, Isolated, shall mean a pier not bonded at its sides to other masonry.

Pilaster shall mean a pier forming part of a wall, partially projecting therefrom, and bonded thereto.

Plumbing System shall mean, severally and individually; the water distribution system; all fixtures and fixture traps; the drainage system; the house sewer; any private sewage disposal system; all leaders, together with all their devices, appurtenance, and connections.

Prefabrication shall mean a type of construction in which floors, walls, ceilings, or roof are composed of sections, or panels which have been fabricated prior to erection on the building foundation.

Rafter shall mean one of a number of members supporting a sloping roof and running parallel to its slope.

Rating. See Fire Resistance Rating.

Roof Panel, or roof panel assembly, shall mean a roof or portion of a roof supported by walls, columns, or beams other than joists and shall include any joists, ribs, or fillers.

Room, Habitable, shall mean any room, other than a business or work room, that is used by one or more persons for living, sleeping, eating, or food preparation.

Room, Height of. See Height of Room.

Rubble shall mean masonry built of irregularly shaped stone units.

Sheathing in wood construction shall mean material attached directly to either face of the studs of a stud wall, or to the upper face of roof joists or rafters.

Shell when used in reference to a hollow masonry unit, shall mean an outer wall of the unit.

Siding in wood frame construction shall mean material other than masonry used as an exterior wall covering.

Smoke Pipe shall mean a pipe connected to a heat appliance burning solid or liquid fuel conveying products of combustion to a chimney flue, or, where no chimney flue is required, to the outer air.

Stairway shall mean one or more flights of stairs and the necessary landings or platforms connecting them, forming a

continuous and uninterrupted path of travel from one storey to another and shall include an escalator. In the case of an exterior stairway, the continuous and uninterrupted path of travel shall be from any storey except the first to the ground.

Stone shall mean natural stone.

Stone, Cast, shall mean solid pre-cast concrete units.

Storey shall mean that portion of any building which is situated between the top of any floor and the top of the floor next above it; if there be no floor above it, that portion between the top of such floor and the ceiling above it.

Storey, First, shall mean the storey closest to grade having its ceiling more than six feet above grade. (Thus in considering the height of building in stories, a basement having a ceiling which is six feet or less above grade need not be considered.)

Storey, Second, shall mean the storey located immediately above the first storey.

Street shall mean a public or common highway in an urban or suburban district, affording principal means of access to abutting property.

Street Line shall mean the division line between a lot and a street.

Structure shall mean a building or construction of any kind.

Tile, End Construction, shall mean hollow structural tile or block designed to receive its principal stress parallel to the longitudinal axes of the cells.

Tile, Facing, shall mean solid units designed to be laid on a backing of other masonry and supported solely by a mortar joint.

Unit (Masonry), Hollow, shall mean a structural masonry unit with a net area less than 75 percent of its gross area.

Unit (Masonry), Solid, shall mean any structural masonry unit other than a hollow unit.

Veneer. See Wall, veneered.

Vent, Gas, shall mean a pipe connecting a gas appliance with a gas flue.

Wall, Bearing, shall mean a wall that supports any load other than its own weight.

Wall, Faced, shall mean a wall in which the masonry facing and backing are so bonded as to exert a common action under load.

Wall, Foundation, shall mean any bearing wall situated below the first floor above grade, having any part of one or both sides in contact with the soil.

Wall, Non-bearing, shall mean a wall that supports no load other than its own weight.

Wall, Party, shall mean a wall used jointly by two parties under easement agreement and erected at or upon a line separating two parcels of land each held under separate deed.

Wall, Veneered, shall mean a wall having a facing of masonry material which is attached but not bonded to the backing.

Yard, shall mean an open space located on the same lot as the building which it serves, unoccupied from the ground to the sky except for structures specifically authorized by this Code.

Yard, Rear - "Rear yard" shall mean a yard located between the rear wall of the building served and the rear lot line, and extending the full width of the lot.

Yard, Side - "Side yard" shall mean a yard located between the side wall of the building served and the side lot line, and extending through from the street line to the rear yard.

SECTION 3

REQUIREMENTS AFFECTING THE LOCATION OF THE DWELLING ON THE LOT

301 Percentage of Lot Occupancy

A single family dwelling must not cover more than 33% of the area of an inside lot and not more than 40% of the area of a corner lot. A two-family dwelling must not cover more than 50% of the area of an inside lot and not more than 60% of the area of a corner lot.

302 Accessory Buildings

The total area of accessory buildings shall not exceed ten percent of the area of the lot in the case of single family dwellings. Such buildings shall not exceed one storey in height above the yard level.

303 Line of Setback

Except as hereinafter provided, no building or part thereof shall be so situated on the lot that any main front wall will be closer to the street line than fifteen feet.

The front yard so provided shall be unobstructed, except that there may be permitted:

(a) an uncovered terrace having a maximum projection from the street wall of eight feet, and bays having a maximum projection from the street wall, excluding eaves and cornices, of three feet and a maximum width of ten feet,

(b) an open, roofed porchway or verandah, limited to one storey in height, and having a maximum projection from the street wall, excluding eaves and cornices, of eight feet and a maximum width of forty percent of the frontage width of such street wall; provided that any enclosure to any such terrace, porchway or verandah shall not exceed three feet six inches in height from the floor level, exclusive of roof supports.

304 Rear Yards

(a) Subject to Clause (b), a rear yard shall be provided having a depth such that the distance from the rear lot line to any wall of the main building that is nearest to such line, will not be less than the height of such rear wall, provided that in no case shall such distance be less than twenty-five percent of the lot depth, but need not exceed twenty-five feet.

(b) In computing the depth of the rear yard of any building on a lot which has a registered lane extending across the rear thereof, one-half of the width of such lane may be deemed to be a portion of such lot.

305 Side Yards

(a) Subject to Clause (b), a side yard shall be provided on each side of the main building. The minimum width of each such yard shall not be less than four feet plus two feet for each additional storey above the first.

(b) In computing the width of a side yard of any building on a lot which has a registered lane at the side one-half of the width of such lane adjacent and opposite to such side yard may be deemed to be a portion of that lot.

306 Location of Accessory Buildings

(a) No accessory building shall be located within three feet of the building to which it is accessory or within six feet of any required window lighting a habitable room.

(b) A private garage located in the side yard of the dwelling it serves shall not be within six feet of such dwelling, unless both the garage and the dwelling are faced with incombustible material, and the garage shall not be within four feet of the lot line. This last provision shall not be interpreted as prohibiting a double garage serving two dwellings and located on the lot line.

SECTION 4

REGULATIONS AFFECTING THE PLANNING AND TYPE OF CONSTRUCTION OF DWELLINGS

401 General Requirements

(a) Rooms in Cellars

No habitable room shall be constructed in any cellar.

(b) Alcoves

Any alcove having a floor area exceeding forty square feet, except a bay window; or a depth greater than its width; or of which the area of the connecting opening is less than 80 percent of the cross-sectional area of such alcove in the plane of such opening; shall be considered to be a separate room and shall be independently lighted and ventilated in accordance with the requirements herein specified.

Any other alcove shall be considered a part of the room upon which it opens, for purposes of lighting and ventilation, and the combined floor areas of such alcove and such room shall be employed in the computation of lighting and ventilation requirements. When the area of any alcove is included with that of a room for the purpose of computing minimum floor area, the height of such alcove shall not be less than seven feet six inches.

(c) Access to Rooms and Dwelling Units

In any building containing more than one dwelling unit, access shall be provided to each dwelling unit without the necessity of passage through any other dwelling unit.

In every dwelling unit, or group or suite of rooms, containing more than one bedroom, access shall be provided to living rooms, bedrooms, and kitchens, and to at least one water-closet room or bathroom without the necessity of passage through any bedroom.

402 Dimensions of Rooms

(a) Height

The height of any habitable room shall not be less

than eight feet; provided that the height of any bedroom shall not be less than seven feet six inches; and provided that for any bedroom situated in an attic where sloping ceilings occur, the height shall not be less than seven feet six inches over at least 50 percent of the minimum required floor area.

The height of any bath room or water-closet room shall not be less than seven feet, except in a basement.

(b) Floor area

Every bedroom and every dining room shall have a gross floor area of at least eighty square feet and shall not be less than seven feet wide in any part. Every living room shall have an area of not less than one hundred and twenty square feet and shall not be less than ten feet wide in any part. Every kitchen shall have a gross floor area of at least fifty square feet and shall not be less than five feet wide in any part, provided that a kitchen that is intended for use as a dining room also, shall have a gross floor area of at least eighty square feet and shall be not less than six feet wide in any part.

Every water-closet room or individual water-closet compartment shall be at least two feet six inches wide and shall have a gross floor area of at least eleven square feet.

Any part of the floor over which the height of a room is less than four feet six inches shall not be considered in the computation of the minimum floor area.

403 Lighting and Ventilation of Rooms

(a) Required windows

Every habitable room and every bath room or water-closet room shall be provided with one or more windows opening directly on a street, yard or court. Such windows shall be above the adjoining ground level. Any court provided for a window shall be so constructed that its width will not be less than its height.

(b) Glass Area of Windows

The requirements of this Item are predicated upon the use of clear glass having a light transmission value of not less than 88 percent. 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 amount transmitted by the required area of clear glass.

The aggregate unobstructed glass area of any required window or windows shall not be less than one tenth of the floor area of the room served by them; provided that in any bath room or water-closet room it shall not be less than three square feet.

(c) Openable area of windows

Required windows shall be so openable that the aggregate open space will not be less than one-twentieth of the floor area of the room served by such windows, and the top of the openable area of at least one window in any habitable room shall not be less than six feet six inches above the floor level; provided that movable sashes, or louvres, otherwise complying with these requirements, of equal net openable area, may be substituted for such window openings.

Whenever storm sash are provided over required windows, not less than one such storm sash per room ventilated shall be openable from within; the aggregate openable area so provided shall not be less than one-eighth of the glass area required for the room or hallway so ventilated.

404 Heating Facilities

(a) General

In any building intended for human occupancy between the 1st day of October and the 1st day of May of the following year, all habitable rooms shall be provided with suitable heating facilities capable of maintaining a minimum temperature of not less than 65 degrees Fahrenheit in weather 15 degrees Fahrenheit above the lowest temperature recorded by the Meteorological Service of Canada, during the preceding ten years, for the locality in which the heating system is to be installed. Such minimum temperature shall be measured in the centre of the room at a point five feet above the floor. If Meteorological Service reports are not available for the locality in question, the reports for the station nearest such locality shall be used.

(b) Design and Installation of Heating Equipment

Every heating system required by this Section shall be designed, constructed, and installed in accordance with accepted good commercial practice. (See also Section 7)

405 Plumbing Facilities

(a) General

Whenever a municipal water supply is available within one hundred feet of the building, every dwelling, whether new or existing, shall be provided with a plumbing system including an adequate supply of potable water, and suitable sanitary facilities with drainage to a public sanitary sewer, private sewage disposal system, or other approved means of sewage disposal.

When such municipal water supply is not available, a plumbing system shall not be mandatory, but any new plumbing system that is installed in any building, and any to which alterations or additions are made, shall comply with the requirements of this Code. When no plumbing system is installed, there shall be provided sanitary privies, chemical closets, or other means for the disposal of human excreta, approved by the authority having jurisdiction.

(b) Quality, Design, and Construction

The quality, design and construction of any plumbing system or part thereof, shall conform to the requirements of the Standard Plumbing By-law, dated 1940, as prepared by the National Building Code Committees, or to such more restrictive requirements as the authority having jurisdiction may designate.

(c) Fixtures required

Every dwelling unit shall be provided with at least one private water-closet, one private bath-tub or shower-bath and one private lavatory or sink.

406 Thermal Insulation

Except in buildings specifically designated for summer occupancy only, no roof construction above any habitable room, including the ceiling of such room, shall have an overall coefficient of heat transfer (U) greater than 0.30 B.T.U. per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, when based on an exterior wind velocity of fifteen miles per hour.

407 Fire Zones and Restrictions Therein

(a) Location of Fire Zones*

For Fire protection purposes, the municipality is hereby divided into three classes of districts termed Fire Zone No. 1, Fire Zone No. 2, and Fire Zone No. 3. The boundaries of these zones are set forth in the "Description of Fire Zones" which is annexed hereto and which is hereby declared to form part of this Code.

(b) Restrictions in Fire Zone No. 1

(See National Building Code.)

(c) Restrictions in Fire Zone No. 2

In Fire Zone No. 2 every building of Wood Frame Construction exceeding two hundred and fifty square feet in area, shall have all exterior walls so constructed as to afford a fire-resistance rating of at least one hour.

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* Whilst the delineation of fire zones for any particular municipality is something that must be done after full consideration of local conditions, it may be useful to indicate the general characteristics of the various fire zones.

Fire Zone No. 1 is a district composed of closely built commercial and industrial buildings including particularly buildings of considerable height and buildings in which large quantities of flammable goods are stored. Fire Zone No. 2 is a district composed of business and commercial buildings of less height and more widely spaced than those in Fire Zone No. 1, together with apartment houses, hotels and multiple dwellings generally. Fire Zone No. 2 separates Fire Zone No. 1 from Fire Zone No. 3. In Fire Zone No. 3, the occupancies are predominantly one- and two-family dwellings with occasional retail stores, gasoline service stations and the like.

In many municipalities there will be no necessity for Fire Zone No. 1, in which case Fire Zone No. 2 will be the more restricted zone.

Municipalities are strongly recommended to obtain competent professional advice when fixing boundaries of fire zones. Such boundaries should be reviewed from time to time and adjusted if necessary.

No verandah or gallery of Wood Frame Construction shall be permitted above the third storey of any building. Any verandah or gallery, or portion thereof, which is enclosed to form a sunroom exceeding one hundred square feet in area, shall be considered a part of the building to which it is appurtenant, and the building shall then be subject to any and all regulations and restrictions resulting from the type of construction employed in such sunroom.

(d) Restrictions in Fire Zone No. 3

Any building complying with the requirements of this Code may be constructed or moved into or within Fire Zone No. 3.

408 Fire Resistive Walls and Floors, Sound Insulation

(a) General Requirements

(i) For Wood Frame buildings located in Fire Zone No. 2 see Clause 407(c).

(ii) Walls and floors separating dwelling units within any building shall have a fire resistance rating of not less than one hour and sound transmission loss, or sound reduction, of not less than 50 decibels. In the case of walls separating units as in semi-detached or row houses, such walls shall be carried up to the underside of the roof construction.

(iii) Walls and floors or ceilings separating private garages from dwelling units shall have a fire resistance rating of not less than one hour.* The garage floor shall be of incombustible material.

(b) Openings in Fire Resistive Walls, Floors and Ceilings

Where fire resistive walls, floors or ceilings are required, there shall be no openings in such except that in the case of a garage there may be a single doorway provided with a snug-fitting, self-closing door having a fire resistance not less than that of a wood-slab door at least one and three-quarter inches thick in all parts, with the door sill at least six inches above the garage floor.

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* For constructions having these ratings see:

(1) Fire resistance, Appendices "A" and "C"

(2) Sound insulation, Appendices "B" and "D"

(c) Fire-resistive Walls supporting structural Members

Incombustible structural members may project into solid or hollow fire resistive walls of masonry, solid plaster, or reinforced concrete, provided that no additional hollow spaces are formed within the wall and that the full thickness of the wall or portion of the wall through which the member projects makes full contact with the member on all sides. Such incombustible members may be continuous through such walls, subject to the provisions of the preceding sentence.

Combustible structural members shall not project into any solid fire resistive wall of masonry or reinforced concrete, unless they are separated from each other and from the opposite side by solid masonry having a thickness of at least a full four and one-half inches, which thickness may include plaster or mortar. Combustible structural members shall not project into hollow fire-resistive walls of masonry or reinforced concrete for a distance in excess of the minimum required for adequate bearing. The end within the wall shall be pocketed in solid masonry or concrete having a minimum thickness of four and one-half inches over all sides and the butt. The pocket shall form an integral part of the wall.

No fire resistive wall of hollow masonry shall be broken into subsequent to its erection, for the insertion of structural members.

409 Exits

In every two-family dwelling, each dwelling unit shall have two exits, provided that one shall be considered sufficient from the upper floor of a duplex building if such floor is not more than twelve feet above adjoining ground level and if its exit is completely independent of any exit from the ground floor dwelling unit.

Exits from dwelling units on floors above the first shall consist of interior stairs separated from the rest of the building by construction having a fire resistance rating of at least one hour, or exterior stairs of approved design.

Stairs serving as exits, whether interior or exterior, shall have a width of not less than thirty-six inches and treads and risers shall be so proportioned that the product of the width of tread, exclusive of nosing and the height of the riser, shall be not less than 70 nor more than 75; risers shall not exceed eight inches in height, and treads exclusive of nosing shall be not less than nine inches wide.

410 Dwelling Units located over Retail Stores and Offices

The regulations contained herein in respect of fire resistive construction and exits for two-family dwellings of the duplex type shall also apply to dwelling units located over retail stores and offices.

SECTION 5

QUALITY OF MATERIALS

501 Wood

(a) General

In addition to the grade requirements prescribed herein it is stipulated that no actual piece of lumber of obviously unsuitable quality shall be used in any construction.

(b) Sheathing, Sub-flooring and Plank Wall Construction

No grade of lumber used for wall and roof sheathing, sub-flooring and plank wall construction shall be below No. 5 Common for White Pine; No. 4 (Quebec 5ths) or Maritime Lumber Bureau 5ths for Eastern Spruce; No. 1 Cull for Red Pine; No. 3 Common for Douglas Fir, Western Hemlock, Western Red Cedar, and Western Spruce; No. 4 Grade, Alberta Forest Product Association for Ponderosa Pine, Idaho White Pine, Larch-Douglas Fir, White Fir, and Spruce; or equivalent grades of Jack Pine, Eastern Hemlock, Eastern Cedar and other species.

(c) Framing

No grade of lumber used for wall framing, floor and ceiling joists, rafters, built-up beams and studding shall be below No. 3 Common for White Pine; No. 3 (Quebec 4ths) or Maritime Lumber Bureau 4ths for Eastern Spruce; "Merchantable" for Red Pine; No. 2 Common for Douglas Fir, Western Hemlock, Western Red Cedar, and Western Spruce; No. 4 Grade, Alberta Forest Products Association for Ponderosa Pine, Idaho White Pine, Larch-Douglas Fir, White Fir, and Spruce; or equivalent grades of Jack Pine, Eastern Hemlock, Eastern Cedar and other species.

(d) Designation of Grades

The grades referred to in the above requirements are those in effect on 31 December, 1946, and prescribed by the White Pine Bureau, Ottawa for White Pine and Red Pine, the Canadian Lumbermen's Association of Ottawa or the Maritime Lumber Bureau of Amherst, Nova Scotia for Eastern Spruce and the B.C. Lumber and Shingle Manufacturers' Association of Vancouver for Douglas Fir, Western Hemlock, Western Red Cedar, and Western Spruce; and to Alberta Forest Products Association of Edmonton for Ponderosa Pine, Idaho White Pine, Larch-Douglas Fir, White Fir, and Spruce.

(e) Plywood

Plywood shall comprise an odd number of wood veneers bonded with a suitable adhesive with the grain of adjacent plies at right angles. The requirements for moisture resistance given in Appendix E of the National Building Code (Moisture-resistant Quality or Exterior Quality) shall be fulfilled.

(f) Wood Shingles

Wood shingles shall have a butt thickness of not less than 0.40 inch, provided that shingles having a butt thickness of not less than 0.33 inch may be used if they are edge grained, clear, and free from sapwood. (For exposure, see Clause 619(c).

502 Fibre Building Board

Fibre building board shall comply with the requirements given in Appendix "G".

503 Gypsum Products

(a) Gypsum Sheathing Board

Gypsum sheathing shall be of not less than one-half inch nominal thickness and shall otherwise comply with A.S.T.M. Specification C79-42, Gypsum Sheathing Board.

(b) Gypsum Lath

Gypsum lath shall comply with A.S.T.M. Specification C37-42. Perforated gypsum lath shall have perforations not less than three-quarter inch diameter, distributed over the face of the lath and comprising not less than 2½ percent of the area of the lath.

(c) Gypsum Block

Gypsum block shall comply with the requirements of A.S.T.M. Specification C52-41, Gypsum Partition Tile or Block.

504 Portland Cement and Concrete Aggregates

(a) Portland Cement

Portland Cement shall comply with the requirements of CSA Specification A5-1940 or CSA Specification A57-1940.

(b) Portland Cement Paint

Portland Cement paint where used as an exterior finish shall comply with the following requirements:

(i) It shall be in powder form (passing a 100-mesh sieve) and shall be free from organic binder.

(ii) It shall mix readily with water when stirred and shall produce a hard adherent finish on porous concrete, stucco, brick or masonry.

(iii) The composition shall be as follows:

Portland cement, min.	65%
Hydrated lime, max.	25%
Titanium dioxide or zinc sulphide	3-5%
Carbon dioxide, max.	3%
Calcium or aluminum stearate	0.5-1.0%
Calcium or sodium chloride	3-5%

(iv) Tinting colours shall be lime-proof.

(c) Concrete Aggregates

Concrete aggregates other than light-weight aggregates shall comply with the requirements of CSA Specification A23-1942.

Light weight aggregates shall comply with the requirements of CSA Specification A23-1942 or A.S.T.M. Specification C130-42.

505 Ready Mixed Concrete

Ready mixed concrete shall comply with the requirements of A.S.T.M. Specifications (For detailed requirements for site mixed concrete see Clause 616)

506 Masonry Units (Bricks, Tiles and Blocks)

All masonry units shall comply with the requirements of the appropriate specification given in Table 1 and any restrictions on the use of any material contained in the appropriate specification shall apply.

Table 1

Specifications for Bricks, Tiles and Blocks

Material	Specification
Clay or Shale Brick	CSA A82.1 - 1944
Sand-lime Building Brick	CSA A82.3 - 1944
Structural Clay Load-Bearing Wall Tile	CSA A82.4 - 1944
Structural Clay Non-Load-Bearing Wall Tile	CSA A82.5 - 1944
Concrete Brick	ASTM C55 - 1937
Solid Load-Bearing Concrete Masonry Units	ASTM C145 - 1940
Hollow Load-Bearing Concrete Masonry Units	ASTM C90 - 1944
Hollow Non-Load Bearing Concrete Masonry Units	ASTM C129 - 1939
Cast Stone	ACI 704 - 1944

507 Mortars for Unit Masonry

(a) Mortar Ingredients

Cementing materials and aggregate shall comply with the specifications indicated in Table 2:

Table 2

Specifications for Mortar Ingredients

Material	Specification A.S.T.M.	C.S.A.
Quicklime	C5-26	-
Hydrated lime	C6-44	-
Hydraulic hydrated lime	C141-42	-
Portland cement	-	A5-1940
Natural cement	C10-37	-
Masonry cement	C91-40	-
Gypsum plaster	C28-40	-
Keene's cement	C61-40	-
Aggregate	C144-44	-

Quicklime shall be slaked with care to avoid overheating and shall be stored in the wet condition for not less than seven days before mixing; hydrated lime shall be stored in the wet condition for not less than twelve hours.

Water for use in mixing mortar shall be clean and free from deleterious amounts of acids, alkalis, salts, and organic matter.

(b) Types of Mortar

All mortars shall consist of one of the following types:

lime mortar
lime-cement mortar
cement mortar
gypsum mortar

or approved substitutes, as hereinafter defined.

(c) Composition of Mortars

Portland cement, natural cement, masonry cement, and aggregate other than that used in gypsum mortar shall be measured by volume, dry, before mixing with water; gypsum and aggregate used in gypsum mortar shall be proportioned by weight, lime whether delivered as hydrate or quicklime shall be measured by volume in the form of wet putty.

Lime mortar shall consist of one part lime putty with not more than three parts of aggregate.

Mortar consisting of one part hydraulic hydrated lime, one part masonry cement, or one part natural cement, with not more than three parts of aggregate may be substituted for lime mortar.

Lime-cement mortar shall consist of not less than one part lime putty, with one part of portland cement, and with not more than six parts of aggregate.

508 Steel and Iron

All steel and iron shall comply with the requirements of the appropriate specification indicated in Table 3. See also Requirements for Wall and Roof Coverings(Clauses 511 and 619(g))

Table 3

Specifications for Steel and Iron

Material	Specification
Reinforcing materials for concrete	CSA G30, G31, G32, G45, G46(1938)
Structural steel	CSA S39 and S40 (1935)
Iron Castings	CSA S16 - 1940

509 Aluminum Alloys

Except as otherwise provided in this Clause, all sheet aluminum alloys used for sheathing or covering walls or roofs shall conform in chemical composition with the specifications indicated hereafter:

Commercially pure aluminum, A.S.T.M. Spec. B25-44T;
Aluminum-manganese alloy, A.S.T.M. Spec. B79-44T;
Aluminum-magnesium-chromium alloy, A.S.T.M. Spec. B109-44T.

Sheet aluminum alloys of the aluminum-magnesium silicide group shall also be permitted provided the chemical composition of such alloys is typical of good commercial practice and guaranteed by the supplier. For the purposes of this Clause, United States Federal Specifications QQ-A-334 and QQ-A-327 shall be accepted as good commercial practice.

510 Asbestos-Cement Siding and Shingles

Asbestos-cement Siding and shingles shall fulfill the following requirements:

(i)	Minimum thickness when in place	5/32 inch
(ii)	Modulus of rupture when dry	3000 pounds per square inch
(iii)	Modulus of rupture following 24 hours immersion in water	1250 pounds per square inch
(iv)	Maximum absorption after 24 hours immersion in water	17½ percent

511 Roof Coverings

Every roof covering shall comply with the requirements listed below for its type:

(a) Wood Shingles or Shakes (Cedar). Butt thickness not less than 0.40 in. provided that shingles having a butt thickness of not less than 0.33 in. may be used if they are edge-grained, clear and free from sapwood. To be laid with a weather exposure not greater than that given in the following table:

Size of Shingles (when green)	Maximum Exposure
Length 16 inches, butt thickness not less than 0.33 inch (6 butts to 2 inches)	4-1/2 inches
Length 16 inches, butt thickness not less than 0.40 inch (5 butts to 2 inches)	5 inches
Length 18 inches, butt thickness not less than 0.45 inch (5 butts to 2-1/4 inches)	5-1/2 inches
Length 24 inches, butt thickness not less than 0.50 inch (4 butts to 2 inches and thicker)	7-1/2 inches

All wood shingles shall be nailed firmly with copper or hot dipped zinc-coated nails not less than 0.08 inch diameter (No. 14 Imp. Wire Gauge) nor 1-1/4 inches long, placed 3/4 inch from edge and one inch above the exposure line. Each shingle shall be nailed with two nails placed one inch above the exposure line and 3/4 inch from each edge driven substantially into the supporting roof construction.

(b) Asphalt Shingles. ASTM Specification D 225-44T. Minimum weight when laid, 180 lbs/100 sq.ft.

(c) Asbestos-Cement Shingles. Minimum thickness 5/32 in.

(d) Slates. Minimum thickness 3/16 in. Minimum modulus of rupture 9000 lb/sq.in.

(e) Built-Up Roof Coverings. Two or more layers of saturated felt having total weight of not less than 42 lb /100 sq.ft. Minimum total weight of felts, sheets and toppings 120 lb/100 sq.ft.

(f) Asphalt Roll Roofing, smooth surfaced. ASTM Specification D 224-44T Minimum weight 50 lb/108 sq.ft. provided that roofing having a minimum weight of 34 lb/108 sq. ft. may be used on accessory buildings.

(g) Asphalt Roll Roofing, surfaced with coarse mineral granules. ASTM specification D 249-45T. Minimum weight 75 lb/108 sq.ft.

(h) Asphalt Roll Roofing, wide selvage, surfaced with coarse mineral granules. ASTM Specification D 371-44. Minimum weight 60 lb/108 sq.ft.

(i) Iron or Steel Sheets or Shingles. Minimum thickness of base sheet 0.018 in. Protected against corrosion by a non-corrodible metal or by suitable paint or bitumen on both sides. To be attached by nails or fasteners of zinc-coated steel or other material equally resistant to corrosion when in contact with iron or steel.

(j) Copper. Minimum weight 14 oz/sq.ft. To be secured with nails or fasteners of copper or other material equally resistant to corrosion when in contact with copper.

(k) Aluminum Alloy (See Clause 509). Minimum thickness 0.020 in. To be secured with nails or fasteners of aluminum alloy or of zinc-coated or cadmium-plated steel.

SECTION 6

STRUCTURAL REQUIREMENTS

601 Special Types of Construction, New Materials and Methods

Construction not covered in this Code but falling within any of the classifications established in the National Building Code shall comply with the appropriate regulations therein.

Materials and methods of construction not specifically regulated by this Code or by the National Building Code, may be permitted provided their suitability and safe working stresses have been approved by the authority having jurisdiction on the basis of laboratory tests carried out by a publicly owned or other recognized laboratory.

602 Live Loads

All dwellings shall be capable of safely resisting the following live loads:

(a) Floor Loads - 30 lb/sq.ft.

(b) Roof Loads

Slope or roof inches rise in 12" horizontal	Assumed wt. of load in lb/sq.ft. of roof surface
4 or less	30
6	25
8	20
12 or more	15

In portions of roofs where an unusual depth of snow may accumulate or in localities where very heavy snow loads are probable, the above figures shall be increased.

(c) Ceiling loads

All ceilings shall be capable of safely supporting a live load of 10 lb/sq.ft. and if the attic space is floored and could be used for storage purposes 20 lb/sq.ft.

(d) Wind loads

The exterior walls of dwellings shall be capable of resisting a pressure of 15 lb/sq.ft. applied either externally or internally.

603 Anchorage

In cases where the full dead weight of the structure is not sufficient to overcome upward air pressure, the roofs of dwellings whether flat or pitched shall be anchored to the walls or columns and the walls or columns shall be anchored to the foundations so as to resist an upward pressure of 15 lb./sq.ft. applied to the horizontal projection of the roof area.

Adequate resistance to sliding and overturning shall be provided.

604 Excavations

Until provision for permanent support has been made, excavations shall be properly guarded and protected by the persons causing them to be made so as to prevent such excavation from becoming dangerous to life or limb.

605 Depth of Foundations

(a) Except as provided in (d) herein, all foundations shall rest upon bedrock or upon well compacted and stable deposits of soil that neither contain nor overlie an appreciable amount of organic or other foreign matter.

(b) Except as provided in (d) herein, all foundations except those resting on bedrock shall be carried down below the level of possible damage from frost.

(c) Except as provided in (d) herein, no foundation shall be placed on frozen soil nor shall any foundation be placed during freezing weather unless adequately protected against frost action.

(d) Paragraphs (a), (b), and (c) hereof do not apply to the foundations of detached garages or similar accessory buildings.

606 Allowable Bearing Values

The allowable bearing values given in this Article are to be used only in the absence of positive tests, well established local experience and practice, or professional advice.

On consolidated and cemented material including rock, the maximum pressure under foundations shall not exceed ten tons per square foot.

On unconsolidated, non-cohesive material such as gravel and sand in a compact state, the maximum pressure under foundations shall not exceed three tons per square foot.

On unconsolidated, cohesive material such as clay, the maximum pressure under foundations shall not exceed two tons per square foot.

607 Foundation Piers, Piles and Posts

Buildings may be supported on foundation piers, piles or posts, without foundation walls, if it can be shown to the authority having jurisdiction that the proposed method of construction will be satisfactory in the locality concerned.

Such piers, piles or posts shall be adequately braced in order to ensure lateral stability.

Wood piles which are not capped below permanent ground water level and wood posts shall be pressure creosoted in conformance with good practice.

608 Footings

(a) General Requirements

Footings shall be constructed of concrete or solid masonry units provided that footings of wood (mud sills) may be used under accessory buildings of wood frame construction. Wood footings shall either be of cedar or other equally durable wood, or they shall be pressure creosoted to ensure a minimum net absorption of six pounds per cubic foot.

(b) Concrete and Solid Masonry Unit Footing

Masonry unit footings shall be acceptable without computation of the unit pressure under them if they have a minimum projection of four inches from all faces of the wall, column, or pedestal, and if their depth is at least equal to their projection and never less than six inches.

609 Foundation Walls

(a) Materials

All foundation walls shall be built of masonry or reinforced concrete.

Masonry shall consist of concrete having a strength of not less than 2000 lb. per sq. in., or either solid or hollow masonry units.

(b) Thickness

In no case shall the thickness of any masonry foundation wall be less than that of the wall above it.

Every masonry foundation wall supporting wood frame construction shall not be less than eight inches thick, provided that any wall supporting masonry veneer shall have a minimum thickness of ten inches.

Every masonry foundation wall supporting masonry construction shall not be less than eight inches thick for one- and two-storey buildings, and twelve inches for three-storey buildings provided that these thicknesses shall be increased by two inches if hollow masonry units are used.

(c) Lateral Support

Where the lateral pressure from adjacent soil makes it necessary, the authority having jurisdiction may require transverse walls, pilasters or additional wall thicknesses to guard against the results of such pressure.

(d) Support for Structural Members

The top course of all foundation walls shall be of solid masonry for a height of not less than five inches.

(e) Waterproofing of Basement Walls

Where foundation walls enclose basements, adequate measures shall be taken to prevent leakage of water through the wall. Walls built of hollow units shall be rendered with cement mortar from the footings to at least two feet above grade.

The walls and floors of habitable rooms located in basements shall be so insulated, heated, or ventilated that there will be no condensation of moisture ('sweating') on their interior surface during periods of high humidity in summer months. Such insulation, when required, may be provided by the application of a lining of wood or similar material supported on furring strips and thus held clear of masonry or reinforced concrete walls.

610 Basement and Cellar Floors

Concrete basement or cellar floors poured on solid rock shall have a thickness of at least two inches exclusive of any topping. When placed over soil such floors shall be supported by at least five inches of crushed rock, broken stone or brick, or cinders and shall have a minimum thickness of three inches exclusive of any topping.

611 Exterior Walls of Masonry Construction

(a) Thickness

The thickness of masonry exterior walls (not including veneered masonry) shall not be less than the amount shown in Table 5.

Table 5

Minimum Thickness of Masonry Exterior Walls

Construction	Height of Wall above Foundation Wall		
	1 Storey	2 Stories	3 Stories
Solid masonry units	6 in.	8 in.	8 in.
Hollow masonry "	6 in.	8 in.	12 in. *
Monolithic concrete	6 in.	8 in.	8 in.
Rubble stone laid on flat beds, height not over 25 ft.	12 in.	12 in.	
Rubble stone, random bedding	16 in.	16 in.	

* May be 8 in. in top storey.

(b) Lateral Support

Every exterior masonry wall shall be supported, at right angles to the wall face by means of intersecting walls, piers, or by floor or roof constructions at intervals not exceeding twenty times the wall thickness.

Where lateral support is provided by intersecting walls or piers, such walls or piers shall have sufficient strength and stability to transfer to the ground all the lateral forces that they are assumed to resist.

Where lateral support is provided by floor or roof construction, provision shall be made to transfer the horizontal forces to the ground.

(c) Anchorage

All masonry walls shall be securely bonded at points where they intersect and all floor constructions above the first floor and all roof constructions shall be securely anchored to the exterior masonry walls. Such anchors shall be spaced not more than six feet eight inches apart.

(d) Mortar

All mortar in exterior walls shall be cement mortar or lime-cement mortar.

(e) Support for Structural Members

Where a concentrated load is supported by hollow masonry units, at least five inches of solid units shall be provided directly under the bearing for a length that is longer than the bearing by at least twice the required height of the solid masonry.

612 Veneered Walls (see definition)

(a) Height

Veneered walls shall not exceed thirty-five feet in height above foundation walls. In no case shall the veneer be considered a part of the wall in computing the strength of bearing walls, nor shall it be considered a part of the required thickness of the wall.

(b) Veneer on Masonry

Where masonry walls are veneered with brick, stone or other masonry, such veneer shall be securely tied into the backing either by a header for every three hundred square inches of wall surface or by approved corrosion resistant wall ties spaced not farther apart than one foot vertically and two feet horizontally. Headers shall project at least three and three-quarter inches into the backing.

(c) Veneer on Wood Frame Construction

Veneer on wood frame construction may consist of solid masonry units not less than three and three-quarter inches thick, or stone not less than six inches thick.

Sheathing shall be covered with water-resistant building paper or asphalt-saturated felt lapped four inches at joints and around all openings. Veneer shall be secured to the studs with approved corrosion resistant metal ties spaced not more than sixteen inches apart in either direction.

613 Faced Walls (see definition)

(a) Thickness

Faced walls shall be at least as thick as required for masonry walls of the material forming the backing.

When facing is used, it shall not be considered to add to the strength of the wall unless it is at least three and three-quarter inches in thickness.

(b) Bond

Facings of brick or stone shall be bonded into the backing with units at least three and three-quarter inches thicker than the facing, the equivalent of one-sixth of the area of the wall. Ashlar facing units exceeding one foot in height shall be anchored to the backing with approved metallic anchors.

614 Exterior Finishes on Masonry Walls

Where exterior walls are built of masonry units which are required to be protected from the weather, such protection shall consist of either stucco or Portland cement paint.

Stucco shall fulfill the requirements for cement mortar or for lime-cement mortar and shall be applied in two or more coats so as to have a minimum thickness of one-half inch.

Portland cement paint shall be applied in two coats using a stiff brush so as to fill all holes and cracks.

615 Partitions of Masonry Construction

Solid masonry bearing partitions shall be not less than eight inches thick and hollow masonry bearing partitions shall be not less in thickness than one-eighteenth of the height between floors or floor beams but never less than eight inches, provided that bearing partitions not more than one storey or ten feet in height may be four inches thick of solid masonry and six inches thick of hollow masonry.

Non-bearing partitions whether solid or hollow shall comply with the requirements of Table 6.

Lateral support shall be provided by wedging to the construction above or by anchoring or bonding to adjacent horizontal or vertical construction.

Table 6

Minimum Thickness and Maximum Height Non-bearing Partitions

Thickness Exclusive of Plaster (inches)	Maximum Unsupported Height (feet)
2	9
3	12
4	15
6	20
8	25

Unsupported length not to exceed six feet except in the case of solid plaster partitions reinforced with metal lath.

616 Concrete Construction

(a) General

The following regulations apply to concrete made under the ordinary conditions prevailing on a small job. When conditions are carefully controlled and regular tests of materials and concrete are made, the requirements of the National Building Code for "controlled concrete" may be substituted for the regulations obtained in this Code. For ready mixed concrete see ASTM Specification C94-44.

(b) Permissible amount of water

The water content of concrete exposed to soil or weather expressed in gallons per 87½ lb. sack of cement, shall not exceed 5¼ for machine mixing or 5 for hand mixing due allowance being made for surface water present in the aggregate.*

* As an approximate guide the following figures may be used:

Condition of sand	Gallons of water to add to each one sack batch	
	Machine Mixing	Hand Mixing
moist	5	4¼
wet	4¼	3½
very wet	3¾	3

(c) Consistency

The consistency of concrete as determined by a slump test shall correspond to a slump of not less than one nor more than five inches, provided that a slump of less than one inch is permissible if compaction of the concrete is accomplished by vibration.

The proportions of fine and coarse aggregate and cement shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed on the work, but without permitting the material to segregate or excess free water to collect on the surface. The volume of coarse aggregate shall be not less than the volume of fine aggregate and not more than twice the volume of fine aggregate. These proportions do not necessarily apply to lightweight aggregates.

(d) Mixing

Mixing shall preferably be done in a mechanical batch mixer.

The mixer shall be equipped with a suitable charging hopper, water storage and water measuring device. It shall be cleaned at frequent intervals when in use and maintained in such a condition that the mixing action will be unimpaired.

The mixing of each batch shall continue until there is a uniform distribution of material and the mass is uniform in colour and consistency. In no case shall the mixing time be less than one minute after all the materials are put into the mixer.

Hand mixing shall be carried out on a water-tight platform and great care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency.

(e) Compacting

All concrete shall be properly compacted by suitable means during the operation of placing and shall be thoroughly worked around reinforcement, around embedded fixtures, and into the corners of the forms.

(f) Re-tempering of Concrete

The re-tempering of concrete or mortar that has partially hardened, that is, remixing with or without additional cement, aggregate or water, will not be permitted.

(g) Curing of Concrete

After concrete has set sufficiently, its exposed surfaces shall be kept continuously wet. This shall continue for a period of at least 7 days after the concrete was deposited.

In warm weather, particular care shall be taken to prevent drying out of the concrete at any time during the curing period.

(h) Cold Weather Requirements

Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near-freezing weather. No frozen materials, or materials containing ice, shall be used.

No dependence shall be placed on salt or other chemicals for the prevention of freezing.

(i) Forms

Forms shall be of such strength and rigidity and so supported as to prevent excessive deflection under the weight or pressure of the wet concrete. They shall be sufficiently tight to prevent leakage of mortar. The removal of forms shall be carried out in such a manner as to ensure the complete safety of the structure.

(j) Concrete in Alkali Soils and Water

Where concrete will be exposed to corrosive soils or ground waters, provision shall be made by the use of a rich mix, special cement, protective coverings or other means acceptable to the authority having jurisdiction to ensure adequate durability.

(k) Tests

The authority having jurisdiction may require tests of the concrete to be made during the progress of the work.

617 Wood Stud Wall Construction: Framing

(a) Size and Height

The studding in exterior walls and bearing partitions shall be not less than the requirements listed in Table 7 provided that these requirements do not necessarily apply if the studs and plates are designed as a system of columns and beams or if sheathing material is glued to the studs or otherwise secured in such a way that it participates in carrying vertical loads. See Clause 601.

The maximum allowable height between floors of a 2 by 4-inch or 3 by 4-inch stud framing shall be fourteen feet and 2 by 6-inch stud framing shall be twenty feet unless the wall is supported laterally by adequate framing.

Table 7

Minimum Requirements for Stud Walls

Note: All stud sizes are nominal

Height of Wall	Studding
Single storey dwellings and accessory buildings	2x4 studs on 24-inch centres
Two storey buildings and upper two stories of three storey buildings	2x4 studs on 16-inch centres
Bottom storey of three storey buildings	2x4 studs on 12-inch centres or 3x4* studs on 16-inch centres or 2x6 studs on 16-inch centres

* Alternatively two 2x4 studs nailed together

(b) Corners

Angles at corners where stud walls or partitions meet shall be framed solid with at least two studs so that no lath can extend from one room to another.

(c) Base Plates

Stud walls resting on masonry shall have base plates or sills. Such sills shall be securely anchored to the foundation walls; they shall be not less than the width of the studs nor less than two inches nominal thickness. When wood members are embedded in masonry below grade they shall be of decay-resistive wood or wood treated with preservative.

(d) Top Plates

In exterior walls and bearing partitions the top plate shall be doubled and lapped at each intersection with walls or partitions. Joints in the upper and lower members of the top plate shall be staggered not less than four feet.

(e) Bridging

All stud partitions or walls over ten feet in height, shall have block bridging, not less than two inches in nominal thickness and of the same width as the stud, fitted snugly and spiked into the studs at mid-height of stud, or other means for giving equal lateral support to the studs. Such bridging may serve as fire-stopping as required in Cl. 620.

(f) Pipes and Ducts in Walls

Stud partitions containing plumbing, heating, or other pipes or ducts shall be so framed and the joists underneath so spaced as to give proper clearance for the piping and ductwork. Where plumbing, heating, or other pipes or ducts are placed in or partly in a partition, necessitating the cutting of the top or bottom plates, a metal tie not less than one-half inch wide shall be fastened to the plate across and to each side of the opening with not less than four three and one-half inch nails. No plate shall be cut in any stud space adjacent to an opening and there shall be at least two stud spaces between any two consecutive openings in such plate.

(g) Headers

All wall openings involving cutting of a stud, which are four feet wide or less, shall be provided with double headers not less than two inches thick, placed on edge, securely fastened together, and such headers shall have two-inch solid bearing to the floor or bottom plate. All openings more than four feet shall be trussed or provided with lintels which shall have not less than two-inch solid bearing at each end to the floor or bottom plate.

618 Wood Stud Wall Construction - Sheathing

(a) General

Sheathing shall be placed on the inside or the outside of the studs in any building provided that it may be omitted in the following circumstances:

(i) Where aluminum alloy, or galvanized iron or steel, or iron or steel otherwise adequately protected against corrosion on both sides, is used as the exterior wall covering, no other sheathing shall be required provided the studs are adequately braced.

(ii) When stucco is used as the exterior wall covering sheathing may be omitted in certain cases (see p. 49).

(iii) When wood siding of not less than five-eighths inch actual thickness, with lapped or tongued-and-grooved joints, and with not less than two nails to each stud, is used sheathing may be omitted.

The following materials may be used as sheathing:

1. Wood sheathing
2. Fibre building board
3. Gypsum sheathing board
4. Plywood
5. Other materials conforming with the requirements for sheathing in the National Building Code.

(b) Wood Sheathing

Wood sheathing shall comply with the requirements of Clause 501(b) as to grade and shall have an actual thickness of not less than five-eighths inch if tongue-and-groove or shiplap is used, and not less than one inch nominal if rough lumber is used.

Wood sheathing shall be fastened to the studs with nails at least two and one-half inches in length. The nailing shall have an average spacing of not more than four inches along each stud.

(c) Fibre Building Board or Gypsum Sheathing Board

The following regulations shall apply to walls sheathed with fibre building board or gypsum sheathing board:

(i) Studs shall be spaced not wider than 16 inches on centres.

(ii) Every sheet shall be erected with the length of the sheet horizontal and with vertical joints staggered so that the joints are not continuous.

(iii) Fibre building board shall be nailed to each stud with nails not less in length than twice the thickness of the sheathing nor less than one and one-half inches. Such nails shall be spaced not more than three inches apart along all edges and not more than six inches apart along all intervening studs and headers.

(iv) Gypsum sheathing shall be nailed to each stud with nails having a length not less than two inches and such nails shall be placed not more than four inches apart along all studs.

(v) The exterior surface of the sheathing shall be protected by water-resistant building paper or saturated asphalt felt lapped not less than four inches at all joint around all openings.

(vi) When either the sheathing or the building paper is highly resistant to the transmission of water vapour, a more effective vapour barrier shall be provided between the interior face of the studs and the exposed interior face of the wall.

(vii) When such sheathing is faced with masonry veneer, the ties required for such masonry shall be fastened to the studs; when shingles are applied over such sheathing, 1 by 2-inch nailing strips, spaced as required, shall be nailed to the studs; wood siding shall be nailed to the studs.

(viii) A clear space of not less than one inch shall be provided between any such sheathing and any masonry veneer.

(ix) When gypsum sheathing board is faced with stucco, 1 by 2-inch nailing strips, spaced as required, shall be nailed to the studs, unless mesh reinforcement is used. All metal lath or mesh shall be nailed to the studs.

(d) Plywood

(i) Thickness

The minimum thickness of plywood sheathing shall be 5/16 inch.

(ii) Application

The following regulations shall apply to walls sheathed with plywood:

1. Studs shall be spaced not wider than 16 inches on centres.

2. Sheathing shall be nailed to each stud with two inch nails spaced not more than six inches apart along all edges and not more than twelve inches apart along all intervening studs.

3. Plywood sheathing shall be protected by an exterior wall covering unless it is of "exterior" quality.

619 Wood Stud Wall Construction - Exterior Wall Coverings

(a) General

Every exterior wall in wood frame construction shall be covered with one or more of the following materials:

(i) Wood siding, bituminous siding, asbestos-cement metal siding
(ii) Wood shingles, bituminous shingles, asbestos-cement shingles, metal shingles
(iii) Plywood
(iv) Stucco
(v) Masonry veneer
(vi) Metal sheets
(vii) Other materials conforming with the requirements for exterior wall coverings in the National Building Code.

All exterior wall covering shall be applied and securely nailed in place in such a way that the sheathing and framing beneath is effectively protected from the weather.

Where the exterior wall covering is highly resistant to the transmissions of water vapour, a more effective vapour barrier shall be provided between the interior face of the studs and exposed interior face of the wall.

(b) Wood Siding

The exposed portion of any piece of wood siding shall not be less than 3/16 inch thick at any point.

(c) Wood Shingles

Wood shingles or shakes may be used for the exterior wall covering. They shall be laid with a weather exposure not greater than that given in the following table:

Size of Shingles (when green)	Maximum Exposure Single Coursed	Maximum Exposure Double Coursed
Length 16 inches, butt thickness not less than 0.33 inch (6 butts to 2 inches)	5½ inches	10 inches
Length 16 inches, butt thickness not less than 0.40 inch (5 butts to 2 inches)	7½ inches	12 inches
Length 18 inches, butt thickness not less than 0.45 inch (5 butts to 2¼ inches)	8½ inches	14 inches
Length 24 inches, butt thickness not less than 0.50 inch (4 butts to 2 inches and thicker)	11½ inches	16 inches

(d) Plywood

Plywood for exterior wall covering shall be at least ¼ inch thick and of "Exterior" quality. The application of such plywood shall be in accordance with good commercial practice.

(e) Bituminous Siding and Shingles

Bituminous siding, whether backed with insulating or reinforcing material or not, shall consist of felt of net weight not less than 0.1 pound per square foot, having not less than 175 percent of saturation, with a continuous covering of crushed siliceous aggregate or other equally inert material.

When used as continuous sheets, such siding, exclusive of any backing which may be incorporated with it, shall weigh not less than 75 lb. per 100 square feet when in place, and when used as lapped siding (shingle fashion), exclusive of any backing, such siding shall weigh not less than 180 pounds per 100 square feet when in place.

Siding of continuous sheets shall be nailed over each stud with not less than one 1½-inch nail for each six inches, and shall also be nailed to sheathing, or other required backing with not less than five nails to each square foot of wall surface; shingle-type siding shall be nailed with not less than two nails under the lap for each shingle

unit and, in addition, all lapped edges within six feet of the ground shall be nailed so as to prevent malicious damage. Nails used shall be copper, zinc-coated, aluminum alloy or other equally non-corrodible type. Subject to permission from the authority having jurisdiction, nailing instructions from the manufacturer of such siding may be substituted for the requirements herein specified for nailing.

When such siding incorporates fibre board backing, it shall be so installed that it overlaps any foundation wall and shall not be within two feet of the soil in any location.

(f) Masonry Veneer

See Clause 612(c)

(g) Metal Wall Coverings

Metal wall coverings shall include metal shingles, metal siding, corrugated or otherwise formed sheets and flat sheets. Such coverings shall consist of one of the following metals:

(i) Aluminum alloy not less than 0.020 inch thick attached with nails or fasteners of aluminum alloy, or of galvanized or cadmium plated steel;

(ii) Galvanized steel or iron having a minimum weight of 12.5 oz./sq.ft., (28 gauge) attached with nails or fasteners of galvanized or cadmium plated steel. When sheathing is omitted, strips shall be placed between the studs in such a manner as to permit adequate nailing.

(h) Stucco

(i) General Requirements

Stucco shall fulfill the requirements prescribed for cement mortar or for lime-cement mortar, and shall be applied in three coats, unless it is pneumatically placed, in which case two coats shall be considered sufficient. The minimum thickness of the stucco shall be not less than three-quarter inch at every point.

Non-corrodible flashing or other materials that will prevent penetration of moisture behind the stucco shall be used where necessary.

The application of stucco shall be in accordance with accepted good commercial practice.

(ii) Back Plastering

Back plastering shall be required where sheathing or its equivalent is omitted. It shall be of sufficient thickness to extend back between the studs a distance of not less than one-quarter inch.

620 Plank Wall Construction

(a) Thickness

Plank walls shall have a thickness of not less than two inches in all parts exclusive of sheathing if sheathing is used, and not less than three inches in all parts if sheathing is omitted.

(b) Framing

All structural members shall be framed together with dovetailed joints or other joints of equivalent strength so as to provide adequate rigidity in the structure.

(c) Sheathing

Sheathing, where used, shall comply with the requirements of Clause 618 as far as quality and thickness of material is concerned. A layer of water-resistant building paper or saturated asphalt felt shall be placed under the sheathing and a similar layer on top.

(d) Exterior Wall Covering

Every exterior wall of plank construction shall have an exterior wall covering meeting the requirements of Clause 619.

(e) Height

Plank walls shall not exceed three stories or thirty-five feet in height. If such walls exceed two stories in height the thickness of the planks, exclusive of any sheathing, shall not be less than three inches.

621 Wood Joist Floors

(a) Design

All floors shall be capable of supporting the prescribed live loads and the dead loads within the unit stresses listed in Appendix "F". Joists supporting plastered ceilings shall be so proportioned that the calculated deflection due to full live load only will not exceed 1/360 of the span length. The corresponding deflection may be 1/240 of the span length where no plastered surfaces are attached to the joists.

In the absence of more exact calculations, joists having span not greater than listed in Appendix "E" may be used.

(b) Bridging

Cross bridging, on not more than eight foot centres, shall be placed between all joists of which the span is greater than eight feet; there shall be two rows of bridging in spans greater than twelve feet.

Under bearing partitions that run parallel with supporting joists, two or more joists, as required, shall be used. They shall be well spiked together or separated by solid bridging on not more than four foot centres to permit the passage of pipes and heating ducts.

(c) Detailed Requirements

Every wooden joist, rafter, beam, or girder entering any masonry or reinforced concrete wall shall be separated from any wood member entering the opposite side of such wall by at least four inches; it shall have a bearing of at least two inches and the end of the member shall be so cut as to fall freely without disrupting the wall in case of fire.

Header beams shall be placed not closer than eighteen inches from the front of any fireplace. All spaces between chimneys and wood joists or beams shall be filled with loose incombustible materials placed in an incombustible support, or a metal collar connected to the chimney and fastened to the joists, beams or flooring to form an effective fire-stop.

All joists shall have a minimum bearing of two inches except when supported on a ribbon board, and nailed securely to the adjoining stud; lapped joists shall be securely nailed to each other. Ribbon boards shall be not less than one by four inches and shall be gained into the studs.

(d) Notching

In the absence of proper supporting evidence as to load carrying capacity, notching of joists shall be limited as follows:

(i) Joists shall not be notched within the middle half of the span.

(ii) Joists may be notched in the outer one-quarter of the span provided the notch does not exceed one-fifth of the depth.

(e) Header and Tail Joists

Header joists over six feet long and tail joists over twelve feet long shall be hung in joist or beam hangers, or secured by other devices affording equivalent support.

Trimmers and header joists more than four feet long shall be doubled.

(f) Sub-flooring

In wood frame buildings, sub-flooring shall be provided under all finish floors less than three-quarter inch in thickness, and under all finish floors except the top floor in buildings two or more stories in height. Sub-flooring shall consist of wood not less than three-quarter inch thick laid diagonally with all ends bearing on joists; alternatively, plywood may be used. Such plywood shall be not less than one-half inch thick. Wood, other than plywood, shall be nailed to the joists with nails which shall be in length at least two and one-half times the nominal thickness of the sub-flooring. The nailing shall have an average spacing of not more than four inches along each joist. Plywood shall be nailed to the joists with two and one-half inch common nails, approximately six inches apart at all edges and ten inches apart at interior joists, the panels to be laid lengthwise across the joists.

The above requirements do not necessarily apply if plywood is glued to the joists.

622 Foundation Ventilation

The space between the bottom of floor joists and the ground of any building (except such space as is occupied by a basement or cellar) shall be provided with a sufficient

number of ventilating openings through foundation walls or exterior walls to insure ample ventilation. The minimum total area of ventilating openings shall be proportioned on the basis of 0.5% of enclosed area plus 0.5 sq.ft. for each 25 lineal feet of wall surrounding the area. When the building site is relatively wet at frequent periods double this area is required. Such openings need not be placed in the front of the building.

The minimum clearance between the bottom of floor joists and the ground beneath shall be eighteen inches.

623 Wood Roof Construction

(a) Ceiling Joists

Ceiling joists shall be capable of supporting the prescribed live loads and the dead loads within the unit stresses listed in Appendix "F". If a plastered ceiling is used the deflection due to live load shall not exceed 1/360 of the span. If the ceiling is not plastered, the corresponding deflection shall not exceed 1/240 of the span length. In the absence of more exact calculations, ceiling joists having spans not greater than those listed in Appendix "E" may be used.

(b) Rafters and Roof Joists

The span of any rafter or roof joist shall be such that the allowable fibre stress will not be exceeded when the prescribed live loads and the dead loads are applied. In the case of roof joists or rafters supporting plaster ceilings, the calculated deflection due to full live load only shall not exceed 1/360 of the span. The corresponding deflection, where no plastered surfaces are attached to the rafters or roof joists, may be 1/240 of the span length.

In the absence of more exact calculations, roof joists or rafters having span not greater than those listed in Appendix "E" may be used.

Double rafters and trimmers shall be used around all dormers and other large roof openings, and hip and valley members shall be increased in size as required to carry the roof load. Where collar ties are used there shall be a collar tie for each rafter.

624 Fire Stopping

Fire-stops shall be located in the following places:

(a) In exterior or interior hollow stud walls, at ceiling and floor levels.

(b) In all hollow stud walls and partitions, including furred spaces so placed that the maximum vertical dimension

of any concealed space is not over seven feet. Furred spaces as herein mentioned shall include spaces formed by furring on masonry or reinforced concrete walls.

(c) Between stair stringers having a ceiling on their underside at least once in the middle portion of each run, and by a header beam at top and bottom; also where a stud wall or partition abuts a stair stringer, such a wall or partitio shall be fire-stopped along and in line with the run of the stair.

(d) Around top, bottom, sides, and ends of sliding door pockets.

(e) Spaces between chimneys and wood framing at floor levels; these shall be completely filled with mortar, loose cinders or other incombustible material held in place by incombustible supports.

(f) Where a ceiling is attached directly to the underside of wood floor joists, the space between the joists shall be fire-stopped over all beams, walls or partitions supporting the joists.

Wood fire-stops shall be at least two inches in nominal thickness, provided that where the width of the opening is such that more than one piece is required, there shall be two thicknesses of one-inch lumber with broken joints.

625 Prefabrication

(a) General Requirements

Prefabricated dwellings shall comply with all the requirements of this code unless they are tested in accordance with the provisions of Clause 625(b).

The prefabricated section or panels shall be manufactured within tolerances which shall assure site assembly and erection without difficulty or unanticipated stress. All corners and connection between panels and sections shall be made tight and true. Exposed exterior surface, joints and connections shall be weathertight and durable.

All panels and parts shall be protected from damage at all times prior to the completion of the building.

(b) Strength

The strength of all components and connections which cannot be determined by engineering analysis, when recognized standards of structural design are used, shall be determined by tests. Components and connections which are identical to those analyzed or tested shall be considered to meet the same strength requirements as those determined by such analysis or tests. Tests shall be made wherever possible in accordance with nationally recognized testing procedures. The point of application of test loads and the location of supports shall conform to conditions encountered in the complete dwelling. Panels, connections, or other elements not subject to analysis by a generally recognized formula or by comparison with comparable assemblies shall be tested in triplicate. The panels and other elements tested shall be representative of commercial production and assembly and shall be accompanied by a complete, accurate, detailed description of the materials and the assembly procedure used. Panels and other elements tested for wind, snow, ceiling and floor loads shall sustain, without failure, for a period of twenty-four hours, a superimposed load equal to two and one-half times the live load. Recovery within twenty-four hours after removal of the full test load, shall be not less than seventy-five percent of the observed deflection. The measured deflection of any panel or element under full live load shall be not over one two-hundred-and fortieth of the clear span.

(c) Connections

Floor, wall, and roof connections shall be of adequate strength and stiffness to transfer the applied test loads from one connected panel to another without failure.

Floor to sill and sill to foundation connections shall be designed to resist shear, uplift, and overturning without failure from application of lateral live loads and uplift. (See Clauses 602 and 603).

626 Reinforced Concrete Construction

All reinforced concrete construction shall fulfill the requirements of the National Building Code Section 3.4.

627 Structural Steel Construction

All structural steel construction shall fulfill the requirements of the National Building Code Section 3.5.

SECTION 7

FLUES, CHIMNEYS, FIREPLACES AND HEAT PRODUCING APPLIANCES

701 Flues and Chimneys

(a) General Construction Requirements

No chimney shall carry any load except its own weight, and such load shall be transmitted to the supporting construction in such a manner as to prevent the shearing, cracking, or falling off of any part of the chimney. Every chimney shall be completely supported by masonry or reinforced concrete. Supports, foundations, and footings for chimneys shall be so designed and constructed as to carry the chimney without detrimental settlement or deflection sufficient to cause cracking of chimney walls.

Chimneys shall be constructed of masonry or reinforced concrete, as specified elsewhere in this Article provided that metal chimneys approved by Underwriter Laboratories, Chicago, or National Research Council, Ottawa, Canada, may be used. All materials entering into the construction of any chimney shall meet the requirements for "Materials for flues, furnace casings, hearths, and similar purposes" as given in C.S.A. Specification No. A54-1940 entitled, "Standard Specification for the Procedure for Fire Tests on Building Construction and Materials".

Every chimney shall extend at least two feet above the highest point at which it comes in contact with the roof of a building, and at least two feet higher than any ridge, mansard roof, parapet wall, or roof structure within ten feet of it.

No chimney or part thereof shall be corbelled from a masonry wall more than eight inches, nor more than one-half of such wall's thickness, nor shall any chimney be corbelled from a wall less than twelve inches thick unless it projects equally on either side of the wall. Corbelled chimneys shall not be supported by hollow walls or walls of hollow units.

No change shall be made in the size or shape of any chimney flue within six inches above or below combustible roof assemblies, i.e., above or below joists or rafters.

Chimney flues shall be as nearly vertical as possible and in no case inclined at more than 45 degrees to the vertical.

Every chimney flue other than one serving a fireplace shall be provided with a cleanout opening at its base, such opening being equipped with tight-fitting metal doors.

All masonry in chimney construction shall be laid with full, mortar joints struck smooth where exposed to weather. All mortar shall be cement or cement-lime mortar.

Smoke pipes or gas vents shall enter chimney flues through a fireclay or metal thimble, or a flue ring of masonry no part of which shall extend within the flue space. No woodwork shall extend within seven and one-half inches of the flue connection.

Upon the completion of a building or the alteration of existing flues, the flues shall be cleaned and left smooth on the inside, and smoke-tight throughout their entire length.

The authority having jurisdiction may require a smoke test to be performed on any chimney flue. Such test shall be carried out by the person responsible for the construction of the flue, or his agent, in the presence of the authority having jurisdiction.

A stone, concrete or metal cap with drip shall be applied to the top of each chimney constructed of masonry units.

(b) Thickness and Materials

The thickness of chimney walls shall be not less than eight inches unless a flue lining is used in which case the thickness may be three and three-quarter inches.

Hollow blocks or hollow tile of clay or concrete may only be used for chimneys to the extent that an eight inch building wall may serve as an exterior wall of the chimney and any wall of a chimney may be constructed of two thicknesses of four inch block or tile set with staggered joints. All such chimneys shall be provided with a flue lining.

(i) Flue Linings shall consist of formed units of fireclay or of other suitable refractory clays adapted to withstand reasonably high temperatures and flue gases, and having a softening point not lower than 1994 F. Flue linings shall be not less than 5/8 inch in thickness and shall be built in as the outer walls of the chimney as constructed. All joints and spaces between the masonry and lining shall be thoroughly slushed and grouted full as each course of masonry is laid. Only cement mortar shall be

used in setting flue linings. Cracked, broken, or otherwise defective linings shall not be used. Flue linings shall start from a point not less than four inches below the lowest point of smoke pipe intakes or, in the case of fireplaces, from the apex of the smoke chamber and shall be continuous to a point not less than four inches above the enclosing walls.

(ii) Where more than two flue linings are installed in one chimney, there shall be a partition of solid masonry at least three and three-quarter inches thick separating each group of two flues from any other flue. Joints shall be staggered at least six inches in adjacent linings where such a partition is not required. Each flue serving a furnace or boiler or fireplace shall be separated from any other flue by such a partition.

(iii) The foregoing provisions shall not prohibit the use of specially shaped precast concrete units approved by the authority having jurisdiction. All such chimneys shall have a flue lining.

(c) Size of Chimney Flues

The cross-sectioned area of chimney flues shall be not less than the following:

Cooking stoves, ranges and room heaters - 40 square inches
Fireplaces - at least 1/12 the fireplace opening for a rectangular flue and 1/10 for circular flue
Furnaces, warm air, hot water, steam - 70 square inches

No flue shall have a cross-section the breadth of which is less than two-thirds the length.

702 Gas Flues

Gas appliances which are required to be connected to a flue may be connected to a gas flue in lieu of a chimney flue. Such gas flue shall be in accordance with the following provisions.

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 wall. Such blocks or linings shall be laid with full mortar joints. The materials employed in forming any gas flue shall be incombustible and corrosion-resistant. They shall be of such

types and thicknesses or so arranged as to avoid any temperature in excess of 160°F. on adjacent combustible materials. Where gas flues extend through combustible walls or partitions, they shall have a full one-inch air space between their exterior walls and any combustible material.

The installation of gas flues shall be in accordance with good commercial practice.

703 Fireplaces

(a) Standard Fireplaces

The requirements of this Item shall apply to any fireplace burning solid or liquid fuel.

The back and sides of every fireplace shall be constructed of clay or shale brick, or ashlar at least eight inches thick or of rubble or hollow clay or concrete units at least twelve inches thick. Walls of hollow units shall consist of two units in thickness with joints staggered. All fireplace walls shall be lined with firebrick or other approved material, or alternatively the minimum wall thicknesses shall be increased four inches. Firebrick shall be laid in fire-clay mortar or high-temperature cement. Where the firebrick lining has a minimum thickness of four inches, it may be included as part of the required minimum wall thickness.

Every fireplace shall be connected to a chimney flue.

Every fireplace shall have a hearth projecting at least sixteen inches from the chimney breast and extending at least eight inches 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 or otherwise carried by approved fire-resistive construction. The minimum thickness of incombustible material composing the hearth and its supports shall be six inches. Wood centering under hearths shall be entirely removed after construction.

No heater burning solid or liquid fuel shall be placed in a fireplace not complying with this Article. No wood shall be placed within eight inches of the jambs or twelve inches of the top or arch of any fireplace opening.

(b) Gas Fireplaces

Fireplaces for gas heaters shall not be constructed in imitation of standard fireplaces unless they conform in all respects including chimney flues to standard fireplaces; except, however, that gas space heaters may be installed in recesses not more than six inches in depth, provided such recess is constructed entirely of incombustible materials.

(c) Imitation Fireplaces

Imitation fireplaces for approved electrical appliances may be constructed provided the recess is lined on sides, back, and top with at least one inch of incombustible material. No flue or vent shall enter such recess.

(d) Fire-stopping Around Chimneys

No wood framing shall be placed closer than two inches to any chimney, regardless of its use, nor closer than two inches to the back of any fireplace. The space between such framing and the chimney or fireplace back shall be filled with loose or porous incombustible material.

No combustible studding, furring, lathing, grounds, or wood plugs shall be placed directly against or within two inches of any chimney, or in its joints. Wood trim may be placed against a chimney if insulated therefrom by at least one-eighth inch of asbestos paper, and secured by incombustible devices to the masonry.

704 Flue Connections

Every apparatus installed in or brought into any building for the purpose of producing heat by the combustion of any solid, liquid, or gaseous fuels shall have a suitable connection to an adequate flue, except as follows:

(i) Small appliances for intermittent use, burning liquid fuel, the capacity of which does not exceed 20,000 British Thermal Units per hour.

(ii) Certain types of gas appliances, in accordance with the recommendations of the American Gas Association as set forth in the publication entitled, "A.G.A. Requirements for House Piping and Appliance Installation", dated 1928;

(iii) In accessory buildings a smoke pipe may be used in place of a chimney flue.

Every heat producing appliance or fireplace shall be connected to a separate flue.

705 Mountings and Clearances for Domestic Furnaces

Except as provided herein, all warm air, hot water, and low pressure steam heating furnaces shall be supported on masonry or reinforced concrete and shall have clearances from combustible walls or partitions in accordance with Table 8.

Warm air, hot water, and low pressure steam furnaces used for heating buildings and having a grate area of less than three square feet may be supported on combustible floors by four inches of hollow masonry, provided such masonry is both separated from the floor and covered on top with continuous sheet metal plates, the masonry being so arranged as to allow free air circulation through it; such masonry shall extend eighteen inches beyond all sides of the appliance burning solid fuel.

Every pipeless warm air furnace shall be so installed that the top of the heater is at least eighteen inches below any part of any combustible floor assembly above and adjacent thereto. Every other warm air furnace shall have the casing-top covered with at least two inches of sand, asbestos, or magnesia.

Table 8

Clearances from Combustible Materials Required for Warm Air, Hot Water and Low Pressure Steam Furnaces

Location of Combustible Material	Minimum Clearance No special insulation	Minimum Clearance Special Insulation (1)
Above the level of the top of the furnace (2) no ceiling	1' 6"	0' 9"
with fire resistive ceiling (3)	0' 9"	0' 9"
On any side except one containing an ash or stoking door no wall protection	3' 0"	1' 6"
Wall protected by sheet metal held clear of wood or by fire-resistive plaster (3)	1' 6"	0' 9"
On any side containing an ash or stoking door	4' 0"	4' 0"

(1) Special insulation shall be interpreted as meaning nothing less than a 1½-inch encasement of the appliance on all sides and the top with brick, asbestos cement, magnesia, or other suitable incombustible material.

(2) These provisions do not apply to a pipeless furnace.

(3) Gypsum or cement plaster on metal lath or perforated gypsum lath, total thickness one inch or more. Except where it meets a wall or partition permitted within 3 feet of the appliance, such ceiling shall extend at least 3 feet beyond any side of the appliance and the space between any edge of the ceiling and the floor shall be sealed up.

706 Stoves and Ranges

The following regulations apply to stoves or ranges, consuming solid or liquid fuel, used for heating, cooking or laundry purposes:

Such stoves may be supported on combustible floors or benches provided they are supported at least twelve inches clear of the floor and are set on a metal covered asbestos pad at least three-eights inch thick extending six inches beyond all sides and twelve inches in front of the appliance. Alternatively, such stoves or ranges may be supported on wood floors by four inches of hollow masonry, provided such masonry is both separated from the floor and covered on top with continuous sheet metal plates, the masonry being so arranged as to allow free air circulation through it.

Such stoves or ranges, when serving only one dwelling unit, need not be supported more than four inches clear of the floor when on legs or pedestals, and an asbestos pad shall not be required, but the floor shall be covered with sheet metal for six inches beyond all sides and twelve inches in front of the appliance.

No such stove or range shall be placed within six inches of any wood stud wall, wood furred wall, or combustible trim; and when within eighteen inches shall be protected therefrom by a shield of metal * or suitable incombustible material extending at least twelve inches above and six inches beyond the sides of the appliance, and so arranged as to leave a free air space behind it of at least two inches.

Gas stoves, gas ranges, gas hot plates and heaters shall be supported at least six inches above any wood floor or combustible materials, and when less than twelve inches shall be set on a metal covered pad of three-sixteenth inch asbestos board, or its equivalent; provided that where such appliances serve one dwelling unit only, these minimum distances shall be reduced to three inches and six inches respectively.

No gas appliance shall rest on a combustible floor or bench unless separated therefrom by sheet metal or suitable incombustible materials.

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* Attention is directed to the fact that metal shield should have a bright surface.

In any dwelling unit, combustible walls, partitions, or trim within six inches of any range, hot plate, or ordinary water heater operated by gas, or within three inches of any domestic automatic storage hot water heater operated by gas, shall be protected therefrom by at least 3/16-inch asbestos board or equivalent, covered on the exposed side with metal; or alternatively the walls may be covered with ¾-inch plaster on metal or perforated gypsum lath. Similar protection shall be provided for gas appliances installed within twelve inches of combustible walls or materials in any place other than a dwelling unit.

Where gas appliances of the fully insulated type are installed, they may, subject to approval by the authority having jurisdiction, be exempted from the above requirements for clearances and protection.

707 Smoke Pipes

Every smoke pipe shall be as short and straight as possible.

No smoke pipe shall pass through any combustible floor, roof, wall or partition except as follows:

(i) In a one-family dwelling, a smoke pipe serving a stove and not exceeding seven inches in diameter may pass through not more than one floor, interior wall or partition. Where such a smoke pipe passes through a floor, interior wall, or partition, it shall be encased with four inches of solid masonry with an air space between the casing and the pipe, or it shall pass through a metal thimble composed of two concentric rings of sheet metal, distant at least two inches from each other and so constructed as to permit free circulation of air between them and between the smoke pipe and the nearest ring. The thimble or masonry as the case may be shall extend through the full thickness of the floor and shall not be overlapped by any other construction or material.

(ii) In accessory buildings, a smoke pipe serving a stove and not exceeding seven inches in diameter may pass vertically through a combustible roof, provided that there is no combustible roof material or roof covering within seven and one-half inches of it. Where a terra cotta smoke pipe is used with all joints thoroughly sealed, this minimum clearance may be four inches. Such a pipe may also pass through a combustible exterior wall of a one-storey building, provided no combustible wall material is within seven and one-half inches of the pipe.

The clear distance on all sides between any smoke pipe and combustible construction shall be not less than nine inches in the case of smoke pipes serving stoves and eighteen inches for smoke pipes serving furnaces provided that the latter clearance may be reduced to nine inches where the smoke pipe is insulated with at least one inch of asbestos cement, magnesia, or equally effective materials; or where a sheet metal shield having a width equal to three pipe diameters is spaced two inches clear of the combustible construction over the full length of the pipe; or where the combustible construction is covered with three-quarter inch of plaster on metal lath or one-half inch plaster on perforated gypsum lath.

708 Clearances for Steam and Hot Water Pipes

All steam and hot water heating pipes shall be kept clear of combustible materials and construction by at least one-quarter inch in the case of hot water pipes and by at least one inch in the case of steam pipes. All pipe coverings or insulation shall be incombustible. Where any such pipe passes through a floor, wall or partition, the opening shall be closed off, above and below or on both sides, by tight-fitting metal caps; and where such floors, walls, or partitions are required to have specific fire-resistance ratings, then the openings shall be sealed tight with incombustible material against flame or smoke.

709 Warm Air Heating System:

Every warm air heating system shall be designed, constructed and installed in accordance with good commercial practice.[x]

710 Gas Fired Appliances

Every gas burning heat producing appliance together with the necessary piping and connection with a gas main shall be designed, constructed and installed in accordance with good commercial practice.[xx]

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x Reference may be made to the following codes published by the National Warm Air Heating and Air Conditioning Association of Cleveland, Ohio and obtainable from the Canadian branch of this association, Royal Bank Building, Toronto, Ontario. Section 5 - The gravity code and manual, Section 7 - Code and manual for winter air conditioning systems.

xx Reference may be made to the recommendations of the National Board of Fire Underwriters "Installation, Maintenance and Use of Piping and Fittings for City Gas", Pamphlet No. 54, or to the recommendations of the American Gas Association, New York, U.S.A. as given in "A.G.S. Requirements for House Piping and Appliance Installation".

711 Oil Burning Appliances

All oil burning appliances including supply tanks and necessary piping shall be designed, constructed, and installed in accordance with good commercial practice. All oil burning appliances, other than small domestic heating and cooking appliances, which consume commercial fuel oil, furnace oil, diesel oil, or other flammable liquid fuel, and all supply tanks for such appliances shall be constructed and installed in accordance with the "Regulations of the National Board of Fire Underwriters for the Installation of Oil Burning Equipments", Pamphlet No. 31, dated in the U.S.A. on 1 April, 1934, as amended in 1940, subject to the following notes and amendments:

(i) Clause 3a shall be amended to read: "Oil burners shall be of a type approved by the Canadian Standards Association";

(ii) In Clause 21, "National Electrical Code" shall be replaced by, "Canadian Electrical Code, Part 1, Fifth Edition, as published by the Canadian Standards Association";

(iii) The Appendix shall not apply.

Small domestic heating and cooking appliances consuming kerosene or fuel oil shall be constructed and installed in accordance with "Regulations of the National Board of Fire Underwriters for the Installation, Maintenance, and Use of Small Heating and Cooking Appliances", Pamphlet No. 310, dated in the U.S.A. on 15 November, 1937, subject to the following amendments:

(i) Clause 2 shall be amended to read: "Only appliances approved by the Canadian Standards Association and operated with the grade of fuel for which they have been found suitable shall be used.";

(ii) In Clauses 12 and 14, "National Electrical Code" shall be replaced by, "Canadian Electrical Code, Part 1, Fifth Edition, as published by the Canadian Standards Association";

(iii) In Clause 16, in the first sentence, the term "suitable flues" shall be changed to, "suitable chimney flues or metal smokestacks".

SECTION 8

ELECTRICAL EQUIPMENT INSTALLATIONS AND WIRING

All electrical equipment, installations, and wiring in any building shall conform to the requirements of the Canadian Electrical Code, Part 1, Fifth Edition, as published by the Canadian Standards Association.

APPENDIX "A"

WALLS AND PARTITIONS HAVING REQUIRED FIRE RESISTANCE

The following wall construction may be assumed to have a fire resistance of one hour or more.

Brick - Any solid brick wall 3¼ inches or more in thickness

Cellular Concrete - 3 inches or more in thickness

Plain Concrete - 8 inches or more in thickness

Concrete Blocks - (a) Solid blocks 4 inches or more in thickness
(b) Hollow block
Face Shells not less than 1¼ inches thick
Core area not more than 50% of gross area -
4-inch block plastered both sides with ½-inch plaster

Hollow Clay Tile - (a) One cell in wall thickness plastered both sides with ½-inch plaster
(b) Two cells in wall thickness no plaster

Solid Gypsum Block - 2 inches or more in thickness

Hollow Gypsum Block - 3 inches or more in thickness

Solid Partitions of Gypsum Plaster - (a) Incombustible studs, metal lath; gypsum plaster, scratch coat 1:2, brown coat 1:3, total thickness 2¼ inches minimum
(b) Incombustible studs, metal lath; gypsum plaster scratch coat 1:1, brown coat 1:1, total thickness 2 inches minimum

Stud Walls or Partitions - (wood or metal studs) -
(a) Metal lath; portland cement or gypsum plaster 7/8-inch thick on each side
(b) Perforated gypsum lath; gypsum plaster ½-inch thick each side, scratch and brown coats 1:2
(c) Stucco on metal lath ¾-inch thick on one face, gypsum plaster ½-inch thick on perforated gypsum lath on other face, scratch and brown coats 1:2

APPENDIX "B"

WALLS AND PARTITIONS HAVING REQUIRED SOUND INSULATION*

The following wall constructions may be assumed to have a sound transmission loss of 50 decibels or more.

Brick - (a) Solid brick, 8 inches thick, plastered both sides with brown coat gypsum plaster, smooth white finish
(b) Brick on edge (2½ in.), plastered direct on one side, plastered on ½-inch fibre building board secured to 2- by 2-inch wood furring strips on other side
(c) Brick on edge (2½ in.), plastered both sides on ½-inch fibre building board nailed to 1- by 2-inch wood furring strips

Hollow Clay Tile - (a) One cell in wall thickness, plastered both sides on metal lath or ½-inch fibre building board secured to 1- by 2-inch wood furring strips
(b) Two cells in wall thickness, plastered direct on one side plastered on ½-inch fibre building board secured to wood furring strips on the other side

Concrete Blocks - 8-inch cinder or concrete blocks plastered both sides

Plain Concrete - 7 inches or more in thickness plastered both sides

Gypsum Blocks - Two panels of 2-inch solid or 3-inch hollow gypsum block with 1½ inches air space, no bridging, plastered on each side

Stud Walls or Partitions - (a) Wood studs, two layers of ½-inch fibre building board applied to both sides, plastered both sides
(b) Staggered wood studs, no bridging, ½-inch fibre building board applied to both sides, plastered both sides

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*
(1) Except where less is specified, the term "plaster" means scratch and brown coats of gypsum or lime plaster, smooth white finish
(2) The specified insulation cannot be obtained if air leaks exist in any layer of the construction

APPENDIX "C"

FLOORS HAVING REQUIRED FIRE RESISTANCE

The following floor constructions may be assumed to have a fire resistance of one hour or more:

Wood Joist Floors - ½-inch finished floor; asbestos paper (14 lb./100 sq.ft.); ¾-inch tongued-and-grooved or shiplap, or 5/8-inch plywood sub-floor; wood joists; ½-inch gypsum plaster not leaner than 1:2 on perforated gypsum lath, all joints covered with 3-inch strip of expanded metal, or ¾-inch gypsum plaster (1:2) on metal lath, or 7/8-inch portland cement plaster (1:3) on metal lath.

Concrete -

(a) 4-inch reinforced concrete slab.
(b) 3-inch reinforced concrete slab with ribbed floor construction, no fillers, no ceiling.
(c) 2-inch reinforced concrete slab with ribbed floor construction, fillers of hollow clay tile, gypsum block or concrete block, no ceiling.
(d) 2½-inch reinforced concrete slab with ribbed floor construction no fillers, ceiling of ¾-inch gypsum plaster on metal lath.

Steel Joist Construction - 2-inch reinforced concrete slab; open web steel joist; ¾-inch gypsum plaster or 7/8-inch portland cement plaster on metal lath.

APPENDIX "D"

FLOORS HAVING REQUIRED SOUND INSULATION*

The following floor constructions may be assumed to have a sound transmission loss of 50 decibels or more:

Wood Joist Floors - (a) Floating floor consisting of 3/8-inch finished flooring, sub-flooring and nailing strips; ½-inch fibre building board; rough flooring; wood joists, plaster ceiling on gypsum or metal lath

(b) 3/8-inch finished flooring; sub-flooring; wood joists; ceiling separately supported, ends of ceiling and floor joists being nailed to a common support; ½-inch fibre building board; plaster

Concrete - (a) 4-inch reinforced concrete slab; furring strips; ½-inch fibre building board; brown coat plaster, smooth white finish

(b) 3/8-inch finished flooring, sub-flooring and nailing strips; ½-inch fibre building board; 4-inch concrete slab; plaster

Steel Joist Floors - 1/8-inch linoleum; 2½ inches concrete on metal lath; open web steel joists; metal lath; plaster

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*

(1) Except where less is specified, the term "plaster" means scratch and brown coats of gypsum or lime plaster, smooth white finish

(2) The specified insulation cannot be obtained if air leaks exist in any layer of the construction

APPENDIX "E"

ALLOWABLE CLEAR SPANS FOR JOISTS AND RAFTERS USING YARD LUMBER

Notes on Tables

(i) The permissible joist and rafter lengths listed are based on the following dressed dimensions:

Nominal Size	Dressed Dimensions
2" x 4"	1 5/8" x 3 5/8"
2" x 5"	1 5/8" x 4 5/8"
2" x 6"	1 5/8" x 5 5/8"
2" x 8"	1 5/8" x 7 1/2"
2" x 10"	1 5/8" x 9 1/2"
2" x 12"	1 5/8" x 11 1/2"

(ii) Where rough lumber having full nominal dimensions is used, the allowable spans given may be increased by one and one-half inches per foot of span.

List of Tables

"E"-1

TABLE I

STRESS GRADING OF YARD LUMBER

Species		Commercial Grading	Stress Grade 2" x 6" & up	2" x 4" 2" x 5"
Cedar	Eastern	A) see note	600	500
		B) see note	500	400
Cedar-Western Red		No. 2 Common	600	500
		No. 1 Common	700	600
Douglas Fir	Coast	No. 1 Common	1300	1000
		No. 2 Common	1000	800
	Mountain	No. 1 Common	1000	800
		No. 2 Common	800	600
Fir	Balsam	A) see note	900	700
		B) see note	700	500
Hemlock	Eastern	A) see note	900	700
		B) see note	700	500
	Western	No. 1 Common	1000	800
		No. 2 Common	800	600
Larch	Tamarack) Western	A) see note	1000	800
		B) see note	800	600
Pine	Jack) Lodgepole)	A) see note	900	700
		B) see note	700	500
	Red	Select Merchantable	1000	800
		Merchantable	800	600
	Western White	A) see note	800	600
		B) see note	600	500
	Western Yellow	A) see note	1000	800
		B) see note	800	600
	White (Eastern)	No. 2 Common	800	600
		No. 3 Common	600	500
Spruce	Eastern	No. 2 (Quebec 3rd's)	900	700
		(Quebec 4th's)	700	500
	Sitka) Engelmann)	A) see note	900	700
		B) see note	700	500

Note: A - means a commercial grade equivalent in strength to Structural Grade (CSA Spec.)
B - means a commercial grade equivalent in strength to 80% of Structural Grade (CSA Spec.)

"E"-2

TABLE II

ALLOWABLE CLEAR SPANS FOR DRESSED JOISTS USING YARD LUMBER:

(a) Loading Condition 1 - Floor, No Ceiling Under

Total Load - 40 lb./sq.ft.
Live Load - 30 lb./sq.ft.

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span)			
		12in.	16in.	20in.	24in.
1300 lb./sq.in.	2 x 4	----	----	----	----
	2 x 5	----	----	----	----
	2 x 6	12'0"	11'0"	10'0"	9'6"
	2 x 8	16'0"	14'6"	13'6"	12'6"
	2 x 10	20'0"	18'0"	17'0"	16'0"
	2 x 12	24'0"	22'0"	20'6"	19'0"
1000 lb./sq.in.	2 x 4	7'6"	6'6"	6'0"	5'6"
	2 x 5	9'6"	8'6"	7'6"	7'0"
	2 x 6	12'0"	10'6"	9'6"	8'6"
	2 x 8	16'0"	14'0"	12'6"	11'6"
	2 x 10	20'0"	17'6"	15'6"	14'6"
	2 x 12	24'0"	21'0"	19'0"	17'6"
900 lb./sq.in.	2 x 4	7'6"	6'6"	5'6"	5'0"
	2 x 5	9'6"	8'0"	7'0"	6'6"
	2 x 6	11'6"	10'0"	9'0"	8'0"
	2 x 8	15'0"	13'0"	11'6"	10'6"
	2 x 10	19'0"	16'6"	15'0"	13'6"
	2 x 12	23'0"	20'0"	18'0"	16'6"
800 lb./sq.in.	2 x 4	7'0"	6'0"	5'6"	5'0"
	2 x 5	9'0"	7'6"	7'0"	6'0"
	2 x 6	10'6"	9'6"	8'6"	7'6"
	2 x 8	14'0"	12'6"	11'6"	10'0"
	2 x 10	18'0"	15'6"	14'0"	13'0"
	2 x 12	22'0"	19'0"	17'0"	15'6"

[x] Refer to Table I. to find stress grade for any particular species.

Table II(a) (cont'd)

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
700 lb./sq.in.	2 x 4	6'6"	5'6"	5'0"	4'6"
	2 x 5	8'0"	7'0"	6'6"	6'0"
	2 x 6	10'0"	8'6"	7'6"	7'0"
	2 x 8	13'6"	11'6"	10'6"	9'6"
	2 x 10	17'0"	14'6"	13'0"	12'0"
	2 x 12	20'6"	17'6"	16'0"	14'6"
600 lb./sq.in.	2 x 4	6'0"	5'0"	4'6"	4'0"
	2 x 5	7'6"	6'6"	6'0"	5'6"
	2 x 6	9'6"	8'0"	7'0"	6'6"
	2 x 8	12'6"	10'6"	9'6"	8'6"
	2 x 10	15'6"	13'6"	12'0"	11'0"
	2 x 12	19'0"	16'6"	14'6"	13'6"
500 lb./sq.in.	2 x 4	5'6"	4'6"	4'0"	4'0"
	2 x 5	7'0"	6'0"	5'6"	5'0"
	2 x 6	8'6"	7'6"	6'6"	6'0"
	2 x 8	11'6"	10'0"	8'6"	8'0"
	2 x 10	14'6"	12'6"	11'0"	10'0"
	2 x 12	17'6"	15'0"	13'6"	12'0"
400 lb./sq.in.	2 x 4	5'0"	4'0"	4'0"	3'6"
	2 x 5	6'0"	5'6"	5'0"	4'6"
	2 x 6	7'6"	6'6"	6'0"	5'6"
	2 x 8	10'0"	8'6"	8'0"	7'0"
	2 x 10	13'6"	11'0"	10'0"	9'0"
	2 x 12	15'6"	13'6"	12'0"	11'0"

x Refer to Table I. to find stress grade for any particular species.

TABLE II

ALLOWABLE CLEAR SPANS FOR DRESSED JOISTS USING YARD LUMBER:

(b) **Loading Condition 2** - Floor, With Ceiling Under

Total Load - 50 lb./sq.ft.
Live Load - 30 lb./sq.ft.

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
1300 lb./sq.in.	2 x 4	-----	-----	-----	-----
	2 x 5	-----	-----	-----	-----
	2 x 6	12'0"	10'6"	9'6"	8'6"
	2 x 8	16'0"	14'0"	12'6"	11'6"
	2 x 10	20'0"	18'0"	16'0"	14'6"
	2 x 12	24'0"	21'6"	19'6"	17'6"
1000 lb./sq.in.	2 x 4	7'0"	6'0"	5'6"	5'0"
	2 x 5	9'0"	7'6"	7'0"	6'0"
	2 x 6	10'6"	9'6"	8'6"	7'6"
	2 x 8	14'0"	12'6"	11'0"	10'0"
	2 x 10	18'0"	15'6"	14'0"	13'0"
	2 x 12	22'0"	19'0"	17'0"	15'6"
900 lb./sq.in.	2 x 4	6'6"	5'6"	5'0"	4'6"
	2 x 5	8'6"	7'0"	6'6"	6'0"
	2 x 6	10'0"	9'0"	8'0"	7'0"
	2 x 8	13'6"	11'6"	10'6"	9'6"
	2 x 10	17'0"	15'0"	13'6"	12'0"
	2 x 12	20'6"	18'0"	16'0"	14'6"
800 lb./sq.in.	2 x 4	6'0"	5'6"	5'0"	4'6"
	2 x 5	8'0"	7'0"	6'0"	5'6"
	2 x 6	9'6"	8'6"	7'6"	7'0"
	2 x 8	12'6"	11'0"	10'0"	9'0"
	2 x 10	16'0"	14'0"	12'6"	11'6"
	2 x 12	19'6"	17'0"	15'0"	14'0"

[x] Refer to Table I. to find stress grade for any particular species.

Table II (b) (cont'd)

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
700 lb./sq.in.	2 x 4	6'0"	5'0"	4'6"	4'0"
	2 x 5	7'6"	6'6"	5'6"	5'0"
	2 x 6	9'0"	7'6"	7'0"	6'6"
	2 x 8	12'0"	10'6"	9'0"	8'6"
	2 x 10	15'0"	13'0"	11'6"	10'6"
	2 x 12	18'6"	16'0"	14'0"	13'0"
600 lb./sq.in.	2 x 4	5'6"	4'6"	4'0"	4'0"
	2 x 5	7'0"	6'0"	5'6"	5'0"
	2 x 6	8'6"	7'0"	6'6"	6'0"
	2 x 8	11'0"	9'6"	8'6"	8'0"
	2 x 10	14'0"	12'0"	11'0"	10'0"
	2 x 12	17'0"	14'6"	13'0"	12'0"
500 lb./sq.in.	2 x 4	5'0"	4'0"	4'0"	3'6"
	2 x 5	6'0"	5'6"	5'0"	4'6"
	2 x 6	7'6"	6'6"	6'0"	5'6"
	2 x 8	10'0"	8'6"	8'0"	7'0"
	2 x 10	13'0"	11'0"	10'0"	9'0"
	2 x 12	15'6"	13'6"	12'0"	11'0"
400 lb./sq.in.	2 x 4	4'6"	4'0"	3'6"	3'0"
	2 x 5	5'6"	5'0"	4'6"	4'0"
	2 x 6	7'0"	6'0"	5'0"	5'0"
	2 x 8	9'0"	8'0"	7'0"	6'6"
	2 x 10	11'6"	10'0"	9'0"	8'0"
	2 x 12	14'0"	12'0"	10'6"	10'0"

x Refer to Table I. to find stress grade for any particular species.

"E"-6

TABLE II

ALLOWABLE CLEAR SPANS FOR DRESSED JOISTS USING YARD LUMBER:

(c) Loading Condition 3 - Ceiling, No Attic Storage

Total Load - 25 lb./sq.ft.
Live Load - 10 lb./sq.ft.

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
1300 lb./sq.in.	2 x 4	----	----	----	----
	2 x 5	----	----	----	----
	2 x 6	17'0"	15'0"	13'6"	12'0"
	2 x 8	23'0"	20'0"	18'0"	16'0"
	2 x 10	29'0"	25'0"	22'6"	20'6"
	2 x 12	35'0"	30'6"	27'6"	25'0"
1000 lb./sq.in.	2 x 4	9'6"	8'6"	7'6"	7'0"
	2 x 5	12'6"	11'0"	9'6"	9'0"
	2 x 6	15'0"	13'0"	11'6"	10'6"
	2 x 8	20'0"	17'6"	15'6"	14'0"
	2 x 10	25'6"	22'0"	20'0"	18'0"
	2 x 12	31'0"	27'0"	24'0"	22'0"
900 lb./sq.in.	2 x 4	9'6"	8'0"	7'0"	6'6"
	2 x 5	12'0"	10'0"	9'0"	8'6"
	2 x 6	14'6"	12'6"	11'0"	10'0"
	2 x 8	19'0"	16'6"	15'0"	13'6"
	2 x 10	24'0"	21'0"	19'0"	17'0"
	2 x 12	29'6"	25'6"	22'6"	20'6"
800 lb./sq.in.	2 x 4	8'6"	7'6"	7'0"	6'0"
	2 x 5	11'0"	9'6"	8'6"	8'0"
	2 x 6	13'6"	11'6"	10'6"	9'6"
	2 x 8	18'0"	15'6"	14'0"	12'6"
	2 x 10	23'0"	20'0"	17'6"	16'0"
	2 x 12	27'6"	24'0"	21'6"	19'6"

x Refer to Table I. to find stress grade for any particular species.

Table II (c) (cont'd)

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
700 lb./sq.in.	2 x 4	8'0"	7'0"	6'6"	6'0"
	2 x 5	10'6"	9'0"	8'0"	7'6"
	2 x 6	12'6"	11'0"	10'0"	9'0"
	2 x 8	17'0"	14'6"	13'0"	12'0"
	2 x 10	21'6"	18'6"	16'6"	15'0"
	2 x 12	26'0"	22'6"	20'0"	18'6"
600 lb./sq.in.	2 x 4	7'6"	6'6"	6'0"	5'6"
	2 x 5	9'6"	[illegible]	7'6"	7'0"
	2 x 6	11'6"	10'0"	9'0"	8'6"
	2 x 8	15'6"	13'6"	12'0"	11'0"
	2 x 10	20'0"	17'0"	15'6"	14'0"
	2 x 12	24'0"	20'6"	18'6"	17'0"
500 lb./sq.in.	2 x 4	7'0"	6'0"	5'6"	5'0"
	2 x 5	9'0"	7'6"	7'0"	6'0"
	2 x 6	10'6"	9'6"	8'6"	7'6"
	2 x 8	14'6"	12'6"	11'0"	10'0"
	2 x 10	18'0"	15'6"	14'0"	13'0"
	2 x 12	22'0"	19'0"	17'0"	15'6"
400 lb./sq.in.	2 x 4	6'0"	5'6"	5'0"	4'6"
	2 x 5	8'0"	7'0"	6'0"	5'6"
	2 x 6	9'6"	8'6"	7'6"	7'0"
	2 x 8	12'6"	11'0"	10'0"	9'0"
	2 x 10	16'0"	14'0"	12'6"	11'6"
	2 x 12	19'6"	17'0"	15'0"	14'0"

x Refer to Table I. to find stress grade for any particular species.

TABLE II

ALLOWABLE CLEAR SPANS FOR DRESSED JOISTS USING YARD LUMBER:

(d) Loading Condition 4 - Ceiling, Attic Storage Above

Total Load - 35 lb./sq.ft.
Live Load - 20 lb./sq.ft.

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
1300 lb./sq.in.	2 x 4	-----	-----	-----	-----
	2 x 5	-----	-----	-----	-----
	2 x 6	13'6"	12'6"	11'6"	10'6"
	2 x 8	18'0"	16'6"	15'0"	13'6"
	2 x 10	23'0"	21'0"	19'0"	17'6"
	2 x 12	27'6"	25'0"	23'0"	21'0"
1000 lb./sq.in.	2 x 4	8'0"	7'0"	6'6"	6'0"
	2 x 5	10'6"	9'0"	8'0"	7'6"
	2 x 6	13'0"	11'0"	10'0"	9'0"
	2 x 8	17'0"	14'6"	13'0"	12'0"
	2 x 10	21'6"	18'6"	16'6"	15'6"
	2 x 12	26'0"	22'6"	20'0"	18'6"
900 lb./sq.in.	2 x 4	8'0"	7'0"	6'0"	5'6"
	2 x 5	10'0"	8'6"	7'6"	7'0"
	2 x 6	12'0"	10'6"	9'6"	8'6"
	2 x 8	16'0"	14'0"	12'6"	11'6"
	2 x 10	20'6"	17'6"	16'0"	14'6"
	2 x 12	25'0"	21'6"	19'0"	17'6"
800 lb./sq.in.	2 x 4	7'6"	6'6"	5'6"	5'0"
	2 x 5	9'6"	8'0"	7'6"	6'6"
	2 x 6	11'6"	10'0"	9'0"	8'0"
	2 x 8	15'0"	13'0"	12'0"	11'0"
	2 x 10	19'6"	16'6"	15'0"	13'6"
	2 x 12	23'6"	20'0"	18'0"	16'6"

x Refer to Table I. to find stress grade for any particular species.

Table II (d) (cont'd)

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
700 lb./sq.in.	2 x 4	7'0"	6'0"	5'6"	5'0"
	2 x 5	9'0"	7'6"	7'0"	6'0"
	2 x 6	10'6"	9'6"	8'6"	7'6"
	2 x 8	14'6"	12'6"	11'0"	10'0"
	2 x 10	18'0"	15'6"	14'0"	13'0"
	2 x 12	22'0"	19'0"	17'0"	15'6"
600 lb./sq.in.	2 x 4	6'6"	5'6"	5'0"	4'6"
	2 x 5	8'0"	7'0"	6'6"	6'0"
	2 x 6	10'0"	8'6"	7'6"	7'0"
	2 x 8	13'0"	11'6"	10'0"	9'6"
	2 x 10	16'6"	14'6"	13'0"	12'0"
	2 x 12	20'0"	17'6"	15'6"	14'6"
500 lb./sq.in.	2 x 4	6'0"	5'0"	4'6"	4'0"
	2 x 5	7'6"	6'6"	6'0"	5'0"
	2 x 6	9'0"	8'0"	7'0"	6'6"
	2 x 8	12'0"	10'6"	9'6"	8'6"
	2 x 10	15'6"	13'0"	12'0"	11'0"
	2 x 12	18'6"	16'0"	14'6"	13'0"
400 lb./sq.in.	2 x 4	5'0"	4'6"	4'0"	3'6"
	2 x 5	6'6"	5'6"	5'0"	4'6"
	2 x 6	8'0"	7'0"	6'6"	5'6"
	2 x 8	11'0"	9'6"	8'6"	7'6"
	2 x 10	13'6"	12'0"	10'6"	9'6"
	2 x 12	16'6"	14'6"	13'0"	11'6"

x Refer to Table I. to find stress grade for any particular species.

TABLE III

ALLOWABLE CLEAR SPANS FOR RAFTERS USING YARD LUMBER:

(a) Loading Condition 5 - Slope of Roof - Rise in 12-in. Span: 0 to 4 inches.

Total Load - 40 lb./sq.ft.
Live Load - 30 lb./sq.ft.

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
1300 lb./sq.in.	2 x 4	-----	-----	-----	-----
	2 x 5	-----	-----	-----	-----
	2 x 6	12'0"	11'0"	10'0"	9'6"
	2 x 8	16'0"	14'6"	13'6"	12'6"
	2 x 10	20'0"	18'0"	17'0"	16'0"
	2 x 12	24'0"	22'0"	20'6"	19'0"
1000 lb./sq.in.	2 x 4	7'6"	6'6"	6'0"	5'6"
	2 x 5	9'6"	8'6"	7'6"	7'0"
	2 x 6	12'0"	10'6"	9'6"	8'6"
	2 x 8	16'0"	14'0"	12'6"	11'6"
	2 x 10	20'0"	17'6"	15'6"	14'6"
	2 x 12	24'0"	21'0"	19'0"	17'6"
900 lb./sq.in.	2 x 4	7'6"	6'6"	5'6"	5'0"
	2 x 5	9'6"	8'0"	7'0"	6'6"
	2 x 6	11'6"	10'0"	9'0"	8'0"
	2 x 8	15'0"	13'0"	11'6"	10'6"
	2 x 10	19'0"	16'6"	15'0"	13'6"
	2 x 12	23'0"	20'0"	18'0"	16'6"
800 lb./sq.in.	2 x 4	7'0"	6'0"	5'6"	5'0"
	2 x 5	9'0"	7'6"	7'0"	6'0"
	2 x 6	10'6"	9'6"	8'6"	7'6"
	2 x 8	14'0"	12'6"	11'0"	10'0"
	2 x 10	18'0"	15'6"	14'0"	13'0"
	2 x 12	22'0"	19'0"	17'0"	15'6"

x Refer to Table I. to find stress grade for any particular species.

Table III (a) (cont'd)

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span)			
		12in.	16in.	20in.	24in.
700 lb./sq.in.	2 x 4	6'6"	5'6"	5'0"	4'6"
	2 x 5	8'0"	7'0"	6'6"	6'0"
	2 x 6	10'0"	8'6"	7'6"	7'0"
	2 x 8	13'6"	11'6"	10'6"	9'6"
	2 x 10	17'0"	14'6"	13'0"	12'0"
	2 x 12	20'6"	17'6"	16'0"	14'6"
600 lb./sq.in.	2 x 4	6'0"	5'0"	4'6"	4'0"
	2 x 5	7'6"	6'6"	6'0"	5'6"
	2 x 6	9'6"	8'0"	7'0"	6'6"
	2 x 8	12'6"	10'6"	9'6"	8'6"
	2 x 10	15'6"	13'6"	12'0"	11'0"
	2 x 12	19'0"	16'6"	14'6"	13'6"
500 lb./sq.in.	2 x 4	5'6"	4'6"	4'0"	4'0"
	2 x 5	7'0"	6'0"	5'6"	5'0"
	2 x 6	8'6"	7'6"	6'6"	6'0"
	2 x 8	11'6"	10'0"	8'6"	8'0"
	2 x 10	14'6"	12'6"	11'0"	10'0"
	2 x 12	17'6"	15'0"	13'6"	12'0"
400 lb./sq.in.	2 x 4	5'0"	4'0"	4'0"	3'6"
	2 x 5	6'0"	5'6"	5'0"	4'6"
	2 x 6	7'6"	6'6"	6'0"	5'6"
	2 x 8	10'0"	8'6"	8'0"	7'0"
	2 x 10	13'0"	11'0"	10'0"	9'0"
	2 x 12	15'6"	13'6"	12'0"	11'0"

x Refer to Table I. to find stress grade for any particular species.

TABLE III

ALLOWABLE CLEAR SPANS FOR RAFTERS USING YARD LUMBER:

(b) Loading Condition 6 - Slope of Roof = Rise in 12-in. Span: above 4 inches.

Total Load - 25 lb./sq.ft.
Live Load - 20 lb./sq.ft.

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span)			
		12in.	16in.	20in.	24in.
1300 lb./sq.in.	2 x 4	-----	-----	-----	-----
	2 x 5	-----	-----	-----	-----
	2 x 6	13'6"	12'6"	11'6"	11'0"
	2 x 8	18'0"	16'6"	15'6"	14'6"
	2 x 10	23'0"	21'0"	19'6"	18'0"
	2 x 12	27'6"	25'0"	23'6"	22'0"
1000 lb./sq.in.	2 x 4	8'6"	8'0"	7'6"	7'0"
	2 x 5	11'0"	10'0"	9'6"	9'0"
	2 x 6	13'6"	12'6"	11'6"	10'6"
	2 x 8	18'0"	16'6"	15'6"	14'0"
	2 x 10	23'0"	21'0"	19'6"	18'0"
	2 x 12	27'6"	25'0"	23'6"	22'0"
900 lb./sq.in.	2 x 4	8'6"	7'6"	7'0"	6'6"
	2 x 5	10'6"	9'6"	9'0"	8'6"
	2 x 6	13'0"	11'6"	11'0"	10'0"
	2 x 8	17'0"	15'6"	14'6"	13'6"
	2 x 10	22'0"	20'0"	18'6"	17'0"
	2 x 12	26'6"	24'0"	22'0"	20'6"
800 lb./sq.in.	2 x 4	8'6"	7'6"	7'0"	6'0"
	2 x 5	10'6"	9'6"	8'6"	8'0"
	2 x 6	13'0"	11'6"	10'6"	9'6"
	2 x 8	17'0"	15'6"	14'0"	12'6"
	2 x 10	22'0"	20'0"	17'6"	16'0"
	2 x 12	26'6"	24'0"	21'6"	19'6"

x Refer to Table I. to find stress grade for any particular species.

Table III (b) (cont'd)

Stress Grade[x]	Nominal Size (inches)	Joist Spacing (Allowable clear span) 12in.	16in.	20in.	24in.
700 lb./sq.in.	2 x 4	8'0"	7'0"	6'6"	6'0"
	2 x 5	10'0"	9'0"	8'0"	7'6"
	2 x 6	12'0"	11'0"	10'0"	9'0"
	2 x 8	16'0"	14'6"	13'0"	12'0"
	2 x 10	20'6"	18'6"	16'6"	15'0"
	2 x 12	25'0"	22'6"	20'0"	18'6"
600 lb./sq.in.	2 x 4	7'6"	6'6"	6'0"	5'6"
	2 x 5	9'6"	8'6"	7'6"	7'0"
	2 x 6	11'6"	10'0"	9'0"	8'6"
	2 x 8	15'6"	13'6"	12'0"	11'0"
	2 x 10	20'0"	17'0"	15'6"	14'0"
	2 x 12	24'0"	20'6"	18'6"	17'0"
500 lb./sq.in.	2 x 4	7'0"	6'0"	5'6"	5'0"
	2 x 5	9'0"	7'6"	7'0"	6'0"
	2 x 6	10'6"	9'6"	8'6"	7'6"
	2 x 8	14'6"	12'6"	11'0"	10'0"
	2 x 10	18'0"	15'6"	14'0"	13'0"
	2 x 12	22'0"	19'0"	17'0"	15'6"
400 lb./sq.in.	2 x 4	6'0"	5'6"	5'0"	4'6"
	2 x 5	8'0"	7'0"	6'0"	5'6"
	2 x 6	9'6"	8'6"	7'6"	7'0"
	2 x 8	12'6"	11'0"	10'0"	9'0"
	2 x 10	16'0"	14'0"	12'6"	11'6"
	2 x 12	19'6"	17'0"	15'0"	14'0"

x Refer to Table I. to find stress grade for any particular species.

APPENDIX "F"

ALLOWABLE STRESSES FOR YARD LUMBER

(For use where tables of Appendix "E" do not apply)

Yard lumber meeting the minimum grade requirements prescribed in Clause 501 (d) shall be assigned stresses equal to those of structural grade as defined in the C.S.A. Standard Specification for Structural Timber A43-1937 with the exception that timbers 2-by 4-in. and 2-by 5-in. shall be allotted allowable working stresses of 80% of such structural grade stresses. See Table I of Appendix "F".

Yard lumber meeting the minimum grade requirements prescribed in Clause 501 (c) shall be assigned stresses equal to 80% of those of structural grade as defined in the previous paragraph, with the exception that timbers 2-by 4-in. and 2-by 5-in. shall be allotted allowable working stresses of 60% of such structural grade stresses. See Table 2 of Appendix "F".

The stresses in Tables I and II apply only to timbers used in continuously dry locations. For other conditions see the National Building Code.

When considering wind loads stresses in Tables I and II may be increased 25%.

In joints the allowable shear stress parallel to the grain may be assumed 50% greater than the horizontal shear stress given in the tables.

In Balloon Frame construction where the joists are nailed to the studding, and supported on a ribbon board joined into the studding the allowable stress in compression perpendicular to the grain may be increased by 50%.

Reference Section 501 (c), the species for which grades are not shown are to be equivalent in grade to the species for which grades are listed.

ALLOWABLE STRESSES FOR YARD LUMBER

Table I

Species	Minimum Grades Equivalent to Structural C.S.A. Grade Spec.(A43-1937)	Bending lb. per sq. in.			Horizontal Shear		Compression lb. per sq. in.		
		Stress at Extreme Fibre		Modulus of Elasticity			Perpendicular to Grain	Parallel to Grain	
		2"x6" & Larger	2"x4" & 2"x5"		2" x 6" & Larger	2"x4" & 2"x5"		2"x6" & Larger	2"x4" & 2"x5"
Cedar - Eastern		600	480	800,000	56	45	175	480	380
- Western Red	No. 1 Common	720	580	1,000,000	64	51	200	640	510
Douglas Fir - Coast	No. 1 Common	1280	1020	1,600,000	80	64	350	960	770
- Mountain	No. 1 Common	960	770	1,400,000	72	58	325	800	640
Fir - Amabilis		880	700	1,100,000	60	48	175	640	510
- Balsam		880	700	1,100,000	60	48	175	640	510
Hemlock - Eastern		880	700	1,100,000	64	51	300	640	510
- Western	No. 1 Common	1040	830	1,400,000	68	54	300	800	640
Larch - Tamarack		960	770	1,300,000	72	58	325	800	640
- Western		1040	830	1,400,000	72	58	325	800	640
Pine - Jack		880	700	1,100,000	60	48	275	640	510
- Lodgepole		880	700	1,100,000	60	48	275	640	510
- Red	Select Merchantable	960	770	1,300,000	68	54	300	720	580
- Western White		800	640	1,000,000	68	54	250	640	510
- Western Yellow		960	770	1,300,000	68	54	300	720	580
- White (Eastern)	No. 2 Common	800	640	1,000,000	68	54	250	640	510
Spruce - Eastern	No. 2 (Quebec 3rds)	880	700	1,200,000	68	54	250	640	510
- Sitka		880	700	1,200,000	68	54	250	640	510
- Engelmann		880	700	1,200,000	68	54	250	640	510

ALLOWABLE STRESSES FOR YARD LUMBER

Table II

Species	Grades Equivalent to 80% of Structural C.S.A. Grades Spec.A43-1937	Bending lbs.per sq.in.					Compression lbs. per sq.in.		
		Stress at Extreme Fibre		Modulus of Elasticity	Horizontal Shear		Perpendicular to Grain	Parallel to Grain	
		2"x 6" & larger	2"x 4" 2"x 5"		2"x 6" & larger	2"x 4" 2" x 5"		2"x 6" & larger	2" x 4" 2" x 5"
Cedar - Eastern		480	360	800,000	45	34	175	380	290
- Western Red	No. 2 Common	580	430	1,000,000	51	38	200	510	380
Douglas Fir - Coast	No. 2 Common	1020	770	1,600,000	64	48	350	770	580
- Mountain	No. 2 Common	770	580	1,400,000	58	43	325	640	480
Fir - Amabalis		700	530	1,100,000	48	36	175	510	380
- Balsam		700	530	1,100,000	48	36	175	510	380
Hemlock - Eastern		700	530	1,100,000	51	38	300	510	380
- Western	No. 2 Common	330	620	1,400,000	54	41	300	640	480
Larch - Tamarack		770	580	1,300,000	58	43	325	640	480
- Western		330	620	1,400,000	58	43	325	640	480
Pine - Jack		700	530	1,100,000	48	36	275	510	380
- Lodgepole		700	530	1,100,000	48	36	275	510	380
- Red	Merchantable	770	580	1,300,000	54	41	300	580	430
- Western White		640	480	1,000,000	54	41	250	510	380
- Western Yellow		770	580	1,300,000	54	41	300	580	430
- White (Eastern)	No. 3 Common	640	480	1,000,000	54	41	250	510	380
Spruce - Eastern	No. 3 (Quebec 4ths)	700	530	1,200,000	54	41	250	510	380
- Sitka		700	530	1,200,000	54	41	250	510	380
- Engelmann		700	530	1,200,000	54	41	250	510	380

APPENDIX "G"

REQUIREMENTS FOR FIBRE BUILDING BOARD

Fibre building board shall comply with the following requirements:

(1) It shall be manufactured from wood or other vegetable fibre, by a felting or moulding process.

(2) It shall have been subjected to a temperature of not less than 100C. for not less than one hour in manufacture or to such other treatment as to destroy completely any rot-producing fungi.

(3) It shall fulfil the following physical requirements:

Thickness (inches) minimum *	½ in.
Transverse strength (modulus of rupture), (pounds per square inch) minimum	
Thickness not more than 0.75 inch	290
Thickness more than 0.75 inch	250
Deflection of 12-inch span at ultimate load (inches)	
Maximum	0.85
Minimum	0.25
Water absorption (per cent)	
Maximum	7
Linear expansion (per cent)	
Maximum	0.5

The above test shall be made in accordance with methods set forth in Appendix "D" of the National Building Code.

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* Where the fibre board has a transverse strength of not less than 20 pounds when determined by the test procedure given in Appendix "D" of the National Building Code, the minimum thickness specified herein shall not apply.