CANADIAN CODE

for

RESIDENTIAL CONSTRUCTION

(RESIDENTIAL STANDARDS)

1970

Second Printing
November 1972

(Includes all Revisions and Errata from Change Series No. 1 and 2 to the National Building Code of Canada 1970.)

THIS DOCUMENT IS NOT INTENDED AS A MUNICIPAL BYLAW

Issued by the
Associate Committee on the National Building Code
National Research Council of Canada
Ottawa, Canada

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FOREWORD

The Canadian Code for Residential Construction, 1970, replaces Residential Standards, Canada, 1965. Unlike the former Residential Standards, this document is not a supplement to the National Building Code and is not intended to be used to regulate construction under a municipal bylaw.

The document contains the requirements for buildings of residential occupancy taken from Part 9 of the National Building Code of Canada 1970, and includes all corrections and revisions from Change Series No. 1 and No. 2 to the National Building Code 1970, combined with additional requirements which are beyond the scope of the National Building Code but which are considered necessary in regulating residential construction under the National Housing Act. For the convenience of the user, the requirements based on Part 9 of the NBC appear in dark-face type, the additional requirements appear in light-face type.

Although based on Part 9, the requirements in this document apply only to residential occupancies. Where buildings contain a major occupancy in addition to residential, the relevant requirements in the National Building Code for such combinations should be applied.

In general the requirements in this document apply only to buildings up to 3 storeys in height or having a floor area on any storey not exceeding 6000 sq ft. For buildings exceeding these limits, the appropriate requirements in the National Building Code should be applied. There are exceptions, however, and these are stated at the beginning of each section where applicable. For example, the requirements for room dimensions and sound resistance apply to all buildings regardless of size.

The Canadian Code for Residential Construction was prepared by the Standing Committee on Residential Standards who are responsible to the Associate Committee on the National Building Code under whose auspices this document is published.

Revisions to this Code will be made on an annual basis and comments, criticisms and suggestions for its improvement will be welcomed by the Associate Committee. If received before 1 September of any year, they will be in time for consideration in relation to such annual revisions. If those who use this document will thus co-operate with those who have worked toward its preparation, its true national character will be maintained and strengthened.

All communications with regard to this Code should be addressed to:

The Secretary,
Associate Committee on the National Building Code,
National Research Council of Canada,
Ottawa, Ontario. K1A 0R6.

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*These Sections apply to all buildings of Residential Occupancy, regardless of size.

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SECTION 1. GENERAL

A. GENERAL

(1) This Code applies to buildings classified as Residential Occupancy which, unless otherwise indicated herein, are 3 storeys or less in building height, and have a building area not exceeding 6000 sq ft. (The following Sections of this Code apply to all buildings of Residential Occupancy, regardless of size: Nos. 2, 5 to 8, 11, 13, 14, 18, 19, 22, 26 to 32, 35, and 37 to 40.) Where a building contains a mixed occupancy, the requirements of the National Building Code of Canada 1970 shall apply. This Part applies both to site-assembled and factory-made buildings.

(2) Measures to ensure the safety of the public during construction shall conform to the appropriate requirements in Part 8 of the National Building Code of Canada 1970.

(3) Buildings other than those described in (1) are regulated by the appropriate provisions contained in the National Building Code of Canada 1970.

(4) Where buildings are designed to accommodate handicapped persons, the requirements in NBC Supplement No. 5 (1970), "Building Standards for the Handicapped," shall be used as a guide, in addition to the requirements contained in this Code.

(5) Workmanship of a standard equal to good building practice shall be provided.

(6) Where a building or a component of a building is assembled off the building site in such a way that it cannot be inspected on site, approved off site inspection shall be provided when required by the authority having jurisdiction to ensure compliance with this Code.

SECTION 2. DEFINITIONS

A. GENERAL

In this Code

Approved means approved by the authority having jurisdiction or the appropriate authority having jurisdiction.

Bachelor dwelling unit means a dwelling unit for 1 or 2 adults with or without 1 bedroom.

Balustrade means a protective barrier that acts as a guard around openings in floors or at the open sides of stairs, landings, balconies, mezzanines, galleries, raised walkways, or other locations to prevent accidental falls from one level to another. Such barrier may or may not have openings through it.

Building means any structure used or intended for supporting or sheltering any use or occupancy.

Building area means the greatest horizontal area of a building above grade within the outside surface of exterior walls, or within the outside surface of exterior walls and the centre line of firewalls.

Building height (in storeys) means the number of storeys contained between the roof and the floor of the first storey.

Closure means a device for shutting off an opening through a construction assembly, such as a door or a shutter, and includes all components such as hardware, closing devices, frames and anchors.

Dead load means the weight of all permanent structural and nonstructural components of a building.

Dwelling unit means 1 or more rooms for the use of 1 or more persons as a housekeeping unit with cooking, eating, living, sleeping and sanitary facilities.

Exit means that part of a means of egress that leads from the floor area it serves, including any doorway leading directly from a floor area to a public thoroughfare or to an approved open space.

Exit, access to means that part of a means of egress within a floor area that provides access to an exit serving the floor area.

Exit, horizontal means that type of exit connecting 2 floor areas at substantially the same level by means of a doorway, vestibule, bridge or balcony, such floor areas being located either in different buildings or located in the same building and fully separated from each other by a firewall.

Exposing building face means that part of the exterior wall of a building which faces one direction and is located between ground level and the ceiling of its top storey, or where a building is divided into fire compartments, the exterior wall of a fire compartment which faces one direction.

Fire compartment means an enclosed space in a building that is separated from all other parts of the building by enclosing construction providing a fire separation having a required fire-resistance rating.

Fire-protection rating means the time in hours or fraction thereof that a closure, window assembly, or glass block assembly will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria or as otherwise prescribed in this Code.

Fire-resistance rating means the time in hours or fraction thereof that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria or as determined by extension or interpretation of information derived therefrom as prescribed in this Code.

Fire separation means a construction assembly that acts as a barrier against the spread of fire. (A fire separation may or may not be required to have a fire-resistance rating or a fire-protection rating.)

Fire stop means a draft-tight barrier within or between construction assemblies that acts to retard the passage of smoke and flame.

Fire stop flap means a device intended for use in horizontal fire separations incorporating protective ceiling membranes, which operates to close off a duct opening through the membrane in the event of a fire.

Firewall means a type of fire separation of noncombustible construction which subdivides a building or separates adjoining buildings to resist the spread of fire and which has a fire-resistance rating as prescribed in this Code and has structural stability to remain intact under fire conditions for the required fire-rated time.

Flame-spread rating means an index or classification indicating the extent of spread-of-flame on the surface of a material or an assembly of materials as determined in a standard fire test as prescribed in this Code.

Floor area means the space on any storey of a building between exterior walls and required firewalls including the space occupied by interior walls and partitions but not including exits and vertical service space that pierce the storey.

Garage, storage means a building or part thereof intended for the storage or parking of motor vehicles and which contains no provision for the repair or servicing of such vehicles.

Gas vent (as applying to heating or cooling systems) means that portion of a venting system designed to convey vent gases vertically to the outside air from the vent connector of a gas-fired appliance, or directly from the appliance when a vent connector is not used and includes any offsets.

Grade (as applying to the determination of building height) means the average level of finished ground adjoining a building at all exterior walls, as determined by the authority having jurisdiction (see storey, first).

Heavy timber construction means that type of combustible construction in which a degree of fire safety is attained by placing limitations on the sizes of wood structural members and on thickness and composition of wood floors and roofs, by avoidance of concealed spaces under floors and roofs, and by use of approved fastenings, construction details and adhesives for structural members.

Horizontal service space means a space such as an attic, duct, ceiling, roof or crawl space oriented essentially in a horizontal plane, concealed and generally inaccessible, through which bui'ding service facilities such as pipes, ducts and wiring may pass.

Limiting distance means the distance from an exposing building face towards a property line, the centre line of a street, lane, public thoroughfare or an imaginary line between two buildings on the same property, measured at right angles to the exposing building face.

Live load means the load other than dead load to be assumed in the design of the structural members of a building. It includes loads resulting from snow, rain, wind, earthquake and those due to occupancy, including movable partitions.

Loadbearing (as applying to a building element) means subjected to or designed to carry loads in addition to its own dead load excepting a wall element subjected only to wind or earthquake loads in addition to its own dead load.

Means of egress means a continuous path of travel provided by a doorway, hallway, corridor, exterior passageway, balcony, lobby, stair, ramp or other egress facility, or combination thereof, for the escape of persons from any point in a building, floor area, room or contained open space to a public thoroughfare or other approved open space. (Means of egress includes exits and access to exits.)

Noncombustible (as applying to an elementary building material) means that such material conforms to CSA B54.1-1960 (as amended October 1969), "Determination of Noncombustibility in Building Materials," or to ASTM E136-65, "Noncombustibility of Elementary Materials."

Noncombustible construction means that type of construction in which a degree of fire safety is attained by the use of noncombustible materials for structural members and other building assemblies.

Occupancy means the use or intended use of a building or part thereof for the shelter or support of persons, animals or property.

Occupancy, major means the principal occupancy for which a building or part thereof is used or intended to be used, and shall be deemed to include the subsidiary occupancies which are an integral part of the principal occupancy.

Occupant load means the number of persons for which a building or part thereof is designed.

Partition means an interior wall, one storey or part-storey in height that is not load-bearing.

Public corridor means a corridor that provides access to exit from individually rented rooms, suites of rooms or dwelling unts.

Residential occupancy means the occupancy or use of a building or part thereof by persons for whom sleeping accommodation is provided but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained.

Service room means a room or space provided in a building to accommodate building service equipment such as air-conditioning or heating appliances, electrical services, pumps, compressors and incinerators.

Service space means space provided in a building to facilitate or conceal the installation of building service facilities such as chutes, ducts, pipes, shafts or wires.

Service water heater means an appliance intended for the heating of water for plumbing services as distinct from water for space heating.

Sprinklered (as applying to a building or part thereof) means that the building or part thereof is equipped with a system of automatic sprinklers.

Storey (except as applying to plumbing systems) means that portion of a building which is situated between the top of any floor and the top of the floor next above it and if there is no floor above it, that portion between the top of such floor and the ceiling above it.

Storey, first means the storey with its floor closest to grade and having its ceiling more than 6 feet above grade.

Unprotected opening (as applying to exposing building face) means a doorway, window or opening other than one equipped with a closure having the required fire-protection rating, or any part of a wall forming part of the exposing building face that has a fire-resistance rating less than required for the exposing building face.

Wall, common means a vertical separation completely dividing a portion of a building from the remainder of the building and creating in effect a building which from its roof to its lowest level is separate and complete unto itself for its intended purpose, such wall being owned by one party but jointly used by 2 parties, one or both of whom is entitled to such use by prior arrangement.

Wall, party means a wall jointly owned and jointly used by 2 parties under easement agreement or by right in law and erected at or upon a line separating 2 parcels of land each of which is, or is capable of being, a separate real-estate entity.

B. OTHER DEFINITIONS

For words not defined in Subsection A, the definitions in Part 2 of the National Building Code of Canada 1970 shall apply.

SECTION 3. MATERIALS, SYSTEMS AND EQUIPMENT

A. GENERAL

(1) Materials, systems and equipment shall possess the essential properties to perform their intended functions.

(2) When required by the authority having jurisdiction, materials, systems or equipment shall be tested to determine the suitability for the intended use.

(3) Except as provided in (5), the test method used to determine the suitability of materials, systems or equipment shall be one that is published by a recognized agency.

(4) Materials, systems and equipment not specifically described herein, or which vary from the specific requirements in this Code or for which no recognized test procedure has been established, may be used if it can be shown that the material, system or equipment is suitable on the basis of past performance, or good engineering practice or on the basis of tests described in (5).

(5) Where no published test method exists the tests shall be designed to simulate or exceed anticipated service conditions or shall be designed to compare the performance of the material, system or equipment with similar material, system or equipment that is known to be acceptable.

(6) Every test shall be carried out by a testing laboratory acceptable to the authority having jurisdiction.

(7) When a specification or reference document listed herein contains requirements that conflict with specific requirements in this Code the requirements in this Code shall govern.

(8) Unless otherwise specified herein the specifications and other reference documents shall refer to those current as of 1 July 1972, together with all relevant amendments or revisions and supplements effective to that date.

B. CONCRETE

(1) Concrete shall be designed, mixed, placed and cured in accordance with CSA A23.1-1967, "Concrete Materials and Methods of Concrete Construction" and tested in accordance with CSA A23.2-1967, "Methods of Test for Concrete."

(2) Cement shall meet the requirements of CSA A5-1971, "Portland Cements." Sulphate-resisting cement shall be used for concrete in contact with sulphate soil deleterious to normal cement. Such concrete shall conform to the requirements in Section 29 of CSA A23.1-1967, "Concrete Materials and Methods of Concrete Construction."

(3) Aggregates shall consist of sand, gravel, crushed rock, crushed air-cooled blast furnace slag, expanded shale, or expanded clay, conforming to CSA A23.1-1967, "Concrete Materials and Methods of Concrete Construction." Aggregate shall be clean, well-graded and free of injurious amounts of organic and other deleterious material.

(4) Water shall be clean and free of injurious amounts of oil, organic matter, sediment or any other deleterious material.

(5) Unless otherwise specifically required elsewhere in this Code, the compressive strength of unreinforced concrete shall be not less than 2000 psi after 28 days.

(6) When concrete is used for garage and carport floors and exterior steps, it shall have a minimum compressive strength of 3000 psi after 28 days and shall have air-entrainment of 5 to 7 per cent.

(7) The concrete mixes described in Table 3A shall be considered acceptable if the slump does not exceed 4 in. when measured according to the slump test described in CSA A23.2-1967, "Methods of Test for Concrete."

TABLE 3A — CONCRETE MIXES, BY VOLUME

Concrete Strength	Cement, part	Sand, parts	Coarse Aggregate (1)
2000 psi	1	2	4 parts
	1	—	6 parts pit run gravel
2500 psi	1	2	3½ parts up to 1½ in. in size
	1	—	5½ parts pit run gravel
Column 1	2	3	4

Note to Table 3A:

(1) Size of aggregate shall not exceed 2 in.

(8) The use of admixtures other than air entrainment shall be approved. All admixtures shall conform to ASTM C260-69, "Air-Entraining Admixtures for Concrete," or ASTM C494-71, "Chemical Admixtures for Concrete," as applicable.

(9) Reinforced concrete shall be designed to conform to the requirements of Part 4 of The National Building Code of Canada 1970.

(10) When the air temperature is below 40°F, concrete shall be kept at a temperature of not less than 50°F or more than 80°F while being mixed and placed and maintained at a temperature of no' less than 50° for 72 hr after placing. No frozen material or ice shall be used in the mix.

C. LUMBER

(1) Lumber for the uses listed in Table 3B and Table 3C shall be identified by the grade stamp of an association or independent grading agency approved to grade stamp lumber by an appropriate organization acceptable to the authority having jurisdiction.

(2) Lumber grades shall conform to Table 3B or to Table 3C for the particular use as appropriate for the grading rule being applied. On-site cross-cutting of a piece shall not be considered to affect the grade of the piece as originally marked.

(3) Moisture content of lumber shall be not greater than 19 per cent at the time of installation.

(4) Lumber dimensions of less than 1 in. referred to in this Code are actual dimensions. Lumber dimensions of 1 in. or more referred to in this Code are nominal dimensions. The corresponding actual dimensions shall be those shown in CSA O141-1965 "Softwood Lumber," or CSA O141-1970 "Softwood Lumber" as appropriate to the grading rules being applied.

TABLE 3B — MINIMUM LUMBER GRADES FOR SPECIFIC END USES

SPECIES / USES	Ponderosa Pine Douglas Fir White Fir Western Larch Engelmann Spruce Western Red Cedar Western Hemlock Lodgepole Pine White Spruce Jack Pine Eastern Spruce (WWPA)[2]	Douglas Fir Western Hemlock Sitka Spruce Western Red Cedar (WCLIB)[2]	Douglas Fir Western Hemlock Sitka Spruce Western Red Cedar Yellow Cedar (BCLMA)[2]	White Pine Red Pine (EPGC)[2]	White Pine Red Pine (CLA)[2]	Eastern Spruce Balsam Fir Jack Pine Eastern Hemlock Eastern Cedar Tamarack Poplar (ESGC)[2]
Stud wall framing (load-bearing members)	Standard No. 1 studs	Standard	Standard	No. 1 Dimension	No. 1 Dimension	Standard (No. 2)
Stud wall framing (non-load-bearing members)	Utility No. 2 studs	Utility, West coast studs	Utility	No. 4 Common	No. 4	Utility (No. 3)
Plank frame construction (load-bearing members)	Utility	Utility	Utility	No. 3 Common	No. 3	Standard (No. 2)
Plank frame construction (non-load-bearing members)	Economy	Economy	Economy	No. 5 Common	No. 5	Economy (No. 4)
Posts and beams	Standard	Standard	Standard	No. 1 Dimension	No. 1 Dimension	Standard (No. 2)
Roof Sheathing	No. 3 Common, Standard	Standard	Standard	No. 3 Common	No. 4	Standard (No. 2)
Subflooring	No. 3 Common, Standard	Standard	Standard	No. 3 Common	No. 3	Standard (No. 2)
Wall sheathing [1]	No. 4 Common, Utility	Utility	Utility	No. 4 Common	No. 4	Utility (No. 3)
Floor, roof and ceiling framing	[3]	[3]	[3]	[3]	[3]	[3]
Column 1	2	3	4	5	6	7

Notes to Table 3B:

[1] Where wall sheathing is not required as a nailing base, one grade lower than those specified is permitted.

[2] BCLMA means British Columbia Lumber Manufacturers Association grading rules, No. 59, revised to Sept. 1967.
WCLIB means West Coast Lumber Inspection grading rules, No. 15, March 1956, revised to June 1967.

[2] WWPA means Western Wood Products Association grading rules, Jan. 1965, revised to Jan. 1966.
ESGC means Eastern Spruce Grading Committee grading rules, revised to Sept. 1964.
EPGC means Eastern Pine Grading Committee grading rules, August 1962.
CLA means Canadian Lumbermen's Association grading rules, August, 1967.

[3] Softwood framing lumber may be used for rafters and joists in those sizes, species and grades for which allowable spans are listed in Appendix B. See Articles 23M (14) and (15) for roof trusses.

TABLE 3C — MINIMUM LUMBER GRADES FOR SPECIFIC END USES [1]

Uses	Boards				Framing	
	Paragraph in the 1971 NLGA grading rules under which boards are graded[2]				2 to 4 in. thick 2 to 5 in. wide	2 to 4 in. thick 6 in. and wider
	All species			Eastern white pine and red pine	All Species	All Species
	Para 111	Para 113	Para 114	Para 115		
Stud wall framing (load bearing members)	—	—	—	—	Standard, No. 2	No. 2
Stud wall framing (non-load bearing members)	—	—	—	—	Stud, Utility, No. 3	No. 3
Floor, roof and ceiling framing	—	—	—	—	[3]	[3]
Plank frame construction (load-bearing members)	Standard	No. 3 Common	—	No. 3	—	No. 2
Plank frame construction (non-load-bearing members)	Economy	No. 5 Common	—	No. 5	Economy, No. 3	Economy No. 3
Posts and Beams	—	—	—	—	Standard No. 2[4]	No. 2[4]
Roof Sheathing	Standard	No. 3 Common	Standard	No. 4	—	—
Subflooring	Standard	No. 3 Common	Standard	No. 3	—	—
Wall Sheathing[5]	Utility	No. 4 Common	Utility	No. 4	—	—

Notes to Table 3C:

(1) Graded in conformance with the 1971 NGLA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority, Vancouver.

(2) To identify board grades, the paragraph number of the NLGA rules under which the lumber is graded must be shown in the grade mark. The grade descriptions in paragraph 113 of the NLGA rules are the same as the 1970 Standard Grading Rules for Western Lumber published by WWPA. The grade descriptions in paragraph 114 are the same as the 1970 Standard Grading Rules for West Coast Lumber, No. 16, published by WCLIB. When graded in accordance with WWPA or WCLIB rules, the grade mark will not contain a paragraph number.

(3) Grades to conform to those listed in "Span Tables for Wood Joists, Rafters and Beams", NRCC Publication No. 11862, (1971). (See Articles 23M(14) and 23M(15) for roof trusses).

(4) Where 5 in. or thicker lumber is used for posts or beams, the grade shall be not less than "Standard".

(5) Where wall sheathing is not required as a nailing base, one grade lower than those specified is permitted.

(5) Joist, rafter, lintel and beam members up to 5 per cent less than the actual Canadian Standard Sizes may be used provided the allowable spans for the grade and species of lumber under consideration are reduced 5 per cent from that shown in the Span Tables in Appendixes B and D.

SECTION 4. LOADS

A. GENERAL

When the sizes of structural members are not given in this Code, the size shall be calculated using the design stresses given in Part 4 of the National Building Code of Canada 1970, the design loads in (B) to (D) and the appropriate dead loads.

B. FLOOR LOADS

The minimum design live load on a floor area is the load listed in Table 4A applied uniformly over the entire area, or the load listed in Table 4B applied over an area of 2½ ft by 2½ ft located so as to cause maximum effects, whichever causes the greater stresses.

TABLE 4A — UNIFORM DESIGN LOADS FOR FLOORS

Use of Area of Floor	Design Live Load, psf
Dwelling units	
— bedrooms	30
— all other rooms	40
Common space in buildings containing more than one dwelling unit	
— locker rooms	50
— entrance halls, ground floor corridors, exits and stairs	100
— corridors above the ground floor	40
Attics where there is no storage of equipment or material and not accessible by a stairway	10
Attics accessible by a stairway	30
Fire escapes, exterior balconies	100
Garages	
— for passenger cars	50
— for unloaded buses and light trucks	125
— for loaded trucks and buses and all trucking spaces	250
Sidewalks and driveways over basements or other open areas	250
Column 1	Column 2

TABLE 4B — CONCENTRATED DESIGN LOADS FOR FLOORS

Use of Area of Floor	Concentrated Load, lb
Floors and areas used by passenger cars	2,500
Floors and areas used by vehicles not exceeding 8,000 lb gross weight	4,000
Floors and areas used by vehicles not exceeding 20,000 lb gross weight	8,000
Floors and areas used by vehicles exceeding 20,000 lb gross weight	12,000
Driveways and sidewalks over basements or other open areas	12,000
Column 1	Column 2

C. SNOW LOADS

(1) Except as provided in (2) design snow loads shall be not less than 60 per cent of the appropriate ground snow load listed in NBC Supplement No. 1 (1970), "Climatic Information for Building Design in Canada", but in no case shall the snow load be considered less than 20 lb per sq ft of horizontal roof projection.

(2) Where the entire width of a roof does not exceed 14 ft, the design snow load shall not be less than 50 per cent of the appropriate ground snow load listed in NBC Supplement No. 1 (1970), "Climatic Information for Building Design in Canada", but in no case less than 20 lb per sq ft of horizontal roof projection.

D. WIND LOADS

Design wind loads shall conform to the appropriate requirements in Section 4.1 of the National Building Code of Canada 1970.

E. DEFLECTIONS

The maximum deflection of structural members shall conform to Table 4C. Dead loads need not be considered in computing such deflections.

TABLE 4C — MAXIMUM DEFLECTIONS

Structural Members	Type of Ceiling Supported	Maximum Allowable Deflection Expressed as a Ratio of the Clear Span
Roof rafters, roof joists, roof beams and roof decking of plank and beam construction	No ceiling	1/180
	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360
Ceiling joists	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360
Floor beams, floor joists and floor decking of plank and beam construction for floor areas other than bedroom in dwelling units	No ceiling	1/360
	Other than plaster or gypsum board	1/360
	Plaster or gypsum board	1/360
Floor beams, floor joists and floor decking of plank and beam construction for floor areas of bedrooms in dwelling units	No ceiling	1/240
	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360
Column 1	2	3

F. EARTHQUAKE LOADS

(1) Except as provided in (2) to (4), two and three storey buildings in seismic Zone 3 and three storey buildings in seismic Zone 2 shall be designed for the earthquake loads in Section 4.1 of the National Building Code of Canada 1970.

(2) Buildings with structural load-bearing precast concrete elements (normal or light weight) shall have connections designed for the earthquake loads in Section 4.1 of the National Building Code of Canada 1970.

(3) Buildings constructed with load-bearing masonry walls which are required to resist the earthquake loads in (1) may in lieu of engineered design be reinforced as required in Section 20 R.

(4) Buildings with structural systems of wood frame construction need not be designed for the earthquake loads in Section 4.1 of the National Building Code of Canada 1970.

SECTION 5. ROOM AND SPACE DIMENSIONS

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Unless otherwise indicated herein, the areas, dimensions and heights of rooms or spaces shall be measured between finished wall surfaces and between finished floor and ceiling surfaces.

(3) Minimum dimensions listed for rooms or spaces in combination with other rooms or spaces refer to the minimum dimension of the combined space.

(4) Minimum floor areas, specified in this Section do not include closets or built-in bedroom cabinets, unless otherwise indicated.

(5) Two or more areas are considered as a combination room if the dividing wall occupies less than 60 per cent of the separating plane.

(6) Areas and dimensions of rooms or spaces may be less than required in this Section provided it can be shown to the satisfaction of the authority having jurisdiction that the rooms or spaces are adequate for their intended use, such as by the provision of built-in furniture to compensate for the reduced sizes.

B. CEILING HEIGHTS

(1) Heights of rooms or spaces shall conform to Table 5A.

TABLE 5A — ROOM HEIGHTS

Room or Space	Minimum Heights
Living room or space Dining room or space Kitchen or kitchen space	7 ft 6 in. over at least 75 per cent of the required floor area with a clear height of 7 ft at any point over the required area.
Bedroom or bedroom space	7 ft 6 in. over at least 50 per cent of the required floor area or 7 ft over the required floor area. Any part of the floor having a clear height of less than 4 ft 6 in. shall not be considered in computing the required floor area.
Unfinished basement or cellar including laundry area therein	6 ft 4 in. under beams, in laundry areas, and in any location that would normally be used for passage to laundry and required storage areas.
Bathroom or water closet and laundry area above grade	7 ft over any area where a person would normally be in a standing position.
Passage, hall or main entrance vestibule and finished rooms not specifically mentioned above.	7 ft
Column 1	Column 2

(2) The clear height above and below a mezzanine floor assembly shall be not less than 7 ft unless otherwise permitted by the authority having jurisdiction.

(3) The clear height in a storage garage shall be not less than 6 ft 6 in.

C. LIVING ROOMS OR SPACES WITHIN DWELLING UNITS

Living areas within dwelling units either as separate rooms or in combination with other spaces shall have at least 145 sq ft of floor area and shall have no dimension less than 9 ft 10 in. within the required area. Where the area of a living space is combined with a kitchen and dining area, the living area alone in a bachelor dwelling unit shall be at least 120 sq ft.

D. DINING ROOMS OR SPACES WITHIN DWELLING UNITS

(1) A dining space in combination with other space shall have a minimum floor area of 35 sq ft. Dining rooms not combined with other space shall have a minimum area of 75 sq ft.

(2) Except as permitted in (3) a dining room or space combined with other space shall have no dimension less than 7 ft 6 in. within the required area measured between wall faces or a wall face and a built-in cabinet or appliance.

(3) When a required dining area is provided in a kitchen or serves a bachelor dwelling unit, the minimum dimension of such space may be reduced to 5 ft 6 in.

E. KITCHEN WITHIN DWELLING UNITS

(1) Kitchen areas within dwelling units either separate from or in combination with other space shall have at least 45 sq ft of floor area, except that in bachelor dwelling units the minimum floor area shall be 40 sq ft.

(2) At least 3 ft clearance shall be provided in front of base cabinets, work surfaces, counter tops and appliances.

(3) At least 8 ft length of counter top work surface including the area occupied by the sink or drainer shall be provided. Such work surfaces shall be at least 1 ft 10 in. in depth and shall have cabinets beneath.

(4) In addition to the base cabinets described in (3) at least 22 sq ft of shelf area not more than 6 ft 6 in. above the floor shall be provided. Sixteen sq ft of this area shall be at least 11 in. in depth with at least 9½ in. clearance above the shelves. The remaining 6 sq ft shall have a depth of at least 5 in. with at least 5 in. clearance above the shelf. The maximum depth for computing shelf areas shall be 11 in.

(5) In bachelor dwelling units, the length of counter top in (3) may be reduced to 5 ft, and the shelf area in (4) reduced to 16 sq ft with 12 sq ft of this area to be at least 11 in. in depth with a 9½ in. minimum clearance above the shelves.

F. BEDROOM OR SPACE IN DWELLING UNITS

(1) Except as provided in (3) at least one bedroom in every dwelling unit shall have at least 105 sq ft of floor area where built-in cabinets are not provided and 95 sq ft of floor area where built-in cabinets are provided. The minimum dimension within the required area shall be 8 ft 10 in.

(2) Except as provided in (3) additional bedrooms shall have at least 75 sq ft of floor area, where built-in cabinets are not provided and 65 sq ft of floor area where built-in cabinets are provided. The minimum dimension within the required area shall be 6 ft 6 in.

(3) Bedroom spaces in combination with other spaces shall have at least 45 sq ft of floor area and have no dimension less than 6 ft 6 in. within the required area.

G. BUILT-IN BEDROOM CABINETS

(1) A built-in cabinet in the first bedroom shall provide at least 27 cu ft of storage within 5 ft of the floor when the bedroom is less than 105 sq ft.

(2) A built-in cabinet in other than the first bedroom shall provide at least 13½ cu ft of storage within 5 ft of the floor when the bedroom area is less than 75 sq ft.

(3) Built-in cabinets shall consist of shelves with door fronts or drawers.

(4) When required cabinet storage is by means of shelves, at least 27 sq ft shall be provided for the first bedroom and 13½ sq ft for additional bedrooms. Shelves shall be at least 12 in. but not more than 18 in. in depth. The distance between shelves shall be not less than ½ the depth.

(5) When required cabinet storage is provided by drawers, the drawers shall be not more than 48 in. wide, not more than 12 in. in height and not more than 24 in. in depth.

H. COAT AND CLOTHES CLOSETS

(1) At least one clothes closet shall be provided in each bedroom.

(2) At least one coat closet shall be provided convenient to an entrance.

(3) Coat and clothes closets shall have at least 6 sq ft of floor area. At least 50 per cent of the required area shall be horizontal and not more than 12 in. above the room floor level. Such closets shall have a minimum height of 6 ft 6 in. over the required floor area.

(4) Walk-in closets shall have at least 6 ft 6 in. head room over the required area.

(5) Coat and clothes closets shall be at least 1 ft 10 in. deep when the width of the opening is at least 1 ft 9 in. and not less than 1 ft 2 in. deep when the opening is 4 ft wide or more.

(6) A shelf not less than 11 in. deep with a clearance of not less than 8 in. above it shall be provided in coat and clothes closets.

I. LINEN CLOSETS

(1) A linen closet shall be provided in each dwelling unit and shall have a shelf area of not less than 6 sq ft for one and two bedroom dwelling units. Two sq ft of additional shelf area shall be provided for each additional bedroom.

(2) The maximum depth of shelf to be used in calculating the shelf area shall be 2 ft.

(3) Shelves shall have not less than 1 ft 2 in. depth, 1 ft 6 in. width and 12 in. clearance above shelves.

J. BATHROOM AND WATER CLOSET ROOMS

(1) In every dwelling unit, an enclosed space of sufficient size shall be provided to accommodate a bathtub, water closet, and wash-basin.

(2) A janitor's toilet room shall be provided adjacent to the boiler room (or other work room) in an apartment building when a dwelling unit is not provided for the janitor.

(3) Bathtubs shall be at least 5 ft nominal length if rectangular type. At least 1 ft 9 in. clearance shall be provided in front of the tub or shower stall to an opposite wall face or 1 ft 6 in. in front to another fixture, over at least a 2 ft length of the bathtub or shower.

(4) The centreline of the water closet shall be at least 1 ft 3 in. away from an adjacent side wall and from a vanity. At least 1 ft 6 in. clearance shall be provided in front of the water closet to the opposite wall or another fixture.

(5) The centreline of a wash basin shall be at least 1 ft 3 in. from an adjacent side wall. At least 1 ft 9 in. clearance shall be provided in front of the wash basin to an opposite wall or 1 ft 6 in. clearance in front to another fixture.

(6) A mirror not less than 12 in. by 18 in. in size shall be installed over each wash basin in bathrooms and wash rooms. Such mirrors shall conform to CGSB 12-GP-5a, "Type 1B" polished plate or float glass for high humidity use and shall be so labelled.

(7) Wall cabinets shall be at least 9 in. in height or width and be at least 1½ sq ft in overall size. Cabinets shall be equipped with shelves. Where wall cabinets are not provided, equivalent shelf space shall be provided in a lockable vanity.

(8) Except for bachelor dwelling units, at least one bathroom access that does not enter through a bedroom shall be provided to the required bathroom.

K. HALLS AND VESTIBULES WITHIN DWELLING UNITS

(1) The minimum width of a hall or passage within a dwelling unit shall be at least 2 ft 10 in., except that in buildings not exceeding 14 ft in width, the hallway width may be 2 ft 4 in. where a second exit is provided near the end of the hallway farthest from the living area.

(2) The minimum width of a main vestibule shall be at least 3 ft 6 in.

L. LAUNDRY AND LAUNDRY SPACE

(1) A clearance of at least 3 ft shall be provided at the front of an automatic washer or dryer.

(2) Where automatic dryers are not provided, space shall be provided for not less than 100 lineal ft of indoor clothes line for each dwelling unit when the laundry facilities are not shared, or for each 20 dwelling units or fraction thereof ,when laundry facilities are shared.

(3) Where automatic washers are not provided, laundry areas either separate or in combination with other space of at least 35 sq ft of floor area with a 5 ft minimum dimension shall be provided for each dwelling unit when laundry facilities are not shared, or for each 20 dwelling units when laundry facilities are shared.

M. GENERAL STORAGE

(1) Except as provided in (2) and (3), every dwelling unit shall have at least 200 cu ft of storage plus at least 75 cu ft for each bedroom. Such storage space shall have at least 6 ft height over at least 50 per cent of the required space and at least 4 ft height over the remainder of the required space. At least 50 per cent of such required storage space shall be heated. Required storage space shall be separate from finished areas, and access to such storage space shall be independent from other dwelling units.

(2) In a building equipped with an elevator, at least 200 cu ft of storage conforming to the requirements in (1) shall be provided for each dwelling unit.

(3) Where a portion of the required storage space consists of communal storage as described in (4), the required independent storage space for each dwelling unit may be reduced to 150 cu ft for a dwelling unit with not more than 1 bedroom plus 30 cu ft for each additional bedroom. Such storage space shall be at least 6 ft in height and at least 3 ft in width and depth. When located within a dwelling unit such storage shall be separated from other space. When located outside a dwelling unit the storage space for each dwelling unit shall be in a separate lockable enclosure with direct and convenient access.

(4) Communal storage referred to in (3) shall consist of at least 60 sq ft when such storage serves not more than 10 dwelling units plus an additional 6 sq ft for each dwelling unit in excess of 10, except that such storage need not exceed 240 sq ft.

SECTION 6. DOORS

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Requirements relating to doors in fire separations and means of egress shall conform to the appropriate requirements in Section 9 and 10.

B. REQUIRED DOORS

(1) Doors shall be provided at the entrance or entrances to a dwelling unit, bedroom, bathroom, water-closet room, shower room, room containing a boiler, furnace or water pump.

(2) In buildings containing more than one dwelling unit, doors shall be provided at the exterior entrances, laundry or drying rooms, storage rooms, public toilet rooms, garbage and incinerator rooms, furnace rooms, recreation rooms and any other locations required by Section 10.

C. DOORWAY SIZES

Doorway openings within dwelling units shall be designed to accommodate not less than the door sizes in Table 6A for swing-type doors. Where folding doors are to be provided, the same openings apply.

TABLE 6A — MINIMUM SIZE OF DOORS

At Entrance to	Width, ft — in.	Height, ft — in.
Dwelling unit (required entrance) Vestibule or entrance hall	2 — 8	6 — 6
Stairs to a floor level that contains a finished space All doors in at least one line of passage from the exterior to the basement Utility rooms	2 — 8	6 — 6
Walk-in closet	2 — 0	6 — 6
Bathroom, water closet room, (1) Shower room	2 — 0	6 — 6
Rooms not mentioned above, exterior balconies	2 — 6 (2)	6 — 6
Column 1	2	3

Notes to Table 6A:

(1) Doors to public water-closet rooms shall be not less than 2 ft 8 in. in width and 6 ft 8 in. in height.
(2) Where 2 ft 4 in. hallways are permitted doors may be 2 ft wide.

D. INTERIOR WOOD DOORS

(1) The construction of interior doors shall conform to CSA O132.2-1969, "Wood Doors."

(2) Interior wood doors in dwelling units, other than closet doors or cupboard doors shall be at least 1⅜ in. thick.

(3) Interior wood doors to rooms or spaces used for storage, laundry, drying, vestibules, recreation or water closets, in apartment buildings but not within dwelling units, shall be at least 1¾ in. thick.

E. EXTERIOR DOORS

(1) Exterior wood doors shall be exterior type conforming to CSA O132.2-1969, "Wood Doors."

(2) All sliding glass doors shall conform to the appropriate requirements in CGSB 82-GP-1 (1964), "Doors: Glass, Aluminum Frame, Sliding Standard Duty," or to CGSB 82-GP-2 (1964), "Doors: Glass, Aluminum Frame, Sliding, Medium Duty."

(3) Exterior wood doors shall be at least 1¾ in. thick, except that doors for secondary entrances serving single dwelling units or balconies may be 1⅜ in. thick if of solid wood, solid core or stile and rail construction.

(4) Storm or combination doors shall be at least 1⅜ in. thick for wood doors and 1 in. for metal doors.

(5) Weatherstripping of metal, plastic, rubber, wood or fabric or combination of these materials shall be installed at the perimeter of all exterior door openings.

(6) Where an exterior door opening is not completely protected from wind blown snow or rain, it shall be provided with a sill that slopes to the exterior and the sill caulked with suitable caulking to prevent the entry of water.

(7) Wood door frames shall be one of the species indicated in Clause 3.1.1. of CSA O132.1—1965 "Wood Windows." Allowable defects shall not exceed those described in Clause 3.2.1. of the same Standard. Such frames shall be treated with preservatives in accordance with Clauses 5.2 and 5.3, or 5.4 and 5.5 of CSA O132.1—1965 "Wood Windows."

(8) Steel frames for exterior doors shall be painted with a rust inhibitive paint or otherwise treated before erection to prevent corrosion. Such frames shall incorporate a thermal break to prevent a through metal path from the interior to the exterior.

F. GLASS

(1) Glass thickness for doors shall conform to Table 6B.

TABLE 6B — GLASS SIZE FOR DOORS

Minimum Glass Weight or Thickness	Maximum Perimeter, in.
18 oz.	80
24 oz.	120
32 oz.	160
3/16 in.	180
7/32 in.	not limited
Column 1	Column 2

(2) Glass in doors and side lights that could be mistaken for doors, within or at the entrances to dwelling units, and which extend to less than 12 in. from the floor shall be safety glass of the laminated or tempered type conforming to CGSB

12-GP-1b (1971), "Glass: Safety for Building Construction", or shall be wired glass.

(3) Every glass door accessible to the public shall be constructed with safety glass or wired glass conforming to (2).

(4) Every glass or transparent door accessible to and used by the public shall be equipped with hardware, bars or other permanent fixtures designed so that the existence and position of such door will be readily apparent.

(5) Glass, other than safety glass, shall not be used for a shower or bathtub enclosure.

G. GARAGE DOORS

(1) Garage doors shall be not less than 8 ft wide for one car width and 14 ft wide for two car width. The height of the clear opening with the door in the open position shall be not less than 6 ft 4 in. For parking garages, garage doors shall be not less than 10 ft wide for one way traffic and 16 ft for two way traffic.

(2) Wood doors shall be at least 1¾ in. thick in side hinged or one piece overhead and not less than 1⅜ in. thick if sectional overhead.

(3) Steel and aluminum doors shall be made with suitably braced frames clad with not less than 24 gauge zinc coated steel prepared for paint, or 0.032 in. thick aluminum.

(4) Overhead doors shall have suitable springs or counterbalances and weather stops.

(5) Side hinged doors shall be equipped with hinges to carry without sagging the weight of the door.

(6) Garage doors shall be equipped with locks.

H. HARDWARE

(1) Hinges for exterior doors shall consist of "18-8" stainless steel; or brass or bronze of a type conforming to CGSB 69-GP-1, 1959, equipped with ball bearings; or steel, electroplated with .0005 in. zinc or cadmium and chromate treated; or steel, pretreated and primed for painting in accordance with CGSB 69-GP-1, 1959.

(2) Except as provided in (4), all doors shall be hung with at least three 3½ in. by 3½ in. solid butt hinges at least 0.10 in. thick.

(3) Hinges for interior doors shall be the same as required in (1) except that bronze or brass hinges need not be ball-bearing type or they may be of steel, plated with chrome, brass, bronze, nickel or cadmium in accordance with CGSB 69-GP-1, 1959.

(4) Interior swing type doors within dwelling units shall be hung with at least two 3 in. by 3 in. solid butt hinges at least 0.08 in. thick.

(5) Screws, bolts and other fastening devices for use with door hinges shall be made from materials compatible with and having the same finish as the door hinges.

(6) All exterior doors to a dwelling unit shall be fitted with devices capable of locking the door from either side and capable of being unlocked from the inside without the use of a key, except that exterior doors in addition to the required doors need not be capable of being locked from the outside. Exterior doors to balconies more than six feet above grade shall be designed not to lock automatically.

(7) Additional requirements for exit door hardware shall be as described in Subsection 9F.

(8) Door stops shall be provided wherever necessary to prevent damage to interior wall finish.

SECTION 7. WINDOWS

A. SCOPE

(1) This Section applies to installation of windows and to the requirements for natural lighting to be provided by windows in all buildings regardless of size.

(2) Requirements for windows in relation to fire protection are described in Section 10.

(3) Requirements for ventilation are described in Section 33.

(4) Window frames shall be constructed to permit the installation of screens and storm sash except that where double glazing is provided, provisions may be made for the installation of screens only.

B. GENERAL

(1) Windows shall be designed and installed so that they shed water.

(2) The minimum window glass area for rooms shall conform to Table 7A.

TABLE 7A — MINIMUM GLASS AREAS FOR ROOMS OF RESIDENTIAL OCCUPANCY

Location	Unobstructed Glass Area	
	With No Electric Lighting	With Electric Lighting
Laundry basement recreation room, unfinished basement or cellar	4 per cent of area served	Windows not required
Bathroom, W.C.	4 sq ft	Windows not required
Kitchen kitchen space, kitchen alcove	10 per cent of area served	Windows not required
Living rooms, Dining rooms, Bedrooms and other finished rooms not mentioned above	10 per cent of area served	10 per cent of area served
Column 1	2	3

The unobstructed glass area of a door or skylight is considered equivalent to that of a window.

(3) Wherever practicable, windows shall be provided to light corridors, stairways and similar public space in buildings.

C. WINDOW STANDARDS

Unless otherwise specified in this section, windows shall conform to one of the following: CSA O132.1-1965, "Wood Windows," CGSB 12-GP-8 (1966), "Factory-Sealed Double-Glazing Units," CGSB 63-GP-2a(1966), "Windows: Extruded Aluminum, Vertical and Horizontal Sliding, Medium Duty," CGSB 63-GP-3a(1966), "Windows: Extruded Aluminum, Vertical and Horizontal Sliding, Standard Duty," CGSB 63-GP-4a(1971), "Windows: Sashless, Horizontal Sliding," CGSB 63-GP-5a (1970), "Windows: Steel, Vertical and Horizontal Sliding, Standard Duty."

D. GLASS

(1) Glass shall conform to CGSB 12-GP-2a(1970), "Glass: Sheet, Flat, Clear," CGSB 12-GP-3b(1970), "Glass: Plate, Flat, Polished Plate or Float" or CGSB 12-GP-1b(1971), "Glass: Safety, for Building Construction."

(2) Thickness of glass in windows shall conform to Table 7B except as provided in (3).

(3) Sashless window glass thickness shall conform to CGSB 63-GP-4a(1971), "Windows: Sashless, Horizontal Sliding."

TABLE 7B — GLASS THICKNESS

Minimum glass thickness or weight of inner and outer panes	Limiting Glass Size		
	Sash type or Fixed Glazing	Factory-Sealed Double Glazing	
		Fused Edges	Other than Fused Edges
18 oz	120 in. perimeter.	180 in. perimeter.	150 in. perimeter.
24 oz	168 in. perimeter.	252 in. perimeter.	210 in. perimeter.
32 oz	240 in. perimeter.	360 in. perimeter.	300 in. perimeter.
3/16 in.	280 in. perimeter.	420 in. perimeter.	350 in. perimeter.
7/32 in.	50 sq ft	113 sq ft	78 sq ft
1/4 in.	No limit	No limit	No limit
Column 1	2	3	4

E. CAULKING AND GLAZING

(1) Sealing compound used in the glazing of factory-sealed double-glazed units shall be of an approved type and shall be compatible with the material used to edge seal the units.

(2) Caulking shall be provided between window frames or trim and the exterior siding or masonry.

F. WINDOWS IN PUBLIC AREAS

(1) Windows or glass panels that could be mistaken for doors shall be protected by barriers or railings.

(2) Windows in exit stairways that extend to less than 42 in. above the landing shall be protected by barriers or railings located approximately 42 in. above such landings.

G. HARDWARE

(1) Material for window hinges shall conform to the requirements in Subsection 6H for door hinges.

(2) Every openable window shall be equipped with corrosion resistant locking devices controlled from the interior.

(3) Either the upper or lower sash of vertical sliding wood sash windows shall be balanced. An unbalanced upper sash shall be fixed in position by means of a block or other sash holding device.

(4) Corrosion resistant sash lifts shall be provided for vertical sliding sash.

(5) Hinged sash in other than unfinished basements shall be equipped with devices to hold the sash in any position.

SECTION 8. STAIRS, RAMPS, HANDRAILS AND BALUSTRADES

A. SCOPE

(1) This Section applies to the design and construction of interior and exterior stairs, steps, ramps, railings and balustrades.

(2) Where the stair forms part of an exit, the appropriate requirements in Sections 9 and 10 shall also apply.

(3) Where stairs are located within dwelling units, this Section shall apply to all buildings, regardless of size.

B. GENERAL

(1) Except in dwelling units, the space under stairs shall be left entirely open or shall be completely closed without any means of access.

(2) Treads and risers shall have uniform rise and run in any one flight.

(3) Except for interior stairs within a dwelling unit, at least 3 risers shall be provided for interior stairs.

(4) Interior stairways extending through the roof of a building shall be protected from ice and snow.

C. STAIR DIMENSIONS

(1) Interior stairs within dwelling units to areas used only for storage, laundry and mechanical equipment such as unfinished basements, cellars and attics, shall have a maximum rise of 9 in., a minimum run of 8 in. and a minimum tread width of 9 in.

(2) Interior stairs within dwelling units other than those listed in Article 8 C (1) and exterior stairs serving dwelling units shall have a maximum rise of 8 in. and a minimum run of 8¼ in. and a minimum tread width of 9¼ in.

(3) Interior stairs not contained within dwelling units and exterior stairs for buildings except those serving not more than one dwelling unit shall have a maximum rise of 7¾ in., a minimum run of 9½ in. and a minimum tread width of 10 in. The product of the run and rise (expressed in inches) for such stairs shall be not less than 70 nor more than 75.

(4) Where the run of any stair is less than 10 in., a nosing of at least 1 in. shall be provided beyond the face of the riser or an equivalent back slope on the risers shall be provided.

(5) Public stairways shall have a minimum width between wall faces of at least 3 ft.

(6) At least one stairway between each floor level in a dwelling unit shall have a minimum width between wall faces of at least 2 ft 10 in.

(7) The head room measured vertically from a line drawn through the outer edges of the nosings shall be at least 6 ft 4 in. for stairs located in dwelling units and 6 ft 9 in. for all other stairs.

D. LANDINGS

(1) Landings shall be at least as wide and as long as the width of stairs in which they occur, except that the length of landing for exterior stairs serving not more than one dwelling unit need not exceed 36 in., and the length of landing for all other stairs in a straight run need not exceed 44 in.

(2) Where a door swings towards a stair, the full arc of its swing shall be over a landing. Except as provided in (3), a landing shall be provided at the top and bottom of each flight of interior stairs and where a doorway occurs in a stairway.

(3) Where a door occurs at the top of the stair in a dwelling unit, no landing is required between the doorway and the stairs.

(4) A landing shall be provided at the top of all exterior stairs, except that a landing may be omitted at a secondary entrance to a building containing a single dwelling unit provided the stair does not contain more than 3 risers.

(5) The vertical height between any landings shall not exceed 12 ft.

(6) The clear height over landings shall be at least 6 ft 4 in. in dwelling units and 6 ft 9 in. for other landings.

E. CURVED STAIRS AND WINDERS

(1) Except as permitted in (2), no winders shall be used in any exit stairway.

(2) A curved stair may be used as an exit, provided the treads have a minimum width of 9 in. measured 9 in. away from the handrail at the narrow end of the tread, and a handrail is installed on both sides.

(3) Except as permitted in (4), a curved stair not required as an exit shall have a minimum average tread width of 9 in. and a minimum tread width of 7 in. Such stairs shall not exceed 44 in. between handrails.

(4) Stairs within dwelling units may contain winders that converge to a centre point provided the winders turn through an angle of not more than 90 deg. and individual treads turn through an angle of 30 deg. Only one set of such winders shall be permitted between floor levels.

F. RAMPS

(1) The maximum gradient for pedestrian ramps shall be 1 in 10.

(2) Where a doorway or stairway opens onto the side of a ramp there shall be a level area extending across the full width of the ramp and for a distance of at least 12 in. on either side of the wall opening.

(3) Where a doorway or stairway opens onto the end of a ramp, there shall be a level area extending across the full width of the ramp and along the ramp for at least 36 in.

G. HANDRAILS AND BALUSTRADES (GUARDS)

(1) When an interior stair has more than 2 risers, the sides of the stair and the landing or floor level around the stair well shall be enclosed by walls or be protected by handrails or balustrades, except that a stair to an unfinished basement or cellar in a dwelling unit may have one unprotected side.

(2) Except as provided in (3), when an exterior stair has more than 3 risers, at least one side shall be protected.

(3) Every exterior stair with more than 6 risers and every exterior landing or porch 2 ft or more above grade, and every balcony, mezzanine, gallery, raised walkway and roof to which access is provided for other than for maintenance purposes, shall be protected by balustrades on all open sides.

(4) Except as permitted in (5) and (6), a handrail shall be provided on at least one side of stairs 44 in. or less in width and on two sides of stairs greater than 44 in. in width.

(5) Handrails are not required for exterior stairs forming part of a public means of egress where such stairs have fewer than 3 risers. Handrails are not required on other stairs having fewer than 4 risers.

(6) Only one handrail is required on exterior stairs more than 44 in. in width and having more than 3 risers provided such stairs serve not more than one dwelling unit.

(7) In closed interior stairways, handrails may be omitted at the landing if the length of the landing between two stair flights is greater than the width of the stairs.

(8) Handrails and balustrades for stairs within dwelling units and exterior steps serving not more than one dwelling unit shall be at least 2 ft 6 in. above a line drawn through the outside edges of stair nosings, and 2 ft 8 in. above landings and around the top of unenclosed stairwells or stairs.

(9) Handrails and balustrades for public stairs in a shared means of egress shall be at least 2 ft 8 in. above a line drawn through the outside edges of the stair nosings and 3 ft above landings.

(10) Balustrades around roofs as required in (3) shall be at least 4 ft in height. All other balustrades including those for balconies shall be at least 3 ft 6 in. in height except as permitted in (8) and (9).

(11) Handrails shall be so constructed that there will be no obstruction on or above them to break a hand-hold.

(12) Handrails shall not project more than 3½ in. into the required stairway or exit width.

(13) Where ramps are used in lieu of stairs the handrail and balustrade requirements for stairs shall apply.

(14) Openings through a balustrade on a balcony, public stair or an exit stair, except an exit stair serving not more than one dwelling unit, shall be of a size as to prevent the passage of a spherical object having a diameter of 4 in. unless it can be shown to the satisfaction of the authority having jurisdiction that the location and size of such openings which exceed this limit do not represent a hazard.

(15) Except for garage floors at ground level and those covered in Section 36, a continuous curb at least 6 in. in height and a guardrail not less than 3 ft 6 in. in height shall be provided at every opening through a garage floor and around the perimeter of such floors where the exterior walls are omitted.

H. CONSTRUCTION

(1) Exterior stairs with more than 2 risers and 2 treads shall be supported on unit masonry or concrete walls or piers at least 6 in. by 6 in. or shall be cantilevered from the main foundation wall. When the steps are cantilevered, the main foundation wall shall be at least 8-in.-thick solid concrete. The depth below grade for foundations for exterior steps shall conform to the requirements in Section 12.

(2) Wooden stair stringers shall have a minimum effective depth of 3½ in. and an over-all depth of at least 9¼ in. Stringers shall be supported and secured top and bottom. Stringers shall be at least 1 in. in actual thickness if supported along their length and 1½ in. actual thickness if unsupported along their length. Stringers shall be spaced not more than 3 ft o.c. in dwelling units and 2 ft o.c. when located in other than dwelling units.

(3) Lumber or plywood treads for stairs within dwelling units shall be at least 1 in. actual thickness, except that if open risers are used, and the distance between stringers exceeds 2 ft 6 in., the treads shall be at least 1½ in. actual thickness.

(4) The finish for treads and landings of interior stairs in dwelling units, other than stairs to unfinished basements and cellars, shall consist of hardwood, vertical grain softwood, resilient flooring or other material providing equivalent performance.

(5) The finish for treads and landings of interior and exterior stairs, other than those in dwelling units, shall have a non-skid finish or shall be provided with non-skid strips.

SECTION 9. MEANS OF EGRESS

A. SCOPE

(1) This Section applies to requirements that are designed to permit the safe and convenient access to the exterior of a building, to a public thoroughfare, or to approved open space.

(2) Stairways, handrails and balustrades in a means of egress shall conform to the requirements in Section 8, as well as to the requirements in this Section.

(3) Flame-spread ratings, fire-resistance ratings and fire-protection ratings shall conform to Section 10.

B. GENERAL

(1) Exits shall be provided from all floor areas, podiums, terraces, platforms, contained open space or roofs intended for occupancy.

(2) Exits may consist of escalators, doorways, passageways, ramps, stairways, fire escapes (existing buildings only), horizontal exits, inclined moving walkways that move only in the direction of exit travel or a combination thereof.

(3) Elevators, slide escapes, or windows shall not be considered as being part of a required means of egress.

(4) An exit shall be designed solely for exiting and no other purpose.

(5) Fire escapes shall not be installed on any new building, and shall not be installed on an existing building unless permitted by the authority having jurisdiction.

(6) When a fire escape is installed on an existing building it shall conform to Part 3 of The National Building Code of Canada 1970.

(7) Where a horizontal exit is used, it shall conform to Part 3 of The National Building Code of Canada 1970.

C. DIMENSIONS OF MEANS OF EGRESS

(1) This Subsection applies to every means of egress except exits that serve not more than one dwelling unit and access to exits within dwelling units.

(2) The occupant load of floor areas or part of floor areas used in determining the minimum required width of a means of egress shall be the number of persons for which such areas are designed but not fewer than 2 persons per bedroom or sleeping area except that in dormitories the maximum area to be assumed per person shall be 50 sq ft unless otherwise approved.

(3) Except as provided in Section 9 F, the minimum aggregate width of exits from a floor area shall be not less than one unit (see (6)) per 30 persons but not less than 44 in. for an exit corridor and 36 in. for all other types of exits.

(4) Except as provided in Subsection 9 F, the minimum width of a doorway, corridor or passageway in an access to exit shall be one unit (see (6)) per 90 persons but in no case shall the minimum width of a public corridor be less than 44 in.

(5) Except as provided in Subsection 9 F, the minimum width of a stairway or ramp in an access to exit shall be 1 unit per 60 persons (see (6)).

(6) The units of exit width in (3) to (5) shall be determined by dividing the width (in inches) of an exit by 22. Where the remainder is less than 12 in., it shall not be considered as contributing to the number of units. Where the remainder is 12 in. or more, it shall be considered as contributing ¼ unit of exit width.

(7) Where an exit serves more than one floor area, the aggregate width of such exit need not be cumulative from floor to floor, except that where exits from above or below converge at an intermediate level the width beyond the convergence in the direction of exit travel shall be not less than the aggregate required width of the converging exits.

(8) Except as provided in Subsection 9 F, and in Articles 8 C (7) and 8 D (7) the minimum height of exits and corridors which provide access to exits shall be 7 ft.

D. FIRE PROTECTION OF EXITS

(1) This Subsection applies to the fire protection of all exits except exits serving not more than one dwelling unit.

(2) Except as provided in (3), every exit other than a doorway opening directly to the outdoors at ground level shall be separated from the remainder of the building or from another exit by a fire separation having a fire-resistance rating of at least ¾ hr. A fire separation common to two exits shall not be penetrated by an opening.

(3) Not more than one exit in a building with two or more exits may be separated from the adjacent floor areas by wired glass including doors. Such wired glass shall conform to the requirements in Article 10 M (3).

(4) Public corridors shall be separated from the remainder of the floor area by a fire separation having a fire-resistance rating of at least ¾ hr.

(5) Openings in the exterior wall of an exit shall be protected with wired glass or glass block installed in accordance with 10 M (3) and 10 M (4) where openings may be exposed to the hazard of a fire in another fire compartment of the same building.

E. OBSTRUCTIONS AND HAZARDS IN MEANS OF EGRESS

(1) This Subsection applies to obstructions and hazards in every means of egress except those within a dwelling unit or serving not more than one dwelling unit.

(2) No mirror shall be placed in or adjacent to any exit in a manner as to confuse the direction of exit, and no mirror or draperies shall be placed on or over exit doors.

(3) Fuel-fired appliances shall not be installed in an exit or a public corridor or within 8 ft horizontally of a doorway used as a required exit.

(4) Service rooms containing equipment subject to possible explosions such as boilers designed to operate at a pressure in excess of 15 psi gauge pressure and certain types of refrigerating and transformer equipment shall not be located under required exits.

(5) Except as permitted in Subsection 9 F and Article 8 G (12), no fixture, turnstile or construction shall project within the required width of exit.

F. DOORS IN A MEANS OF EGRESS

(1) This Subsection applies to all doors in a means of egress except exterior doors serving not more than one dwelling unit unless otherwise stated herein.

(2) Exit doors shall not decrease the required exit width by more than 2 in. for each full unit of exit width (22 in.), and where such doors lead out of stairs or ramps in the direction of exit travel they shall not be less than ¾ of the width of such stairs or ramps.

(3) Doors in their swing shall not reduce the effective width of exit stairs or landings to less than 30 in. nor shall they reduce the effective width of an exit passage way to less than the required width.

(4) No door closer or other device shall be installed in an exit in such a manner as to reduce the head room clearance to less than 6 ft 6 in.

(5) An exit door or a door that opens to or is located in a public corridor or other facility providing access to exit from individually rented rooms, suites of rooms or dwelling units shall be not less than 6 ft 8 in. in height. Except as required in (2) and 6 C (1) such doors shall be at least 30 in. and not more than 48 in. in width. Where more than one door is provided in the width of a doorway in such access to exit, individual doors shall not be less than 24 in. in width.

(6) A door that opens to or is located in a public corridor or other facility providing access to exit from an individually rented room or suite of rooms with an occupant load of more than 60 persons shall open in the direction of exit travel. Such doors shall swing on a vertical axis in the direction of exit travel. This shall not be considered to prohibit approved sliding doors designed to swing on a vertical axis when pressure is applied. Such doors shall not open onto a step.

(7) Except as permitted in (8), where an exit door opens onto a landing, the landing shall be not less than 1 ft wider and longer than the width of the door. Such doors either in the open or closed position shall be not closer than 12 in. to the nearest riser.

(8) Where there is a danger of blockage from ice or snow, an exit door may open onto not more than one step provided the rise of such step does not exceed 6 in.

(9) Every required exit door including an exit door serving not more than one dwelling unit shall swing on a vertical axis. Such door shall open in the direction of exit travel except that a door serving a single dwelling unit is permitted to swing inward.

(10) Revolving doors used as exits shall be of an approved collapsible type, and shall be permitted only at ground floor level away from the foot of any stairway. Not more than ½ unit of exit width may be assumed for such doors. Swing doors shall be provided adjacent to such doors.

(11) Exit doors and doors to dwelling units shall be openable from the inside without the use of keys.

(12) A door opening onto a public corridor which provides access to exit from individually rented rooms, suites of rooms or dwelling units shall be designed not to lock automatically when such doors are equipped with automatic self-closing devices.

G. EXITS FROM FLOOR AREAS

(1) This Subsection applies to exits from all floor areas except exits serving not more than one dwelling unit unless otherwise stated herein.

(2) Where more than one exit is required from a floor area, each exit shall be independent from every other exit leading from that floor area.

(3) Not more than ½ the required exits from a floor area may be horizontal exits.

(4) Except as provided in (5) and H (6), at least two exits shall be provided from every storey.

(5) A single exit is permitted from every dwelling unit where such exit is an exterior door located at or near ground level and access to such exit is not through a garage, or through a room not under the immediate control of the occupants of the dwelling unit served.

(6) Where more than one exit is required from a floor area, every exit shall be placed remote from each other along the path of travel between them.

(7) Where more than one exit is required, every such exit shall be considered as contributing not more than ½ the required units of exit width.

(8) Not more than one exit from a floor area above or below the main entrance lobby shall lead through the lobby. Such lobby shall not be more than 15 ft above grade and the path of travel through the lobby shall not exceed 50 ft. Occupancies adjacent to such lobby shall be separated from the lobby by fire separations having fire-resistance ratings conforming to the requirements in Subsection 10 H unless the storey in which the lobby is located is sprinklered.

H. ACCESS TO EXITS

(1) This Subsection applies to access to exits within floor areas except within individually rented rooms, suites of rooms or dwelling units unless otherwise stated herein.

(2) Except as permitted in (3), each individually rented room, suite of rooms or dwelling unit on a floor area occupied by more than one tenancy shall have an exterior doorway at ground level or a doorway leading to an exterior balcony or exterior passageway open to the outside air, or to an interior corridor. From the point where such doorway enters the balcony, exterior passageway, or interior corridor it shall be possible to go in opposite directions to each of two separate exits, except as permitted in (4).

(3) A doorway to a dwelling unit is permitted into an exit stairway or into a public corridor served by a single exit stairway provided each dwelling unit is provided with a second and separate means of egress.

(4) Except as permitted in (3), a dead-end public corridor is acceptable in Residential Occupancies, provided it does not exceed 20 ft in length, measured from the end of the corridor to the nearest exit. Such dead-ends shall contain no door openings except entrance doors to individually rented rooms, suites of rooms or dwelling units. Such doors shall be located so that it shall not be necessary to pass more than 2 doors in travelling to the nearest exit. Such doors in dead-end public corridors shall be equipped with self-closing devices.

(5) Where the distance from any point within such rooms, suite of rooms or dwelling unit to the nearest door opening to a public corridor is more than 75 ft, no fewer than two egress doors shall be provided. Such doors shall be spaced so that in the event that one doorway is made inaccessible by a fire within such room, suite or dwelling unit, the other doorway will provide safe egress.

(6) Except as permitted in G (5), a dwelling unit containing more than one storey shall have an exit or doorway into a public access to exit from its top and bottom storeys.

(7) Required access to exit from individually rented rooms, suites of rooms or dwelling units shall not be through any other dwelling unit, service room, or other occupancy.

I. TRAVEL DISTANCE

(1) Where more than one exit is required in G (4), the travel distance to the nearest exit from any point on a floor area shall not be greater than 100 ft where the floor area is not divided into individually rented rooms, suites of rooms or dwelling units.

(2) Where more than one exit is required in G (4), the travel distance measured to the nearest exit from the entrance doorway to an individually rented room, suite of rooms or dwelling unit shall be not greater than 100 ft except that where the floor area is sprinklered the travel distance for all occupancies may be increased to 150 ft.

J. EXIT SIGNS

(1) This Subsection applies to all exits except those serving not more than one dwelling unit.

(2) Exits shall be located so as to be clearly visible or their locations shall be clearly indicated.

(3) Except for the main entrance door to a building, every exit door in a 3-storey building, or a building having an occupant load greater than 150, shall have an exit sign over it.

(4) Exit direction signs shall be placed in corridors and passageways where necessary to indicate the direction of exit travel.

(5) Exit signs shall be installed so as to be visible from the exit approach. Such signs shall have the word "EXIT" or "SORTIE" in red letters at least 4½ in. high, printed in at least ¾-in.-wide strokes if the sign is internally lighted, or white letters at least 6 in. high printed with at least ¾-in.-wide strokes on a red background if the sign is externally illuminated.

(6) Provisions shall be made to illuminate exit signs required in (3) by an electrical circuit separate from other electrical circuits.

(7) In 3-storey buildings any part of an exit ramp or stair that continues past the exit door at ground level shall be clearly marked to indicate that it does not lead to an exit, where there is a possibility that the portion below ground level may be mistaken as the direction of exit travel.

K. LIGHTING

(1) This Subsection applies to the lighting of all exits except those serving not more than one dwelling unit.

(2) Every exit and public corridor shall be provided with lighting in accordance with the requirements in 35 B (9).

(3) In buildings of 3 storeys in building height every exit or public corridor in buildings having an occupant load of over 100 persons, shall be provided with emergency lighting.

(4) Emergency lighting required in (3) shall be provided from a source of energy separate from the electrical supply for the building. Such lighting shall be designed to be automatically activated when the electric lighting in the affected area is interrupted. Illumination from such lighting shall be at least one footcandle for a perod of at least ½ hr. Illumination having a lighting capacity of at least 1 watt per 10 sq ft of floor area shall be considered to meet this illumination requirement.

SECTION 10. FIRE PROTECTION

A. SCOPE

(1) This Section contains requirements to protect the lives of the occupants by resisting the collapse of buildings in the event of fire and by resisting the spread of fire throughout the buildings or to other buildings.

(2) Where buildings are connected by enclosed walkways or covered malls, such walkways and malls shall conform to Part 3 of the National Building Code of Canada 1970.

(3) Where elevators, transformer vaults, moving walkways or escalators are provided, they shall conform to Part 3 and Part 6 of the National Building Code of Canada 1970. (See also Section 37).

(4) Where fuel-fired appliances are installed on a roof, such appliances shall be installed to conform to Part 3 of the National Building Code of Canada 1970.

(5) Where rooms or spaces are intended for the storage, manufacture, or use of hazardous or explosive material, or for assembly, such rooms or spaces shall conform to Part 3 of the National Building Code of Canada 1970.

(6) Where sprinkler systems, standpipe and hose systems, or fire alarm and detection systems are installed, they shall be installed to conform to Part 6 of the National Building Code of Canada 1970.

B. GENERAL

(1) Except for construction supporting a service room, construction required to have a fire-resistance rating shall be supported on construction having at least the same fire-resistance rating.

(2) An assembly required to be of noncombustible construction shall be supported by noncombustible construction.

(3) Where a firewall divides a building, each portion of the building so divided may be considered as a separate building. Such firewalls shall be constructed to conform to Subsection J.

(4) Facilities for dispensing gasoline shall not be installed in any building.

C. RATINGS

(1) Where a fire-resistance rating or a fire-protection rating is required in this Section for an element of a building such rating shall be determined in conformance with the test methods described in Part 3 of the National Building Code of Canada 1970 in NBC Supplement No. 2 (1965), "Fire Performance Ratings," or in Appendix A.

(2) Where a flame-spread rating is required in this Section for an element of a building, such rating shall be determined in accordance with the test methods described in Part 3 of the National Building Code of Canada 1970 or in accordance with NBC Supplement No. 2 (1965), "Fire Performance Ratings." Unless such rating is referred to herein as a "surface flame-spread rating," it shall apply to any surface of the element being considered that would be exposed by cutting through it as well as to the exposed surface of the element.

(3) Floor and roof assemblies shall be rated for exposure to fire on the underside.

(4) Exterior walls shall be rated for exposure to fire from inside the building. Such walls need not comply with the temperature rise limitations required by the standard tests referred to in (1) if such walls have a limiting distance of at least 4 ft and due allowance is made for the effects of heat radiation in accordance with the requirements in Part 3 of the National Building Code of Canada 1970.

(5) Firewalls and interior vertical fire separations required to have fire-resistance ratings shall be rated for exposure to fire on both sides.

(6) Where a ceiling construction has a suspended membrane ceiling with lay-in panels or tiles which contribute to the required fire-resistance rating, hold down clips or other approved means shall be provided to prevent the lifting of such panels or tiles in the event of a fire.

D. PERMITTED OPENINGS IN WALL AND CEILING MEMBRANES

(1) Except as permitted in (2) to (4), a membrane forming part of an assembly required to have a fire-resistance rating shall not be pierced by openings into the assembly unless the assembly has been tested and rated for such openings.

(2) A wall or ceiling membrane forming part of an assembly required to have a fire-resistance rating may be pierced by openings for noncombustible electrical and similar service outlet boxes provided such outlet boxes are tightly fitted.

(3) Except as provided in (4), a membrane ceiling forming part of an assembly required to have a fire-resistance rating, may be pierced by openings into noncombustible ducts within the ceiling space, provided such openings are located not less than 7 ft apart and do not constitute more than 1 per cent of the ceiling area within a fire compartment. Individual openings shall not exceed 1 sq ft in area, and if greater than 20 sq in. shall be protected by a fire stop flap as described in 10 M (10).

(4) Where ducts within a ceiling space are protected within such space by construction providing a fire-resistance rating of not less than ½ that required for the assembly, the opening into such ducts through a ceiling membrane is not restricted as described in (3).

E. CONSTRUCTION TYPES

(1) A wall, floor, ceiling or roof shall be considered to be of noncombustible construction if constructed of noncombustible materials except as otherwise permitted in (2) to (6).

(2) When noncombustible construction is required, minor combustible components, including the following, are permitted: paint, insulation and jackets on wiring, caulking, furring or nailing strips of not more than 2- by 2-in. material, and interior millwork including doors, door frames, window sash, window frames and trim.

(3) Paper attached to noncombustible backing, adhesives, vapour barriers and sheathing paper may be used in buildings required to be of noncombustible construction.

(4) Except as provided for in (7) combustible insulation having a flame-spread rating of not more than 75 may be used in assemblies required to be of noncombustible construction provided such insulation is sandwiched between two layers of noncombustible material having a melting point above 1200°F without an intervening air space. Except as provided in (7), where insulation in such noncombustible construction is not installed in this manner, it shall have a flame-spread rating of not more than 25.

(5) Combustible interior wall, ceiling and floor finishes may be used in assemblies required to be of noncombustible construction provided such finishes are not more than 1 in. thick and have a flame-spread rating of not more than 150 in the case of walls and 25 in the case of ceilings.

(6) Combustible sash and frames for exterior windows may be used in a wall required to be of noncombustible construction provided the aggregate area of openings in the exterior wall of a fire compartment does not exceed 40 per cent of such wall, and provided the windows are separated from windows in the same storey by noncombustible construction and separated from windows in adjacent storeys by not less than 3 ft of noncombustible construction.

(7) Combustible material may be used in roof assemblies required to be of noncombustible construction provided such material conforms to the requirements in Part 3 of the National Building Code of Canada 1970 for noncombustible construction.

(8) Combustible pipes, electrical boxes, conduit or other similar service equipment used in noncombustible construction shall have a flame-spread rating of not more than 25.

(9) Heavy timber construction shall be considered to have ¾-hr fire-resistance rating when it is constructed in accordance with the requirements for heavy timber construction in Part 3 of the National Building Code of Canada 1970.

(10) The finish of every garage floor shall be of asphalt, noncombustible material or other approved material.

F. PROTECTION OF STEEL MEMBERS

(1) Except as permitted in (2) to (8), structural steel members used in construction required to have a fire-resistance rating shall be protected in an approved manner to provide the required fire resistance.

(2) Steel lintels in load bearing walls spanning not more than 6 ft and steel lintels in non-load bearing walls spanning not more than 10 ft need not be protected.

(3) The bottom flanges of shelf angles, and plates that are not part of the structural frame need not be protected as required in (1).

(4) Steel members around elevator shaft doorways, or supporting elevator and dumbwaiter guides, counterweights and other such equipment when entirely enclosed in a shaft and not forming part of the structural frame of the building need not be protected.

(5) Steel members for stairways and escalators that are not part of the structural frame of the building need not be protected.

(6) Steel members of porches, balconies, stairways, fire escapes, cornices, marquees and other similar constructions need not be protected provided they are outside of the building.

(7) Steel members not less than 10 ft from a property line or a centreline of a public thoroughfare and which are at least 3 ft away from an unprotected opening need not be protected.

(8) Load-bearing steel or concrete members such as columns, beams and arches at least 10 ft from a property line or centreline of a public thoroughfare and which are shielded from a possible fire within the building by construction having a fire-resistance rating at least equivalent to that required for the load-bearing walls, columns and arches in Subsection G need not be protected provided such members are located so that they are not closer to an unprotected opening than the maximum horizontal projection of the member from the wall face.

G. FIRE RESISTANCE IN RELATION TO OCCUPANCY AND HEIGHT

(1) Fire-resistance ratings of floors, roofs, walls, columns, arches, balconies and mezzanines shall conform to (2) to (5) and B (1) except that where there are more restrictive requirements elsewhere in this Code the more restrictive requirements shall apply.

(2) Except as provided in (3) and (4), every floor shall have a fire-resistance rating of at least ¾ hr.

(3) Floors within dwelling units in which there is no dwelling unit above another dwelling unit need not have a fire-resistance rating.

(4) Where a crawl space does not exceed 6 ft in height and is not used for any occupancy or the passage of flue pipes or as a plenum, the floor above the crawl space need not have a fire-resistance rating.

(5) Interior mezzanines and balconies shall have a fire-resistance rating of at least ¾ hr or shall be of noncombustible construction.

(6) Where a building contains more than one major occupancy the requirements in the National Building Code of Canada 1970 shall apply.

(7) Elevator machine rooms, stairway bulkheads and penthouse service rooms need not be considered as a storey in applying the requirements in this Section.

(8) A mezzanine need not be considered as a storey in applying the requirements in this Section where it occupies less than 40 per cent of the room or storey in which it is located and is used as an open floor area, provided the space above the mezzanine floor and the floor beneath it have no visual obstructions more than 42 in. above such floors.

(9) Roofs with slopes at 60 deg. or more to the horizontal and which are adjacent to a room or space intended for occupancy shall be considered as a wall in applying the requirements of this Section.

(10) Basements and cellars which are more than one storey below ground level shall conform to the requirements contained in Part 3 of the National Building Code of Canada 1970.

H. FIRE SEPARATIONS BETWEEN ROOMS AND SPACES WITHIN BUILDINGS

(1) This Subsection applies to fire separations required between rooms and spaces in buildings except between rooms and spaces within a dwelling unit.

(2) Except as permitted in (4) and (5), a wall, partition, or floor assembly required to be a fire separation shall be constructed as a continuous element of a fire compartment.

(3) Except as permitted in (4) and (5), openings in required fire separations shall be protected with closures conforming to 10 M.

(4) Except as permitted in (5), all floor assemblies except those contained within dwelling units shall be constructed as fire separations.

(5) A floor assembly over a crawl space which is not used for any occupancy and which does not contain a flue pipe need not be constructed as a fire separation provided the crawl space is 6 ft or less in height and is not used as a plenum except as permitted in G (3).

(6) Pipes and ducts that penetrate through a required fire separation shall be tightly fitted or fire stopped to prevent the passage of smoke and flame if such pipes or ducts are not enclosed in a shaft. Unenclosed ducts that penetrate through a required fire separation shall be provided with fire dampers installed to conform to Part 6 of the National Building Code of Canada 1970. (See also 10 D.)

(7) Every pipe, duct, electrical conduit, electrical outlet box or other similar service equipment that partly or wholly penetrates through a required fire separation shall be noncombustible except that such equipment may be combustible where the assembly has been tested incorporating such combustible equipment (see also 10 C).

(8) Where a fire separation required to be of noncombustible construction terminates on the exterior wall or roof surface, no combustible material shall extend across the end of the fire separation to form a bridge where fire could cross.

(9) Combustible construction that abuts on or is supported by a noncombustible fire separation shall be constructed so that its collapse under fire conditions will not cause collapse of the fire separation.

(10) Combustible members shall not pierce a noncombustible fire separation or reduce the thickness of the fire separation to less than 4 in.

(11) Except as provided in (12), a horizontal service space or other concealed space located above a required vertical fire separation shall be divided at the fire separation by an equivalent fire separation within the space.

(12) Where a horizontal service space or other concealed space is located above a required vertical fire separation, such space need not be divided as required in (11), provided the construction between such space and the space below is constructed as a fire separation having a fire-resistance rating at least equivalent to that required for the vertical fire separation.

(13) Except as provided in (14), dwelling units, suites, and individually rented sleeping rooms shall be separated from adjacent dwelling units, suites, individually rented rooms, public corridors and from other parts of the building by a fire separation having a fire-resistance rating of not less than ¾ hr.

(14) Dwelling units which contain 2 or more floor levels including basements or cellars shall be separated from adjacent dwelling units and from other parts of the building by a fire separation having a fire-resistance rating of not less than 1 hr.

(15) Except as provided in (16) and (17), a storage garage shall be separated from other occupancies by a fire separation having not less than a 1½-hr fire-resistance rating.

(16) Except as permitted in (17), storage garages containing 5 cars or fewer shall be separated from other occupancies by a fire separation of not less than 1 hr.

(17) In houses containing a single dwelling unit, or two vertically separated dwelling units, the fire separation required in (16) may be omitted where an attached or built-in garage serves only the dwelling unit adjacent to it and the construction between the garage and dwelling unit provides an effective barrier to gas and exhaust fumes and any door between the garage and dwelling unit conforms to M (12). Where an attic space is common to two dwelling units and to the garage, the attic space adjacent to the garage shall be separated from such common attic space by a membrane at least equivalent to type B, C, D, E, I or K finishes in Appendix A or the ceiling of the garage shall be protected with a similar membrane.

(18) The fire separation requirements for vertical shafts and chutes shall comply with Subsection K; boiler, furnace, incinerator and service rooms shall comply with Subsection I; firewalls shall comply with Subsection J.

(19) Plastic drain, waste and vent pipe shall not be used in systems that pass through or are located in a required fire separation.

I. SERVICE ROOMS

(1) This Subsection applies to service rooms in all buildings except rooms located within a dwelling unit.

(2) Service rooms containing service machinery shall be separated from the remainder of the building by a fire separation having not less than a 1-hr fire-resistance rating.

(3) Except as provided in (4) and (5), or unless otherwise permitted by the authority having jurisdiction, fuel-fired appliances other than fireplaces, shall be located in a service room or service space designed for this purpose and separated from the remainder of the building by a fire separation having not less than a 1-hr fire-resistance rating.

(4) Where prior approval has been obtained from the authority having jurisdiction, fuel-fired space heating, space cooling and service water heating appliances that serve a single room, space or suite of rooms, or serving a building having a building area of not more than 4000 sq ft and containing not more than 2 storeys including basement or cellar, need not be separated from the remainder of the building as required in (3).

(5) Service rooms containing incinerators shall be separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than 2 hr.

(6) The design, construction, installation and alteration of each indoor incinerator shall conform to NFPA 82-1971, "Standard on Incinerators and Rubbish Handling."

(7) Every incinerator shall be connected to a chimney flue conforming to the requirements in Section 21. Such chimney flue shall serve no other appliance.

(8) An incinerator shall not be located in a room with other fuel-fired appliances unless permitted by the authority having jurisdiction.

(9) Rooms for the temporary storage of combustible refuse or for public storage shall be separated from the remainder of the building by a fire separation having not less than a 1-hr fire-resistance rating, except that a ¾-hr fire separation is permitted where the fire-resistance rating of the floor assembly is not required to exceed ¾ hr, or where such rooms are sprinklered.

(10) Cooking equipment in kitchens, other than in dwelling units, that is used in processes producing smoke or grease-laden vapours shall be equipped with a mechanical exhaust system and shall conform to Sections 3, 4, 6 and 10 of NFPA 96, 1971, "Standard for the Installation of Equipment for the Removal of Smoke and Grease-laden Vapors from Commercial Cooking Equipment".

J. FIREWALLS

(1) Except as provided in (2), a party wall on a property line shall be constructed as a firewall.

(2) In a building in which there is no dwelling unit above another dwelling unit, a common wall or party wall on a property line between dwelling units need not be constructed as a firewall, provided it is constructed as a fire separation having not less than a 1-hr fire-resistance rating. Such walls shall provide continuous protection from the top of the footings to the underside of the roof deck. Any space between the top of such walls and the roof deck shall be tightly sealed by caulking with mineral wool or noncombustible material.

(3) A required firewall (see (1) and B (3)) shall be constructed as a fire separation having a fire-resistance rating of not less than 2 hr. Such firewall shall be of noncombustible construction (see also 10 E).

(4) Except as provided in (5), every firewall shall extend from the top of the footings continuously through all storeys and not less than 6 in. above the roof surface where the firewall is required to have a 2-hr fire-resistance rating.

(5) In buildings of noncombustible construction, a firewall need not extend above the roof provided the roof assembly on both sides of the firewall has not less than a 1-hr fire-resistance rating where the firewall is required to have a 2-hr fire-resistance rating. Such firewall shall terminate at the underside of a solid roof slab or deck with a smoketight joint, and there shall be no concealed spaces within the roof slab in that portion above the firewall.

(6) A firewall may be offset at any intermediate floor construction, provided the fire separation for the complete assembly is continuous.

(7) Openings in a firewall shall conform to the requirements in 10 M.

K. CHUTES AND VERTICAL SHAFTS

(1) This Subsection applies to shafts and chutes in all buildings except where such shafts and chutes are entirely contained within a dwelling unit.

(2) Where a vertical shaft penetrates a floor construction required to be a fire separation, the shaft shall be separated from the floor area by a fire separation.

(3) Except as provided in (5), where the floor assembly through which a shaft passes is required to be a fire separation, the shaft walls shall have a fire-resistance rating conforming to Table 10A.

(4) Where the top of a shaft does not extend through the roof of the building, or where the bottom of the shaft does not extend to the bottom of the building, the top or bottom of the shaft shall be separated from the remainder of the building by a fire separation having a fire-resistance rating not less than that required for the shaft walls.

TABLE 10A — MINIMUM FIRE-RESISTANCE RATINGS FOR SHAFT WALLS

Minimum Required Fire-Resistance Rating of Floor Assembly Through Which the Shaft Passes	Type of Shaft	
	Exit and Elevator Shafts	Other Shafts
Less than ¾ hr	¾ hr	—
¾ hr	¾ hr	¾ hr
1 hr	¾ hr	¾ hr
1½ hr	1 hr	1 hr
2 hr	1½ hr	1 hr
Column 1	2	3

(5) Linen and refuse chutes shall be enclosed in a shaft constructed of noncombustible materials. Such shafts shall have a fire-resistance rating of not less than 1 hr where the chute outlet is protected with an approved automatic self-latching closure held open by a fusible link. Where such closure is not provided, the shaft shall have not less than a 2-hr fire-resistance rating.

(6) Linen and refuse chutes shall be lined with not less than 0.0157-in.-thick copper-bearing galvanized steel, 0.019-in.-thick aluminum or other approved material.

(7) The intake openings for refuse and linen chutes shall be located in a compartment having no dimension less than 30 in., separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than ¾ hr. Such compartment shall be used only as a facility for separating the intake opening from the remainder of the floor area unless otherwise permitted by the authority having jurisdiction and shall not open into an exit. The intake openings for such chutes shall be not greater in area than 60 per cent of the cross-sectional area of the chutes. Such openings shall be fitted with closures designed to close automatically after use.

(8) A refuse or linen chute shall discharge into a room or bin seperated from the remainder of the building by a fire separation. Such separations shall have a fire-resistance rating of not less than 1 hr in the case of linen chutes and not less than 2 hr in the case of refuse chutes. Doors into such rooms shall not be located in an exit.

(9) The room or bin into which a refuse chute discharges shall be of sufficient size to contain the refuse between normal intervals of emptying. Such rooms or bin shall be impervious to moisture and shall have wash water supply and floor drains. Chute discharge rooms shall contain no other service equipment unless permitted by the authority having jurisdiction.

(10) Automatic sprinklers shall be installed at the top of each refuse or linen chute, and in the room or bin into which the chute discharges.

(11) Every refuse chute shall be equipped at the top with spray equipment for washing the chute.

(12) Refuse and linen chutes exceeding 1 sq ft in cross-sectional area shall be vented to the exterior to conform to Part 6 of the National Building Code of Canada 1970.

L. PREVENTION OF FIRE SPREAD AT BUILDING EXTERIORS

(1) Openings in an exterior face of a building on either side of a firewall shall conform to the requirements in N (9).

(2) Where an exterior wall of a building is located above an adjacent roof having a fire-resistance rating of less than 1 hr and is part of a fire compartment in the same building, separate from that enclosed by the roof, every opening in such wall above the roof and within 15 ft horizontally of the roof shall be protected with wired glass in steel frames or glass blocks.

M. DOORS, DAMPERS AND OTHER CLOSURES IN FIRE SEPARATIONS

(1) Openings in required fire separations shall be protected with closures conforming to Table 10B, which shall be installed in accordance with NFPA 80-1970, "Standard for Fire Doors and Windows" unless otherwise specified herein (see also C (1)).

TABLE 10B — FIRE PROTECTION RATINGS FOR CLOSURES

Minimum Fire-Resistance Rating of Fire Separation, hr	Minimum Fire-Protection Rating of Closure, hr
Less than ¾	No minimum
¾	⅓ (1) (2)
1	¾ (1) (2)
1½	1
2	1½
3	2
4	3
Column 1	2

Notes to Table 10B:

(1) A 1¾-in. thick solid core wood door may be used where a minimum fire-protection rating of ⅓ hr is permitted or between a public corridor and an individually rented room, dwelling unit or suite of rooms. Such door shall have not more than ¼-in. clearance beneath and not more than ⅛ in. at the sides and top.

(2) Doors required to provide a ⅓-hr fire-protection rating or permitted to be 1¾-in. solid core wood shall be mounted in a wood frame of at least 2-in. thickness where the frame has not been tested and rated.

(2) Doors forming part of an exit or a public means of egress shall conform to 9 F in addition to this Subsection.

(3) Wired glass which has not been tested in accordance with C (1) is permitted as a closure in a fire separation required to have a fire-resistance rating of not more than 1 hr provided such glass is not less than ¼ in. thick. Such glass shall be mounted in steel frames. Individual panes of such glass shall not exceed 9 sq ft in area or 4 ft 6 in. in height and width and the area of glass between structural mullions shall not exceed 80 sq ft.

(4) Glass block that has not been tested in accordance with C (1) is permitted as a closure in a fire separation required to have a fire-resistance rating of not more than 1 hr provided each horizontal joint is reinforced with metal.

(5) Closures in fire separations shall not exceed 120 sq ft in area, and 12 ft in height and width. Except in exits, the aggregate width of such openings shall not exceed 25 per cent of the length of the fire separation in which they occur.

(6) Every door in an interior fire separation shall have an approved self-closing device and latch or other approved device designed to close and hold the door closed, except that self-closing devices need not be provided for doors at the entrance to individually rented sleeping rooms, suites, or dwelling units which do not open directly into an exit or which are not located in a dead-end corridor.

(7) Approved hold-open devices may be installed on closures other than those on exit stairwells, when permitted by the authority having jurisdiction. Such devices shall be activated by the sprinkler system, or fire alarm system or smoke or thermal detector system.

(8) Swing-type doors to service rooms such as boiler, furnace or incinerator rooms shall swing into such rooms, where such doors lead to public corridors or rooms used for assembly. Such doors shall swing outward from such rooms in all other cases. Doors from such rooms shall not lead directly into an exit.

(9) Except as permitted in 10 D (3) and M (10), M (11) and M (12), where a duct pierces a required fire separation, a fire damper shall be installed in the duct at the fire separation in conformance with Article 3.1.7.1. in Part 3 of the National Building Code of Canada 1970.

(10) Fire stop flaps in ceiling membranes required in 10 D (3) shall be constructed of not less than 0.0667-in. thick sheet steel with ⅛-in. thick asbestos on the unexposed side and be equipped with corrosion resistant pins and hinges. Such dampers shall be designed to close automatically at a temperature 50°F above the maximum temperature that will normally be encountered in the system.

(11) Where a noncombustible branch duct having a melting point of at least 1200°F and a cross-sectional area of less than 20 sq in. supplies only air conditioning units discharging air at not more than 4 ft above the floor, no fire damper is required where the branch duct pierces a required fire separation provided the duct does not pierce the floor at more than one place.

(12) Where a noncombustible branch duct having a melting point of at least 1200°F pierces a required fire separation around an exhaust duct riser in which the air flow is upward, no fire damper is required provided the branch duct is carried up the inside of the riser at least 22 in.

(13) A door between an attached or built-in garage and a dwelling unit shall be tight fitting and weatherstripped to provide an effective barrier against the passage of gas and exhaust fumes, fitted with a self-closing device and shall not open into a room intended for sleeping.

(14) Openings shall not be permitted through doors in required fire separations unless such openings are protected with approved covers which will not significantly reduce the fire-protection rating or increase the passage of smoke through the door assembly.

(15) Where a 1¾-in. thick solid core wood door is permitted in a required fire separation, the requirement for a noncombustible sill in NFPA 80-1970, "Standard for Fire Doors and Windows", shall not apply.

N. SPATIAL SEPARATIONS BETWEEN BUILDINGS

(1) Except as provided in (4) to (6), the maximum percentage of unprotected openings calculated in accordance with (2) in an exposing building face shall conform to Table 10C. The maximum percentage of unprotected openings determined in accordance with Part 3 of the National Building Code of Canada 1970 shall be permitted as an alternative method for determining such allowable openings.

(2) The area of unprotected openings shall be calculated as the aggregate of the window and door openings which are not equipped with closures as described in 10 M and that portion of the wall having a fire-resistance rating less than that required in (6) to (8). Glass blocks and wired glass shall not be considered as closures for the purpose of this Article.

(3) The percentage of unprotected openings shown in Table 10C may be increased provided the aggregate area of unprotected openings in an exposing building face does not exceed the square of the limiting distance.

(4) The area of unprotected openings in (1) and (3) may be doubled where the building is sprinklered, or where the unprotected openings are glazed with wired glass in steel frames or glass blocks as described in M (3) and M (4).

(5) Where the limiting distance is 30 ft or more, an exposing building face on the first storey and facing a street may have unlimited unprotected openings.

TABLE 10C — MAXIMUM PERCENTAGE OF UNPROTECTED OPENINGS IN EXTERIOR WALLS

Maximum Area of Exposing Building Face[2]	Limiting Distance[1]								
	Less than 4 ft	4 ft	6 ft	8 ft	10 ft	15 ft	20 ft	30 ft	50 ft
Up to 300 sq ft	0	12	17	25	35	68	100	—	—
300 to 399 sq ft	0	11	15	21	29	54	89	100	—
400 to 499 sq ft	0	11	14	19	25	45	73	100	—
500 to 999 sq ft	0	9	10	14	17	28	43	88	100
Over 999 sq ft	0	6	7	10	12	17	23	41	100
Column 1	2	3	4	5	6	7	8	9	10

Notes to Table 10C:

(1) Limiting distance shall be measured at right angles from each exposing building face toward a property line between two buildings on the same property or centreline of a street or lane or to an assumed line between two buildings on the same property measured at right angles to the exposing building face.

(2) The area of an exposing building face shall be calculated as the total area of exterior wall facing in one direction on any side of a building measured from the finished ground level to the uppermost ceiling, except as follows: where a building is divided by fire separations into fire compartments, the area of exposing building face may be calculated for each fire compartment, provided such separations have not less than a ¾-hr. fire-resistance rating.

(6) Except as permitted in (7) and (8) each exposing building face shall be constructed to conform to Table 10D and Subsection 10 G.

TABLE 10D — MINIMUM CONSTRUCTION REQUIREMENTS FOR EXTERIOR WALLS

Maximum Percentage of Unprotected Openings Permitted. (See Table 10C)	Minimum Required Fire-Resistance Rating for Exposing Building Face(1)
10%	1 hr(2)(3)
25%	1 hr(3)
Less than 100%	¾ hr
Column 1	2

Notes to Table 10D:

(1) Heavy timber and steel columns need not comply with these requirements where the limiting distance is 10 ft or more.

(2) Shall be of noncombustible construction.

(3) Cladding shall be noncombustible.

(7) In buildings containing only dwelling units in which there is no dwelling unit located above another dwelling unit, the exposing building face may be of combustible construction. Such exposing building face shall have a minimum fire-resistance rating of ¾ hr except that where the limiting distance is 4 ft or more, no minimum fire-resistance rating is required. Any wall or other part of such buildings which is less than 2 ft from the boundary between two properties shall be clad with noncombustible material. Walls having a limiting distance of less than 4 ft shall have no unprotected openings.

(8) An exposing building face of a garage serving not more than one dwelling unit need not meet the requirements in (6). Where such exposing building face has a limiting distance of less than 2 ft, it shall have a fire-resistance rating of not less than ¾ hr.

(9) Where two exterior walls of two buildings meet at a firewall at an angle of 135 deg. or less, the distance from an opening on one side of the firewall to another opening on the other side of the firewall shall conform to Part 3 of the National Building Code of Canada 1970.

O. FIRE STOPPING

(1) Fire stops shall be provided at floor, ceiling and roof levels to cut off all concealed draft openings occurring between storeys and between the top storey and roof space.

(2) Fire stops shall be provided at the ceiling and floor level of furred walls and partitions. The maximum vertical dimension of any concealed space in a wall or partition of combustible construction shall not exceed 10 ft.

(3) Fire stops shall be provided at the top and bottom of each run of stairs where they pass through a floor containing concealed space.

(4) In unsprinklered buildings of combustible construction, every concealed space created by a suspended ceiling, roof space or unoccupied attic space shall be separated by fire stops into draft-tight compartments not more than 3000 sq ft in area where such space contains materials having a flame-spread rating greater than 25. No dimension of such space shall exceed 150 ft.

(5) Concealed spaces in mansard roofs, exterior cornices, balconies and canopies of combustible construction shall be fire stopped from the point where such concealed spaces extend across the ends of required fire separations.

(6) Fire stops shall consist of sheet steel, asbestos board, gypsum board, ½-in. minimum thickness of plywood with joints backed with similar material, two thicknesses of nominal 1-in.-thick lumber with joints staggered, or not less than 2-in.-thick lumber.

(7) Where fire stops are pierced by pipes, ducts or other elements, the effectiveness of the fire stops shall be maintained around such elements.

P. INTERIOR FINISH FLAME-SPREAD LIMITS

(1) Except as provided in (2) to (6), the exposed surface of every wall and ceiling shall have a surface flame-spread rating of not more than 150.

(2) Not less than 90 per cent of the exposed surface of every ceiling in an exit, or unsprinklered ceiling in a public corridor shall have a surface flame-spread rating of not more than 25.

(3) Not less than 90 per cent of the exposed surfaces of every wall of an exit, exclusive of doors, shall have a surface flame-spread rating of not more than 25 except that 25 per cent of the wall surface of a lobby at or near grade used as an exit may have a surface flame-spread rating of not more than 150.

(4) At least 90 per cent of the total wall surface, exclusive of doors, in any unsprinklered public corridor shall have a surface flame-spread rating of not more than 75, or not less than 90 per cent of the upper half of such walls, exclusive of doors, shall have a surface flame-spread rating of not more than 25.

(5) Light diffusers and lenses having a surface flame-spread rating of not more than 200 may be used where the required flame-spread rating of the ceiling is permitted to be 150 provided such diffusers and lenses are installed to conform to Part 3 of the National Building Code of Canada 1970.

(6) Where a covering or a lining is used with a duct, such lining or covering shall have a flame-spread rating conforming to Part 3 of the National Building Code of Canada 1970.

Q. ALARM AND DETECTION SYSTEMS

(1) Except as provided in (2) and (3), an approved fire alarm and fire detection system shall be provided in buildings of 3 storeys in building height or where sleeping accommodation is provided for 10 or more persons.

(2) A fire alarm and a fire detection system need not be provided where each dwelling unit or individually rented sleeping room has direct access to outdoors by a door at ground level or to a balcony with access to ground level.

(3) A fire alarm and a fire detection system need not be provided in buildings containing only dwelling units provided public corridors and exits serve not more than two dwelling units.

(4) Except for a recirculating air system serving not more than one dwelling unit, an approved smoke detection system shall be installed in recirculating air systems where such systems supply more than one storey or more than one individually rented room or suite of rooms (see also 33 E (2)).

(5) Fire alarm, fire detection and smoke detection devices shall be installed in accordance with Part 6 of the National Building Code of Canada 1970.

R. FIRE FIGHTING

(1) Except as provided in (2), a window or access panel providing an opening not less than 42 in. high and 22 in. wide and having a sill height of not more than 36 in. above the floor shall be provided on the second and third storey of every building in at least one wall facing on a street if such storeys are not sprinklered. Such access panels shall be readily openable from both inside and outside or be glazed with plain glass.

(2) Access panels as described in (1) need not be provided in buildings containing only dwelling units where there is no dwelling unit above another dwelling unit.

(3) Except in basements serving not more than one dwelling unit, each unsprinklered basement or cellar exceeding 75 ft in length or width shall be provided with direct access to the outdoors to at least one street. Such access may be provided by a door, window, or other means that provide an opening not less than 42 in. high and 22 in. wide, the sill height of which shall not be more than 36 in. above the floor. Access may also be provided by an interior stair accessible from the outdoors.

(4) Except when otherwise approved, every building shall be located so that it has access to a street, either directly, or indirectly by a yard at least 30 ft wide designed to be capable of carrying fire trucks at all times.

SECTION 11. SOUND CONTROL

A. SOUND TRANSMISSION CLASS RATING (AIRBORNE SOUND)

(1) This Section applies to all buildings, regardless of size.

(2) Sound transmission class ratings for construction shall be determined in accordance with ASTM E-90-66T, "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions."

B. REQUIRED SOUND CONTROL LOCATIONS (AIRBORNE SOUND)

(1) Construction shall provide a sound transmission class rating of not less than 45 between dwelling units in the same building and between a dwelling unit and any space common to two or more dwelling units.

(2) Every service room or space such as storage room, laundry, workshop or building maintenance room or garage serving more than one dwelling unit, shall be separated from the dwelling units by a construction providing a sound transmission class rating of not less than 45.

(3) Construction described in Appendix A as having airborne sound ratings of I and II shall be deemed to satisfy the requirements of (1) and (2).

SECTION 12. EXCAVATION

A. GENERAL

(1) The top soil and vegetable matter in all unexcavated areas under a building shall be removed.

(2) The bottom of every excavation shall be free of all organic material.

(3) Excavations shall be kept free of standing water.

(4) The bottom of excavations shall be kept from freezing throughout the entire construction period.

B. DEPTH

(1) Excavations for foundations shall extend to undisturbed soil.

(2) The minimum depth of foundations shall conform to Table 12A except that lesser depths are permitted where local experience with the soil conditions shows that lesser depths are satisfactory or where the foundation is specially designed for lesser depths.

(3) The minimum depth of foundations for exterior steps with more than 2 risers shall conform to (2). Steps with one and two risers may be laid on ground level.

TABLE 12A — MINIMUM DEPTHS OF FOUNDATIONS

Type of Soil(1)	Foundation Containing Heated Basements, Cellars, or Crawl Space		Foundation Containing No Heated Space	
	Good Soil Drainage to at Least the Depth of Frost Penetration(2)	Poor Soil Drainage	Good Soil Drainage to at Least the Depth of Frost Penetration(2)	Poor Soil Drainage
Rock	No limit	No limit	No limit	No limit
Coarse grained soils	No limit	No limit	No limit	Below the depth of frost penetration(2)(3)
Silt	No limit	No limit	Below the depth of frost penetration(2)(3)	Below the depth of frost penetration(2)(3)
Clay or soils not clearly defined (4)	4 ft(3)	4 ft(3)	4 ft but not less than the depth of frost penetration(2)(3)	4 ft but not less than the depth of frost penetration(2)(3)

Notes to Table 12A:

(1) These soils may be identified according to Guide to the Field Description of Soils, published by the Associate Committee on Geotechnical Research, National Research Council of Canada (NRC No. 3813).

(2) Depth of frost penetration shall be as established by the authority having jurisdiction.

(3) Does not apply to non-residential accessory buildings of one storey in height and not more than 500 sq ft floor area or to buildings not more than 14 ft wide with a floor structure that will permit foundation movement without damage to the superstructure.

(4) Intended to apply to soils that are subject to significant volume change with change in soil moisture content.

C. BACKFILL

(1) Backfill shall be placed to avoid damaging the drainage tile or the waterproofing of walls.

(2) Backfill shall be graded to prevent drainage towards the foundation after settling.

(3) Backfill within 2 ft of the foundation shall be free of deleterious debris and boulders larger than 10 in. diam.

D. TRENCHES BENEATH FOOTINGS

The soil in trenches beneath footings for sewers and watermains shall be compacted by tamping up to the level of the footing base or shall be filled with concrete having a strength not less than 1500 psi to support the footing.

SECTION 13. WATERPROOFING AND DAMPPROOFING

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Where hydrostatic pressure occurs, floors on ground and exterior surfaces of walls below ground level shall be waterproofed.

(3) Where hydrostatic pressure does not occur and the exterior finished ground level is at a higher elevation than the ground level inside the foundation walls, exterior surfaces of foundation walls below ground level shall be dampproofed.

(4) Except as provided in (5) when hydrostatic pressure does not occur, slabs on ground in other than garages shall be dampproofed.

(5) When hydrostatic pressure does not occur, floor slabs in unfinished basements or cellars need not be dampproofed when the slab is supported on a base of granular fill as described in 16 B.

(6) The method of application of all bituminous waterproofing and dampproofing materials shall conform to one of the following:

CGSB 37-GP-3b (1971), "Application of Emulsified Asphalts for Dampproofing and Waterproofing,"

CGSB 37-GP-12b (1971), "Application of Unfilled Cutback Asphalt for Dampproofing,"

CGSB 37-GP-22b (1971), "Application of Unfilled Tar Cutback Foundation Coating for Dampproofing."

B. MATERIAL

Bituminous materials used for dampproofing or waterproofing shall conform to one of the following:

CGSB 37-GP-2c (1971), "Emulsified Asphalt: Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings,"

CGSB 37-GP-6c (1971), "Cutback Asphalt: Unfilled, for Dampproofing,"

CGSB 37-GP-16c (1971), "Cutback Asphalt: Filled, for Dampproofing and Waterproofing Systems,"

CGSB 37-GP-17b (1971), "Asphalt: Hot Application, for Dampproofing and Waterproofing Systems,"

CGSB 37-GP-18c (1971), "Cutback: Tar, Unfilled, for Dampproofing."

C. WATERPROOFING OF WALLS

(1) Unit masonry walls to be waterproofed, shall be parged on exterior surfaces below ground level with not less than ¼ in. of mortar conforming to Section 20. Concrete walls shall have all holes and recesses resulting from removal of form ties sealed with mortar or waterproofing material.

(2) Walls to be waterproofed shall be covered with not less than two layers of bitumen-saturated membrane with each layer being cemented in place with bitumen and coated over-all with a heavy coating of bitumen.

D. WATERPROOFING OF FLOORS

Basement floors to be waterproofed shall have a system of membrane waterproofing provided between two layers of concrete each of which shall be not less than 3 in. thick. The floor membrane shall be mopped to the wall membrane to form a complete seal.

E. DAMPPROOFING OF WALLS

(1) Unit masonry walls to be dampproofed shall be parged on the exterior face below ground level with not less than ¼ in. of mortar, conforming to Section 20 and shall be coved over the footing when the first course of block is laid. Concrete walls shall have any holes and recesses resulting from the removal of form ties sealed with cement mortar or dampproofing material.

(2) A heavy coat of bituminous or other approved dampproofing material shall be applied over the parging or concrete below ground level.

(3) Where a separate interior cladding is applied to a foundation wall which is in contact with the soil, or where wood members are applied to such walls for the installation of insulation or finish, the interior surface of the foundation wall below ground level shall be dampproofed. The dampproofing shall extend from the basement floor and shall terminate at ground level. No membrane shall be applied above ground level between the insulation and the foundation wall. Dampproofing shall consist of at least 2-mil polyethylene lapped 4 in. at the joints or at least two mopped-on coats of bitumen, or a material providing equivalent performance.

F. DAMPPROOFING OF SLABS

(1) When slabs are dampproofed, the dampproofing shall be installed below the slab, except that where a separate floor is provided over the slab, the dampproofing may be applied to the top of the slab.

(2) When installed below the slab, dampproofing shall consist of 6-mil polyethylene or 45-lb roll roofing. Dampproofing shall be lapped not less than 4 in. at the joints.

(3) When installed above the slab, dampproofing shall consist of at least 2 mopped-on coats of bitumen, 2-mil polyethylene or other material providing equivalent performance.

G. DAMPPROOFING OF CRAWL SPACES

Crawl spaces shall be dampproofed in accordance with Section 18.

SECTION 14. DRAINAGE

A. SCOPE

(1) This Section applies to subsurface drainage and to surface drainage for all buildings regardless of size.

(2) Drainage for crawl spaces shall conform to Section 18.

(3) Sanitary drains and floor drains shall conform to Section 32.

(4) Drainage requirements beneath floor slabs shall conform to Section 16.

B. GENERAL

Unless otherwise permitted by the authority having jurisdiction, all exterior foundation walls shall be drained by drainage tile or pipe laid around the exterior of the foundation so that the top of the tile or pipe is below the bottom of the floor slab or crawl space.

C. MATERIAL

Drain tile and drain pipe shall conform to the following:

ASTM C4-62, "Clay Drain Tile,"

ASTM C211-68, "Standard and Extra Strength Perforated Clay Pipe,"

ASTM C412-65, "Concrete Drain Tile,"

ASTM C444-68, "Perforated Concrete Pipe,"

CGSB 34-GP-22a (1970), "Pipe: Asbestos-Cement, Drain,"

CGSB 56-GP-1b (1970), "Pipe: Bituminized Fibre, Drain and Sewer,"

CGSB 56-GP-10a (1970), "Pipe: Bituminized Fibre, Perforated,"

CSA B182.1-1967, "Plastic Drain and Sewer Pipe and Pipe Fittings for use Underground."

D. INSTALLATION

(1) Drain tile or pipe shall be laid on undisturbed or well-compacted soil.

(2) Drain tile or pipe with butt joints shall be laid with ¼-in. to ⅜-in. open joints. The top half of such joints shall be covered with No. 15 asphalt or tar-saturated paper or felt.

(3) When perforated drain pipe is used, the pipe shall be laid with perforations down. Such pipe may be connected with couplings.

(4) The top and sides of drain pipe or tile shall be covered with not less than 6 in. of crushed stone or other coarse clean granular material containing not more than 10 per cent of material that will pass a No. 4 sieve.

E. DRAINAGE DISPOSAL

(1) Drain pipe or tile shall drain to a sewer, drainage ditch, or dry well.

(2) Where gravity drainage is not practical, a covered sump with an automatic pump shall be provided to discharge the water into a sewer, drainage ditch or dry well.

(3) Dry wells shall be not less than 15 ft from the building foundation and located so that drainage is away from the building. Dry wells may be used only

when located in areas where the natural groundwater level is below the bottom of the dry well.

F. SURFACE DRAINAGE

(1) Adequate surface water drainage shall be provided over the entire building site.

(2) The building site shall be graded to direct surface water away from the building. Where the grading will result in the collection of surface water on the site, catch basins to carry such surface water from the site shall be installed or other acceptable method of drainage used to dispose of surface water without soil erosion. Surface drainage shall be directed away from the location of a water supply well or septic tank disposal bed.

(3) Driveways, walks, terraces, retaining walls or other construction shall not be constructed to interfere with the flow of surface drainage. Where runoff water from a driveway is likely to accumulate or enter a garage, a catch basin shall be installed to provide adequate drainage.

(4) Where downspouts are provided and are not connected to a sewer, provision shall be made to prevent soil erosion.

SECTION 15. FOOTINGS AND FOUNDATIONS

A. SCOPE

(1) This Section applies to foundations erected on average stable soils where the building is of other than reinforced concrete or steel frame construction. (See Section 36 for small garages and carports.)

(2) Where a foundation is erected on fill, soft till, loose or very loose sand, loose or very loose sand and gravel, soft or very soft clay, the appropriate requirements in Section 4.2 of the National Building Code of Canada 1970 shall apply. (See Section 4.2 of the National Building Code of Canada 1970 for an explanation of soil types.)

B. GENERAL

(1) The authority having jurisdiction may permit a foundation design to deviate from the requirements in this Section where it is designed for the existing soil conditions in accordance with accepted engineering practice or where past experience shows the foundation design to be adequate.

(2) Foundation walls shall be constructed of monolithic concrete, unit masonry or other approved material. Footings shall be constructed of concrete or other approved material.

(3) Concrete shall conform to Section 3. Concrete for unreinforced footings and foundation walls shall have a minimum compressive strength of 2000 psi after 28 days.

(4) Concrete block shall be load-bearing type conforming to requirements in CSA A165.1-1964, "Hollow Load-Bearing Concrete Masonry Units" and CSA A165.3-1964, "Solid Load-Bearing Concrete Masonry Units."

(5) Mortar, mortar joints, corbelling and protection for unit masonry shall conform to Section 20.

(6) Where pier type foundations are used, the piers shall be designed to support the applied loads from the superstructure in conformance with good engineering practice.

C. FOOTINGS

(1) Footings shall be provided under walls, pilasters, columns, piers, fireplaces and chimneys that bear on soil. Footings may be omitted under monolithic concrete walls if the safe bearing capacity of the soil or rock is not exceeded.

(2) Footings shall rest on undisturbed soil or rock.

(3) Footings shall be of a size to support adequately all superimposed loads. Except as required in (4), the footing size shown in Table 15A may be used provided the length of supported joists does not exceed 16 ft and the design live load on any floor supported by the footing does not exceed 50 lb per sq ft (Table 4A). Where the design live load exceeds 50 lb per sq ft or the length of the supported joists exceeds 16 ft, footings shall be designed in accordance with Section 4.2 of the National Building Code of Canada 1970.

(4) Where a foundation rests on gravel, sand or silt in which the water table level is less than the width of the footings below the bearing surface, the footing width shall be not less than twice the width shown in Table 15A.

TABLE 15A — MINIMUM FOOTING SIZES

No. of Floors Supported	Minimum Widths of Strip Footings		Minimum Area of Column (1) Footings
	Supporting Exterior Walls	Supporting Interior Walls	
1	10 in.(2)	8 in.	4½ sq ft
2	14 in.(2)	14 in.	8 sq ft
3	18 in.(2)	20 in.	11 sq ft
Column 1	2	3	4

Notes to Table 15A:

(1) Columns spaced not more than 8 ft o.c.

(2) For each storey of masonry veneer over wood-frame construction, footing widths shall be increased by 2½ in. For each storey of masonry construction other than foundation walls, the footing width shall be increased by 5 in.

(5) The thickness of footings shall be not less than the projection beyond the face of the supported elements, except where the footing is suitably reinforced. In no case shall the footing thickness be less than 4 in.

D. FOUNDATION WALLS

(1) Where average stable soils are encountered, the thickness of foundation walls subject to lateral earth pressure shall conform to Table 15B for walls not exceeding 8 ft in unsupported height.

(2) Exterior foundation walls shall extend not less than 6 in. above finished ground level.

(3) Where the top of a foundation wall is reduced in thickness to permit the installation of floor joists, the reduced section shall not be higher than 14 in. and not less than 3⅝ in. thick.

(4) Where the top of a foundation wall is reduced in thickness to permit the installation of a masonry exterior facing, the reduced section shall be not less than 3⅝ in. thick and tied to the facing material with metal ties conforming to 20 I (5) spaced not more than 8 in. o.c. vertically and 36 in. o.c. horizontally. The space between wall and facing shall be filled with mortar.

TABLE 15B — THICKNESS OF FOUNDATION WALLS

Type of Foundation Wall	Minimum Wall Thickness, in.	Maximum Height of Finish Grade Above Basement Floor or Inside Grade	
		Foundation Wall Laterally Unsupported At the Top (1) to (4), ft — in.	Foundation Wall Laterally Supported At the Top (1) to (4), ft — in.
Solid Concrete (2000 psi min. strength)	6	2 — 6	5 — 0
	8	4 — 0	7 — 0
	10	4 — 6	7 — 6
	12	5 — 0	7 — 6
Solid Concrete (3000 psi min. strength)	6	2 — 6	6 — 0
	8	4 — 0	7 — 6
	10	4 — 6	7 — 6
	12	5 — 0	7 — 6
Unit masonry	6	2 — 0	2 — 0
	8	3 — 0	4 — 0
	10	4 — 0	6 — 0
	12	4 — 6	7 — 0
Column 1	2	3	4

Notes to Table 15B:

(1) Foundation walls are considered laterally supported at the top if the floor joists are embedded in the top of the foundation walls or if the floor system is anchored to the top of the foundation walls with anchor bolts, in which case the joists may run either parallel or perpendicular to the foundation wall.

(2) When a foundation wall contains an opening more than 4 ft. in length or openings in more than 25 per cent of its length, that portion of the wall beneath such openings shall be considered laterally unsupported unless the wall around the opening is reinforced to withstand the earth pressure.

(3) When the length of solid wall between windows is less than the average length of the windows, the combined length of such windows shall be considered as a single opening.

(4) When foundation walls support masonry walls, the foundation wall is considered to be laterally supported by the first floor.

(5) Corbelling of foundation walls supporting cavity walls shall conform to 20 L (2).

(6) Crack control joints shall be provided in foundation walls exceeding 80 ft in length at intervals of not more than 50 ft. Such joints shall be designed to resist moisture penetration and shall be keyed to prevent relative displacement of the wall portions adjacent to the joint.

(7) Interior masonry foundation walls not subject to lateral earth pressure shall conform to Section 20.

E. JOIST AND BEAM SUPPORT

(1) Foundation walls of hollow unit masonry supporting floor joists shall be capped with at least 2 in. of solid masonry or concrete or have the top course filled with mortar or concrete except that such capping may be omitted when the joists are supported on a wood plate not less than 2 in. by 4 in. where the siding overlaps the foundation wall not less than ½ in.

(2) Not less than an 8-in. depth of solid masonry shall be provided beneath beams supported on masonry. The ends of such beams shall be protected from the weather by not less than 2 in. of masonry or mortar.

(3) Pilasters shall be provided under beams that frame into 6-in. unit masonry foundation walls. Pilasters shall be not less than 4 in. by 12 in. and shall be bonded or tied into the wall. The top 8 in. of pilasters shall be solid.

F. PARGING AND FINISHING

(1) Concrete block foundation walls shall be parged on the exterior face below ground level as required in Section 13.

(2) All form ties shall be removed at least flush with the concrete surface.

(3) Exterior surface of concrete block foundation walls above ground level shall have tooled joints, or shall be rendered, parged or otherwise suitably finished.

SECTION 16. SLABS ON GROUND

A. SCOPE

(1) This Section applies to basement and cellar slabs and to floor slabs-on-grade with perimeter foundation walls that support the superstructure.

(2) Floor slabs-on-grade without foundation walls to support the superstructure shall be designed for the existing soil conditions in accordance with good engineering practice and past practice in the area in which the slab is to be built.

B. SLAB SUPPORTS

(1) When granular fill is used beneath basement and cellar slabs (see 13 A (4)) it shall consist of not less than 5 in. of coarse clean granular material containing not more than 15 per cent by weight of material passing a No. 10 sieve. Where dampproofing or waterproofing is provided, such fill is not required.

(2) The soil beneath concrete slabs-on-grade shall be compacted. Not less than 5 in. of coarse clean granular material containing not more than 15 per cent by weight of material passing a No. 10 sieve shall be provided beneath the slab and shall be compacted.

C. DAMPPROOFING AND WATERPROOFING

Dampproofing and waterproofing of basement and cellar slabs and slabs-on-grade shall conform to Section 13.

D. DRAINAGE

(1) Where groundwater levels may cause uplift pressure against the bottom of a slab-below-grade, lateral drains shall be installed under the slab or the slab shall be designed to resist such uplift pressures.

(2) The accumulation of water underneath a slab-on-grade shall be prevented by grading, drainage or other method.

(3) When floor drains are installed (see Section 32) the floor surface shall be so sloped that no water will accumulate.

E. CONCRETE

(1) Concrete for floor slabs shall conform to Section 3 and shall have a maximum slump of 3 in.

(2) The finished surface shall be trowelled smooth and even. Dry cement shall not be added to the floor surfaces to absorb surplus water.

(3) When a topping course is provided it shall consist of 1 part cement to 2½ parts clean well-graded sand by volume with a water cement ratio approximately equal to that of the base slab.

F. THICKNESS AND HEIGHT

(1) Concrete slabs-on-ground shall be not less than 3 in. thick exclusive of concrete topping. When concrete topping is provided it shall be not less than ¾ in. thick.

(2) The top of every slab-on-grade shall be not less than 6 in. above exterior finished ground level.

G. REINFORCEMENT

Concrete slabs-on-grade except for slabs for garages and carports serving dwelling units shall be reinforced with not less than ⅜-in. diam. steel spaced 24 in. o.c. in both directions, or 6 in. by 6 in., 6/6 mesh. Such reinforcement shall be located near the mid-depth of the slab.

H. PIPES AND DUCTS

(1) Metal pipes in contact with cinders or other corrosive material shall be protected by a heavy coating of bitumen or other approved corrosion protection.

(2) Ducts in slabs shall be completely encased with not less than 2 in. of concrete and installed so that water will not accumulate in the ducts (see also Section 34).

SECTION 17. COLUMNS

A. SCOPE

(1) This Section applies to columns used to support carport roofs (see Section 36), and beams carrying loads from not more than 2 wood-frame floors where the length of joists carried by such beams does not exceed 16 ft and the live load on any floors does not exceed 50 lb per sq ft (see Table 4A).

(2) Columns for applications other than as described in (1) shall be designed in accordance with good engineering practice.

B. GENERAL

(1) Columns shall be centrally located on a footing conforming to Section 15.

(2) Columns shall be securely fastened to the supported member to prevent lateral movement.

C. STEEL COLUMNS

(1) Except as permitted in (2), steel pipe columns shall have a minimum outside diameter of 2⅞ in. and a minimum wall thickness of 3/16 in.

(2) Columns of sizes other than as specified in (1) may be used where the load-bearing capacities are shown to be adequate.

(3) Except as permitted in (4), steel columns shall be fitted with not less than 4-in. x 4-in. by ¼-in. thick steel plates at each end.

(4) The top plate required in (3) may be omitted where a column supports a steel beam and provision is made for the attachment of the column to the beam by welding or other approved method.

(5) Columns shall be treated on the outside surface with at least one coat of rust-inhibitive paint.

D. WOOD COLUMNS

(1) The width or diameter of a wood column shall be not less than the width of the supported member. Except as provided in 36 E (2) columns shall be not less than 8 in. for round columns and 6 in. by 6 in. for rectangular columns unless calculations are provided to show that lesser sizes are adequate.

(2) Wood columns shall be either solid, glued laminated, or built up. Built-up columns shall consist of not less than 2-in.-thick full-length members bolted together with not less than ½-in. diam. bolts spaced not more than 18 in. o.c., or nailed together with not less than 3¼-in. nails spaced not more than 12 in. o.c. Glued-laminated columns shall conform to Section 4.3 of the National Building Code of Canada 1970.

(3) Wood columns shall be separated from concrete in contact with the ground by 2-mil polyethylene film or 45-lb roll roofing or other approved dampproofing material.

E. UNIT MASONRY COLUMNS

(1) Unit masonry columns shall be built of load-bearing masonry units.

(2) Unit masonry columns shall have minimum nominal dimensions of 12 in. by 12 in. or 10 in. by 16 in.

F. SOLID CONCRETE COLUMNS

(1) Concrete shall conform to Section 3.

(2) Concrete columns shall be not less than 8 in. by 8 in. for rectangular columns and 9 in. diameter for circular columns.

SECTION 18. CRAWL SPACES

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) In this Section, a crawl space refers to a space beneath a floor with clearance less than required for basements and cellars.

(3) Foundations enclosing crawl spaces shall conform to Section 15.

(4) Insulation shall conform to Section 26.

(5) Heating of crawl spaces shall conform to Section 34.

B. ACCESS

(1) An access opening of not less than 1 ft 8 in. by 2 ft 4 in. shall be provided to each crawl space where the crawl space serves a single dwelling unit and not less than 1 ft 10 in. by 3 ft for other crawl spaces.

(2) Access openings shall be fitted with a door or hatch except when the access opening into the crawl space is from the adjacent basement and provides ventilation to the crawl space.

C. VENTILATION

(1) Crawl spaces shall be ventilated by natural or mechanical means.

(2) Except as otherwise permitted in (5), natural ventilation for crawl spaces shall be provided to the outside air by not less than 1 sq ft of unobstructed vent area for every 500 sq ft of floor area.

(3) Vents for crawl spaces shall be designed to prevent the entry of snow, rain or insects and shall be provided with tight-fitting covers to prevent air leakage in winter if the crawl space is heated.

(4) Vents for crawl spaces shall be uniformly distributed on opposite sides of the building.

(5) Ventilation to the outside air is not required when the crawl space is used as a warm air plenum or if the crawl space is vented to an adjacent basement or cellar with an opening conforming to C (2).

D. CLEARANCE

(1) The ground level in a crawl space shall be not less than 12 in. below the level of all joists and beams.

(2) Where equipment requiring service such as plumbing cleanouts, traps and burners, is located in crawl spaces, an access way with a minimum height and width of 2 ft shall be provided from the access door to the equipment and for a distance of 3 ft on the side or sides of the equipment to be serviced.

E. DRAINAGE

(1) Unless groundwater levels and site conditions are such that water will not accumulate in the crawl space, the crawl space floor and access trenches shall be sloped to drain to sewer, ditch or dry well.

(2) Drains shall conform to Section 14.

F. GROUND COVER

A ground cover consisting of not less than 2 in. of asphalt or 1500 psi portland cement concrete, 45-lb roll roofing or 4-mil polyethylene shall be provided in every crawl space. Joints in sheet-type ground cover shall be lapped not less than 4 in. and weighted down with stone, or by other approved means.

G. FIRE PROTECTION

Crawl space used as warm air plenums shall be restricted to one-storey portions of dwelling units. Enclosing material, including insulation, shall have a surface flame-spread rating not greater than 150. Combustible ground cover shall be covered with noncombustible material or have noncombustible receptacles beneath the register openings.

SECTION 19. ROOF SPACES

A. SCOPE

This Section applies to all buildings regardless of size.

B. VENTILATION

(1) Except as provided in (2), every attic or roof space above an insulated ceiling shall be ventilated with openings to the exterior to provide unobstructed vent area of not less than 1/300 of the insulated ceiling area. Vents may be roof type, eave type, gable-end type or any combination thereof, and shall be uniformly distributed on opposite sides of the building. Vents shall be designed to prevent the entry of rain, snow or insects.

(2) A roof space in a building containing not more than one storey need not be vented provided the vapour barrier protecting the ceiling insulation is Type 1 (see 26 C (3)) and is applied as a single continuous sheet without openings over the entire ceiling area. Openings such as for plumbing vents may be cut in such vapour barrier provided the perimeter of such openings is sealed in a manner that will maintain the effectiveness of the vapour barrier.

C. ACCESS

Every attic space more than 2 ft in height at the highest point shall be provided with an access stair or shall have a hatchway of not less than 22 in. by 36 in. except that where such hatchway serves not more than one dwelling unit the hatchway may be reduced to 20 in. by 28 in. Hatchways shall be fitted with doors or covers.

SECTION 20. ABOVE-GRADE MASONRY

A. SCOPE

(1) This Section applies to unreinforced masonry and masonry veneer in which the wall height above the foundation wall does not exceed 36 ft and in which the roof or floor system above the first storey is not of concrete construction.

(2) For buildings other than those described in (1), or where the masonry is designed on the basis of design loads and allowable stresses, Section 4.4 of the National Building Code of Canada 1970 shall apply.

(3) In seismic Zone 3, load-bearing elements of masonry buildings more than one storey in height shall be reinforced with at least the minimum amount of reinforcement as required in 20 R.

(4) In seismic Zone 2, load-bearing masonry elements of three-storey masonry buildings shall be reinforced with at least the minimum amount of reinforcement as required in 20 R.

B. MASONRY UNITS

(1) Masonry units shall comply with one of the following:

CSA A82.1-1965, "Burned Clay Brick,"

CSA A82.3-1954, "Sand-Lime Building Brick,"

CSA A82.4-1954, "Structural Clay Load-Bearing Wall Tile,"

CSA A82.5-1954, "Structural Clay Non-Load-Bearing Tile,"

CSA A82.25-1950, "Gypsum Partition Tile or Block,"

CSA A165.1-1964, "Hollow Load-Bearing Concrete Masonry Units,"

CSA A165.2-1964, "Hollow Non-Load-Bearing Concrete Masonry Units,"

CSA A165.3-1964, "Solid Load-Bearing Concrete Masonry Units,"

CSA A165.4-1965, "Concrete Brick Masonry Units,"

ASTM C126-69, "Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units,"

ASTM C212-60, (1970), "Structural Clay Facing Tile."

(2) Used bricks shall be free of old mortar, soot or other surface coating and conform to (1).

(3) Glass blocks and gypsum masonry shall not be used as load-bearing units or in the construction of fireplaces or chimneys. Gypsum block shall not be exposed to soil, weather or dampness. Masonry made with foamed concrete shall not be used in contact with the soil or exposed to the weather unless approved for this purpose.

(4) Stone shall be sound and durable.

C. MORTAR

(1) Cementitious materials and aggregates for mortar shall comply with the following:

CSA A82.42-1950, "Quicklime for Structural Purposes,"

CSA A82.43-1950, "Hydrated Lime for Masonry Purposes,"

CSA A5-1971, "Portland Cements,"

CSA A8-1970 "Masonry Cement,"

CSA A82.22-1963, "Gypsum Plasters,"

CSA A82.26-1950, "Keene's Cement,"

CSA A82.56-1950, "Aggregate for Masonry Mortar."

(2) Water and aggregate shall be clean and free of significant amounts of deleterious materials.

(3) Lime used in mortar shall be hydrated.

(4) If lime putty is used in mortar, it shall be made by slaking quicklime in water for not less than 24 hr (see Appendix to CSA Standard A82.42-1950, "Quicklime for Structural Purposes") or soaking hydrated lime in water for not less than 12 hr.

TABLE 20A — MORTAR MIX PROPORTIONS
(by volume)

Permissible Use of Mortar	Portland Cement	Masonry Cement (Type H)	Lime	Aggregate
All locations(1)	½ to 1 1	1 —	— ¼ to ½	Not less than 2¼ and not more than 3 times the sum of the volumes of the cement and lime
All locations(1) except foundation walls and piers	— 1	1 —	— ½ to 1¼	
All locations except load bearing walls of hollow units, parapets, walls and chimneys	1	—	1¼ to 2½	
All non-load-bearing partitions and all load-bearing walls of solid units except foundation walls, parapet walls and chimneys	1 —	— —	2¼ to 4 1	
Column 1	2	3	4	5

Note to Table 20A:

(1) These mixes shall not be used for sand-lime brick or concrete brick. Where sand-lime or concrete brick is used, a mix consisting of 1 part masonry cement to 3 parts aggregate by volume may be used.

(5) Except as provided in (6) and (7) mortar mixes shall conform to Table 20A. Mortar containing portland cement shall not be used later than 2½ hr after mixing.

(6) Mortar for gypsum units shall consist of 1 part gypsum and not more than 3 parts aggregate by weight.

(7) Mortar for glass block shall consist of 1 part portland cement, 1 part hydrated lime to not more than 4 parts aggregate, by volume.

D. MORTAR JOINTS

(1) Maximum average joint thickness shall be ½ in. Maximum thickness of an individual joint shall be ¾ in.

(2) Solid masonry units shall be laid with full head and bed joints.

(3) Hollow masonry units shall be laid with mortar applied to head and bed joints of both inner and outer face shells.

E. MASONRY SUPPORT

(1) All masonry shall be supported on masonry, concrete or steel.

(2) Masonry over openings shall be supported by steel, reinforced concrete or masonry lintels or arches designed to support the imposed load.

(3) Every masonry wall shall be at least as thick as the wall it supports except as otherwise permitted in L (2).

F. THICKNESS AND HEIGHT

(1) Masonry exterior walls, other than cavity walls, in one-storey buildings and the top storey of two-storey buildings shall be not less than 5½ in. thick provided the walls are not more than 9 ft high at the eave and 15 ft high at the peak of a gable end. The exterior walls of the bottom storey of two-storey buildings and all walls of 3-storey buildings shall be not less than 7½ in. thick. In walls composed of more than one wythe, each wythe shall be not less than 3⅝ in. thick.

(2) Cavity walls shall have not less than 3⅝-in.-thick wythes separated by a cavity of not less than 2 in. nor more than 3 in. except that where the wythes are bonded together with masonry units, the cavity shall not be less than 3 in. and not more than 4 in. The minimum thickness of cavity walls above the supporting base shall be 10 in. for the top 25 ft and 14 in. for the remaining portion.

(3) The thickness of load-bearing interior walls shall be determined on the basis of J (1).

(4) Interior non-load-bearing partitions shall be not less than 2⅝ in. thick (see J (1)).

(5) Masonry veneer resting on a bearing support shall be of solid units not less than 3 in. thick for wall heights up to 36 ft. Such veneer over wood-frame walls shall have not less than a 1-in. air space behind the veneer. Masonry veneer less than 3⅝ in. thick shall have unraked joints.

(6) Masonry veneer individually supported by the back-up material shall conform to the appropriate requirements contained in Section 4.4 of the National Building Code of Canada 1970.

(7) The height of parapet walls above the adjacent roof surface shall be not more than three times the parapet wall thickness. Parapet walls shall be solid from the top of the parapet to not less than 1 ft below the adjacent roof level.

(8) Limestone slab facings and precast concrete panel facings shall conform to the appropriate requirements of Section 4.4 of the National Building Code of Canada 1970.

G. CHASES AND RECESSES

(1) Except as permitted in (3) and (5), the depth of any chase or recess shall not exceed ⅓ the thickness of the wall, and the horizontal projection of the chase or recess shall not exceed 20 in.

(2) Except as permitted in (3) and (5), no chase or recess shall be constructed in any wall 8 in. or less in thickness.

(3) Chases may be constructed in 8-in. walls provided they do not exceed 4 in. in depth, 30 in. in height and the total horizontal projection of the chase does not exceed 20 in.

(4) Chases and recesses shall be not less than 4 times the wall thickness apart and not less than 2 ft away from any pilaster, cross wall, buttress or other vertical element providing required lateral support for the wall.

(5) Chases or recesses that do not conform to the limits specified in (1) to (4) shall be considered as openings and any masonry supported above such a chase or recess shall be supported by a lintel or arch.

(6) Chases and recesses shall not be cut into walls made with hollow units after the masonry units are in place.

H. SUPPORT OF LOADS

(1) Load-bearing walls of hollow masonry units supporting roof or floor framing members shall be capped with not less than 2 in. of solid masonry, or have the top course filled with concrete. Capping may be omitted where the roof framing is supported on a wood plate not less than 2 in. thick, the same width as the masonry wall.

(2) Floor joists supported on cavity walls shall be supported on solid units not less than 2½ in. in height. Floor joists shall not project into the cavity. Roof and ceiling framing members bearing on cavity walls shall be supported on not less than 2½ in. of solid masonry, bridging the full thickness of the wall, or a wood plate not less than 2 in. thick, bearing not less than 2 in. on each wythe.

(3) The bearing area under beams and joists shall be sufficient to carry the supported load. In no case shall the minimum length of end bearing of beams supported on masonry be less than 3⅝ in. The minimum length of end bearing of floor, roof or ceiling joists supported on masonry shall be not less than 1½ in.

(4) Beams and columns supported on masonry walls shall be supported on pilasters where the thickness of the masonry wall or wythe is less than 8 in. Not less than 8-in. thickness of solid masonry or concrete shall be provided under the beam or column. Pilasters shall be bonded or tied to masonry walls. Concrete pilasters shall be not less than 2 in. by 12 in.; unit masonry pilasters shall be not less than 4 in. by 12 in.

(5) The distance from the face of a wall to the edge of a supporting member attached to the structure such as a shelf angle or the flange of a beam shall not exceed 1¼ in., except as otherwise permitted in Section 4.4 of the National Building Code of Canada 1970.

I. BONDING AND TYING

(1) Vertical joints in adjacent courses of walls and partitions shall be offset unless each wythe of masonry is reinforced with the equivalent of not fewer than 2 corrosion-resistant steel bars of 0.148 in. diam. placed in the horizontal joints at vertical intervals not exceeding 18 in. Where joints in the reinforcing occur, the bars shall be lapped not less than 6 in.

(2) Masonry walls that consist of two or more wythes shall have the wythes bonded or tied together with masonry bonding units as described in (3) or with metal ties as described in (4) to (6).

(3) Where wythes are bonded together with masonry units, the bonding units shall comprise not less than 4 per cent of the wall surface area. Bonding units shall be spaced not more than 24 in. o.c. vertically and horizontally in the case of brick masonry and 36 in. o.c. in the case of block or tile. Such units shall extend not less than 3⅝ in. into adjacent wythes.

(4) Where two or more wythes are bonded together with metal ties of the individual rod type, the ties shall conform to the requirements in (5) to (8). Other metal bonding ties may be used where it can be shown that such ties provide walls that are at least as strong and as durable as those made with the individual rod type.

(5) Metal ties of the individual rod type shall be corrosion resistant and shall have a minimum cross-sectional area of not less than 0.0276 sq in. Such ties shall have not less than a 2-in. portion bent at right angles at each end.

(6) Metal ties of the individual rod type shall extend from within 1 in. of the outer face of the wall to within 1 in. of the inner face of the wall and shall be completely embedded in mortar except for the portion exposed in cavity walls. Such ties shall be staggered from course to course.

(7) Where two or more wythes in walls, other than cavity walls are bonded together with metal ties of the individual rod type, the space between wythes shall be completely filled with mortar. Such ties shall be located within 12 in. of openings and spaced not more than 36 in. apart around openings. Ties at other locations shall be spaced not more than 36 in. apart horizontally and 18 in. apart vertically.

(8) Where the inner and outer wythes of cavity walls are bonded together with metal ties of the individual rod type, the ties shall be shaped to provide a drip near their centres. Such ties shall be spaced not more than 24 in. apart horizontally within 4 in. of the bottom of each tier of floor joists where the cavity extends below the joists and not more than 36 in. apart around openings within 12 in. of the openings. At other locations, the ties shall be spaced not more than 36 in. apart horizontally and 18 in. apart vertically.

(9) Masonry veneer 3 in. or more in thickness and resting on a bearing support shall be tied to masonry back-up or to wood framing members with not less than 28-gauge ⅞-in.-wide corrosion-resistant straps spaced in accordance with Table 20B and shaped to provide a key with the mortar.

TABLE 20B — VENEER TIE SPACING

Maximum Vertical Spacing, in.	Maximum Horizontal Spacing, in.
16	32
20	24
24	16
Column 1	Column 2

(10) Masonry veneer individually supported by masonry or wood-frame back-up shall be secured to the back-up in conformance with Section 4.4 of the National Building Code of Canada 1970.

(11) Glass block shall have horizontal joint reinforcement of 2 corrosion-resistant bars of not less than 0.148 in. diam. or expanded metal strips not less than 3 in. wide spaced at vertical intervals not exceeding 24 in. for units 8 in. or less in height and in every horizontal joint for units higher than 8 in. Reinforcement shall be lapped not less than 6 in.

J. LATERAL SUPPORT

(1) Masonry walls and partitions shall be supported at right angles to the wall by floor or roof construction or by intersecting masonry walls or buttresses. The spacing of such supports shall conform to Table 20C.

(2) Floor and roof constructions providing required lateral support for walls as required in (1) shall be constructed to transfer lateral loads to walls or buttresses approximately at right angles to the laterally supported walls.

TABLE 20C — MAXIMUM DISTANCE BETWEEN LATERAL WALL SUPPORTS

Type of Wall	Maximum Spacing of Supports
Load-bearing walls of solid units	20 times the wall thickness
Load-bearing walls of hollow units or cavity walls	18 times the wall thickness
Non-load-bearing walls or partitions	36 times the wall thickness
Column 1	2

K. ANCHORAGE OF ROOFS, FLOORS AND INTERSECTING WALLS

(1) Where required to provide lateral support (see Subsection J) masonry walls shall be anchored to each tier of joists, beams, or floor construction at maximum intervals of 6 ft 8 in., except that anchorage of floor joists not more than 3 ft above grade may be omitted. Ties shall be corrosion resistant and be not less than the equivalent of 1½-in. by 3/16-in.-thick steel straps. Such anchors shall be shaped to provide a mechanical key with the masonry and shall be securely fastened to the horizontal support to develop the full strength of the tie. When joists are parallel to the wall, such ties shall extend across at least 3 joists.

(2) Where required to provide lateral support, intersecting walls or partitions shall be bonded or tied together. Fifty per cent of the adjacent masonry units in the intersecting wall shall be embedded in the laterally supported wall, or corrosion-resistant metal ties equivalent to not less than 3/16 in. by 1½ in. steel strapping shall be provided. Such ties shall be spaced not more than 2 ft 8 in. o.c. vertically and shaped at both ends to provide sufficient mechanical key to develop the strength of the ties.

(3) Wood-framed walls or partitions shall be tied to intersecting masonry walls with not less than 3/16-in. diam. corrosion-resistant steel rods spaced not more than 36 in. o.c. vertically. The ties shall be anchored to the wood framing at one end and shaped to provide a mechanical key at the other end to develop the strength of the tie.

(4) Roof systems of wood-frame construction shall be tied to exterior walls by not less than ½-in.-diameter anchor bolts spaced not more than 8 ft apart embedded not less than 4 in. into the masonry and fastened to a rafter plate of not less than nominal 2-in.-thick lumber. Alternatively the roof system may be anchored by nailing the wall furring strips to the side of the rafter plate.

(5) Cornices, sills or other trim of masonry material which projects beyond the wall face shall have not less than 65 per cent of their mass but not less than 3⅝ in. within the wall, or shall be adequately anchored to the wall with corrosion-resistant anchors.

(6) Where anchor bolts are to be placed in the top of a pier, the pier shall be capped with concrete or reinforced masonry not less than 12 in. thick.

L. CORBELLING

(1) All corbelling shall consist of solid units. The units shall be corbelled so that the horizontal projection of any unit does not exceed 1 in. and the total projection does not exceed ⅓ the total wall thickness.

(2) Cavity walls of greater thickness than the foundation wall on which they rest shall not be corbelled but may project 1 in. over the outer face of the foundation wall disregarding parging. The unit masonry foundation wall may be corbelled to meet flush with the inner face of a cavity wall provided the individual corbel does not exceed ½ the height or ⅓ the width of the corbelled unit and the total corbel does not exceed ⅓ the foundation wall thickness.

(3) Masonry veneer resting on a bearing support shall not project more than 1 in. beyond the supporting base where the veneer is at least 3⅝ in. thick, and ½ in. beyond the supporting base where the veneer is less than 3⅝ in. thick. In the case of rough stone veneer, the projection, measured as the average projection of the stone units, shall not exceed ⅓ the bed width beyond the supporting base.

M. FLASHING

(1) Exposed flashing shall consist of not less than 4-lb sheet lead, 28-GSG galvanized copper-bearing steel, 14-oz. copper, 11-oz. zinc, or 0.019-in.-thick aluminum. Aluminum flashing in contact with masonry or concrete shall be effectively coated or separated from the masonry or concrete by an impervious membrane.

(2) Concealed flashing shall consist of not less than 4-lb sheet lead, 28-GSG copper-bearing steel, 14-oz. copper, 11-oz. zinc, 45-lb roll roofing, 6-mil polyethylene or 2-oz. copper or aluminum laminated to felt or kraft paper.

(3) Fastening devices for flashing shall be corrosion resistant and compatible with the flashing with respect to galvanic action.

(4) Flashing shall be installed in masonry and masonry veneer walls beneath jointed masonry window sills, over the back and top of parapet walls, over the heads of glass block panels, beneath weep holes and over the heads of window or door openings in exterior walls when the vertical distance between the top of a window or door trim and the bottom edge of the eave exceeds ¼ of the horizontal eave overhang.

(5) When installed beneath jointed masonry window sills or over the heads of openings, flashing shall extend from the front edge of the masonry up behind the sill or lintel.

(6) Flashing beneath weep holes in cavity walls shall be installed so that it is bedded in both wythes and slopes toward the outside wythe. Such flashing shall be bedded not less than 1 in. in the inside wythe and shall extend to the outside of the outer wythe.

(7) Flashing beneath weep holes in masonry veneer over wood-frame walls shall be installed so that it extends from the front edge of the masonry to 6 in. up behind the sheathing paper.

N. WEEP HOLES

Weep holes spaced not more than 2 ft apart shall be provided at the bottom of the cavity wall and masonry veneer wall construction to drain the cavity to the exterior.

O. DAMPPROOFING

(1) Unless protected for full height by a roof of a carport or porch, exterior walls other than cavity walls shall be parged on the interior surface and covered with No. 15 breather-type asphalt-saturated paper or felt conforming to CGSB

9-GP-2(1951), "Paper: Building, Sheathing, Water Repellent (Breather Type)" lapped at least 4 in. at the joints. Where the insulation effectively limits the passage of water vapour and is applied by a waterproof adhesive or by mortar directly to the masonry, the requirements for parging and building paper do not apply.

(2) Cavity walls shall be constructed so that mortar droppings are prevented from forming a bridge to allow the passage of rainwater across the cavity.

(3) The junction between door and window frames with masonry shall be caulked (see also Section 28).

(4) Where no flashing is installed beneath window sills such sills shall be provided with a drip not less than 1 in. from the wall surface.

P. EXTERIOR FINISH

Above-grade exterior walls of concrete block shall be stuccoed, painted or otherwise finished to provide breather-type water repellency.

Q. PROTECTION

(1) Mortar and masonry shall be maintained at a temperature of not less than 40°F during installation and for not less than 48 hr after installation. No frozen material shall be used in the mix.

(2) The top surface of uncompleted masonry exposed to the weather shall be completely covered with a waterproofing material when construction is not in progress.

R. REINFORCEMENT FOR EARTHQUAKE RESISTANCE

(1) Where reinforcement is required in this Section, masonry walls shall be reinforced horizontally and vertically with steel having a total cross-sectional area of not less than 0.002 times the cross-sectional area of the wall, so that not less than ⅓ of the required steel area is installed horizontally and vertically.

(2) Where reinforcement for masonry is required in this Section, it shall be installed in conformance with the requirements for reinforced masonry as contained in Part B of NBC Supplement No. 4 (1970).

SECTION 21. CHIMNEYS AND FLUES

A. GENERAL

(1) Where a chimney exceeds 40 ft in height or where the cross-sectional area of a flue exceeds 126 sq in. or where the capacity of an appliance connected to a flue has a rated input exceeding 400,000 Btu per hr, the requirements in Part 6 of the National Building Code of Canada 1970 shall apply.

(2) Metal chimneys consisting of a single thickness of metal shall conform to the requirements in Part 6 of the National Building Code of Canada 1970.

(3) Factory-built chimneys shall conform to U.L.C. 103-1963, "Chimneys, Factory-Built."

(4) Where a metal gas vent is used for venting of gas-burning appliances, such appliances shall be vented in accordance with CSA B149.1-1971, "Installation Code for Natural Gas Burning Appliances and Equipment."

(5) Dampers and draft regulators in flue pipes serving oil-fired appliances shall conform to CSA B139-1971, "Installation Code for Oil Burning Equipment."

(6) Chimneys or gas vents approved for gas appliances but not suitable for solid- or liquid-fuel-fired appliances shall be plainly and permanently marked to that effect.

(7) The authority having jurisdiction may require a chimney, vent or flue pipe to be tested for gas, smoke and flame tightness.

B. CHIMNEY FLUES

(1) A chimney flue serving a fireplace or incinerator shall not serve any other appliance.

(2) Two or more fuel-burning appliances, other than fireplaces, may be connected to the same flue provided adequate draft is maintained for the connected appliances and the connections are made at different elevations.

(3) Chimney flues shall not be inclined more than 45 deg. to the vertical.

(4) The size of a chimney flue shall conform to Table 21A unless calculations are provided to show that smaller sizes can be justified.

(5) The width of a rectangular or oval chimney flue shall not be less than two-thirds its breadth.

TABLE 21A — FLUE SIZES

Maximum Rated Input[1] of one or more appliances, Btu/hr	Minimum size of flue or flue pipes[2]	
	Round	Rectangular
105,000	6-in. diam.	8 in. x 8 in. nom.
175,000	7-in. diam.	8 in. x 8 in. nom.
280,000	8-in. diam.	8 in. x 8 in. nom.
400,000	9-in. diam.	8 in. x 12 in. nom.
Column 1	2	3

Notes to Table 21A:

(1) Minimum size required for fireplace flues shall be 9 in. in diam. for round flues and 8 in. by 12 in. for rectangular flues.

(2) Where the flues serve only one appliance, the flue area shall be at least equal to the flue pipe connected to it.

C. CHIMNEY LINING

(1) Every masonry or concrete chimney shall have a lining of clay, firebrick or other approved material.

(2) Clay liners shall conform to the requirements in ASTM C315-56 (1965), "Clay Flue Linings." Such liners shall be not less than 5/8 in. thick and shall be capable of resisting without softening or cracking a temperature of 2000°F.

(3) Firebrick liners shall conform to ASTM C64-61, "Fireclay Brick Refractories for Heavy Duty Stationary Boiler Service," or to ASTM C153-61, "Fireclay Brick Refractories for Moderate Duty Stationary Boiler Service." Such fire brick shall be laid with fire clay mortar or high temperature cement mortar.

(4) Chimney liners shall be installed when the surrounding masonry or concrete is placed. Spaces between the liner and surrounding masonry shall not be filled with mortar where the chimney walls are less than 7½ in. in thickness.

(5) Chimney liners shall extend from a point not less than 8 in. below the lowest flue pipe connection to a point not less than 2 in. above the chimney cap.

D. MASONRY AND CONCRETE CHIMNEY CONSTRUCTION

(1) Unit masonry shall conform to Section 20.

(2) Concrete shall conform to Section 3.

(3) Footings for masonry chimneys and concrete chimneys shall conform to the requirements in Section 15.

(4) A chimney flue shall extend not less than 3 ft above the highest point at which the chimney comes in contact with the roof, and not less than 2 ft above the highest roof surface or structure within 10 ft of the chimney. Not more than 8 in. of chimney flue above the top of the chimney cap may be considered in computing this height. Chimneys shall be braced when necessary to provide lateral stability.

(5) The top of a chimney shall have a waterproof cap of concrete, metal, or other approved material. The cap shall slope from the lining and be provided with a drip not less than 1 in. from the chimney wall. Jointed masonry chimney caps shall have flashing installed beneath the cap extending from the liner to the drip edge.

(6) A cleanout opening, equipped with a metal frame and a tight-fitting metal door shall be installed near the base of the chimney flue.

(7) The walls of a masonry chimney shall be built of solid units not less than 3 in. thick.

(8) Flues in the same chimney shall be separated by not less than 3 in. of solid masonry or concrete exclusive of liners where clay liners are used, or 3½ in. of firebrick where firebrick liners are used.

(9) Junctions with adjacent materials shall be adequately flashed to shed water.

E. FLUE PIPES

(1) Flue pipes connecting a fuel-burning appliance to a chimney flue shall be made of metal conforming to Table 21B.

(2) Flue pipes shall be as short and as straight as possible.

(3) The cross-sectional area of the flue pipe shall not be less than the area of the flue outlet of the appliance, except that a tapered reduction in the section of the flue adjacent to the chimney is permitted provided adequate draft is maintained.

TABLE 21B — WALL THICKNESS OF FLUE PIPES

Maximum Diameter of Flue Pipe, in.	Minimum Metal Thickness (1)				
	Galvanized Steel (GSG)		Uncoated Steel (MSG)		Aluminum (B & SG)
	Oil and Gas Fuels	Solid Fuels	Oil and Gas Fuels	Solid Fuels	Gas Fuels
4	30	28	28	26	26
5	30	28	28	26	24
8	28	26	26	24	24
10	26	24	24	22	22
Column 1	2		3		4

Note to Table 21B:

(1) **The minimum metal thickness in inches equivalent to the gauge numbers are found in Table 6.1.4.A. of Part 6 of the National Building Code of Canada 1970.**

(4) The flue pipe connection with the chimney shall be made by a metal thimble or masonry flue ring. The connection shall be tight and made so that the flue pipe does not extend into the chimney flue.

(5) A flue pipe shall be supported by metal or other noncombustible supports.

(6) No flue pipe shall pass through an attic, closet, concealed space, or floor.

F. CLEARANCE FROM COMBUSTIBLE CONSTRUCTION

(1) The clearance between concrete or masonry chimneys and combustible framing shall be not less than 2 in. for interior chimneys and ½ in. for exterior chimneys.

(2) A clearance of not less than 6 in. shall be provided between a cleanout opening and combustible material.

(3) All spaces between masonry or concrete chimneys and combustible framing shall be sealed top or bottom with noncombustible material.

(4) Flooring shall have not less than a ½-in. clearance from masonry or concrete chimneys. Wood trim shall be separated from masonry or concrete chimneys by not less than ⅛ in. of asbestos, asbestos millboard or other noncombustible material.

(5) The clearance between flue pipes and unprotected combustible material shall be not less than 18 in., except that where the flue gas temperature does not exceed 750°F, the clearance may be reduced to 9 in. Where an 18-in. clearance is required, it may be reduced to the values shown in Table 21C where combustible material is protected.

(6) Joists or beams may be supported on masonry walls which enclose chimney flues provided the combustible members are separated from the flue by a maximum of 12 in. of solid masonry.

TABLE 21C — CLEARANCE BETWEEN A FLUE PIPE AND PROTECTED COMBUSTIBLE MATERIAL

Type of Protection Applied to the Combustible Material Unless Otherwise Specified and Covering All Surfaces Within 18 in. of the Flue Pipe	Clearance Between Flue Pipe and Combustible Material in.
¼-in. asbestos millboard spaced out 1 in. by noncombustible material	12
0.0129-in. sheet metal on ¼ in. asbestos millboard	12
0.0129-in. sheet metal spaced out 1 in. by noncombustible material	9
0.0129-in. sheet metal on ⅛ in. asbestos millboard spaced out 1 in. by noncombustible material	9
1½-in. asbestos-cement covering on flue pipe	9
0.0259-in. sheet metal on 1 in. mineral wool batts reinforced with wire mesh or equivalent	3
Column 1	2

SECTION 22. FIREPLACES

A. GENERAL

(1) The requirements in Subsections B to H apply to all buildings regardless of size.

(2) Except as otherwise stated in this Section, unit masonry shall conform to Section 20, and concrete to Section 3.

(3) Footings for masonry and concrete fireplaces shall conform to Section 15.

B. FIREPLACE LINERS

(1) Every fireplace shall have a liner of not less than 2 in. of fire brick or an approved steel liner.

(2) Fire brick liners shall be laid with fire clay mortar or high temperature cement mortar.

C. WALL THICKNESS

(1) When a 2-in. fire brick liner or a steel liner is used without an air circulating chamber, the back and sides of a fireplace shall be not less than 7½ in. thick when constructed of masonry of solid units, and 12 in. thick when constructed of hollow units or stone, exclusive of liner thickness. When hollow units are used, the backs and sides shall consist of two wythes with all joints staggered in adjacent wythes.

(2) When a fire brick liner not less than 3½ in. is used, the thickness of the liner may be included as part of the wall thickness required in (1).

(3) When a steel fireplace liner is used with an air circulating chamber surrounding the firebox, the back and sides of the fireplace shall consist of not less than 3½-in. thickness of solid masonry units, or 7½-in. thickness of hollow masonry units.

D. OPENINGS

Masonry above openings shall be supported by steel, reinforced concrete or a masonry arch.

E. HEARTH

(1) Fireplaces shall have a noncombustible hearth extending not less than 16 in. in front of the fireplace opening and not less than 8 in. beyond each side of the fireplace opening.

(2) The hearth shall be supported on not less than a 6-in.-thick trimmer arch of solid masonry units or not less than a 4-in.-thick reinforced concrete trimmer.

F. DAMPER

The throat of every fireplace shall be equipped with a metal damper sufficiently large to cover the full area of the throat opening.

G. SMOKE CHAMBER

The sides of the smoke chamber connecting a fireplace throat with a flue shall not be sloped at an angle greater than 45 deg. to the vertical. Wall thickness of the smoke chamber, above the damper shall conform to the chimney wall thickness in Section 21. Every smoke chamber shall be parged on the inside surface with fire clay or high temperature cement mortar or protected with tapered clay or concrete tile liners.

H. FACTORY-BUILT FIREPLACES

Factory-built fireplaces shall comply with ULI 127-1970 "Fireplaces, Factory-Built."

SECTION 23. WOOD-FRAME CONSTRUCTION

A. SCOPE

(1) This Section applies to conventional wood-frame construction in which the framing members are spaced not more than 24 in. o.c.

(2) The requirements in this Section with regard to floor framing, subflooring and their fastenings apply to floors for which the design live load does not exceed 50 lb per sq ft.

(3) The requirements in this Section with regard to wall framing and its fastenings apply to walls which support floors for which the design live load does not exceed 50 lb per sq ft on any floor.

(4) Where the conditions in (2) or (3) are exceeded the design of the framing and fastening shall conform to Section 4.3 of the National Building Code of Canada 1970.

(5) Post, beam and plank construction and plank-frame wall construction shall conform to Sections 24 and 25 respectively.

B. GENERAL

(1) All members shall be so framed, anchored, fastened, tied and braced to provide the necessary strength and rigidity.

(2) Ends of wood joists or beams and other members framing into masonry or concrete shall be treated to prevent decay where the bottom of the member is at or below ground level or a ½-in. air space shall be provided at the end and sides of the member.

(3) Wood framing shall be separated from concrete in contact with the ground by 2-mil polyethylene, 45-lb roll roofing, or other approved dampproofing material.

(4) Lumber shall conform to the appropriate requirements in Subsection 3 C.

C. NAILS AND STAPLES

(1) Nails specified in this Section shall be common steel wire nails, conforming to CSA B111-1967, "Wire Nails, Spikes and Staples," unless otherwise indicated. Other nails providing at least equivalent performance may also be used.

(2) All nails shall be long enough so that not less than half their length penetrates into the second member. Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from the edges.

(3) Nailing of framing shall conform to Table 23A.

TABLE 23A — NAILING FOR FRAMING

Construction Detail	Minimum Length of Nails (in.)	Minimum Number or Maximum Spacing of Nails
Floor joist to plate — toe nail	3¼	2
Wood or metal strapping to underside of floor joists	2¼	2
Cross bridging to joists	2¼	2 each end
Doubled header or trimmer joists	3	12 in. o.c.
Floor joist to stud (balloon construction)	3	2
Ledger strip to wood beam	3¼	2 per joist
Joist to joist splice (see also Table 23E)	3	2 at each end
Tail joist to adjacent header joist (end nailed) around openings	3¼ 4	5 3
Each header joist to adjacent trimmer joist (end nailed) around openings	3¼ 4	5 3
Stud to wall plate (each end) toe nail	2½	4
or end nail	3¼	2
Doubled studs at openings, or studs at partition or wall intersections and corners	3	30 in. o.c.
Doubled top wall plates	3	24 in. o.c.
Bottom wall plate or sole plate to joists or blocking (exterior walls)	3¼	16 in. o.c.
Interior partitions to framing or subflooring	3¼	24 in. o.c.
Horizontal member over openings in non-load-bearing partitions — each end	3¼	2
Lintels to studs	3¼	2 at each end
Ceiling joist to plate — toe nail each end	3¼	2
Roof rafter, roof truss, or roof joist to plate — toe nail	3¼	3
Rafter plate to each ceiling joist	4	2
Rafter to joist (with ridge supported)	3	3
Rafter to joist (with ridge unsupported)	3	see Table 23E
Gusset plate to each rafter at peak	2¼	4
Rafter to ridge board — toe nail	2¼	4
— end nail	3¼	3
Collar tie to rafter — each end	3	3
Collar tie lateral support to each collar tie	2¼	2
Jack rafter to hip or valley rafter	3¼	2
Roof strut to rafter	3	3
Roof strut to bearing partition — toe nail	3¼	2
2 by 6 or less plank decking to support	3¼	2
Plank decking wider than 2 by 6 to support	3¼	3
2-in. edge laid plank decking to support (toe nail)	3	1
2-in. edge laid plank to each other	3	18 in. o.c.
Column 1	2	3

(4) Fastening of sheathing and subflooring shall conform to Table 23B.

TABLE 23B — SHEATHING AND SUBFLOOR ATTACHMENT

Element	Min. Nail Length, in.	Min. Staple Length, in.(3)	Min. No. or Max. spacing
5/16 and 3/8 in. plywood or particleboard	2(1)	1½	6 in. o.c. along edges and 12 in. o.c. along intermediate supports
½ in. to ¾ in. plywood or particleboard	2(1)	2	
⅞ in. plywood or particleboard	2¼(1)	N/A	
7/16 in. and ½ in. fibreboard sheathing	1¾(2)	1½	
½ in. gypsum sheathing	1¾(2)	N/A	
Board lumber 8 in. or less wide	2	2	2 per support
Board lumber more than 8 in. wide	2	2	3 per support
Column 1	2	3	4

Notes to Table 23B:

(1) Nail length may be reduced ¼ in. if nails are annular grooved.

(2) Nails shall be not less than 10 gauge with min. head diameter of 7/16 in.

(3) Staples shall be not less than 16 gauge with not less than a ⅜-in. crown, driven with crown parallel to framing.

D. ALLOWABLE SPANS

(1) Except as required in (4), the spans for wood beams, joists and rafters shall conform to Appendix B for the uniform live loads shown in the tables for lumber graded under the grading rules shown in Table 3B.

(2) Except as required in (4), the spans for wood beams, joists and rafters shall conform to Appendix D for the uniform live loads shown in the tables for lumber graded under the grading rules shown in Table 3C.

(3) The spans for steel beams in basements, cellars and crawl spaces in one- and two-storey dwellings shall conform to Appendix C.

(4) Where a floor is required to be designed to support a concentrated load as specified in Table 4B, or supports a uniform live load in excess of those shown in the span tables, such spans shall be determined in conformance with Section 4.3 of the National Building Code of Canada 1970.

E. NOTCHING AND DRILLING

(1) Holes drilled in roof, floor or ceiling framing members, shall be not larger than ¼ the depth of the member and shall be located not less than 2 in. from the edges unless the depth of the member is increased by the size of the hole.

(2) Floor, roof and ceiling framing members may be notched provided the notch is located on the top of the member within ½ the joist depth from the edge of bearing and is not deeper than ⅓ the joist depth, unless the depth of the member is increased by the size of the notch.

(3) Wall studs shall not be notched, drilled or otherwise damaged so that the undamaged portion of the stud is less than ⅔ the depth of the stud if the stud is load-bearing, or 1⅝ in. if the stud is non-load-bearing unless the weakened studs are suitably reinforced.

(4) The top plates in load-bearing walls and partitions shall not be notched, drilled or otherwise weakened to reduce the undamaged width to less than 2 in. unless the weakened plates are suitably reinforced.

(5) Roof truss members shall not be notched, drilled or otherwise weakened unless such notching or drilling is allowed for in the design of the truss.

F. ANCHORAGE

(1) Building frames shall be anchored to the foundation, unless a structural analysis of wind and earth pressures shows anchorage is not required.

(2) Anchorage shall be provided by embedding the ends of the first floor joists in concrete, or fastening the sill plate to the foundation with not less than ½-in. diam. anchor bolts spaced not more than 8 ft o.c. Such anchor bolts shall be embedded not less than 4 in. in the foundation and so designed that they may be tightened without withdrawing the bolt from the foundation.

(3) Exterior columns and posts shall be anchored to resist uplift and lateral movement.

G. SILL PLATES

(1) Where sill plates provide bearing for the floor system they shall be not less than 2 in. by 4 in. material.

(2) Sill plates shall be levelled by setting them on a full bed of mortar, except that where the top of the foundation is level they may be laid directly on the foundation provided the junction between foundation and sill plate is caulked.

H. BEAMS FOR BASEMENTS, CELLARS AND CRAWL SPACES

(1) Beams shall have even and level bearing. Beams shall have not less than 3⅝ in. length of bearing at end supports.

(2) Steel beams shall be shop primed.

(3) Wood beams may be solid, glued laminated or built up. Built-up beams for dwelling units shall consist of nominal 2 in. lumber, vertically nail laminated. Except as provided in (4), the joints in built-up beams shall occur over supports or within 6 in. of the quarter points of the clear span. Where located near the quarter points, the joints in built-up beams shall be separated by at least one lamination and shall not exceed half the beam width.

(4) When the number of laminations in a built-up beam exceeds the number shown in Appendixes B or D, the joints may be at locations other than described in (3). The distance between joints shall be not less than 4 times the depth of the beam when located in adjacent vertical laminations and not less than twice the depth of the beam when not in adjacent vertical laminations.

I. FLOOR JOISTS

(1) Except when supported on ribbon boards, floor joists shall have not less than 1½ in. length of end bearing. Ribbon boards shall be not less than 1 in. by 4 in. lumber let into the studs.

(2) Floor joists may be supported on the top of beams or may be framed into the sides of beams.

(3) When framed into the side of a wooden beam, the joists shall be supported on joist hangers or other acceptable mechanical connectors or on not less than 2 in. by 3 in. ledger strips nailed to the side of the beam.

(4) When framed into the side of steel beams, the joists shall be supported on the bottom flange of the beam or on not less than 2-in. by 2-in. lumber bolted to the web with not less than ¼-in.-diam. bolts spaced not more than 24 in. apart. Such joists shall be spliced above the beam with not less than 2-in. by 2-in. lumber at least 2 ft long to support the flooring. Not less than a ½-in. space shall be provided between the splice and the beam to allow for shrinkage of the wood joists.

(5) Unless ceiling furring or plywood cladding is installed on the underside of floor joists, floor joists shall be restrained from twisting at the end supports and at intervals between supports not exceeding 7 ft. Such restraint may be provided at end supports by toe nailing to the support, or by end nailing the joists to the header joist. Restraint at the intermediate locations or at the ends may be provided by not less than 1-in. by 3-in. or 1½-in. by 2-in. cross bridging, or 1-in. by ⅛-in. steel strapping or 1-in. by 4-in. continuous wood strapping nailed to each joist and fastened at each end to the header or sill to prevent over-all movement. Blocking tightly fitted between joists and securely nailed in place is also acceptable for restraining joist twisting.

(6) Header joists around floor openings shall be doubled when they exceed 4 ft in length. The size of header joists exceeding 10 ft 8 in. in length shall be determined by calculations.

(7) Trimmer joists around floor openings shall be doubled when the length of the header joist exceeds 32 in. When the header joist exceeds 6 ft 8 in. in length the size of the trimmer joists shall be determined by calculations.

(8) When tail joists and header joists are supported by the floor framing, they shall be supported by suitable joist hangers, nailing or other approved connectors.

(9) Non-load-bearing partitions parallel to floor joists shall be supported on beams, load-bearing walls or doubled joists where the partition is over 6 ft in length and contains openings that are not full ceiling height. Where such partitions contain no openings, or openings that are full ceiling height, the joists need not be doubled. Non-load-bearing partitions less than 6 ft in length need not be supported on framing but may be supported by the subfloor. Doubled joists may be separated not more than 8 in. by blocking if the blocking is not less than 2-in. by 4-in. lumber spaced not more than 4 ft apart.

(10) Non-load-bearing partitions at right angles to the floor joists are not restricted as to location.

(11) Load-bearing interior walls parallel to floor joists shall be supported by beams or walls of sufficient strength to transfer safely the design loads to the vertical supports.

(12) Load-bearing interior walls at right angles to floor joists shall be located not more than 3 ft from the joist support when the wall does not support a floor and not more than 2 ft from the joist support when the wall supports one or more floors, unless the joist size is designed to support such loads.

J. WALL STUDS

(1) Wall studs shall be continuous for the full storey height except at openings and shall not be spliced except by approved type of glued joints.

(2) Wall studs shall be placed at right angles to the wall face, except that studs on the flat may be used in gable ends of roofs that contain only unfinished space or in non-load-bearing partitions. (See Note 1 to Table 23C.)

(3) Corners and intersections shall be designed to provide adequate support for the vertical edges of interior and exterior cladding materials and in no instance shall exterior corners be framed with less than the equivalent of two studs. Where the vertical edges of interior cladding at wall intersections are supported at vertical intervals by blocking or other acceptable method, the vertical distance between such supports shall not exceed the maximum distance between supports specified in Section 30.

(4) Except as provided in (5), studs shall be doubled on each side of openings so that the inner studs extend from the lintel to the bottom wall plate and the outer studs extend from the top wall plates to the bottom wall plate.

(5) Single studs may be used on either side of openings in non-load-bearing partitions provided the studs extend from the top wall plate to the bottom wall plate.

(6) The size and spacing of studs shall conform to Table 23C.

TABLE 23C — SIZE AND SPACING OF STUDS

Type of Wall	Supported Loads (including dead loads)	Minimum Stud Size, in.	Maximum Stud Spacing, in.	Maximum Unsupported Height, ft.
Interior	No Load	2 by 2 2 by 4 flat	16 16	8 12
	Limited Attic Storage(1)	2 by 3 2 by 4	24 24	10 12
	Full attic storage,(2) or roof-load, or limited attic storage(1) plus one floor	2 by 4	24	12
	Full attic storage(2) plus one floor, or roof load plus one floor, or limited attic storage plus two floors	2 by 4	16	12
	Full attic storage(2) plus two floors, or roof load plus two floors	2 by 4 3 by 4 2 by 6	12 16 16	12 12 14
	Full attic storage(2) plus three floors, or roof load plus three floors	2 by 6	12	14
Exterior	Roof, with or without attic storage	2 by 3 2 by 4	16 24	8 10
	Roof, with or without attic storage plus one floor	2 by 4	16	10
	Roof, with or without attic storage plus two floors	2 by 4 3 by 4 2 by 6	12 16 16	10 10 12
	Roof, with or without attic storage plus three floors	2 by 6	12	6
Col. 1	2	3	4	5

Notes to Table 23C:

(1) Applies to attics not accessible by a stairway.

(2) Applies to attics accessible by a stairway.

K. WALL PLATES

(1) Wall plates shall be not less than 2 in. thick and the same width as the wall studs except that in non-load-bearing partitions and in load-bearing walls where the studs are located directly over framing members, the bottom wall plate may be ¾ in. thick.

(2) A bottom wall plate shall be provided in all cases. The bottom plate in exterior walls shall not project more than ⅓ the plate width over the support.

(3) Except as permitted in (4) to (6), no fewer than 2 top plates shall be provided in load-bearing walls.

(4) A single top plate may be used in a section of a bearing wall containing a lintel provided the top plate forms a tie across the lintel.

(5) A single top plate may be used in load-bearing walls where the concentrated loads from ceilings, floors and roofs are not more than 2 in. to one side of the supporting studs and in all non-load-bearing partitions.

(6) The top plates may be omitted in a section of load-bearing wall containing a lintel, provided the lintel is tied to the adjacent wall section with not less than 3-in. by 6-in. 20-GSG galvanized steel or 1-in. by 4-in. by 12-in. wood splice nailed to each wall section with no fewer than three 2½-in. nails.

(7) Joints in top plates of load-bearing walls shall be staggered at least one stud spacing.

(8) The top plates in load-bearing walls shall be lapped or otherwise suitably tied at corners and intersecting walls. Joints in single top plates used with load-bearing walls shall be suitably tied. Such ties shall be the equivalent of at least 3-in. by 6-in. 20-GSG galvanized steel nailed to each wall with at least the equivalent of three 2½-in. nails.

L. FRAMING OVER OPENINGS

(1) Except as provided in (4), openings in non-load-bearing partitions shall be bridged with not less than 2-in. material, the same width as the studs securely nailed to adjacent studs.

(2) Openings in load-bearing walls shall be bridged with lintels designed to carry superimposed loads to adjacent studs. Except as provided in (4), where two or more members are used in lintels, they shall be fastened together with not less than 3¼-in. nails in a double row, with nails not more than 18 in. apart in each row. The lintel members may be separated by filler pieces.

(3) In buildings where the wall studs exceed 2 in. x 3 in. in size and where the spans of supported joists do not exceed 16 ft and the spans of trusses do not exceed 32 ft, the spans for wood lintels shown in Table 23D may be used except that where the lumber is graded in conformance with the grading rules shown in Table 3B, the lintel spans for exterior walls shall be reduced by at least 1 in. per ft of span.

(4) In load-bearing exterior and interior walls of 2 in. x 3 in. framing members, lintels shall consist of solid 3 in. thick members on edge or 2 in. thick and ¾ in. thick members securely nailed together. Such lintels shall be at least 2 in. greater in depth than those shown in Table 23D for the allowable spans and shall not exceed 8 ft in length.

TABLE 23D — WOOD LINTEL SPANS[1]

Location of Lintels	Supported Loads Including Dead Loads and Ceiling	Nominal Depth of Lintels, in.	Maximum Allowable Spans, ft. — in.
Interior Walls	Limited attic storage	4	4 — 0
		6	6 — 0
		8	8 — 0
		10	10 — 0
		12	12 — 6
	Full attic storage, or roof load, or limited attic storage plus one floor	4	2 — 0
		6	3 — 0
		8	4 — 0
		10	5 — 0
		12	6 — 0
	Full attic storage plus one floor, or roof load plus one floor, or limited attic storage plus two or three floors	4	—
		6	2 — 6
		8	3 — 0
		10	4 — 0
		12	5 — 0
	Full attic storage plus two or three floors, or roof load plus two or three floors	4	—
		6	2 — 0
		8	3 — 0
		10	3 — 6
		12	4 — 0
Exterior Walls	Roof, with or without attic storage	4	4 — 0
		6	6 — 0
		8	8 — 0
		10	10 — 0
		12	12 — 0
	Roof, with or without attic storage plus one floor	4	2 — 0
		6	5 — 0
		8	7 — 0
		10	8 — 0
		12	9 — 0
	Roof with or without attic storage plus two or three floors	4	2 — 0
		6	4 — 0
		8	6 — 0
		10	7 — 0
		12	8 — 0
Column 1	2	3	4

Note to Table 23D:

(1) Spans apply to 4-in.-thick lumber or 2 pieces of 2-in.-thick lumber on edge.

M. ROOF AND CEILING FRAMING

(1) Roof and ceiling framing members shall be continuous, or shall be spliced over vertical supports that extend to suitable bearing.

(2) Roof and ceiling framing members shall be doubled on each side of openings greater than 2 rafter or joist spacings in width.

(3) The length of end bearing of joists and rafters shall be not less than 1½ in.

(4) Rafters shall be located directly opposite each other and tied together at the peak, or may be offset by their own thickness if nailed to a ridge board not less than 11/16 in. thick.

(5) Rafters shall be shaped at supports to provide even bearing surfaces and supported directly above the exterior walls.

(6) Hip and valley rafters shall be not less than 2 in. greater in depth than the common rafters and not less than 1½ in. thick, actual dimension.

(7) Ceiling joists and collar ties of not less than 2-in. by 4-in. lumber may be assumed to provide intermediate support to reduce the span for rafters and joists where the roof slope is 4/12 or greater. Such collar ties more than 8 ft in length shall be laterally supported near their centres by not less than 1-in. by 4-in. continuous members at right angles to the collar ties.

(8) Dwarf walls and struts may be used to provide intermediate support to reduce the span for rafters and joists. When struts are used they shall be not less than 2-in. by 4-in. material extending from each rafter to a load-bearing wall at an angle of not less than 45 deg. to the horizontal.

(9) When dwarf walls are used for rafter support, they shall be framed in the same manner as load-bearing walls and securely fastened top and bottom to the roof and ceiling framing to prevent over-all movement. Solid blocking shall be installed between floor joists beneath dwarf walls that enclose finished rooms. Single top plates may be used where rafters occur directly over studs.

(10) Except as provided in (11), the ridge of the roof shall be supported by a load-bearing wall extending from the ridge to suitable bearing, or by a ridge beam of not less than 2-in. by 6-in. material. Such ridge beam shall be supported at intervals not exceeding 4 ft by not less than 2-in. by 4-in. members extending vertically from the ridge to suitable bearing.

(11) When the roof slope is 4/12 or more, ridge support may be omitted provided the lower ends of the rafters are adequately tied to prevent outward movement. These ties may consist of tie rods or ceiling joists forming a continuous tie for opposing rafters and nailed in accordance with Table 23E. Members may be fastened together either directly or through a gusset plate.

TABLE 23E — MINIMUM RAFTER-TO-JOIST NAILING (1) (2)

(Unsupported Ridge)

Roof Slope	Rafter Spacing	Rafter tied to Every Joist						Rafter tied to Joist Every 4 ft					
		Building Width up to 26 ft			Building Width up to 32 ft			Building Width up to 26 ft			Building Width up to 32 ft		
		Roof Snow Load, lb/sq ft											
		20 psf or less	30 psf	40 psf or more	20 psf or less	30 psf	40 psf or more	20 psf or less	30 psf	40 psf or more	20 psf or less	30 psf	40 psf or more
4/12	16 in.	3	4	5	4	5	7	9	—	—	—	—	—
	24 in.	5	7	8	7	9	11	9	—	—	—	—	—
5/12	16 in.	3	3	4	4	5	6	6	8	10	8	—	—
	24 in.	4	5	7	6	7	9	6	8	10	—	—	—
6/12	16 in.	3	3	3	3	3	4	5	7	8	7	9	11
	24 in.	3	4	5	4	5	7	5	7	8	7	9	11
7/12	16 in.	3	3	3	3	3	3	4	5	7	6	7	9
	24 in.	3	3	4	4	5	6	4	5	7	6	7	9
9/12	16 in.	3	3	3	3	3	3	3	4	5	4	5	6
	24 in.	3	3	3	3	3	4	3	4	5	4	5	6
12/12	16 in.	3	3	3	3	3	3	3	3	3	3	3	4
	24 in.	3	3	3	3	3	3	3	3	3	3	3	4
Col.1	2	3	4	5	6	7	8	9	10	11	12	13	14

Notes to Table 23E:

(1) Nails not less than 3½ in.

(2) Ceiling joists shall be fastened together with at least one more nail per joist splice than required for the rafter-to-joist connection.

(12) Roof joists supporting a finished ceiling other than plywood shall be restrained from twisting along the bottom edges by means of furring, blocking, cross bridging or strapping, conforming to I (5).

(13) Ceiling joists supporting part of the roof load from the rafters shall be not less than 1 in. greater in depth than required for ceiling joists not supporting part of the roof load except that when the roof slope is 3/12 or less the ceiling joist sizes shall be determined from the span tables for roof joists.

(14) Roof trusses shall be designed in accordance with the appropriate requirements in Part 4 of the National Building Code of Canada 1970, except that where the span of the roof trusses does not exceed 40 ft and the roof truss spacing does not exceed 24 in. o.c., roof trusses are acceptable provided they conform to the requirements in (15).

(15) Where lumber roof trusses not designed in conformance with Part 4 of the National Building Code of Canada 1970, are used as permitted in (14), they shall be capable of withstanding a load equal to the ceiling load plus 2⅔ times the design roof snow load, but not less than 60 psf, for 24 hr. Such trusses shall not deflect more than 1/360 of the span after being loaded with the ceiling load plus 1⅓ the design roof snow load after 1 hr in the case of trusses supporting a gypsum board or plastered ceiling, and not more than 1/240 of the span for other types of ceiling finish. Where such trusses do not exceed 14 ft span, the deflection is permitted to be not more than 1/180 of the span when loaded with the ceiling load plus 1⅓ the design roof load where the trusses do not support a gypsum board or plastered ceiling (see 4 C (1)). Where lumber roof trusses are tested, such tests shall be in accordance with Technical Note No. 423 published by the Division of Building Research of the National Research Council of Canada, July 1964.

N. SUBFLOORING

(1) Subflooring shall be provided beneath finish flooring where the finish flooring does not have adequate strength to support the design loads (see Subsection 31 C).

(2) Plywood for subfloors shall be exterior type conforming to CSA O121-1961, "Douglas Fir Plywood," CSA O151-1961, "Western Softwood Plywood," CSA O153-1963, "Poplar Plywood." Particleboard subflooring shall conform to Type 1 board in CSA O188-1968, "Mat-Formed Wood Particleboard."

(3) Where the edges of panel type subflooring are required to be supported (see 31 B (2)), such support shall consist of not less than 2-in. by 2-in. blocking or tongued-and-grooved edged plywood.

(4) Plywood subflooring shall be installed with the surface grain at right angles to the joists and with joints parallel to floor joists staggered.

(5) Subfloors shall conform to Table 23F.

TABLE 23F — THICKNESS OF SUBFLOORING

Maximum Joist Spacing, in.	Minimum Plywood Thickness, in.	Minimum Particleboard Thickness, in.	Minimum Lumber Thickness, in. (2)
16	1/2	5/8	11/16
20	5/8 (1)	3/4 (1)	3/4
24	3/4 (1)	1 (1)	3/4
Column 1	2	3	4

Notes to Table 23F:

(1) Plywood may be 1/2 in. thick and particleboard 5/8 in. thick if the finish flooring consists of matched wood strip not less than 3/4 in. thick laid at right angles to the joists.

(2) Lumber shall be of uniform thickness and not more than 8 in. wide.

(6) When resilient flooring is to be applied directly to the plywood subfloor, the plywood shall be installed with annular grooved nails.

(7) Lumber subflooring shall be laid at an angle of not less than 45 deg. to the joists. Lumber subflooring shall be fully supported at the ends on solid bearing.

O. ROOF SHEATHING

(1) Plywood used for roof sheathing shall be exterior type plywood conforming to CSA O121-1961, "Douglas Fir Plywood," CSA O151-1961, "Western Softwood Plywood," or CSA O153-1963, "Poplar Plywood." Particleboard for roof sheathing shall conform to Type 1 board in CSA O188-1968, "Mat-Formed Wood Particleboard."

(2) Plywood roof sheathing shall be installed with the surface grain at right angles to the roof framing.

(3) Particleboard and plywood roof sheathing shall be installed with at least a 1/16 in. gap between sheets.

(4) Where panel-type roof sheathing requires edge support, the support shall be not less than 2-in. by 2-in. blocking securely nailed between framing members, or metal H clips. Such supports are not required when tongued-and-grooved edge plywood is used.

(5) The thickness of roof sheathing on a flat roof used as a walking deck shall conform to the requirements in Table 23F for subfloors. The thickness of roof sheathing on a roof not used as a walking deck shall conform to Table 23G.

TABLE 23G — THICKNESS OF ROOF SHEATHING

Joist or Rafter Spacing, in.	Minimum Plywood Thickness, in.		Minimum Particleboard Thickness, in.	Minimum Lumber Thickness, in. (1)
	Edges Supported	Edges Unsupported	Edges Supported	
12	5/16	5/16	3/8	11/16
16	5/16	3/8	3/8	11/16
20	3/8	1/2	7/16	3/4
24	3/8	1/2	7/16	3/4

Note to Table 23G:
(1) Lumber shall not be wider than 12 in.

P. WALL SHEATHING

(1) Exterior walls and gable ends shall be sheathed when the exterior cladding requires intermediate fastening between supports or if the exterior cladding requires solid backing.

(2) Where wall sheathing is required, it shall conform to Table 23H.

TABLE 23H — WALL SHEATHING THICKNESS AND SPECIFICATIONS

Type of Sheathing	Minimum Thickness, in.		Material Standards
	with supports 16 in. o.c.	with supports 24 in. o.c.	
Lumber	11/16	11/16	See Tables 3B and 3C
Fibreboard (insulating)	3/8	7/16	CSA A247.2-1969
Gypsum board	3/8	1/2	CSA A82.28-1962
Plywood (exterior type)	1/4	5/16	CSA O121-1961 CSA O151-1961 CSA O153-1963
Particleboard	1/4	5/16	CSA O188-1968 (type 1)

(3) Gypsum board and fibreboard shall not be used for the attachment of siding materials. Nails used in attaching gypsum board or fibreboard shall be not less than 10 gauge with a minimum head diameter of 7/16 in.

(4) Lumber wall sheathing shall be applied so that all ends are supported with end joints staggered.

(5) Panel-type sheathing board shall be applied so that vertical joints are staggered if the sheathing is applied horizontally. A gap of not less than 1/16 in. shall be left between sheets of plywood, particleboard or fibreboard.

Q. WALL SHEATHING PAPER

(1) Sheathing paper shall conform to CGSB 9-GP-2a(1970), "Paper: Building, Cellulosic Fibre, Water Repellent (Breather Type)."

(2) Except as permitted in (4), a layer of sheathing paper shall be applied over the sheathing so that the paper is lapped not less than 4 in. at the joints and returned around openings. When applied horizontally the upper sheets shall overlap the lower sheets.

(3) Except as permitted in (4), two layers of sheathing paper shall be applied over the wall framing beneath siding when no sheathing is used. The paper shall be applied vertically and joints lapped not less than 4 in. Joints shall occur over studs. Paper shall be attached to the framing with roofing nails or staples spaced not more than 3 in. o.c. along the edges of the outer layer of sheathing paper. Wall sheathing may be used in lieu of one layer of paper. Such sheathing need not conform to Table 23H.

(4) Sheathing paper may be omitted beneath siding where the joints in the siding are formed in such a manner as to effectively resist the passage of wind and rain, or where all edges of panel-type siding are directly supported by framing members and joints between adjacent panels are caulked and the vertical joints covered with battens. Where caulking is not provided a layer of sheathing paper shall be provided beneath panel-type siding.

(5) Sheathing paper beneath stucco shall be asphalt type.

SECTION 24. POST, BEAM AND PLANK CONSTRUCTION

A. SCOPE

This Section applies to wood-frame construction with the framing members spaced more than 24 in. apart.

B. GENERAL

(1) The size and spacing of posts and beams, and the span and thickness of lumber decking shall be calculated in conformance with Section 4.3 of the National Building Code of Canada 1970.

(2) Glued-laminated beams and posts shall conform to Section 4.3 of the National Building Code of Canada 1970.

(3) Requirements for nails, lumber, notching and drilling, anchorage and sill plates shall conform to Section 23.

(4) Lumber shall conform to the appropriate requirements in Subsection 3C.

C. DECKING

(1) Floor and roof decking shall consist of not less than 2-in. lumber laid on the flat or on edge, or plywood, conforming to CSA O121-1961, "Douglas Fir Plywood," CSA O151-1961, "Western Softwood Plywood," or CSA O153-1963, "Poplar Plywood."

(2) Plank floor decking laid on the flat shall not be more than 8 in. wide. Such decking shall be tongued-and-grooved or splined unless a separate underlay is installed or the flooring consists of wood strips laid at right angles to the decking.

(3) Plywood decking that is not tongued and grooved shall have edges supported by not less than 2-in. by 4-in. blocking securely nailed between framing members or by metal H clips. Plywood roof decking shall be not less than ½ in. thick on supports up to 32 in. o.c., ⅝ in. thick on supports up to 36 in. o.c., ¾ in. thick on supports up to 40 in. o.c. and ⅞ in. thick on supports up to 48 in. o.c.

D. BEAMS

(1) Beams shall be solid, built-up, glued-laminated or plywood web beams. Where glued assemblies extend to the exterior, waterproof glue shall be used, except that water-resistant glue may be used where the exposed portion is adequately protected against wetting.

(2) Roof beams shall be securely connected to the exterior wall framing and the centre bearing partition or centre beams to resist adequately uplift forces due to wind.

(3) The length of end bearings for beams shall be determined on the basis of the allowable design stress of the wood but shall not be less than 1½ in.

(4) When beams are supported by mechanical connectors, the connectors shall be capable of supporting the design loads.

(5) Where joints in beams do not occur over solid supports, joints shall be designed according to recognized engineering principles.

(6) Opposing beams shall be tied together at the joints by means of splices or suitable mechanical connectors.

(7) Where secondary framing members span between floor beams, the members and connections shall be designed to support the required design loads.

(8) Loads from load-bearing walls, columns or other concentrated loads shall be supported by framing members designed to carry such loads.

E. POSTS

(1) Posts shall be solid, built-up or laminated.

(2) Where wall sheathing does not provide suitable anchorage, exterior wall posts shall be anchored to the wall plate by not less than 18 GSG steel angles or other approved anchors.

(3) Solid posts and individual members in built-up posts shall extend in one piece the full height of the wall storey. Built-up members shall be fastened together with nails spaced not more than 12 in. o.c. and at least twice as long as the individual member thickness, or with not less than ⅜-in. diam. bolts fitted with washers and spaced not more than 18 in. o.c.

(4) Intermediate studs or blocking shall be provided between posts in post and beam walls for the support of exterior and interior cladding. Intermediate studs shall conform to Section 23 for non-load-bearing stud walls.

SECTION 25. PLANK FRAME WALL CONSTRUCTION

A. SCOPE

(1) This Section applies to wall construction of flat vertical framing members that support horizontal beams, and with horizontal plank infilling between the vertical framing members.

(2) Lumber shall conform to the appropriate requirements in Subsection 3C.

B. PLANK THICKNESS AND HEIGHT

(1) Thickness of plank framing shall conform to Table 25A.

TABLE 25A — NOMINAL THICKNESS OF PLANK FRAMING

Supported Load (Including dead load and ceiling)	Minimum Plank Thickness, in.
Roof with or without attic load	2
Roof with or without attic storage plus one floor	2
Roof with or without attic storage plus two floors	3
Column 1	2

(2) The unsupported height of 2-in. vertical plank non-load-bearing partitions shall not exceed 12 ft.

C. VERTICAL FRAMING

(1) Vertical framing shall consist of not less than 10-in.-wide planks spaced not more than 8 ft o.c.

(2) Vertical framing shall not bear on wood members with the grain at right angles to the vertical framing except where bearing on sills.

(3) Corners shall be formed by butting and fastening together the face and edge of two planks.

(4) Vertical framing shall be provided on each side of every opening, except that a window opening not more than 2 ft 6 in. width may be supported on one side only by a vertical member. In such cases, the opposite jamb of the window or short upright to which it is attached shall bear on the filler wall plank immediately below, which in turn shall be notched into the vertical structural members on each side.

D. HORIZONTAL FRAMING

(1) Where horizontal planks act as load-bearing lintels or headers, they shall be framed into the vertical members by dovetailing so that not less than a 1½-in. length of bearing is provided.

(2) Openings in load bearing walls shall be bridged with lintels designed to carry superimposed loads to adjacent vertical members.

(3) In buildings where the unsupported spans of supported joists do not exceed 16 ft and the spans of trusses do not exceed 32 ft, the spans for wood lintels shown in Table 25B may be used except that when the lumber is graded in conformance with the grading rules shown in Table 3D, the lintel spans shall be reduced 1 in. per foot of span.

TABLE 25B — LINTEL SPANS

Nominal Lintel Size, in.	Maximum Span, ft — in.
2 by 8	5 — 6
2 by 10	7 — 0
2 by 12	8 — 0
3 by 8	7 — 0
3 by 10	8 — 0
Column 1	Column 2

(4) Non-load-bearing horizontal members (fillers) shall be securely fastened to the vertical framing.

E. SHEATHING PAPER

(1) Sheathing paper shall be installed over the exterior of the planks when no sheathing is provided or over the sheathing when sheathing is provided.

(2) Sheathing paper shall conform to the requirements in Section 23.

SECTION 26. THERMAL INSULATION AND VAPOUR BARRIERS

A. SCOPE

(1) This Section applies to all buildings regardless of size.

(2) This Section applies to the thermal insulation of buildings of residential occupancy.

B. GENERAL

(1) Dwelling units shall be provided with sufficient thermal insulation to prevent moisture condensation on the interior surfaces of walls, ceilings and floors during the winter and to ensure comfortable conditions for the occupants.

(2) Insulation of heating and ventilating ducts shall conform to Sections 33 and 34.

(3) Where insulation is installed so that there is a space between the insulation and the roofing, the roof space or attic shall be ventilated according to Section 19.

C. MATERIALS

(1) Insulation in contact with the ground shall be inert to the action of soil and water. The insulation properties shall not be significantly reduced by moisture.

(2) Insulating materials shall conform to one of the following:
CSA A101-1968, "Mineral Wool Thermal Building Insulation,"
CSA A247.1-1969, "Fibreboard Roof Insulation,"
CSA A247.2-1969, "Insulating Fibreboard Sheathing,"
CGSB 41-GP14(1961), "Polystyrene: Cellular,"
CGSB 41-GP-16a(1971), "Polyurethane: Rigid, Cellular."

(3) Vapour barriers shall conform to CGSB 70-GP-1a(1970), "Vapour Barriers: Sheet, for Use in Above-Grade Building." Type I vapour barriers shall be used where a high resistance to vapour movement is required, such as in wall constructions that incorporate exterior cladding or sheathing having a low water vapour permeance. Type II vapour barriers may be used in all other locations.

D. AREAS TO BE INSULATED

(1) Except as provided in 26 D (2) insulation shall be provided between heated and unheated spaces and between heated space and the exterior, and around the perimeter of concrete slabs-on-grade.

(2) Insulation need not be provided for masonry or concrete basement or cellar walls, including the space between the joists enclosing unfinished space or crawl space walls where the crawl space is not used as a plenum.

E. INSTALLATION OF INSULATION

(1) Insulation shall be installed so that there is a reasonably uniform insulating value over the entire face of the insulated area.

(2) Insulation shall be applied to the full width and length of the space between furring or framing.

(3) Batt-type insulation manufactured with no membrane on either face shall be installed so that at least one face is in full and continuous contact with cladding, sheathing or other membrane.

(4) Loose-fill insulation may be used on horizontal surfaces only, except that approved water-repellent types may be used between the outer and inner wythes of cavity walls.

(5) The upper part of foundation walls enclosing heated finished space or a crawl space used as a warm air plenum shall be insulated to not less than 12 in. below the finished ground level.

(6) Insulation on the interior of foundation walls enclosing a crawl space shall be applied so that there is not less than a 2-in. clearance above the crawl space floor if the insulation is of a type that may be damaged by water.

(7) Insulation around concrete slabs-on-grade shall extend not less than 12 in. below exterior ground level and be located so that heat from the building is not restricted from reaching the ground beneath the perimeter where exterior walls are not supported by footings extending below frost level.

(8) Where the insulation around concrete slabs-on-grade is exposed to the weather and subject to mechanical damage it shall be protected with not less than ¼-in. asbestos-cement board, or ½-in. cement parging on wire lath applied to the exposed face and edge.

(9) Insulation between a garage and an adjacent dwelling unit shall be protected from mechanical damage by a covering of gypsum board, plywood, particleboard, hard-pressed fibreboard or other approved material.

F. INSTALLATION OF VAPOUR BARRIERS

(1) Except as provided in (2), vapour barriers shall be installed on the warm side of insulation if the insulation is of a type which, when installed, has a vapour permeance greater than that required for vapour barriers in C (3).

(2) Lightweight cellular plastic-type insulation may be used without additional vapour barrier protection provided such insulation has a permeance rating of not more than 4 perm-inches and is installed in continuous contact with masonry or concrete.

(3) Every vapour barrier shall be installed to protect the entire wall surface including framing members.

(4) Where an interior wall meets an exterior wall or ceiling required to have vapour barrier protection, such vapour barrier shall be installed so that it covers the area between exterior wall or ceiling and the interior wall.

(5) Every vapour barrier joint shall lap not less than 1 in. when located over supporting members and shall be covered with a strip of vapour barrier which shall extend not less than 4 in. on both sides of the joint where not located over supporting members.

(6) Openings such as for electrical boxes and registers shall be cut so that the vapour barrier fits snugly around them.

G. AMOUNT OF INSULATION

(1) Reflective surfaces of insulating materials shall not be considered in calculating the thermal resistance of building assemblies in areas where the mean annual total degree days exceed 8,000.

(2) A frame wall supported on a masonry or concrete foundation wall shall be insulated between the top of the masonry or concrete and the floor construction above, including the space between the joists.

(3) Where garages are to be heated during the winter months, insulation shall be incorporated into the exterior walls, ceiling or roof assembly of the garage and the construction separating the garage from a dwelling unit. Except where the separating wall is the basement foundation wall, it need not be insulated if the portion exposed to the garage is 3 ft or less in height.

(4) In buildings in which there is no dwelling unit above another dwelling unit, the over-all coefficient of thermal resistance for insulated walls, ceilings and floors, excluding doors and windows, for constructions described in Sections 20, 23, 24 and 25 shall conform to Table 26A. For constructions other than those described in Sections 20, 23, 24 and 25, Table 26A shall also apply except that the authority having jurisdiction may accept a lower value of thermal resistance where this is justified on the basis of economic considerations.

(5) In buildings in which there is a dwelling unit above another dwelling unit, the over-all coefficient of thermal resistance for insulated walls, ceilings and floors, excluding doors and windows for constructions described in Sections 23, 24 and 25 shall conform to Table 26A.

(6) For buildings other than as described in (4) and (5) the over-all coefficient of thermal resistance for insulated walls, ceilings and floors excluding windows and doors shall be at least 6.67.

(7) In determining the thermal resistance in (4), (5) and (6) appropriate allowance shall be made for framing members. Thermal resistance values may be found in the "Handbook of Fundamentals," published by the American Society of Heating, Refrigerating and Air Conditioning Engineers, or may be determined by testing. Information on degree days of various geographical locations may be found in Supplement No. 1 of the National Building Code of Canada 1970.

(8) The edges of slabs supported on ground at or near grade level in heated buildings shall be insulated with material providing a thermal resistance value of not less than 5.

TABLE 26A — MINIMUM THERMAL RESISTANCE ("R" VALUE)

Climate Area	Type of Heating			
	Other than Electrical		Electrical	
	Walls Floors	Ceilings Roofs	Walls Floors	Ceilings Roofs
Areas where the mean annual total degree days do not exceed 8,000	8.33(1)	9.09	11.11	14.29
Areas where the mean annual total degree days exceed 8,000 but do not exceed 11,000	9.09(2)	11.11	12.50	16.67
Areas where the mean annual total degree days exceed 11,000	10.00	12.50	12.50	20.00

Notes to Table 26A:

(1) May be reduced to 6.67 for masonry walls.
(2) May be reduced to 7.14 for masonry walls.

SECTION 27. ROOFING

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Roofs shall be protected with roofing including flashing installed to shed rain effectively and prevent water due to ice damming from entering the roof.

B. ROOFING MATERIALS

(1) Roofing materials shall conform to the following:

CGSB 9-GP-2a(1971), "Paper: Building, Cellulosic Fibre, Water Repellent (Breather Type),"

CGSB 37-GP-4b(1971), "Cement: Lap, Asphalt Cutback, Fibrated, for Asphalt Roofing,"

CGSB 37-GP-5c(1971), "Cement: Plastic, Cutback Asphalt,"

CGSB 37-GP-8c(1971), "Asphalt, Cutback: Filled, for Roof Coating,"

CGSB 37-GP-9c(1971), "Asphalt Primer for Asphalt Roofing, Dampproofing or Waterproofing,"

CGSB 37-GP-21c(1971), "Roof Coating: Tar Cutback, Fibrated,"

CSA A123.1-1964, "Asphalt Shingles Surfaced with Mineral Granules,"

CSA A123.2-1966, "Asphalt Roofing Surfaced with Mineral Granules,"

CSA A123.3-1971, "Asphalt Roofing Surfaced with Powdered Mineral Matter,"

CSA A123.4-1965, "Wide Selvage Asphalt Roofing Surfaced with Mineral Granules,"

CSA A123.6-1953, "Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.7-1962, "Asphalt for Use in Construction of Built-Up Roof Coverings,"

CSA A123.8-1953, "Coal-Tar Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.9-1953, "Asphalt-Saturated Asbestos Felts for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.10-1953, "Coal-Tar Saturated Asbestos Felts for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.11-1969, "Asphalt-Saturated and Coated Asbestos Felts for Use in Constructing Built-Up Roofs,"

CSA A123.13-1953, "Coal-Tar Pitch for Roofing, Dampproofing and Waterproofing,"

CSA A123.17-1963, "Asphalt-Saturated Felted Glass-Fibre Mat for Use in Construction of Built-Up Roofs,"

CSA O118-1960, "Western Red Cedar Shingles, Machine Grooved Shakes, and Hand-Split Red Cedar Shakes."

(2) Nails used for roofing shall be corrosion-resistant roofing or shingle nails conforming to CSA B111-1967, "Wire Nails, Spikes and Staples." Nails shall have sufficient length to penetrate through or ½ in. into roof sheathing. Nails used with asphalt roofing shall have a head diameter of not less than ⅜ in. and a shank thickness of not less than 0.116 in. Nails used with wood shingles or shakes shall have a head diameter of not less than 3/16 in. and a shank thickness of not less than 0.080 in.

(3) Staples used to apply asphalt or wood shingles shall be corrosion-resistant and shall be driven with the crown parallel to the eaves. Staples used with wood shingles shall be not less than 1⅛ in. long, 16-gauge, with not less than a ⅜-in. crown. Staples used with asphalt shingles shall be not less than ¾ in. long, 16-gauge, with not less than a 1-in. crown except that a 7/16-in. crown may be used if the number of staples specified in G (4) is increased by one-third.

C. ROOF SLOPE

(1) The roof slopes on which roof covering may be applied shall conform to Table 27A.

TABLE 27A — ROOFING TYPES AND SLOPE LIMITS OF ROOFS

Type of Roofing	Minimum Slope	Maximum Slope
Built-up Roofing:		
Asphalt base (gravelled)	¼ in 12	3 in 12
Asphalt base (without gravel)	½ in 12	6 in 12
Asphalt base (surfaced with wide selvage asphalt roofing)	2 in 12	no limit
Coal-tar base (gravelled)	¼ in 12	½ in 12
Cold process	½ in 12	9 in 12
Asphalt Shingles:		
Normal applicaton	4 in 12	no limit
Low slope application	2 in 12	no limit
Roll Roofing:		
Smooth and mineral surfaced	3 in 12	no limit
19-in. wide selvage asphalt roofing	2 in 12	no limit
Cold application felt	½ in 12	9 in 12
Wood Shingles	3 in 12	no limit
Hand-Split Shakes	4 in 12	no limit
Asbestos-Cement Shingles	4 in 12	no limit
Asbestos-Cement Corrugated Sheets	3 in 12	no limit
Sheet Metal Roofing	¼ in 12	no limit
Corrugated Metal Roofing	3 in 12	no limit
Sheet Metal Shingles	3 in 12	no limit
Slate Shingles	6 in 12	no limit
Clay Tile	6 in 12	no limit

D. FLASHING AT INTERSECTIONS

(1) Sheet metal flashing shall consist of not less than 4-lb, sheet lead, 30-GSG galvanized steel, 14-oz. copper, 11-oz. zinc, or 0.019-in.-thick aluminum.

(2) A layer of No. 15 roofing paper or felt shall be provided beneath metal roof flashing.

(3) Where sloping surfaces of shingled roofs intersect to form a valley, the valley shall be flashed. Closed valleys shall not be used with rigid shingles on slopes of less than 10 in 12.

(4) Open valleys shall be flashed with not less than one layer of sheet metal not less than 24 in. wide, or two layers of roll roofing. The bottom layer shall consist of not less than 55-lb smooth surface roll roofing or 90-lb mineral surface roll roofing (mineral surface down) not less than 18 in. wide, centered in the valley and fastened with nails spaced not more than 18 in. o.c. located 1 in. away from the edges. The top layer shall consist of not less than 90-lb mineral surface roll roofing (mineral surface up), 36 in. wide, centered in the valley, applied over 4-in.-wide strip of cement along each edge of the bottom layer, and fastened with sufficient number of nails to hold it in place until the shingles are applied.

(5) Closed valley flashing shall consist of sheet metal, 6-mil polyethylene or 55-lb roll roofing not less than 24 in. wide. Nails shall not penetrate the flashing within 3 in. of the top of the valley or 5 in. of the bottom of the valley, measured from the centreline of the valley.

(6) The intersection of shingle roofs and masonry walls or chimneys shall be protected with flashing. Counter flashing embedded not less than 1 in. in the masonry shall extend not less than 6 in. down the masonry and lap the lower flashing not less than 4 in. Flashing along the slopes of a roof shall be stepped so that there is not less than a 3-in. head lap in both the lower flashing and counter flashing. Where the roof slopes upwards from the masonry, the flashing shall extend up the roof slope to a point equal in height to the flashing on the masonry but not less than 1½ times the shingle exposure.

(7) The intersection of shingle roofs and walls clad with other than masonry shall be protected with flashing. Flashing shall be installed so that it extends up the wall not less than 3 in. behind the sheathing paper, and extends not less than 3 in. horizontally. Along the slope of the roof, the flashing shall be stepped with not less than a 3-in. head lap.

(8) The intersection of built-up roofs with masonry walls or chimneys shall have a cant strip at the intersection and a roofing membrane shall be mopped over the cant strip and not less than 6 in. up the wall. Counter flashing installed over the intersection shall be embedded not less than 1 in. in the masonry and shall be of sufficient length to extend down not less than 6 in., lapping the membrane on the masonry not less than 4 in.

(9) The intersection of built-up roofs with walls clad with other than masonry shall have a cant strip at the intersection. The roofing membrane shall be mopped over the cant strip. Flashing plies shall extend not less than 6 in. up the wall behind the sheathing paper.

(10) Except as otherwise permitted in (11), chimney saddles shall be installed where the upper side of a chimney on a sloping roof is more than 30 in. wide. Chimney saddles shall be covered with sheet metal or roofing material of equivalent weight and quality as the roofing. Saddles shall be suitably flashed where they intersect the roof. The intersection of the saddle and the chimney shall be flashed and counterflashed as in (6).

(11) A chimney saddle need not be installed if the intersection between the chimney and roof is protected by sheet metal flashing that extends up the chimney to a height equal to not less than 1/6 the width of the chimney, but not less than 6 in., and up the roof slope to a point equal in height to the flashing on the chimney, but not less than 1½ times the shingle exposure. Such flashing at the chimney shall be counterflashed as required by (6).

E. EAVE PROTECTION FOR SHINGLES AND SHAKES

(1) Except as provided in (3), eave protection shall be provided on shingle or shake roofs, extending from the edge of the roof to a line not less than 12 in. inside the inner face of the exterior wall.

(2) Eave protection shall consist of not less than 6-mil polyethylene laid as a continuous sheet without the use of cement, or No. 15 asphalt-saturated felt laid in two plies lapped 19 in. and cemented together with lap cement or 45-lb roll roofing. Roll roofing shall be laid with not less than 4-in. head and end laps cemented together with lap cement. The bottom edge of eave protection shall be fastened with roofing nails not more than 12 in. o.c.

(3) Eave protection is not required over unheated garages, carports and porches or where the roof overhang exceeds 3 ft measured along the roof slope from the edge of the roof to the inner face of the exterior wall or where low slope shingles are used.

F. UNDERLAY BENEATH SHINGLES

(1) When underlay is used beneath shingles, it shall be asphalt-saturated sheathing paper weighing not less than 4 lb per square, or No. 15 plain or perforated asphalt-saturated felt or 2-mil polyethylene, except that underlayment used beneath wood shingles shall be breather type.

(2) When used with shingles, underlay shall be installed parallel to the eaves with head and end lap of not less than 2 in. The top edge of each strip shall be fastened with sufficient roofing nails to hold it in place until the shingles are applied. The underlay shall overlap the eave protection by not less than 4 in. (See J (3) for underlay beneath wood shakes.)

G. ASPHALT SHINGLES ON SLOPES OF 4 IN 12 OR GREATER

(1) Coverage shall be not less than 2 thicknesses of shingle, disregarding cutouts, over the entire roof.

(2) A starter strip shall be installed along the lower edge of the roof so that it extends approximately ½ in. beyond the eaves and rake of the roof and fastened along the bottom edge with nails spaced not more than 12 in. o.c. Such starter strips shall be not less than 85-lb mineral-surfaced roll roofing not less than 12 in. wide, or shingles of the same weight and quality as those used as a roof covering with tabs facing up the roof slope. Starter strips may be omitted where eave protection of not less than 85-lb mineral-surfaced roll roofing is provided.

(3) Shingles shall have a head lap of not less than 2 in.

(4) Shingles shall be fastened with at least 4 nails or staples for 36-in.-wide shingles so that no nails or staples are exposed. Fasteners may be reduced for narrower shingles in proportion to the width of the shingle or when shingles incorporating approved interlocking devices are used.

(5) Fasteners shall be located 1 in. to 1½ in. from each end of each strip shingle with the other fasteners equally spaced between them. Such fasteners shall be located not less than ½ in. above the tops of the cutouts.

(6) Shingle tabs shall be secured by a 1-in.-diameter spot of plastic cement under the centre of each tab, or by approved interlocking devices or selfsealing strips.

(7) Shingles on hips and ridges shall be applied so they extend not less than 4 in. on either side of the hip or ridge and shall be lapped not less than 6 in. Shingles shall be fastened with nails or staples on each side located not more than 1 in. from the edge and 1 in. above the butt of the overlying shingle.

(8) Eave protection shall conform to Subsection E.

(9) Flashing shall conform to Subsection D.

H. ASPHALT SHINGLES ON SLOPES OF LESS THAN 4 IN 12

(1) Coverage except for the first two courses shall be not less than 3 thicknesses of shingle, disregarding cutouts, over the entire roof.

(2) A starter strip shall be installed as in G (2). Such starter strip shall be laid in a continuous band of cement not less than 8 in. wide.

(3) Shingle tabs shall be secured with cold application cement applied at the rate of not less than 1 gal. per 100 sq ft of cemented area or hot application asphalt applied at the rate of 20 lb per 100 sq ft of cemented area.

(4) The first course of shingles shall be secured by a continuous band of cement along the eaves applied so that the width of the band equals the shingle exposure plus 4 in. and the band is located not less than 4 in. above the butt of the overlying course of shingles.

(5) The succeeding courses of shingles shall be secured by a continuous band of cement applied so that the width of the band equals the shingle exposure plus 2 in. Such band shall be located not less than 1 in. nor more than 2 in. above the butt of the overlying course of shingles.

(6) Shingles on hips and ridges shall be not less than 12 in. wide applied to provide triple coverage. Such shingles shall be cemented to the roof shingles and to each other with a coat of cement 1 in. from the edges of the shingles and fastened with nails or staples located 1½ in. above the butt of the overlying shingle and 2 in. from each edge.

(7) Flashing shall conform to Subsection D.

(8) Shingles shall be fastened in accordance with G (4) and G (5).

I. WOOD ROOF SHINGLES

(1) Shingles shall be not less than No. 2 grade.

(2) Decking for wood shingled roofs may be continuous or spaced.

(3) Wood shingles shall be not less than 16 in. long and not less than 3 in. nor more than 14 in. wide.

(4) Shingles shall be spaced approximately ¼ in. apart and offset at the joints in adjacent courses not less than 1½ in. so that joints in alternate courses are staggered.

(5) Shingles shall be fastened with at least 2 nails or staples located approximately ¾ in. from the sides of the shingle and 1½ in. above the exposure line.

(6) The exposure of wood roof shingles shall conform to Table 27B.

TABLE 27B — EXPOSURE OF WOOD ROOF SHINGLES

Roof Slope	Maximum Shingle Exposure, in.		
	16-in. Shingles	18-in. Shingles	24-in. Shingles
4 in 12 or less	3¾	4¼	5¾
over 4/12	5	5½	7½
Column 1	2	3	4

(7) Flashing shall conform to Subsection D.

(8) Eave protection shall conform to Subsection E.

J. HANDSPLIT ROOF SHAKES

(1) Spaced roof decking shall not be used on roof slopes of less than 8 in 12 where wind-driven snow occurs.

(2) Shakes shall be not less than 18 in. long and not less than 4 in. nor more than 14 in. wide with a butt thickness of not more than 1¼ in.

(3) Where wind-driven snow occurs, a breather-type underlay shall be provided beneath roof shakes. Underlay shall be laid as a strip not less than 36 in. wide along eaves and 12 in. wide along hips and ridges. Underlay shall be laid as a strip not less than 18 in. wide between each course of shakes with the bottom edge of the underlay positioned above the butt line, a distance equal to double the exposure of the shakes.

(4) Shakes shall be spaced approximately ¼ in. apart and offset at the joints in adjacent courses not less than 1½ in. so that joints in alternate courses are staggered.

(5) Shakes shall be fastened with nails located approximately ¾ in. from the sides of the shakes and 1½ in. above the exposure line.

(6) The exposure of wood shakes shall conform to Table 27C.

TABLE 27C — EXPOSURE OF HANDSPLIT WOOD SHAKES

Minimum Length of Shake, in.	Limiting Minimum Butt Thickness, in.	Maximum Exposure, in.
18	⅜	7½
24	⅜	10
32	⅜	13

(7) Flashing shall conform to Subsection D.

(8) Eave protection shall conform to Subsection E.

K. BUILT-UP ROOFS

(1) Coal tar products and asphalt products shall not be used together in built-up roof construction.

(2) Aggregate used for surfacing shall be clean durable gravel, crushed stone, or air-cooled blast furnace slag. Aggregate shall be dry and uniformly graded in particle size from ¼ in. to ⅝ in.

(3) Bitumen roofing felts shall be not less than No. 15.

(4) In hot mix applications, mopped-on layers of bitumen-saturated felt shall be laid while the bitumen is still hot with each layer overlapping the previous one. The full width under each lap shall be mopped with bitumen so that in no place does felt touch felt. Mopping shall be from 3 to 5 ft ahead of each roll of felt as it is laid. Felt shall be laid free of wrinkles and shall be rolled directly into the hot bitumen and broomed forward and outward from the centre to ensure complete adhesion.

(5) Flashing shall conform to Subsection D.

(6) Bituminous materials, aggregate surfacing and roofing felts shall conform to Table 27D.

TABLE 27D — MATERIAL COMBINATIONS FOR BUILT-UP ROOFS

Type of Roof	Amount of Bitumen per 100 sq ft of Roof Surface		Number of Plies of Dry Sheathing, Roofing Felts			Minimum Amount of Aggregate Surfacing per 100 sq ft of Roof Surface
			Roof Board or Plywood Deck		All other Decks	
	Mopping Coats Between Plies	Flood Coat	Dry Sheathing	Roofing Felts	Roofing Felts	
Asphalt and Aggregate	20 lb	60 lb	1	4(1)	3(2)	400 lb gravel or crushed rock or 300 lb slag on level roof; 300 lb gravel or crushed rock or 225 lb slag on 3 in 12 slope, proportional weights for intermediate roof slopes
Coal Tar Pitch and Aggregate	25 lb	75 lb	1	4(1)	3(2)	
Glass Felt and Aggregate	25 lb	60 lb	—	3(3)	2(4)	
Asphalt — Smooth Surface	20 lb	25 lb	1	4(1)	3(2)	—
Glass Felt — Smooth Surface	20 lb	20 lb	—	3(3)	3(4)	—
Cold Process Roofing	1.5 gal. Cold Process Cement	4 gal. Cold Process Top Coating	—	2	—	—

Notes to Table 27D:

(1) 2 layers of felt laid dry over the sheathing 2 layers mopped with bitumen.
(2) All layers of felt mopped with bitumen.
(3) 1 combination felt laid dry and 2 layers of glass felt mopped with bitumen.
(4) All layers of glass felt mopped with bitumen.

(7) A gravel stop or a cant strip shall be provided at the edges of roofs and shall be cemented to the roofing membranes. Flashing shall extend over the edge of the roof to form a drip.

L. SELVAGE ROOFING

(1) Wide selvage asphalt roofing shall provide double coverage over the entire roof surface.

(2) Plies of selvage roofing shall be cemented together with bitumen applied at not less than 20 lb per 100 sq ft of roof surface.

M. ASBESTOS-CEMENT SHINGLES

Asbestos-cement shingles shall weigh not less than 250 lb per 100 sq ft of roof surface. Flashing of valleys, hips, and ridges shall be of sheet metal as described in Subsection D.

N. SHEET METAL ROOFING

Sheet metal roofing shall be not less than 30-GSG galvanized sheet steel, 14-oz. copper, 11-oz. zinc, or 0.019-in.-thick aluminum.

O. DOWNSPOUTS AND ROOF DRAINS

(1) Where downspouts are provided and are not connected to a sewer, extension shall be provided to carry rainwater away from the building in a manner which will prevent soil erosion.

(2) When roof drains are provided they shall conform to Part 7 of the National Building Code of Canada 1970.

(3) Where metal eavestroughs are used, they shall be not less than 28-GSG galvanized sheet steel, 16-oz. copper or .020-in. thick aluminum. Downspouts of the same material may be of the next lower standard gauge, weight or thickness. Wood gutters, where used, shall be of durable species or treated with acceptable wood preservative.

SECTION 28. SIDING

A. SCOPE

(1) This Section applies to all buildings, regardless of size.

(2) This Section applies to exterior wall coverings of lumber, wood shingles, shakes, asbestos-cement shingles and sheets, plywood, particleboard, hard-pressed fibreboard, aluminum and steel including trim, soffits and flashing.

(3) Requirements for stucco shall conform to Section 29 and requirements for masonry veneer shall conform to Section 20.

B. GENERAL

(1) Exterior walls shall be protected with a siding including flashing and trim where necessary to provide protection from the weather.

(2) Not less than 8 in. clearance shall be provided between the finished ground level and siding that is adversely affected by moisture such as wood, plywood, particleboard and hard-pressed fibreboard.

(3) Not less than a 2-in. clearance shall be provided between a roof surface and siding that is adversely affected by moisture such as wood, plywood, particleboard and hard-pressed fibreboard.

(4) Insulating asphalt siding shall be ventilated by not less than a ⅜-in. air space behind the siding. (See 26 C (3)).

C. FLASHING

(1) Flashing shall consist of not less than 4-lb sheet lead, 30-GSG galvanized steel, 14-oz. copper, 11-oz. zinc or 0.019-in.-thick aluminum.

(2) Flashing shall be installed at every horizontal junction between two different exterior finishes except where the upper finish overlaps the lower finish.

(3) Except as provided in (5), flashing shall be applied over exterior wall openings where the vertical distance from the bottom of the eave to the top of the trim is more than ¼ of the horizontal overhang of the eave.

(4) Flashing shall be installed so that it extends upwards not less than 2 in. behind the sheathing paper and forms a drip on the outside edge.

(5) Where a window or exterior door is designed to be installed without head flashing, the exterior flange of the window or door frame shall be bedded into a non-hardening type caulking material and the exterior flange screwed down over the caulking material to the wall framing to form a waterproof joint.

D. CAULKING

(1) Caulking shall be provided where required to prevent the entry of water into the structure.

(2) Caulking shall be provided between masonry and siding and between door sills and siding unless the sill is completely protected from the wind and rain.

(3) Caulking shall conform to one of the following:

CGSB 19-GP-3a(1968), "Sealing Compound: Elastomeric, Two Component, Polysulphide Base, Chemical Curing,"

CGSB 19-GP-5a(1968), "Sealing Compound: One Component, Acrylic Base, Gun Grade,"

CGSB 19-GP-6a(1970), "Compound: Caulking, Oil Base,"

CGSB 19-GP-9b(1971), "Sealing Compound: One Component, Silicone Base, Chemical Curing,"

CGSB 19-GP-13(1968), "Sealing Compound: Elastomeric, One Component, Polysulphide Base, Chemical Curing,"

CGSB 19-GP-15a(1971), "Sealing Compound: Multicomponent, Polyurethane Base, Chemical Curing."

E. ATTACHMENT OF SIDING

(1) Except as permitted in (4) to (8), siding shall be nailed to the framing members or to blocking between the framing members.

(2) Blocking for the attachment of siding shall be not less than 2-in. by 2-in. lumber securely nailed to the framing and spaced not more than 24 in. o.c.

(3) Except as permitted in (7) and (8), furring for the attachment of siding shall be not less than 1-in. by 2-in. lumber when applied over sheathing. When applied without sheathing such furring shall be not less than 1-in. by 3-in. lumber on supports spaced not more than 16 in. o.c. and 1-in. by 4-in. on supports spaced not more than 24 in. o.c. Such furring shall be securely fastened to the framing and shall be spaced not more than 24 in. o.c.

(4) Vertical lumber and stucco lath or reinforcing may be attached to sheathing only where the sheathing consists of not less than 9/16-in. lumber, ½-in. plywood or ⅝-in. particleboard.

(5) Vertically applied metal siding and wood shingles and shakes may be attached to the sheathing only where the sheathing consists of not less than 9/16-in. lumber, 5/16-in. plywood or 5/16-in. particleboard.

(6) Asbestos-cement shingles may be attached to the sheathing only when the sheathing consists of not less than 9/16-in. lumber, ⅜-in. plywood, or ½-in. particleboard.

(7) Where wood shingles or shakes are applied to sheathing which is not suitable for attaching the shingles or shakes, the shingles or shakes may be attached to a wood lath not less than 2 in. by ⅜ in. thick securely nailed to the framing, and applied as described in G (5).

(8) Where asbestos-cement shingles are applied to sheathing that is not suitable for attaching the shingles, the shingles may be fastened to a wood lath not less than 4 in. by ⅜ in. thick securely nailed to the framing. Such lath shall be applied so that it overlaps the preceding shingle course by not less than ¾ in.

(9) Nails for the attachment of sidings and wood trim shall be corrosion-resistant and shall be compatible with the siding material. Nail size and spacing shall conform to Table 28A.

TABLE 28A — NAILING OF SIDING

Type of Siding	Min. Nail Length, in.	Min. No. of Nails	Maximum Nail Spacing
Wood trim	2(1)	—	24 in. o.c.
Lumber siding or horizontal siding made from sheet material	2(1)	—	24 in. o.c.
Metal siding	1½(1)	—	24 in. o.c. (nailed to framing) 16 in. o.c. (nailed to sheathing only)
Hand split wood shakes	2(2)	2(3)	—
Wood shingles and machine grooved shakes	1¼(2)	2(3)	—
Asbestos-cement shingles	1¼(2)	2	—
Panel or sheet type siding up to ¼ in. thick	1½(1)	—	6 in. o.c. along edges
Panel or sheet type siding greater than ¼ in. thick	2(1)	—	12 in. o.c. along intermediate supports

Notes to Table 28A:

(1) Shall penetrate through the nail-holding base or not less than 1 in. into the framing.

(2) Shall penetrate through the nail-holding base or not less than ¾ in. into the framing.

(3) Shingles or shakes over 8 in. in width shall be fastened with no fewer than 3 nails.

F. LUMBER SIDING

(1) Lumber siding shall be sound, free of knot holes, loose knots, through checks or splits.

(2) Drop, rustic, novelty, lapped board and vertical wood siding shall be not less than 9/16 in. thick and not more than 12 in. wide.

(3) Bevel shall be not less than 3/16 in. thick at the top and 15/32 in. thick at the butt for sidings 8 in. or less in width and 9/16 in. thick at the butt for sidings wider than 8 in. Bevel siding shall be not more than 12 in. wide.

(4) Lumber siding shall prevent water from entering at the joints by the use of lapped or matched joints or by vertical wood battens. Siding shall overlap not less than 1/16 in. per in. width of lumber but not less than ⅜ in. for matched siding, 1 in. for lapped bevel siding or ½ in. for vertical battens.

G. WOOD SHINGLES AND MACHINE-GROOVED SHAKES

(1) Shingles and shakes shall conform to CSA O118-1960, "Western Red Cedar Shingles, Machine Grooved Shakes, and Hand Split Red Cedar Shakes." Shakes shall be not less than No. 1 grade and shingles not less than No. 2 grade except that No. 3 grade may be used for undercoursing.

(2) Shingles and shakes shall be not less than 2½ in. nor more than 14 in. wide.

(3) Shingles or shakes shall be fastened with nails located approximately ¾ in. from each edge and not less than 1 in. above the exposure line for single-course applications or approximately 2 in. above the butt for double-course applications.

(4) In single-course application, joints in succeeding courses shall be offset at least 1½ in. so that joints in any 2 of 3 consecutive courses are staggered. In double-course application, joints in the outer course shall be offset from joints in the under-course by not less than 1½ in., and joints in succeeding courses shall be offset not less than 1½ in.

(5) When lath is used with double-course application (see E (7)), it shall be spaced according to the exposure and securely fastened to the framing. The butts of the under-course shall rest on the top edge of the lath. The outer course shall be fastened to the lath with nails of sufficient length to penetrate through the lath. The butts of the shingles or shakes shall be so located that they project not less than ½ in. below the bottom edge of the lath. If wood lath is not used, the butts of the under-course shingles or shakes shall be located ½ in. above the butts of the outer course.

(6) The exposure and butt thickness of shingles and shakes shall conform to Table 28B.

TABLE 28B — EXPOSURE AND THICKNESS OF WOOD SHINGLES AND MACHINE GROOVED SHAKES

Shake or Shingle Length, in.	Maximum Exposure		Minimum Butt Thickness, in.
	Single Coursing, in.	Double Coursing, in.	
16	7½	12	2/5
18	8½	14	9/20
24	11½	16	½

H. ASBESTOS-CEMENT SHINGLES AND SHEETS

(1) Asbestos-cement shingles and sheets shall conform to one of the following:
CGSB 34-GP-4b(1970), "Siding: Asbestos Cement, Shingles and Clapboards,"
CGSB 34-GP-5b(1960), "Sheets: Asbestos Cement, Corrugated,"
CGSB 34-GP-14a(1969), "Sheets: Asbestos Cement, Flat, Decorative,"
CGSB 34-GP-16a(1969), "Sheets: Asbestos Cement, Flat, Fully Compressed,"
CGSB 34-GP-17b(1959), "Sheets: Asbestos Cement, Flat, Semicompressed,"
CGSB 34-GP-21(1960), "Sheets: Sandwich, Asbestos Cement and Fibreboard."

(2) Asbestos-cement shingles shall weigh not less than 165 lb per square. Asbestos-cement sheet shall be not less than 3/16 in. thick where applied to studs spaced not more than 16 in. o.c. nor less than ¼ in. thick where applied to studs spaced not more than 24 in. o.c. Where applied over sheathing, thickness shall be not less than ⅛ in.

(3) Asbestos-cement shingles shall be fastened with nails located not less than 1 in. above the exposure line.

(4) Asbestos-cement shingles shall be installed so that vertical joints in succeeding courses are staggered. Asphalt-coated backer strips shall be installed behind each vertical joint. Shingles shall have not less than a 1-in. head lap.

(5) Vertical joints of asbestos-cement panels shall be protected with batten strips, caulking or other suitable method.

(6) Horizontal joints shall be lapped, flashed, caulked or otherwise suitably protected.

I. PLYWOOD

(1) Plywood siding shall be exterior type conforming to CSA O115-1967, "Hardwood Plywood," CSA O121-1961, "Douglas Fir Plywood," CSA O151-1961, "Western Softwood Plywood," or CSA O153-1963, "Poplar Plywood."

(2) Plywood siding shall be not less than ¼ in. thick when applied directly to sheathing. When applied directly to framing or over furring strips, plywood thickness shall conform to Table 28C.

TABLE 28C — PLYWOOD THICKNESS, EXTERIOR WALL FINISH

Spacing of Supports, in.	Minimum Siding Thickness With Sheathing (over furring)		Minimum Siding Thickness Without Sheathing	
	Face Grain Parallel to Supports, in.	Face Grain Right Angles to Supports, in.	Face Grain Parallel to Supports, in.	Face Grain Right Angles to Supports, in.
16	¼	¼	⅜	⅜
20	⅜	¼	½	⅜
24	⅜	¼	½	⅜
Column 1	2	3	4	5

(3) The edges of plywood siding shall be treated with a suitable paint or sealer.

(4) Plywood applied in panels shall have all edges supported. Not less than a 1/16-in. gap shall be provided between sheets. Vertical joints in such siding shall be protected with batten strips or caulking when the plywood joints are not matched. Horizontal joints shall be lapped not less than 1 in. or shall be suitably flashed.

(5) Plywood applied in horizontal lapped strips shall have not less than a 1/16-in. gap provided at the butted ends, which shall be caulked. The horizontal joints shall be lapped not less than 1 in. Wedges shall be inserted under all vertical butt joints and at all corners when horizontal lapped plywood is applied without sheathing.

J. HARD-PRESSED FIBREBOARD

(1) Hard-pressed fibreboard siding shall be type 2 or type 4 tempered or treated type or type 1 untempered type with a factory applied prime coat or finish conforming to CGSB 11-GP-3a(1970), "Standard for Hardboard."

(2) Hard-pressed fibreboard siding shall be not less than ¼ in. thick where applied over sheathing and 5/16 in. thick were applied without sheathing on supports not more than 16 in. o.c.

(3) Hard-pressed fibreboard siding applied in panels shall have all edges supported. Not less than a 3/16-in. gap shall be provided between sheets. Vertical joints in such siding shall be protected with batten strips or caulking when the joints are not matched. Horizontal joints shall be lapped not less than 1 in. or shall be suitably flashed.

(4) Hard-pressed fibreboard applied in horizontal lapped strips shall have not less than a 3/16-in. gap provided at the butted ends, which shall be caulked or otherwise protected with suitable mouldings. The horizontal joints shall be lapped not less than 1 in. Wedges shall be inserted under all vertical butt joints and corners.

K. PARTICLEBOARD

(1) Particleboard siding shall conform to Type 1 board in CSA O118-1968, "Mat-Formed Wood Particleboard."

(2) Particleboard shall be not less than 5/16 in. thick where applied directly to sheathing. Where applied directly to framing or over furring strips, particleboard shall be not less than ⅜ in. thick on supports spaced not more than 16 in. o.c. and ½ in. thick on supports spaced not more than 24 in. o.c.

(3) Particleboard applied in panels shall have all edges supported. Not less than a ⅛-in. gap shall be provided between sheets. Vertical joints in such siding shall be protected with batten strips. Horizontal joints shall be lapped not less than 1 in. or shall be suitably flashed.

L. METAL SIDING

(1) Steel siding including flashing and trim accessories shall conform to CGSB 93-GP-4(1971), "Siding, Soffit and Fascia, Steel, Zinc Coated, (Galvanized) Standard Duty."

(2) Aluminum siding including flashing and trim accessories shall conform to CGSB 93-GP-2(1970), "Siding, Soffit and Fascia, Aluminum, Coated, Standard Duty."

(3) Aluminum siding in contact with masonry or concrete shall be effectively coated or separated from the masonry or concrete by an impervious membrane.

M. EXTERIOR CEILINGS AND SOFFITS

(1) Where provided, ceilings for carports, galleries and porches and eave soffits shall be at least ⅜ in. lumber, ¼ in. plywood, ¼ in. hard-pressed fibreboard or ⅛ in. asbestos-cement board on supports spaced not more than 24 in. o.c. Particleboard used for soffits shall be at least 5/16 in. thick on supports spaced not more than 16 in. o.c. and ⅜ in. thick for supports spaced not more than 24 in. o.c. Other material accepted by the authority having jurisdiction may also be used.

(2) Exterior ceilings and soffits shall be fastened with corrosion-resistant nails.

N. WOOD TRIM

(1) Exterior wood trim shall be one of the species mentioned in clause 3.1.1 of CSA O132.1-1965. The defects in the lumber shall not exceed those permitted in clause 3.2.1 of CSA O132.1-1965.

(2) Wood trim shall be fastened with corrosion-resistant casing or finishing nails.

SECTION 29. STUCCO

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Sheathing shall be provided beneath stucco applied over wood-frame walls except as permitted in D (2). Where applied beneath stucco, sheathing shall conform to Subsection 23 P.

(3) Stucco lath or reinforcing shall be used to attach stucco to woodframe construction. Such lath or reinforcing shall also be used to attach stucco to masonry where the masonry is soft-burned tile or brick of less strength than the stucco or if the masonry surface is not sound, clean and sufficiently rough to provide a good key. Stucco applied over masonry chimneys shall be reinforced.

(4) Stucco finish shall not be applied over concrete masonry units less than one month old unless the units have been cured by the autoclave process.

(5) Stucco shall be not less than 8 in. above finished ground level except when it is applied over concrete or masonry.

(6) Flashing for stucco shall conform to Section 28, except that if aluminum flashing is used, it shall be separated from the stucco by an impervious membrane or coating.

B. STUCCO MATERIALS

(1) Portland cement shall conform to CSA A5-1971, "Portland Cements."

(2) Aggregate shall be clean, well-graded natural sand or sand manufactured from crushed stone, gravel or air-cooled blast furnace slag and shall contain no significant amounts of deleterious material. Aggregate grading shall conform to Table 29A.

TABLE 29A — AGGREGATE GRADING FOR STUCCO

Sieve Sizes	Per Cent Passing	
	Maximum	Minimum
No. 4	—	100
8	—	90
16	90	60
30	60	45
50	30	10
100	5	—
Column 1	2	3

(3) Hydrated lime shall conform to CSA A82.44-1950, "Normal Finishing Hydrated Lime."

(4) Water shall be clean and free of significant amounts of deleterious material.

C. FASTENERS

(1) Fasteners for stucco lath or reinforcing shall be corrosion-resistant and of a material other than aluminum.

(2) Nails for stucco lath or reinforcing shall be not less than 10-gauge with a head diameter of not less than 7/16 in. Staples shall be not less than 14-gauge.

(3) Staples and nails for attaching stucco lath or reinforcing to vertical surfaces shall be of sufficient length to penetrate 1 in. into framing members or to the full depth of the sheathing where the sheathing is used for attachment. On horizontal surfaces nails shall be not less than 1½ in. long.

D. STUCCO LATH

(1) Rib lath or expanded metal stucco mesh shall be copper-alloy steel coated with rust-inhibitive paint after fabrication or shall be galvanized. Woven or welded wire mesh shall be galvanized.

(2) Sheathing need not be provided beneath stucco where not less than 18-gauge galvanized wire is applied horizontally to the framing at vertical intervals not exceeding 6 in. or where approved paper-backed welded wire metal lath is used.

(3) Stucco lath shall conform to Table 29B.

TABLE 29B — STUCCO LATH

Location	Type of Lath	Min. U.S. Gauge	Max. Mesh Opening	Min. Wt per sq yd
Vertical surfaces	Welded or woven wire	18 17 16	1 in. 1½ in. 2 in.	— — —
	Stucco mesh reinforcing (expanded metal)	—	4 sq in	1.8 lb
Horizontal surfaces	⅜ in. Rib Lath	—	—	3.4 lb
	Cedar Lath	—	—	—
Column 1	2	3	4	5

(4) Stucco lath shall be held not less than ¼ in. away from the backing by means of suitable self-furring devices.

(5) Stucco lath shall be applied with the long dimension horizontal. Horizontal and vertical joints shall be lapped not less than 2 in. End joints shall be staggered and shall occur over framing members. External corners shall be reinforced with a vertical strip of lath or reinforcing extending not less than 6 in. on both sides of the corner or the lath or reinforcing shall extend around corners not less than 6 in.

(6) Stucco lath on vertical surfaces shall be fastened to the framing members, lumber sheathing or to plywood that is not less than ½-in. thick. Stucco lath on horizontal surfaces shall be fastened to the framing members.

(7) Fasteners on vertical surfaces shall be spaced not more than 6 in. o.c. vertically and 16 in. o.c. horizontally, or 4 in. o.c. vertically and 24 in. o.c. horizontally. Other nailing patterns may be used provided there are not fewer than 16 fasteners per sq yd of wall surface.

(8) Fasteners on horizontal surfaces shall be spaced not more than 16 in. o.c. along the framing members when members are spaced not more than 16 in. o.c. and 4 in. o.c. along members when members are spaced not more than 24 in. o.c.

E. STUCCO MIXES

(1) Stucco mixes shall conform to Table 29C.

TABLE 29C — STUCCO MIXES
(by volume)

Portland Cement	Masonry Cement Type H	Lime	Aggregate
1 1	— 1	¼ to 1 —	3¼ to 4 parts per part of cementitious material
Column 1	2	3	4

(2) Pigment if used shall consist of pure mineral oxides inert to the action of sun, lime or cement. Pigment shall not exceed 6 per cent of the portland cement by weight.

(3) Materials shall be thoroughly mixed before and after water is added. Stucco shall be applied not later than 3 hr after the initial mixing.

F. STUCCO APPLICATION

(1) The base for stucco shall be maintained above freezing. Stucco shall be maintained at a temperature of not less than 50°F during, and for not less than 48 hr after application.

(2) Stucco shall be applied with not less than 2 base coats and 1 finish coat, providing a total thickness of at least ⅝ in. measured from the face of the lath or face of the masonry where no lath is used.

(3) The first coat shall be not less than ¼ in. thick measured from the face of the lath or masonry, fully embedding the lath. The surface shall be scored to provide a key with the second coat.

(4) The second coat shall be not less than ¼ in. thick. The surface shall be lightly roughened to provide a key with the finish coat if the finish coat is other than stone dash.

(5) When the finish coat is other than stone dash, the base shall be dampened but not saturated before the finish coat is applied. The thickness of the finish coat shall be not less than ⅛ in.

(6) Staples for fastening gypsum lath shall be not less than 1 in. long for ⅜-in. thick second coat before the second coat starts to set or stiffen.

SECTION 30. INTERIOR WALL AND CEILING FINISHES

A. GENERAL

(1) This Section applies to all buildings, regardless of size.

(2) The requirements for plastering in this Section apply to the application of plaster to gypsum or metal lath attached to wood furring or framing. Plastering applications and plaster mixes not described in this Section, and requirements

for metal framing and metal furring shall conform to CSA A82.30-1965, "Interior Furring, Lathing and Gypsum Plastering." Flame-spread requirements are contained in Subsection 10P.

B. WATERPROOF WALL FINISH

(1) Waterproof finish shall be provided to a height of not less than 6 ft above the floor in shower stalls, 46 in. above the rims of bathtubs equipped with showers, and 16 in. above the rims of bathtubs not equipped with showers.

(2) Waterproof finish shall consist of ceramic, plastic or metal tile, sheet vinyl, tempered hard-pressed fibreboard, laminated thermosetting decorative sheets or linoleum.

C. WOOD FURRING

(1) Wood furring for the attachment of wall finishes shall be not less than 5/8 in. by 2 in. where applied to solid backing such as masonry or to supports spaced not more than 16 in. o.c., and 5/8 in. by 4 in. if applied to supports spaced not more than 24 in. o.c.

(2) Furring shall be fastened to the framing or to wood blocks with not less than 2-in nails.

D. GYPSUM LATH

(1) Gypsum lath shall conform to CSA A82.24-1962, "Gypsum Lath."

(2) Gypsum lath shall be not less than 3/8 in. thick on supports not more than 16 in. o.c. and 1/2 in. thick on supports not more than 24 in. o.c.

(3) Gypsum lath shall be applied so that vertical joints do not occur at jam studs above or below openings.

(4) Gypsum lath shall be fastened at each support with not fewer than 4 uniformly spaced fasteners where 16-in.-wide lath is used on vertical supports spaced not more than 16 in. o.c. Such lath shall be fastened with not fewer than 5 fasteners per support for all other conditions. Lath 24 in. wide shall be fastened with no fewer than 6 fasteners per support. Lath need not be nailed to the framing at inside corners.

(5) Nails for fastening gypsum lath shall be not less than 1 1/4 in. long, 13 gauge, 19/64 in. head diameter blued steel wire nails.

(6) Staples for fastening gypsum lath shall be not less than 1 in. long for 3/8-in.-thick lath and 1 1/8 in. long for 1/2-in. lath. Staples shall be not less than 16 gauge with not less than a 3/4-in. crown.

E. METAL LATH

(1) Metal lath shall consist of galvanized metal or copper-bearing steel treated with a suitable rust-inhibitive coating after manufacture.

(2) The weight of metal lath shall conform to Table 30A.

TABLE 30A — MINIMUM WEIGHT OF METAL LATH

Type of Lath	Min. Weight, lb per sq yd	Max. Spacing of Wood Supports, in.	
		Walls	Ceilings
Diamond Mesh	2.5	12	12
	3.0	16	12
Flat Rib	2.5	16	12
	3.0	16	16
3/8 in. Rib	2.5	16	16
	3.0	20	20
	3.5	24	24
Paper backed Welded wire	1.4(1)	16	16
	1.95(2)	24	24
Column 1	2	3	4

Notes to Table 30A:

(1) Shall be not less than 16-gauge wire.

(2) Shall be not less than 16-gauge wire. Every third back wire at right angles to support shall be not less than 11 gauge.

(3) Nails for the attachment of metal lath shall be not less than 10-gauge large-head roofing nails not less than 1½ in. long for ceiling supports and 1 in. long for wall supports. Such nails shall be spaced not more than 6 in. o.c.

(4) Staples for the attachment of metal lath shall be not less than 14 gauge nor less than 1½ in. long with a ¾-in. crown. Such staples shall be spaced not more than 6 in. o.c.

(5) Metal lath shall be applied at right angles to the supports. End joints shall be lapped not less than 1 in. Side joints of diamond mesh lath shall be lapped not less than ½ in. Side joints of rib lath shall be lapped so that the adjacent side ribs nest. End joints shall be staggered. End laps that occur between supports shall be tied.

(6) When metal lath is applied over a continuous surface, it shall be held not less than ¼ in. from the back-up by means of furring strips, self-furring nails or self-furring lath.

F. CORNER REINFORCEMENT FOR PLASTER

(1) Material for corner reinforcement shall have at least the same corrosion resistance as metal plaster lath.

(2) All internal corners of walls and ceilings shall be reinforced with metal lath or wire fabric having not less than 2-in.-wide legs. Corner beads shall be installed at all external corners.

(3) Corners of openings shall be reinforced with a strip of metal lath not less than 6 in. by 18 in. long installed at an angle of 45 deg. to the horizontal.

(4) All plaster reinforcement shall be fastened to the lath and not to the framing.

G. PLASTERING

(1) Materials used in plastering shall conform to the following:
CSA A82.21-1950, "Gypsum,"
CSA A82.22-1963, "Gypsum Plasters,"
CSA A82.26-1950, "Keene's Cement,"
CSA A82.42-1950, "Quicklime for Structural Purposes,"
CSA A82.44-1950, "Normal Finishing Hydrated Lime,"
CSA A82.46-1962, "Special Finishing Hydrated Lime,"
CSA A82.57-1954, "Inorganic Aggregates for Use in Interior Plaster."

(2) Grounds shall be installed to ensure even and uniform plaster thickness.

(3) Plaster shall be not less than ⅜ in. thick at any point, measured from the face of the lath. Where electric cables for heating are embedded in the plaster, there shall be not less than ⅜ in. of plaster covering the cables.

(4) Plaster shall be applied in 3 coats consisting of a scratch coat, brown coat and finish coat, except that where the base consists of gypsum lath or unit masonry other than concrete masonry, a 2-coat application may be used in which a brown coat is doubled back over the scratch coat.

(5) When plaster is applied over concrete or concrete masonry a special bond coat shall be used as the first coat or an approved liquid bonding agent shall be applied before the application of the first coat of plaster. Normal finishing hydrated lime shall not be used in plaster applied to exterior masonry or concrete walls.

(6) Plaster to embed cables used for electric heating shall not incorporate lightweight aggregate.

(7) When 3-coat plaster is used, the first or scratch coat shall consist of 1 part gypsum plaster to 2 parts sand by weight. The second or brown coat shall consist of 1 part gypsum plaster to 3 parts sand by weight. The finish coat shall consist of 1 part gypsum plaster to 3 parts lime by volume.

(8) When two-coat plaster is used, the first coat shall consist of 1 part gypsum plaster to 2½ parts sand by weight. The finish coat shall consist of 1 part gypsum plaster to 3 parts lime by volume.

(9) The finish coat shall be trowelled to a smooth hard finish unless a special decorative finish is used conforming to CSA A82.22-1963, "Gypsum Plasters."

(10) In cold weather, plaster shall be applied at from 50°F to 70°F and maintained at this temperature range for not less than 96 hr and above freezing thereafter. Ventilation shall be provided for the proper drying of the plaster.

H. GYPSUM BOARD FINISH (TAPED JOINTS)

(1) Gypsum board shall conform to CSA A82.27-1963, "Gypsum Wallboard."

(2) Gypsum board applied as a single layer shall be not less than ⅜ in. thick on supports not more than 16 in. o.c. and ½ in. thick on supports not more than 24 in. o.c. When applied as two layers, each layer shall be not less than ⅜ in. thick on supports not more than 24 in. o.c.

(3) The length of fasteners for gypsum board shall conform to Table 30B.

(4) Nails for fastening gypsum board to wood supports shall be not less than 13-gauge annular grooved nails with a head diameter of 7/32 in.

TABLE 30B — FASTENER PENETRATION INTO WOOD SUPPORTS

Required Fire-Resistance Rating of Assembly	Min. Fastener Penetration Into Wood Supports, in.	
	Walls	Ceilings
Fire-Resistance Rating not Required	¾(1)	¾(1)
¾ hr	¾(2)	1⅛(2)
1 hr	¾(2)	1⅞(2)
1½ hr	¾(2)	2½(2)
Column 1	2	3

Notes to Table 30B:

(1) May be reduced to ⅝ in. for screws.

(2) Where the exposed layer of wallboard is attached with an approved heat-resistant adhesive to an underlying layer of gypsum board, the fasteners for the underlying layer shall penetrate not less than ¾ in. into the supports where nails are used and ⅝ in. where screws are used.

(5) For single-layer application, nails shall be spaced not more than 7 in. o.c. on ceiling supports and not more than 8 in. apart along vertical wall supports except that nails may be spaced in pairs about 2 in. apart every 12 in. along such wall or ceiling supports. Where the ceiling sheets are supported by the wall sheets around the perimeter of the ceiling, this support may be considered as equivalent to nailing at this location. The uppermost wall nails shall be not more than 8 in. below the ceiling. Nails shall be located not less than ⅜ in. from the side or edge of the board. Nails shall be driven so that the heads are below the plane of the board surface but do not puncture the paper.

(6) For double-layer applications, the first layer shall be fastened as in (5). The second layer shall be fastened with similar nailing or with suitable adhesive. The second layer shall be held in place by temporary shoring or bracing or by nails until the adhesive has set. Such nails shall be spaced about 12 in. o.c. on ceilings and 16 in. o.c. on walls and may be removed when the adhesive sets.

(7) Where strip laminated method of application is used, strips of gypsum board not less than ⅜ in. thick and 6 in. wide shall be nailed to the framing members with nailing conforming to (5). The finish layer of gypsum board shall be attached by means of a suitable adhesive to these strips as described in (6).

(8) Where gypsum board is applied with drywall screws, the screws shall be spaced not more than 12 in. o.c. along supports except that on vertical surfaces the screws may be spaced 16 in. o.c. where the supports are not more than 16 in. o.c.

(9) Nail heads and screw heads shall be covered with a suitable filler.

(10) Surfaces to receive tape shall be clean, and torn paper or loose material shall be removed. Openings greater than ⅛ in. shall be filled with patching plaster that is allowed to dry before joint tape cement is applied.

(11) External corners shall be protected with corrosion-resistant metal corner beads or wood mouldings.

(12) A band of joint cement about 5 in. wide shall be applied along the joints to embed the tape. The tape shall be smoothed out and excess cement removed with a suitable spreader tool.

(13) After the cement has dried, a second layer of cement shall be applied so that it completely covers the tape. The edges of the cement shall be feathered to provide a band about 8 in. wide where the joints are recessed and 10 in. wide where the joints are not recessed.

(14) After the second layer is dry, a third layer of cement shall be applied and feathered to provide a band about 10 in. wide where the joints are recessed and 16 in. wide where the joints are not recessed.

(15) After the third layer of cement has dried, all rough and uneven areas shall be sanded to provide a smooth even surface.

(16) In cold weather the taping and finishing of gypsum board shall be carried out at a temperature of not less than 50°F.

I. PLYWOOD FINISH

(1) The minimum thickness of plywood interior finish shall conform to Table 30C, except that no minimum thickness is required when the plywood is applied over solid backing.

TABLE 30C — THICKNESS OF PLYWOOD INTERIOR FINISH

Maximum Spacing of Supports	On Supports with no Horizontal Blocking	On Supports with Blocking at Vertical Intervals not Exceeding 4 ft
16 in. o.c. 24 in. o.c.	3/16 in. 3/8 in.	5/32 in. 3/16 in.
Column 1	2	3

(2) Where plywood for interior finishes is grooved, the grooves shall not extend through the face ply unless the required thickness of the plywood is increased to allow for the depth of the groove.

(3) Nails for attaching plywood finishes shall be not less than 1½ in. casing or finishing nails spaced not more than 6 in. o.c. along edge supports and 12 in. o.c. along intermediate supports, except that staples providing equivalent lateral resistance may also be used.

(4) All plywood edges shall be supported by furring, blocking or framing.

J. HARD-PRESSED FIBREBOARD FINISH

(1) Hard-pressed fibreboard shall conform to CGSB 11-GP-3a(1970), "Standard for Hardboard."

(2) Hard-pressed fibreboard shall be not less than ⅛ in. thick where applied over continuous back-up, ¼ in. thick where applied to supports spaced not more than 16 in. o.c., and ⅜ in. thick where applied to supports spaced not more than 24 in. o.c.

(3) Nails for fastening hard-pressed fibreboard shall be casing or finishing nails not less than 1½ in. long, spaced not more than 6 in. o.c. along edge supports and 12 in. o.c. along intermediate supports.

(4) All hard-pressed fibreboard edges shall be supported by furring, blocking or framing where the back-up is not continuous.

K. INSULATING FIBREBOARD FINISH

(1) Insulating fibreboard shall conform to CSA A247.3-1969, "Fibreboard used in Interior Applications."

(2) Insulating fibreboard sheets shall be not less than 7/16 in. thick on supports not more than 16 in. o.c. Insulating fibreboard tile shall not be less than ½ in. thick on supports spaced not more than 16 in. o.c.

(3) Nails for fastening fibreboard sheets shall be not less than 12-gauge casing or finishing nails of sufficient length to penetrate at least ¾ in. into the supports. Nails shall be spaced not more than 4 in. o.c. along edge supports and 8 in. o.c. along intermediate supports.

(4) All fibreboard edges shall be supported by blocking, furring or framing.

L. PARTICLEBOARD FINISH

(1) Particleboard finish shall conform to CSA O188-1968, "Mat-Formed Wood Particleboard."

(2) Particleboard shall be not less than ¼ in. thick on supports not more than 16 in. o.c. and not less than ⅜ in. thick on supports not more than 24 in. o.c.

(3) Nails for fastening particleboard shall be not less than 1½-in. casing or finishing nails spaced not more than 6 in. o.c. along edge supports and 12 in. o.c. along intermediate supports.

(4) All particleboard edges shall be supported by furring, blocking or framing.

M. WALL TILE

(1) Ceramic tile shall be set in a mortar base or applied with an adhesive. Plastic tile shall be applied with an adhesive.

(2) When ceramic tile is applied to a mortar base the cementitious material shall consist of 1 part portland cement to not more than ¼ part lime by volume. This shall be mixed with not less than 3 nor more than 5 parts of aggregate per part of cementitious material by volume. Mortar shall be applied over metal lath or masonry. Ceramic tile applied to a mortar base shall be thoroughly soaked and pressed into place forcing the mortar into the joints while the tile is wet.

(3) Adhesives to attach ceramic or plastic tile shall be applied to the finish coat or brown coat of plaster that has been steel-trowelled to an even surface or to gypsum board or to masonry, provided the masonry has an even surface.

(4) The joints between wall tiles and the bathtub shall be suitably caulked with material conforming to CGSB 19-GP-3a(1968), "Sealing Compound: Elastomeric, Two Component, Polysulphide Base, Chemical Curing" or CGSB 19-GP-9b(1971), "Sealing Compound: One Component, Silicone Base, Chemical Curing."

N. INTERIOR TRIM

(1) Interior trim shall be provided where necessary to cover unprotected edges of friable wall finishes or where the junction of two surfaces is not finished to provide an acceptable appearance.

(2) Trim shall be made of wood, metal, plastic or other acceptable material.

(3) Steel trim shall be primed with a rust-inhibitive paint before installation or otherwise treated to prevent corrosion.

(4) Aluminum mouldings shall be treated with a protective coating when in contact with masonry, plaster, mortar or concrete.

(5) Wood trim shall be smooth, clean, sound stock suitable for finishing. Moisture content at the time of installation shall not exceed 12 per cent.

SECTION 31. FLOORING

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Finished flooring shall be provided in all dwelling units, public and private entrances, corridors, stair landings and all public areas.

(3) Finished flooring in bathrooms, kitchens, public entrance halls, laundry and general storage areas shall consist of resilient flooring, felted-synthetic-fibre floor coverings, concrete, terrazzo, ceramic tile, mastic or other types of flooring providing similar degrees of water resistance.

(4) Wood sleepers supporting finished flooring over a concrete base on ground shall be not less than 1 in. by 2 in. and shall be treated with a soaking coat of approved wood preservative.

B. PANEL-TYPE UNDERLAY

(1) A panel-type underlay shall be provided under resilient flooring, parquet flooring, ceramic tile, felted-synthetic-fibre floor coverings or carpeting laid over lumber subflooring. (See C (3)).

(2) A panel-type underlay shall be provided under resilient flooring, parquet flooring, felted-synthetic-fibre floor coverings, carpeting or ceramic tile on panel-type subflooring whose edges are unsupported (see 23 N (3)).

(3) Panel-type underlay shall be not less than ¼ in. thick and shall conform to one of the following:
CSA O115-1967, "Hardwood Plywood,"
CSA O121-1961, "Douglas Fir Plywood,"
CSA O151-1961, "Western Softwood Plywood,"
CSA O153-1963, "Poplar Plywood,"
CSA O188-1968, "Mat-Formed Wood Particleboard,"
CGSB 11-GP-3a(1970), "Standard for Hardboard."

(4) Panel-type underlay shall be fastened to the subfloor with staples or annular grooved flooring nails, spaced not more than 6 in. o.c. along the edges and 8 in. o.c. both ways at other locations.

(5) Nails for panel-type underlay shall be not less than ¾ in. long for ¼-in.-thick underlay and ⅞ in. long for 5/16-in.-thick underlay. Staples for panel-type underlay shall be not less than 18 gauge with a ⅜-in. crown and shall be not less than ⅞ in. long for ¼-in. underlay and 1⅛ in. long for 5/16- and ⅜-in. underlay.

(6) Underlay beneath resilient or ceramic floors applied with an adhesive shall have all holes or open defects on the surface patched so that the defects will not be transmitted to the finished surface.

C. WOOD STRIP FLOORING

(1) Wood strip flooring shall be sanded so that the surface is smooth, even, and free from roughness or open defects.

(2) The thickness of wood strip flooring shall conform to Table 31A.

TABLE 31A — WOOD STRIP FLOORING

Type of Flooring	Maximum Joist Spacing, in.	Minimum Actual Thickness of Flooring, in.	
		with subfloor	no subfloor
Matched Hardwood (interior use only)	16 24	5/16 5/16	3/4 1 1/4
Matched Softwood (interior or exterior use)	16 24	3/4 3/4	3/4 1 1/4
Square Edge Softwood (exterior use only)	16 24	— —	1 1 1/2
Column 1	2	3	4

(3) Wood strip flooring shall not be laid parallel to lumber subflooring unless a separate underlay is provided.

(4) If wood strip flooring is applied without a subfloor, it shall be laid at right angles to the joists so that the end joints are staggered and occur over supports or are end matched. If the flooring is end matched, it shall be laid so that no two adjoining strips break joints in the same space between supports and each strip bears on no fewer than 2 supports.

(5) Wood strip flooring shall be toe nailed or face nailed with at least one nail per strip at the spacings shown in Table 31B except that face nailed strips of more than 1 in. in width shall have no fewer than 2 nails per strip. Face nails shall be counter sunk and the holes filled with suitable filler.

TABLE 31B — NAILING OF WOOD STRIP FLOORING

Finish Floor Thickness, in.	Minimum Length of Flooring Nails, in.	Maximum Spacing of Flooring Nails, in.
5/16	1 1/2(1)	8
7/16	2	12
3/4	2 1/4	16
1	2 1/2	16
1 1/4	2 3/4	24
1 1/2	3 1/4	24
Column 1	2	3

Note to Table 31B:

(1) Staples not less than 1 1/8 in. long, 18 gauge, 3/16 in. crown may be used in lieu of nails.

D. PARQUET FLOORING

(1) Hardwood parquet block flooring shall be finished so that the surface is smooth, even, and free from roughness or open defects.

(2) Adhesive used to attach parquet block flooring shall be suitable for bonding wood to the applicable subfloor material.

E. RESILIENT FLOORING

(1) Resilient floor shall conform to one of the following:

CSA A100-1962, "Asphalt Floor Tile,"

CSA A146-1965, "Linoleum Products,"

CSA A126.1-1967, "Vinyl Asbestos Floor Tile,"

CSA A145-1959, "Rubber Floor Tile,"

FS-L-F00450(1959), "Flooring, Vinyl Plastic."

(2) Resilient flooring used on concrete slabs supported on ground shall consist of asphalt, rubber, vinyl-asbestos, unbacked vinyl or vinyl with an inorganic type backing. Such flooring shall be attached to the base with a suitable waterproof and alkali-resistant adhesive. Other types of resilient flooring may be used on slabs-on-ground when approved.

F. CERAMIC TILE

(1) Ceramic tile shall be set in a mortar bed or applied to a sound, smooth base with a suitable adhesive.

(2) When set in a mortar bed the bed shall be not less than 1¼ in. thick. Asphalt sheathing paper, felt or polyethylene film shall be applied under the mortar bed when the mortar is applied over wood subfloors. The mortar shall consist of 1 part portland cement to not more than ¼ part lime to not less than 3 nor more than 5 parts of aggregate per part of cementitious material, by volume. The tile shall be soaked before installation and pressed firmly into place while the mortar is still plastic. The mortar shall be compressed into the tile joints and the joints tooled the same day the tile is installed. Where no spacers are provided the joints shall not exceed 1/16 in. in width.

(3) Ceramic tile installed with an adhesive shall be applied over a smooth base of concrete, plywood, or hard-pressed fibreboard. The adhesive shall be applied to both the base and the tile.

G. CARPETING

(1) Carpeting shall not be used as a finish flooring in kitchens, bathrooms, washrooms, laundry areas or other areas where excessive amounts of water are likely to be encountered unless approved.

(2) When carpeting is used it shall be laid over concrete or panel-type subflooring or over lumber subflooring covered with a panel-type underlay conforming to Subsection B.

(3) Carpeting shall conform to the following specifications:

CGSB 4-GP-70c(1970), "Carpets: Wilton, Velvet and Modified Woven for Residential Use."

CGSB 4-GP-71b(1970), "Carpets: Axminster, for Residential Use."

CGSB 4-GP-76b(1970), "Carpets: Tufted for Residential Use."

CGSB 4-GP-77(1969), "Carpets: Modified woven with Bonded Sponge Rubber Cushion, for Residential Use."

CGSB 4-GP-78(1969), "Carpets: Knitted with Foam Latex Cushion Back, for Residential Use."

A carpet underlay shall be provided beneath the carpeting. This shall consist of a felt type weighing not less than 32 oz. per sq yd conforming to CGSB 4-GP-36a, Type I, II, or III or sponge or foam type conforming to CGSB 20-GP-23a at least 3/16 in. thick for Type I and ¼ in. thick for Type II or III.

H. FELTED-SYNTHETIC-FIBRE FLOOR COVERINGS

(1) Felted-synthetic-fibre floor coverings may be used in all rooms and spaces. When a felted-synthetic-fibre floor covering is used, it shall be laid over concrete or panel-type subflooring or over lumber subflooring covered with a panel-type underlay conforming to Subsection B.

(2) A carpet underlay shall not be used beneath felted-synthetic-fibre floor coverings in those areas where carpeting is not permitted (See G (1)).

SECTION 32. PLUMBING

A. SCOPE

(1) This Section applies to the facilities required in plumbing systems within dwelling units in all buildings regardless of size.

(2) Facilities in plumbing systems other than those required in dwelling units shall conform to Part 3 of the National Building Code of Canada 1970.

B. GENERAL

(1) Every plumbing system shall conform to appropriate provincial regulations. In the absence of such regulations, the requirements of this Section shall apply.

(2) The construction, extension, alteration, renewal or repair of plumbing systems shall conform to Part 7 of the National Building Code of Canada 1970.

(3) Fixture clearance shall conform to the requirements in Section 5.

C. WATER SUPPLY AND DISTRIBUTION

(1) Every dwelling unit shall be supplied with potable water from an approved public or community system when these systems are available.

(2) Where public or community systems are not available, every dwelling unit shall be supplied with an adequate supply of potable water from an approved private source. Where individual wells deliver less than 4 gal. per minute per dwelling unit over a 1-hr period, not less than 200 gal. cold water storage shall be provided per dwelling unit.

(3) Piping for hot and cold water shall be connected to every kitchen sink, washbasin, bathtub, shower, slop sink and laundry area. Piping for cold water shall be run to every water closet and hose bib.

D. REQUIRED FACILITIES

(1) A kitchen sink, washbasin, bathtub and water closet shall be provided for every dwelling unit where a piped water supply is available. Where there is no piped water supply other approved means of waste disposal shall be provided for every dwelling unit.

(2) Laundry facilities or a space for laundry facilities shall be provided in every dwelling unit or grouped elsewhere in the building in a location conveniently accessible to occupants of every dwelling unit.

(3) A hot water supply shall be provided in every dwelling unit.

(4) Where gravity drainage to a sewer, drainage ditch or dry well is possible, a floor drain shall be installed in a basement or cellar forming part of a dwelling unit.

(5) A floor drain shall be provided in a public laundry room, and in a garbage room, incinerator room, boiler or heating room serving more than one dwelling unit.

(6) Every public water closet room shall be equipped with at least one water closet and one washbasin (see Subsection 5 J).

(7) Every janitor's water closet room shall be equipped with one water closet and one washbasin or slop sink (see Subsection 5 J).

(8) At least one outside hose bib with inside shut-off valve and drain cock or other acceptable draining device shall be provided for each building and for each ground floor dwelling unit in a building in which there is no dwelling unit above another dwelling unit. In row-housing, the bibs are to be provided alternately at front and back.

(9) Bathrooms in dwelling units shall be equipped with a wall cabinet or vanity, a mirror, toilet paper holder, soap dish, grab bar and towel bar. When a shower is provided, a shower rod or enclosure shall be installed.

(10) Where automatic washing machines are provided, there shall be at least one machine for every 20 dwelling units.

(11) Where automatic clothes dryers are provided there shall be at least one domestic size dryer for every 20 dwelling units, or commercial dryers providing equivalent capacity shall be provided.

E. SERVICE WATER HEATING FACILITIES

(1) Equipment shall be installed to provide to every dwelling unit an adequate supply of service hot water with a temperature range from 140° to 165°F.

(2) Service hot water may be distributed from a centrally located heater to supply the entire building or may be supplied by an individual service water heater for each dwelling unit.

(3) Every service water heater and its installation shall conform to Part 6 of the National Building Code of Canada 1970.

(4) Fuel-burning service water heaters shall be connected to a chimney flue conforming to Section 21.

(5) Heating coils of service water heaters shall not be installed in a flue or in a combustion chamber of a building heating boiler or furnace unless approved for such installations.

(6) Where a steel storage tank for a service water heater is located in a dwelling unit, it shall be coated with zinc, vitreous enamel (glass lined), hydraulic cement or other approved corrosion-resistant material.

(7) Tanks for service water heaters shall be of a type having a service life of at least 10 years with the kind of water encountered.

(8) Central storage tanks for service water heaters serving more than one dwelling unit may consist of non-galvanized steel rated at not less than 125 psi water pressure.

(9) The minimum storage tank capacity and watt input for electricity heated storage type service water heaters serving individual dwelling units shall conform to Table 32A. Other combinations of tank capacity and element wattage may be used where it can be shown that such combinations will provide an equivalent supply of hot water.

TABLE 32A — ELECTRICAL SERVICE WATER HEATERS, STORAGE TYPE

No. of Bath-rooms(1)	No. of Bed-rooms	Min. Tank Capacity (Can. gal.)	Minimum Wattage of Elements		
			Single element type	Dual Element Type (nonsimultaneous operation)	
				Primary element	Secondary element
1	1 or 2	20	1000	750	1000
	3 or 4	30	1500	1000	1000
2	2 or 3	40	2000	1000	1000
	4 or 5	40	2500	1000	3000

Note to Table 32A:

(1) Rooms containing a shower or bathtub.

(10) The minimum storage and heating capacity of nonelectric storage type service water heaters for individual dwelling units shall conform to Table 32B. Other combinations of tank capacity and recovery rates may be used where it can be shown that such combinations will provide an equivalent supply of hot water.

TABLE 32B — NONELECTRIC SERVICE WATER HEATERS, STORAGE TYPE

No. of Bath-rooms(1)	No. of Bed-rooms	Min. Tank Capacity (Can. gal.)	Minimum Heating Capacity (Can. gal. raised 100° F in 1 hr.)
1	1 or 2	14	12
	3 or 4	16	12
2	2 or 3	22	16
	4 or 5	30	21

Note to Table 32B:

(1) Rooms containing a shower or bathtub.

(11) The minimum heating capacity in Canadian gallons per hour raised through 100°F for instantaneous or tankless heaters serving individual dwelling units, shall be 140 for dwelling units with one bathroom and 240 dwelling units with two bathrooms.

(12) Service water heaters of any type serving more than one dwelling unit shall have a minimum heating capacity in Canadian gallons per hour raised through 100°F conforming to Table 32C.

(13) Storage tanks for service water heaters shall be insulated with mineral wool, cellular asbestos or other acceptable material.

TABLE 32C — MINIMUM HEATING CAPACITY
(Can. gal. per hr. @ 100°F temp. rise)

Max. No. of Dwelling Units(1)	Min. Storage Capacity per Dwelling Unit (gal.)(2)					
	0 Instantaneous	5	10	15	20	25
3	292	29	25	22	19	17
5	338	48	42	36	31	28
10	392	97	84	72	63	54
15	430	144	126	108	94	81
20	464	193	167	144	124	108
25	498	232	200	173	150	130
30	535	272	234	203	175	152
40	600	340	293	252	218	188
50	675	396	340	292	251	217
60	750	447	383	326	278	240
80	875	519	439	374	316	—
100	958	541	452	376	—	—
150	1160	566	462	—	—	—
200	1330	753	616	—	—	—
250	1500	942	—	—	—	—
300	1670	1130	—	—	—	—

Notes to Table 32C:
(1) For numbers of dwelling units not listed, interpolations may be made to determine recovery capacity.
(2) For storage capacities not listed, interpolations may be made to determine recovery capacity.

SECTION 33. VENTILATION

A. SCOPE

(1) The requirements in this Section apply to all buildings regardless of size.

(2) This Section applies to the ventilation of rooms and spaces by natural ventilation and mechanical ventilation where the rated fan capacity does not exceed 4000 cfm.

(3) Where the rated fan capacity exceeds 4000 cfm, mechanical ventilation shall conform to Part 6 of the National Building Code of Canada 1970.

(4) A garage for parking more than 5 cars shall be ventilated in accordance with Part 3 of the National Building Code of Canada 1970.

B. GENERAL

(1) Rooms and spaces in buildings shall be ventilated by natural means in accordance with Subsection C or by mechanical means in conformance with Subsection D.

(2) A space that contains a fuel-fired heating appliance shall have natural or mechanical means of supplying the required combustion air.

(3) Where the ventilation system forms part of the heating system, Section 34 shall also apply.

(4) Air contaminants released within buildings shall be removed insofar as possible at their points of origin and shall not be permitted to accumulate in unsafe concentrations.

(5) Every building in which dust, fumes, gases, vapour or other contaminants tend to create a fire or explosion hazard shall be provided with an exhaust ventilation system designed to conform with Part 6 of the National Building Code of Canada 1970, and shall be provided with explosion relief devices and vents or other protective measures to conform with Part 3 of the National Building Code of Canada 1970.

C. NATURAL VENTILATION

(1) The unobstructed ventilation area to the outdoors for rooms and spaces in buildings ventilated by natural means shall conform to Table 33A.

(2) Openings for natural ventilation other than windows shall be constructed to provide protection from the weather and insects. Screening shall be of rust-proof material.

TABLE 33A — NATURAL VENTILATION

Location		Minimum Unobstructed Area
Within Dwelling Units	Bathrooms or water closet rooms	1 sq ft
	Unfinished basement space	0.2% of the floor area
	Dining rooms, livings rooms,(1) bedrooms, kitchens, combined rooms,(1) dens, recreation rooms and all other finished rooms	3 sq ft(2)
Other Than Within Dwelling Units	Bathrooms	1 sq ft per water closet
	Sleeping areas	1½ sq ft per occupant
	Laundry rooms, kitchens, recreation rooms	4% of the floor area
	Corridors, storage rooms and other similar public rooms or spaces	2% of the floor area
	Unfinished basement space not used on a shared basis	0.2% of the floor area
Column 1	2	3

Notes to Table 33A:

(1) Ventilation to the outdoors may be through a vestibule opening directly off a living or dining room.

(2) Where living, dining, or sleeping areas are contained in a single room, the 3 sq ft of minimum unobstructed area shall apply to the entire room.

D. MECHANICAL VENTILATION

(1) Where rooms or spaces are mechanically ventilated, the system shall be capable of providing at least 1 air change per hour. Where a kitchen space is combined with a living area, natural or mechanical ventilation shall be provided in the kitchen area.

(2) No air from any dwelling unit shall be circulated directly or indirectly to any other dwelling unit, public corridor or public stairway.

(3) Exhaust ducts from rooms containing water closets, urinals, showers, slop sinks or domestic cooking equipment shall not be connected to duct systems serving other areas of a building except at the inlet of the exhaust fan. Where such a connection is made, devices shall be installed to prevent the circulation of exhaust air through the dwelling units when the fan is not operating.

(4) Air intakes shall be located so as to avoid contamination from exhaust outlets or other sources in concentrations greater than normal in the locality in which the building is located.

(5) Exhaust ducts shall discharge directly to the outside air. Where the exhaust duct passes through or is adjacent to unheated space the duct shall be insulated to prevent moisture condensation in the duct.

(6) Ventilation equipment shall be accessible for inspection, maintenance, repair and cleaning. Kitchen exhaust ducts shall be designed and installed so that the entire duct can be cleaned where the duct is not equipped with a filter at the intake end.

(7) Outdoor air intake and exhaust outlets shall be shielded from weather and insects. Screening shall be of rust-proof material.

(8) Outdoor intake openings into the cold air return system shall be provided with a manually operated or automatic damper. Air intake openings larger than 5 in. diameter shall be equipped with a manually operated closure if the system is gravity type, or an automatic closure if the system is mechanically operated.

(9) Where a duct enters or passes through a wall, floor or ceiling, the space between the duct and surrounding construction shall be closed off with noncombustible material.

(10) Ventilating ducts shall conform to the requirements in Section 34 for warm air supply ducts except that where spaces between studs or joists are used as supply ducts in ventilating systems within a dwelling unit, the portions of such spaces so used shall be separated from the unused portions by tight-fitting metal stops or wood blocking.

(11) Underground ventilating ducts shall he adequately drained. Such ducts shall have no sewer connections and shall be provided with access for inspection and cleaning.

SECTION 34. HEATING AND AIR-CONDITIONING

A. SCOPE

(1) This Section applies to the design and installation of heating systems in which the heat input does not exceed 400,000 Btu per hr and to air-conditioning systems in which the rated fan capacity does not exceed 4000 cfm.

(2) Where the heat input of a heating system exceeds 400,000 Btu per hr or the rated fan capacity of an air-conditioning system exceeds 4000 cfm, Part 6 of the National Building Code of Canada 1970 shall apply.

B. GENERAL

(1) The design, including heat loss and heat gain calculations for the construction and installation of heating and air-conditioning systems shall conform to good engineering practice.

(The procedures described in the ASHRAE Guide and Data Books, the ASHRAE Handbook of Fundamentals, the HRA Digest and the IBR Manuals may be considered as good engineering practice.)

(2) Equipment forming part of a heating or air-conditioning system except for concealed or embedded pipes or ducts shall have easy access for inspection, maintenance and cleaning.

(3) Oil-burning, gas-burning and electric equipment shall be installed to conform to the following:

CSA B51-1969, "Code for the Construction and Inspection of Boilers and Pressure Vessels,"

CSA B52-1965, "Mechanical Refrigeration Code,"

CSA B139-1971, "Installation Code for Oil Burning Equipment,"

CSA B149.1-1971, "Installation Code for Natural Gas Burning Appliances and Equipment,"

CSA B149.2-1969, "Installation Code for Propane Burning Appliances and Equipment," and Supplement No. 1-1971.

CSA C22.1-1972, "Canadian Electrical Code, Part I."

(4) The installation of solid-fuel-burning appliances, including mounting, clearances and requirements for safety devices, shall conform to Part 6 of the National Building Code of Canada 1970.

(5) Fuel-fired heating appliances shall not be installed in a corridor, stairway, or beneath a stair or landing.

(6) Residential buildings shall be equipped with heating facilities capable of maintaining an indoor air temperature of 72°F at the outside winter design temperature, except as provided in (7). Winter design temperatures shall be determined on the basis of the January 2½ per cent design temperature as listed in NBC Supplement No. 1, "Climatic Information for Building Design in Canada" (1970).

(7) Heating facilities shall be provided which shall be capable of maintaining a temperature not less than 65°F in an unfinished basement or cellar. Crawl spaces need not be heated.

C. HEATING SUPPLY DUCTS

(1) The size of supply ducts shall conform to good engineering practice.

(2) Except for ducts encased in concrete which serve a single dwelling unit, ducts shall be noncombustible and shall be reasonably airtight. Such combustible ducts shall be of a type approved for such use and shall be not less than 2 ft away from the furnace supply plenum and not less than 2 ft from a vertical connection to a riser or register. Ducts in or beneath concrete slabs-on-ground shall be encased in concrete, be watertight and treated to prevent corrosion.

(3) Galvanized steel, aluminum or tin plate supply ducts shall conform to Table 34A. Other metals shall have equivalent strength and durability. Rectangular panels in plenums and ducts greater than 12 in. wide shall be shaped to provide sufficient stiffness.

TABLE 34A — MINIMUM METAL THICKNESS OF DUCTS

Shape and Location of Duct	Size of Duct, in.	Galvanized Steel (GSG)(1)	Aluminum (B&SG)(1)	Tin Plate, lb per base box
All round ducts and enclosed rectangular ducts	14 or under	No. 30	No. 26	135
	over 14	No. 28	No. 24	—
Exposed rectangular ducts	14 or under	No. 28(2)	No. 24	—
	over 14	No. 26(2)	No. 23	—
Column 1	2	3	4	5

Notes to Table 34A:

(1) The minimum metal thickness in inches equivalent to the gauge numbers is given in Table 6.1.4.A. of Part 6 of the National Building Code of Canada 1970.

(2) In systems serving a single dwelling unit, thickness may be reduced to 30 GSG for ducts 14 in. or smaller in size and to 28 GSG for ducts over 14 in. in size, where the permissible duct clearance is ½ in. or less.

(4) Where the installation of heating supply ducts in walls, floors and partitions creates a space between the duct and construction material, the space shall be sealed with noncombustible material at each end.

(5) Vertical supply ducts located in closets or rooms shall be covered with not less than ¼-in. cellular-asbestos insulation or noncombustible insulation.

(6) Ducts shall be securely supported by metal hangers, straps, lugs or brackets except that where zero clearance is permitted as described in (8) and (9), wooden brackets may be used.

(7) The clearance of furnace plenums from combustible material shall conform to one of the following:

CSA B139-1971, "Installation Code for Oil Burning Equipment,"

CSA B149.1-1971, "Installation Code for Natural Gas Burning Appliances and Equipment,"

CSA B149.2-1969, "Installation Code for Propane Burning Appliances and Equipment," and Supplement No. 1-1971.

Part 6 of the National Building Code of Canada 1970, for solid-fuel-burning furnaces.

(8) Supply ducts from warm-air furnaces having a required plenum clearance of 3 in. or less shall maintain this clearance from combustible material where the duct leaves the main plenum. This may be gradually reduced to ½-in. clearance at a distance of not less than 18 in. from the furnace plenum and to zero beyond a bend or offset in the duct sufficiently large to shield the remainder of the duct from direct radiation from the furnace heat exchanger.

(9) Supply ducts from warm-air furnaces having a required furnace plenum clearance of over 3 in. but not more than 6 in. shall maintain this clearance from combustible material at the main furnace plenum and for a horizontal distance of 6 ft from the furnace plenum. This may be reduced to ½-in.

clearance beyond this point and to zero clearance beyond a bend or offset in the duct sufficiently large to shield the remainder of the duct from direct radiation from the furnace heat exchanger.

(10) Supply ducts from warm air furnaces having a required plenum clearance of more than 6 in. shall have a clearance from combustible material equal to that specified for the furnace plenum. This clearance shall be maintained for a horizontal distance of not less than 3 ft from the furnace plenum. This may be reduced to 6-in. clearance beyond this point and to 1-in. clearance at a horizontal distance of 6 ft from the furnace plenum. This may be further reduced to 5/16-in. clearance beyond a bend or offset in the duct sufficiently large to shield the remainder of the supply duct from direct radiation from the furnace heat exchanger.

(11) Clearances for boots and register boxes shall be as described for supply ducts when the boot or box is not separated from combustible material except that no clearance is required when not less than ¼ in. of cellular-asbestos insulation is provided.

(12) Where a register is installed in a floor directly over a pipeless furnace, a double walled register box with not less than 4 in. between walls, or a register box with the warm air passage completely surrounded by the cold air passage, shall be permitted in lieu of the clearances listed in (8) to (10).

(13) All round pipe joints shall be lapped not less than 1 in. and shall have a snug fit without undue crimping or distortion. Such joints need not be screw fastened or taped.

(14) Rectangular duct connections shall be made with S and drive cleats or equivalent mechanical connection. Such connections need not be taped if reasonably airtight.

(15) Trunk ducts shall be securely supported by metal hangers, straps, lugs or brackets. The ducts shall not be nailed directly to wood members. Branch pipes shall be supported at suitable spacing to maintain alignment and prevent sagging.

D. SUPPLY OUTLETS FOR WARM AIR DUCTS

(1) A warm air supply outlet shall be provided in each finished room in a dwelling unit. When rooms are located adjacent to exterior walls such outlets shall be located so as to bathe at least one exterior wall with warm air except in bathrooms or kitchens where this may not be practical.

(2) A warm air supply outlet per 400 sq ft shall be provided in unfinished basements serving dwelling units located so as to provide adequate distribution of warm air.

(3) No fewer than 4 supply outlets shall be provided in crawl spaces used as warm air plenums and located to direct the air towards the corners of the crawl space. Ducts for such outlets shall be not less than 6 ft in length.

(4) Except for pipeless furnaces and floor furnaces, the capacity of warm air supply outlets serving dwelling units shall be not less than the design heat loss from the area served and shall not exceed 10,000 Btu per hr per outlet. In basements and heated crawl spaces, the calculated heat gain from the supply ducts and plenum surfaces may be considered in the calculations.

(5) **Registers for warm-air supply outlets in garages shall be located not less than 4 ft above the floor and be fitted with an automatic damper to prevent garage vapours entering the heating system.**

(6) **Except for pipeless and floor furnaces, the temperature of supply air at the warm-air supply outlets shall not exceed 160°F.**

(7) **Warm-air supply systems for residential buildings built on concrete slabs-on-grade, shall be installed in the slab. Such systems shall be of the perimeter loop type or radial perimeter type.**

(8) Supply outlets shall be provided near the exterior doors of a dwelling unit where such entrances are not heated by warm air from the basement.

E. REGISTERS, DIFFUSERS, GRILLES AND FITTINGS FOR WARM AIR HEATING

(1) **The design of fittings for ducts, shall conform to CSA B228.1-1968, "Pipes, Ducts and Fittings for Residential Type Air Conditioning Systems," except that metal thickness requirements shall conform to those in Table 34A.**

(2) **Warm-air supply outlets located in finished areas or on the furnace plenum or extended plenum shall be provided with a diffuser and adjustable opening.**

(3) **All branch supply ducts which are not fitted with diffusers with an adjustable balance stop shall be supplied with an adjustable damper and fitted with a device to indicate the position of the damper.**

(4) **Return air inlets in finished areas shall be supplied with grilles.**

F. INSULATION OF DUCTS

Supply ducts and return ducts in exterior walls shall be insulated on the three cold sides to provide an "R" value of not less than 1.5. Supply ducts and return ducts in attic spaces or unheated crawl spaces shall be insulated to provide an "R" value of not less than 7.

G. RETURN AIR SYSTEMS

(1) **The return air system shall be designed to handle the entire air supply.**

(2) **Where any part of a return duct will be exposed to radiation from the furnace heat exchanger or other heat radiating part within the furnace, parts of return ducts directly above or within 2 ft horizontally of the outside furnace casing shall be noncombustible. Return ducts in other locations shall be constructed of material having a surface flame-spread rating of not more than 150.**

(3) **Combustible return ducts shall be lined with noncombustible material below floor registers, at the bottom of vertical ducts and under furnaces having a bottom return.**

(4) **Spaces between studs used as return ducts shall be separated from the unused portions of such spaces by tight-fitting metal stops or wood blocking.**

(5) **A vertical return duct shall have openings to return air on not more than one floor.**

(6) **A public corridor or public stairway shall not be used as a return air plenum.**

(7) The return air system shall be designed so that the negative pressure from the circulating fan cannot affect the furnace combustion air supply nor draw combustion products from joints or openings in the furnace or flue pipe.

(8) Return air inlets shall not be located in a garage or an enclosed furnace room or in a crawl space where the furnace is installed in the crawl space.

(9) Where warm air is exhausted into a garage, special provision shall be made for make up air from the outside to compensate for this air.

(10) Return air from a dwelling unit shall not be recirculated to any other dwelling unit.

(11) At least one return air inlet shall be provided per dwelling unit. Each return shall serve an area having a design heat loss of not more than 60,000 Btu per hr.

(12) Provision shall be made for the return of air from all rooms by leaving a gap beneath doors, using louvred doors, or installing a return duct inlet.

H. STEAM AND HOT WATER HEATING SYSTEMS

(1) Every steam and hot water pipe shall be constructed of noncombustible material having adequate strength and durability.

(2) Insulation or other covering for steam or hot water pipes shall be noncombustible.

(3) Clearance between steam or hot water pipes and combustible construction shall be not less than ½ in. for steam or water temperatures greater than 200°F but not more than 250°F, and 1 in. for temperatures over 250°F.

(4) The space around pipes passing through a wall or floor construction shall be fire stopped with noncombustible material.

(5) When pipes are run in a vertical shaft, the fire-resistance rating of the shaft shall conform to the requirements contained in Subsection 10 L. Such shafts shall have a noncombustible lining where the pipes are not insulated.

(6) Steam and hot water pipes shall be designed to allow expansion and contraction with changes in temperature.

I. RADIATORS, CONVECTORS AND HEAT EXCHANGERS

(1) Every heat exchanger or unit heater using hot water or low pressure steam shall be installed with sufficient clearance to ensure that the temperature of any combustible material will not exceed its safe limit.

(2) Every steam or hot water radiator or convector attached to a wall or located in a recess or concealed space containing combustible material shall be provided with a noncombustible backing.

SECTION 35. ELECTRICAL

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Electrical installations, including the service capacity of the installation and the number and distribution of circuits, shall meet the requirements of the appropriate provincial or municipal statutes or in the absence of such statutes, shall conform to CSA C22.1-1972, "Canadian Electrical Code, Part I."

(3) Unless otherwise approved, electrical facilities shall be provided for every building and every dwelling unit and public shared space in buildings containing dwelling units.

(4) Electrical facilities shall have sufficient capacity to provide, without overloading, electrical energy for lighting, appliances, outlets and equipment installed in the building.

(5) Entrance switches, meters, panel boxes, splitter boxes, time clocks, and other similar equipment shall not be located in any public area unless adequate precautions are taken to prevent interference with the equipment.

B. LIGHTING OUTLETS

(1) An exterior lighting outlet with fixture, controlled by a wall switch located within the building, shall be provided at every entrance to buildings of Residential Occupancy.

(2) A lighting outlet with fixture, controlled by a wall switch, shall be provided in kitchens, utility rooms, laundry rooms, dining rooms, bathrooms, water closet rooms, vestibules and hallways, in dwelling units.

(3) A receptacle controlled by a wall switch or lighting outlet shall be provided in bedrooms and living rooms in dwelling units.

(4) Every stairway shall be lighted. Except as provided in (5), three-way wall switches located at the head and foot of every stairway shall be provided to control at least one lighting outlet with fixture for stairways with 4 or more risers in dwelling units.

(5) The stairway lighting for basements or cellars that serve not more than one dwelling unit and do not contain finished space, or lead to an outside entrance or built-in garage, may be controlled by a single switch located at the head of the stair.

(6) A lighting outlet with fixture shall be provided for each 300 sq ft, or fraction thereof, of floor area in unfinished basements or cellars. The outlet nearest the stair shall be controlled by a wall switch located at the head of the stair.

(7) A lighting outlet with fixture shall be provided in storage rooms.

(8) A lighting outlet with fixture shall be provided for an attached, built-in or detached garage or carport. Such outlet shall be controlled by a wall switch near the doorway where the fixture is ceiling mounted above an area normally occupied by a parked car; otherwise a switched lampholder may be used. Where a carport is lighted by a light at the entrance to a dwelling unit, additional carport lighting is not required.

(9) Every public or service area in buildings shall be provided with lighting outlets with fixtures controlled by a wall switch or panel to illuminate every portion of such areas. When provided by incandescent lighting, illumination shall conform to Table 35A. When other type of lighting is used, illumination equivalent to that shown in Table 35A shall be provided.

TABLE 35A — MINIMUM LIGHTING FOR PUBLIC AREAS

Room or Space	Footcandles	Watts per Square Foot of Floor Area (Incandescent Lighting)
Storage Rooms	5	½
Service Rooms and Laundry Areas	20	2
Garages	5	½
Public Water Closet Rooms	10	1
Public Corridors and Stairways	5	—
Service Hallways and Stairways	5	—
Recreation Rooms	10	1
Column 1	2	3

C. RECEPTACLES

(1) Except in kitchens, bathrooms, laundry rooms, water closet rooms, utility rooms and hallways, wall receptacles shall be installed in every finished room or area in a dwelling unit so that no point along the floor line of any usable wall space is more than 6 ft from an outlet installed in the same room. Usable wall space shall be considered as wall space not less than 3 ft wide. Such space shall not include doorways, areas occupied by door when fully opened, windows less than 12 in. above the floor, fireplaces, or other permanent installation that would limit the use of the wall space.

(2) Where a switched receptacle is used in lieu of a lighting outlet and fixture as permitted in B (3), it need not be additional to the requirements in (1), provided only half of a duplex receptacle is switched.

(3) No fewer than two receptacles shall be provided in kitchens in dwelling units. One such receptacle shall be provided over the countertop work surface and one shall be provided at the refrigerator space. In addition, a receptacle shall be provided in a dining area forming part of a kitchen.

(4) A duplex receptacle shall be provided in every laundry room or area, utility room or area or combined laundry-utility room. When grouped laundry facilities are provided, sufficient outlets shall be provided to serve adequately the equipment to be installed by the building owner or tenants.

(5) Except for stairs leading to unfinished basements or cellars, no point in a hall or stairway in a dwelling unit shall be more than 15 ft from a receptacle.

(6) A special purpose outlet or cable shall be provided to the space where an electric range is to be installed.

(7) Public corridors and public stairs shall have at least one duplex receptacle for each 35-ft length or fraction thereof.

D. EMERGENCY LIGHTING

Emergency lighting shall conform to Subsection 9K.

SECTION 36. GARAGES AND CARPORTS

A. SCOPE

(1) This Section applies to garages and carports serving not more than one dwelling unit.

(2) The construction of a garage or carport shall conform to the requirements for other buildings in this Code except as provided in this Section.

(3) Garage door requirements shall conform to the appropriate requirements in Subsection 6 G.

(4) Insulation of heated garages shall conform to the requirements in Section 26.

B. GENERAL

Where a roofed enclosure used for the storage or parking of a car or cars has more than 60 per cent of the total perimeter enclosed by walls, doors or windows, the enclosure shall be considered a garage.

C. FOUNDATIONS

(1) Except as permitted in this Subsection foundations shall be provided for the support of carport and garage superstructures, including that portion beneath garage doors, conforming to Sections 12 and 15.

(2) In clay-type soils subject to significant movement with a change in soil moisture content, the foundation depth of carports or garages connected to a dwelling unit by a breezeway shall be approximately the same depth as the main building foundation. Where slab-on-grade construction is used, a construction joint shall be provided between the main building slab and the garage or breezeway or carport slab. Except as provided in Section 12, foundations for attached unheated garages or carports shall be below frost level.

(3) Detached garages of less than 500 sq ft floor area and not more than one storey in height may be supported on wood mud sills, provided the garage is not of masonry or masonry veneer construction.

(4) Piers for the support of carport columns shall extend not less than 6 in. above grade. Such piers shall project not less than 1 in. beyond the base of the column but in no case be less than 8 in. by 8 in. in size.

D. FLOORS

Garage floors shall conform to 10 E (8).

E. WALLS AND COLUMNS

(1) Interior finish need not be applied to garage and carport walls.

(2) Columns shall conform to Section 17, except that 4-in. by 4-in. wood columns may be used.

(3) Garage or carport walls and columns shall be anchored to the foundation to resist wind uplift.

F. DIMENSIONS

(1) Garages and carports shall have a clear inside length of not less than 20 ft.

(2) Garages and carports shall have a clear inside width of at least 10 ft for single car parking, except that where a door in a side wall of a garage swings into the garage or where there is a doorway in a wall between the house or apartment building and the carport, the inside width shall be at least 11 ft. At least 8 ft additional clear width shall be provided for each additional car. Where a garage or carport is divided by columns or walls, the dimensions of each section shall conform to the preceding requirements. Measurements shall be taken 8 in. from the floor.

(3) Door heights shall conform to 6 G (2).

SECTION 37. ELEVATORS

A. GENERAL

In addition to the requirements for elevators in Parts 3 and 6 of the National Building Code of Canada 1970, the requirements in this Section shall apply to all buildings regardless of size.

B. NUMBER OF ELEVATORS

(1) Except as provided in (2), at least one elevator shall be provided in buildings which have dwelling units on the 4th or a higher floor, the first floor being considered the floor closest to the finish grade.

(2) At least two elevators shall be provided in buildings which have more than three dwelling units on the 7th or a higher floor, the first floor being considered the floor closest to the finished grade.

C. ELEVATOR CAPACITY

(1) The elevators shall have a carrying capacity of not less than 7 per cent of the total building occupant load in 5 minutes.

(2) The total building occupant load shall be calculated on the basis of two persons per bedroom or combination room with sleeping facilities excluding the ground elevator terminal floor.

(3) At least one elevator in each building with dwelling units on 7 or more floors shall have a minimum capacity of 2000 lb.

D. ELEVATOR SPEED

(1) Elevator speeds shall be designed to provide a maximum time interval of 80 sec. for two or more elevators. For single elevator installations the maximum time interval shall be 150 seconds.

(2) Elevator speed shall be not less than 200 ft per minute for buildings of more than 10 storeys in building height.

E. CONTROLS

(1) In one, two or three car installations, the system shall be not less than simplex, duplex or triplex down collective control respectively.

(2) Hydraulic elevators shall have full electric control and operation.

SECTION 38. PAINTING

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Paints, other protective coatings and materials for mixing and thinning shall conform to appropriate specifications of the Canadian Government Specifications Board or shall be of a type acceptable to the authority having jurisdiction.

(3) Surfaces that are to be finished shall be free from dirt, grease, asphalt or other foreign material that may harm the finish. If a wooden surface is to be painted, a prime coat shall be applied to it, exposed open defects shall be filled with putty or other suitable filler and knots or other resinous areas shall be sealed with suitable knot sealer or aluminum paint.

(4) Paints or other finishes shall be applied at a temperature not less than 40°F.

B. EXTERIOR PAINTING

(1) Except for cedar and redwood, all exposed exterior materials subject to deterioration in their unprotected state, such as wood (including the tops and bottoms of wood doors), hardboard and ferrous metal shall be painted or otherwise suitably treated.

(2) Exterior metal that is to be painted shall receive at least one coat of suitable primer plus two finish coats of exterior paint.

C. INTERIOR PAINTING

(1) Bathrooms, kitchens and laundry areas other than in unfinished basements shall be painted or otherwise suitably treated to resist damage from moisture except that plaster need not be painted.

(2) In habitable rooms, vestibules and halls, a suitable finish shall be applied to gypsum board without factory applied decorative finish, wood panelling, trim, cupboards, shelving, sash and window frames, door and door frames.

(3) A suitable finish shall also be applied to handrails and stairs to basements, cellars or attics.

(4) Wood floors and stairs between floor levels with habitable rooms shall be treated with at least one coat of sealer plus one coat of wax or other suitable finish.

(5) All structural steel surfaces shall be painted to resist corrosion.

SECTION 39. WALKWAYS, DRIVEWAYS AND PARKING AREAS

A. PARKING AREA

(1) This Section applies to all buildings regardless of size.

(2) Except when equivalent parking is provided in garages or carports, a parking area for the storage of at least one car per dwelling unit shall be provided for buildings containing one or two dwelling units or provision shall be made on the property for suitable access to and a space for a future parking area, garage or carport.

(3) Except when equivalent parking is provided in garages or carports at least one parking space for each dwelling unit in a building containing more than two dwelling units shall be provided on the property. Such parking areas shall not be located so as to impair the view from living rooms, entrances or front yards and shall be at least 20 ft away from windows for living rooms, dining rooms, bedrooms or kitchens below grade.

(4) Parking areas shall be at least 20 ft long and 8 ft wide with a gradient and cross slope of not more than 7 in. in 10 ft and a minimum cross slope of 2 in. in 10 ft where gradient is less than 2 in. in 10 ft.

(5) Depending on the angle of parking, sufficient additional space shall be provided to allow for turnout. This space shall be at least 18 ft wide, measured between rows of parked cars or from one row to the limit of the paved area. This space may be reduced when permitted by the authority having jurisdiction.

(6) When parking areas are surfaced, the base and topping shall conform to the requirements in B for driveways.

B. DRIVEWAYS

(1) A space for a driveway shall be provided to a garage, carport or parking area. Where a garage or carport is provided, a driveway shall be installed to connect with the paved or travelled portion of the street or lane.

(2) Driveways serving not more than 4 dwelling units shall have a minimum width of 8 ft, except that combined walkway-driveways shall be at least 10 ft wide. Two paved ribbons may be used for driveways serving a single dwelling unit provided the ribbons are at least 2 ft wide and are spaced 5 ft o.c.

(3) Driveways serving more than 4 dwelling units shall be at least 8 ft 0 in. wide for one-way driveways and at least 18 ft wide for two-way driveways.

(4) Driveways shall have a maximum cross slope of 7 in. in 10 ft, and a minimum cross slope of 2 in. in 10 ft where the gradient is less than 2 in. in 10 ft.

(5) Driveways shall not be constructed on unconsolidated filled ground.

(6) The base for driveways shall be crushed stone, gravel or other coarse clean granular material.

(7) The surface shall consist of stone chips, crushed stone, gravel, asphalt concrete or portland cement concrete.

(8) When the surface consists of stone chips, gravel or crushed stone, the base shall be at least 6 in. thick and the surface material shall be not more than ¾ in. size.

(9) When the surface consists of asphalt concrete the base material shall be at least 4 in. thick and the compacted thickness of the concrete at least 1½ in. thick.

(10) When the surface consists of portland cement concrete, the base shall be at least 5 in. thick and the concrete at least 3 in. thick, except that the base may be omitted where the ground is solid rock, compacted sand or gravel, provided the concrete is 5 in. thick. Concrete shall have at least 3000 psi compressive strength after 28 days. Construction joints shall be spaced not more than 10 ft apart.

C. WALKWAYS

(1) Every entrance to a building shall be served by a walkway or a system of walkways, except that a combined walkway-driveway may be used where the building entrance serves not more than two dwelling units.

(2) A main walkway shall be provided from the street to the principal entrance of a building on each property.

(3) Where a garage, parking area or driveway serves a building containing more than 2 dwelling units, a main walkway shall be provided between such building and garage, parking area or driveway.

(4) All other walkways may be secondary walkways leading to main walkways or to the street.

(5) The minimum width of walkways shall conform to Table 39A.

TABLE 39A — WALKWAY WIDTHS

Type of Walkway	Maximum No. of Dwelling Units Served	Minimum Walkway Width, ft - in.
Main Walkways	4	2 - 6
	8	3 - 0
	16	4 - 0
	more than 16	5 - 0
Secondary Walkways	4	2 - 0
	8	2 - 6
	16	3 - 0
	more than 16	4 - 0

(6) Walkways shall have a maximum gradient of 12 in. in 10 ft and a maximum cross slope of 7 in. in 10 ft. When the gradient is less than 2 in. in 10 ft the minimum cross slope shall be 2 in. in 10 ft.

(7) Where steps occur in walkways, there shall be at least 2 risers at any one location. Such steps shall have a rise of not less than 4 in. nor more than 7 in. and a minimum run of 12 in. The product of the run and rise shall not exceed 84. Steps shall be as wide as the walkway and shall be provided with a handrail on one side when there are more than three risers.

(8) Walkways shall not be constructed over unconsolidated filled ground.

(9) Except as provided in (10), walkways shall consist of hard burned shale, clay or concrete brick, 1½ in. thick smooth, durable flagstone, precast concrete, 4 in. thick portland cement concrete of at least 3000 psi strength after 28 days or 1½ in. thick asphalt concrete over a granular base at least 4 in. thick. Portland cement concrete walkways shall have contraction joints spaced not more than 1½ times the walkway width apart.

(10) Walkways serving not more than two dwelling units, and all secondary walkways shall consist of the materials listed in (9) or shall consist of at least 3 in. of fine gravel or crushed stone.

SECTION 40. SITE IMPROVEMENT

A. GENERAL

(1) This Section applies to all buildings regardless of size.

(2) Details of the drainage design for the entire building site shall be submitted for approval to the authority having jurisdiction before commencement of any building.

(3) Construction or other debris such as tree stumps or boulders shall be removed from the site before grading or any subsequent landscaping operations are commenced.

(4) All grade transitions including those associated with swales shall be gradual. Gradients exceeding 6 ft in 10 ft shall be suitably landscaped or retained to prevent soil erosion. Existing slopes which are adequately retained by trees, shrubs, turf, rock outcropping or any combinations of these will require no further treatment.

B. PROTECTION OF EXISTING TREES

(1) Every effort shall be made to permit the retention of existing desirable trees.

(2) Where fill occurs around existing trees the depth of sandy or light sandy loam cover shall not exceed 9 in. over the root area. When heavier soils are used, the depth of cover shall not exceed 6 in. Such cover shall be kept at least 12 in. away from the tree trunk by a wall of dry stone or unmortared bricks to the depth of the cover.

(3) When a greater depth of fill is required, the entire root area shall be brought to within 6 in. of finished grade by a fill of broken stone blinded at its surface with fine stone. The final 6 in. shall be filled with topsoil. A protective wall of stone or brick shall be provided as in (2) to the full depth of the fill, including stone.

(4) Where the grading operation lowers the grade around trees to be retained, the earth around such trees shall be undisturbed for a radius from the tree equal to approximately two-thirds of the branch spread. When such change of level exceeds 10 in., the soil around such trees shall be contained by stone revetting or a dry stone wall or a well formed mound extending to the branch spread.

C. GRADING AND TOPSOIL

(1) The specified lawn area except for portions of the lot which are covered by rock outcropping, satisfactory tree, shrub or grass growth shall be subgraded to within 4 in. of the finished lawn grade. All low points shall be filled and compacted.

(2) Where top soil is specified, it shall be reasonably free of stones and capable of supporting good agricultural growth. It shall be applied in a uniform layer to a minimum depth of 4 in. over the area disturbed by the building operation.

D. LAWN AREAS

(1) On areas of the building site on which seeding or sodding is specified, a suitable mixture of low nitrogen, high phosphorous content commercial fertilizer shall be applied evenly and cultivated to the full depth of the top soil at the rate recommended by the manufacturer.

(2) On areas of the building site on which seeding is specified, a Canada No. 1 mixture grade of permanent lawn grass species known to be successful in the locality shall be applied at the rate of 4 to 5 lb of seed for 1000 sq ft. The area shall then be lightly raked, rolled with a light turf roller and watered until the moisture has penetrated to a depth of at least 1 in.

(3) On areas of the building site on which sodding is specified, sods not less than ¾ in. nor more than 1½ in. thick containing a good percentage of permanent lawn grass species common to the locality shall be carefully laid over topsoil which has been cultivated and raked level. Sods shall be laid evenly with no overlapping and with tightly closed joints. Immediately after sodding, the ground shall be thoroughly watered to ensure a moisture penetration of 4 to 5 in. After the soil has dried out sufficiently so that its structure will not be damaged, it shall be rolled with a medium weight roller or tamped to provide a uniform surface.

E. PLANTING OF TREES AND SHRUBS

(1) Where planting of trees and shrubs is specified the requirements in (2) to (8) shall apply.

(2) Plant material shall conform to the standards of the Canadian Association of Nurserymen. Dried out plants shall not be used.

(3) Pits for tree planting shall be at least 24 in. deep and have a diameter of at least 6 in. beyond the root spread, or a diameter in feet not less than the diameter of the tree in inches at 1 ft above grade.

(4) Pits for shrub planting shall be at least 15 in. deep and have a diameter at least 6 in. beyond the root spread.

(5) Approximately 4 oz. of bone meal and 4 oz. of activated sludge shall be thoroughly mixed with each bushel of topsoil.

(6) Each plant shall be thoroughly watered when the hole is two-thirds filled with soil. After final backfilling and watering, the soil shall be left at least 1 in. lower than the surrounding ground level forming a shallow depression to collect rainwater.

(7) All planted trees with a caliper of 3 in. and over, measured at 1 ft above grade shall be suitably guyed by at least three wires encased at the trunk in water hose or other protective material. Smaller trees shall be supported by a wood stake and suitably protected to prevent damage to the tree.

(8) Pruning of planted material and existing trees shall be done in accordance with good local practice.

APPENDIX A

FIRE AND SOUND RESISTANCE

TABLE A-1

FIRE AND SOUND RESISTANCE OF WALLS

Type of Wall	No.	Description	Finish on Each Side (1)	Fire Resistance Rating (2)	Sound Rating (3)
Brick	1	4-in.-thick walls of shale, clay, concrete or sand lime brick, at least 75% solid	None	1 hr	II
	2	4-in.-thick walls of clay or shale brick	A	2 hr	II
	3	6-in.-thick walls of clay or shale brick, at least 80% solid	A	4 hr	II
	4	8-in.-thick walls, same as in 1	None	4 hr	I
Hollow Tile	5	8-in.-thick clay or shale tile with min. face shell thickness of $\frac{5}{8}$ in., two cells in wall thickness	None	1 hr	III
	6	Same as 5, and at least 37% solid	A	2 hr	II
	7	Same as 5, and at least 47% solid	A	3 hr	II

(Notes for (1), (2), and (3) follow Table A-3)

Continued on next page

TABLE A-1—(Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS

Type of Wall	No.	Description	Finish on Each Side (1)	Fire Resistance Rating (2)	Sound Rating (3)
Hollow Concrete Block	8	4-in.-thick with at least 1-in. face shell with natural stone, gravel or lightweight aggregate with a low proportion of quartz with a total wall weight less than 35 lb/sq ft.	A	1 hr	III
	9	Same as 8 but with a total wall weight of 35 lb/sq ft or more	A	1 hr	II
	10	6-in. hollow concrete block of expanded slag, expanded clay or shale aggregate concrete with finish applied over furring strips. Units at least 48% solid	H (at least one side)	1 hr	II
	11	Same as 10, but with units at least 59% solid	H (at least one side)	1½ hr	II
	12	6-in. hollow concrete block of limestone aggregate units at least 63% solid	A, H or N (at least one side)	1 hr	II
	13	8-in.-thick with at least 1-in. face shell, weighing at least 40 lb/sq ft made of natural stone or gravel aggregate with a low proportion of quartz	A, H or N (at least one side)	1 hr	II
	14	Same as 13 but with lightweight aggregate, units weighing less than 40 lb/sq ft	None	1 hr	III
	15	8-in.-thick made with expanded slag aggregate. Units at least 65% solid	A, H, N	3 hr	II
	16	8-in.-thick made with air-cooled slag or cinder aggregate. Units at least 66% solid	A, H, N	2 hr	II
	17	8-in.-thick made with limestone aggregate. Units at least 47% solid	A, H or N (at least one side)	1 hr	II
	18	Same as 17, but with units at least 57% solid	A, H or N (at least one side)	1½ hr	II
	19	Same as 17, but with units at least 66% solid	A, H or N (at least one side)	2 hr	I

(Notes for (1), (2), and (3) follow Table A-3)

Continued on next page

TABLE A-1—(Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS

Type of Wall	No.	Description	Finish on Each Side (1)	Fire Resistance Rating (2)	Sound Rating (3)
Reinforced Concrete	20	4-in.-thick weighing at least 35 lb/sq ft	A, H or N (at least one side)	1 hr	II
Natural Stone	21	8-in.thick	A, H or N (at least one side)	1 hr	I
Brick Faced	22	4-in. face brick bonded to 4-in. hollow concrete block or 4-in. hollow clay tile	None	1 hr	II
Cavity Walls	23	2 wythes of shale, clay, concrete or sandlime brick with 2-in. cavity	A, H or N (at least one side)	1 hr	I
	24	2 wythes of 4-in.-thick hollow clay tile at least 40% solid, or hollow concrete block at least 62% solid provided the maximum load does not exceed 80 psi	A, H or N (at least on side)	1 hr	I
	25	8-in. wall thickness with two 2-in.-thick wythes of solid gypsum block, 4-in. space; tied together with non-corroding metal ties	Z	3 hr	II
	26	Same as 25, but with 2-in. mineral wool in cavity	Z	3 hr	I
Gypsum Block	27	3-in.-thick hollow gypsum block at least 70% solid	None	1 hr	III
	28	2-in.-thick solid gypsum block	None	1 hr	III
	29	3-in.-thick solid gypsum with resilient clips on one side to attach metal lath	T on one side and Z on other side	2 hr	I
	30	5-in.-thick solid block	Z	4 hr	II

(Notes for (1), (2), and (3) follow Table A-3)

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TABLE A-1—(Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS

Type of Wall	No.	Description	Finish on Each Side (1)	Fire Resistance Rating (2)	Sound Rating (3)
Wood Stud	31	Two rows of staggered 2 x 4 studs with 2 x 6 top and bottom plates	B, Q	1 hr	II
	32	Same as 31 with 2-in. mineral wool in cavity	B, Q	1 hr	I
	33	Same as 31	D, F, O	1 hr	I
	34	Same as 31, but with mineral wool blanket at least 1.-in.-thick weighing at least 2.2 lb per cu ft threaded between studs or 2-in. mineral wool batts applied between studs on both sides	I	1 hr	II
	35	Same as 34	J	¾ hr	II
	36	Same as 31 but with at least 2-in. mineral wool batts between studs on at least one side	K, B	1 hr	II
	37	Single row of 2 x 4 studs	B, D, G, L, K, F, O, Q, U, V, W	1 hr	III
	38	Same as 37, but with resilient fasteners on at least one side and with 2-in. mineral wool in cavity	K	1 hr	II
	39	Same as 37, but with full thick mineral wool batts completely filling the stud spaces	I, J	1 hr	III
	40	Two rows of 2 x 4 studs with separate wall plates with 2-in. mineral wool in at least one row of studs	K	1 hr	II

(Notes for (1), (2), and (3) follow Table A-3)

Continued on next page

TABLE A-1—(Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS

Type of Wall	No.	Description	Finish on Each Side (1)	Fire Resistance Rating (2)	Sound Rating (3)
Plank Wall	41	2 layers of 2 x 6 lumber placed vertically with joints staggered	H	1 hr	III
Steel Stud	42	Single row of steel studs 16 in. o.c., non-load-bearing	R	1 hr	III
	43	Same as above, but with 2-in. mineral wool in cavity	D, P, R, U, V, W	1 hr	I
	44	Single row of steel studs 24-in. o.c., 2-in. mineral wool in cavity	K	1 hr	II

(Notes for (1), (2), and (3) follow Table A-3)

TABLE A-2

FIRE-RESISTANCE RATING OF EXTERIOR WOOD STUD WALLS

Type of Wall	No.	Description	Interior Finish (1)	Fire Resistance Rating (2)
Wood Stud	1	2 x 4 studs with mineral wool batts with $\frac{5}{8}$-in. T & G sheathing or fibreboard sheathing, or $\frac{1}{2}$-in. gypsum board sheathing or $\frac{5}{16}$-in. plywood sheathing, plus building paper and siding, stucco or masonry veneer	D, F, K	1 hr
	2	Same as 1 except $\frac{3}{8}$-in. plywood siding without sheathing	D, F, K	1 hr
	3	Same as 1 with mineral wool batts of at least 1.2 lb/sq ft or glass wool at least 0.6 lb/sq ft	I	1 hr
	4	Same as 1	B	$\frac{3}{4}$ hr
	5	Same as 3	H	$\frac{3}{4}$ hr
	6	Same as 1 but with mineral wool batts weighing at least 0.86 lb/sq ft	M	$\frac{3}{4}$ hr

(Notes for (1), (2) and (3) follow Table A-3)

TABLE A-3

FIRE AND SOUND RESISTANCE OF FLOORS, CEILINGS, AND ROOFS [4]

Type of Construction	No.	Description	Ceiling Finish (1)	Fire Resistance Rating (2)	Sound Rating (3)
Concrete Slab	1	5-in. reinforced concrete with ¾-in. minimum cover over reinforcing steel	None	1 hr	I
	2	3½-in. reinforced concrete with ¾-in. minimum cover over reinforcing steel	None	1 hr	II
	3	3-in. reinforced concrete with limestone aggregate having ⅝-in. minimum cover over reinforcing steel	None	¾ hr	III
Concrete Joists	4	3-in. reinforced concrete (gravel aggregate) on precast concrete joists (expanded shale aggregate) with 1-in. minimum cover over reinforcing steel in joists. Two-inch wood furring wired to underside of joists to attach ceiling	J	1 hr	I
Open Web Steel Joists	5	2-in. reinforced concrete on metal lath on open web steel joists with ceiling secured to underside of joists	E	1 hr	I
	6	Same as 5, but ceiling secured by metal screws to ¾-in. furring channels or 1¼-in. nails to ⅞-in. nailing channels	K	1 hr	III
Heavy Timber	7	1-in. nominal finish flooring or ⅝-in. phenolic bonded plywood on nominal 6-in. laminated plank deck	None	¾ hr	—
	8	1-in. nominal finish flooring or ⅝-in. phenolic bonded plywood on nominal 3-in. T and G plank or 4-in. laminated plank deck	None	¾ hr	—
	9	1-in. nominal finish flooring or ⅝-in. phenolic bonded plywood on 4-in. laminated plank deck treated with fire-retardant chemicals or a heavy coating of fire-retardant compound on underside	None	1 hr	—

(Notes for (1), (2), (3), and (4) follow Table A-3)

Continued on next page

TABLE A-3—(Cont'd)

FIRE AND SOUND RESISTANCE OF FLOORS, CEILINGS, AND ROOFS [4]

Type of Construction	No.	Description	Ceiling Finish (1)	Fire Resistance Rating (2)	Sound Rating (3)
Wood Joists	10	1-in. nominal T and G or 5/8-in. phenolic bonded plywood on 1- by 3-in. furring strips on asbestos paper weighing at least 14 lb/ 100 sq ft on 1/2-in. soft fibreboard on 1-in. nominal T and G or 5/8-in. phenolic bonded plywood subfloor on wood joist at 16-in. o.c. No nails are to pass through the fibreboard into the subfloor	C, E, K	1 hr	II
	11	Double wood floor of nominal 1-in. T and G subfloor or 5/8-in phenolic bonded plywood subfloor with asbestos-cement paper weighing at least 14 lb/100 sq ft between, on wood joists 16-in. o.c.	C, K	1 hr	III
	12	Same as 11	E, D (I with 1 1/2-in.-long nails spaced 6-in. o.c.)	1/2 hr	III
	13	Nominal 1-in. T and G subfloor or 5/8-in. phenolic bonded plywood subfloor on wood joists 16-in. o.c.	D, K, S, U, V, X	1 hr	III
	14	Nominal 1-in. T and G lumber or 5/8-in.-thick phenolic bonded plywood subflooring on wood joists 16-in. o.c. with ceiling suspended on mild steel hangers with 3-in. mineral wool fill between joists	T	1 hr	III
	15	Nominal 1-in. T and G lumber or 5/8-in. phenolic bonded plywood subfloor on wood joists 16-in. o.c. with metal ceiling supports spaced 18-in o.c., 1 1/2-in. by 3-in. steel channel sections 3 ft. o.c. hung with mild steel hangers	3/4 in. Gypsum and sand plaster on 3/8 in. gypsum board	1 hr	III
	16	Nominal 1-in. T and G lumber or 5/8-in. phenolic bonded plywood subfloor on wood floor joists 16-in. o.c. with separate ceiling joists at least 1-in. below the bottom of the floor joists. With 2-in. insulation between floor or ceiling joists	C, D, E, K	1 hr	II

(Notes for (1), (2), (3), and (4) follow Table A-3)

Continued on next page

TABLE A-3—(Cont'd)

FIRE AND SOUND RESISTANCE OF FLOORS, CEILINGS, AND ROOFS [4]

Type of Construction	No.	Description	Ceiling Finish (1)	Fire Resistance Rating (2)	Sound Rating (3)
Trussed Roof-Ceiling	17	Nominal 2-in. framing members spaced not more than 24-in. o.c. with at least 3-in. of mineral wool batts without paper backing. No sheathing on top of framing members	D, E, G, K, R, U, X	¾ hr	—
Ceiling Joists	18	Same as 17	D, E, G, K, R, U X	¾ hr	—

Notes to Tables A-1, A-2 and A-3:

(1) The finishes designated by letter in Tables A-1, A-2 and A-3 refer to the following:

(The finishes shall be nailed in accordance with the requirements contained in this Code unless otherwise specified. Except as otherwise specified, the proportions of plaster mixes are by weight.)

A ⅝-in. gypsum-sand plaster (1 part gypsum to 3 parts sand).
B ½-in. gypsum-sand plaster (1 part gypsum to 2 parts sand) on ⅜-in. perforated gypsum lath or plain gypsum lath with lath pads.
C Same as B but with 3-in.-wide strips of expanded metal over all joints.
D ¾-in. gypsum-sand plaster (1 part gypsum to 2 parts sand) over metal lath.
E ¾-in. gypsum-sand plaster (1 part gypsum to 2 parts sand for first coat, 1 part gypsum to 3 parts sand for second coat) over metal lath.
F ⅞-in. portland cement-gypsum plaster (1 part portland cement to 2 parts sand for first coat and 1 part gypsum to 3 parts sand for second coat) over metal lath.
G ⅝-in. gypsum-perlite plaster (100 lb gypsum to 2½ cu ft of aggregate) on ⅜-in. perforated gypsum lath.
H ⅜-in. gypsum board.
I Double layer of ⅜-in. gypsum board, joints staggered.
J ½-in. gypsum board, taped joints.
K ⅝-in. special fire-resistant gypsum board rated by Underwriters' Laboratories Inc. or Underwriters' Laboratories of Canada for 1-hr fire-resistance rating.
L 3/16-in. asbestos-cement board on ⅜-in. gypsum board.
M ½-in. phenolic bonded Douglas fir plywood.
N 2 coats of resin emulsion or other coating providing equivalent seal.
O ⅞-in. portland cement-sand plaster on metal lath with 3 lb asbestos fibre per bag of cement.
P 1-in. portland cement-sand plaster on metal lath with 3 lb asbestos fibre per bag of cement.
Q ⅝-in. gypsum-sand plaster on ⅜-in. gypsum lath.
R ¾-in. gypsum-sand plaster on ⅜-in. gypsum lath.
S ½-in. gypsum-sand plaster on ⅜-in. gypsum lath with No. 16 SWG 1-in. square wire mesh between lath and plaster.
T ⅞-in. Gypsum-sand plaster on metal lath.
U ½-in. gypsum-perlite or gypsum-vermiculite plaster on ⅜-in. gypsum lath.
V ¾-in. gypsum-perlite or gypsum-vermiculite plaster on metal lath.
W Double layer of ½-in. gypsum wallboard.
X Double layer of ½-in. gypsum wallboard with No. 16 SWG 1-in. square wire mesh between sheets.
Z ½-in. gypsum-sand plaster (1 part gypsum to 3 parts sand).

(2) The fire-resistance ratings in Tables A-1 and A-3 were based on tests conducted at a number of fire testing laboratories. The ratings in Table A-2 are estimated.

(3) Rating I for airborne sound transmission signifies construction with a sound transmission class rating of 50 or more and is considered to provide good resistance to transmission of airborne sound.
Rating II for airborne sound transmission signifies constructions with a sound transmission class rating of 45 to 50 and is considered to provide fair resistance to airborne sound. This is the minimum rating that satisfies the requirements in Section II.
Rating III for airborne sound transmission signifies constructions with a sound transmission class rating of less than 45 and is not acceptable where sound-resistant construction is required.

(4) Fire-resistance ratings for floor constructions listed in Table A-3 for steel joist or wood-frame assemblies may be applied to roof assemblies having the same ceiling construction. Where wood joists are used, the roof sheathing shall consist of not less than ½-in.-thick phenolic bonded plywood or nominal 1-in.-thick boards. Where steel joists are used, the roof deck shall be at least equivalent in fire resistance to 2-in. reinforced concrete.

APPENDIX B

SPAN TABLES FOR WOOD JOISTS, RAFTERS AND BEAMS

(Based on the grading rules shown in Table 3B in Section 3).

FOREWORD

The allowable spans in the following span tables are measured from face or edge of support to face or edge of support and have been calculated on the basis of seasoned lumber, dressed to Canadian standard sizes for yard lumber in accordance with CSA O141-1965, "Softwood Lumber."

Spans for lumber dressed to Canadian standard sizes for yard lumber in accordance with CSA O141-1970, "Softwood Lumber" are contained in Appendix D.

Spans for odd-size lumber (i.e. 2-in. by 5-in., 2-in. by 7-in., etc.) may be estimated by straight line interpolation in the tables.

These span tables may be used where members support a uniform live load only. Where the members are required to be designed to support concentrated loads (see Table 4B Section 4) the members must be designed to conform to Section 4. 3 of the National Building Code of Canada 1970.

Design Assumptions

Design load assumptions and deflection limits used in calculating the Span Tables conform to Section 4 of this Code.

Snow loads are expressed in terms of the horizontal projection of the sloping roof. The rafter spans (sloping roofs) are expressed in terms of the horizontal projection of the rafter.

For other snow loads, spans may be calculated as follows:

60 psf. Use spans for 30 psf. and 24 in. spacing but space members 12 in. o.c. or use spans for 40 psf. and 24 in. spacing but space members 16 in. o.c.

70 psf. Use spans for 50 psf. and 24 in. spacing but space members 16 in. o.c.

80 psf. Use spans for 40 psf. and 24 in. spacing but space members 12 in. o.c.

For floor loads other than those shown in the tables, the spans listed may be used provided the joist spacing is varied as the ratio of the listed load to the proposed load.

The lumber grades listed in the second column in each of these tables are the official grades of the various grading authorities listed in Table 3B of Section 3.

Spans for lumber graded under the 1971 "NLGA Standard Grading Rules for Canadian Lumber" are provided in Appendix D.

The facsimiles of grade stamps applying to such lumber are shown in Appendix E.

TABLE B-1

CEILING JOISTS — ATTIC NOT ACCESSIBLE BY A STAIRWAY

Species	Grade	Nominal Size	LIVE LOAD 10 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist spacing						Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	ft	in.	ft	in.	ft	in.	ft.	in.	ft	in.	ft	in.	ft	in.	ft	in.
Douglas Fir, Western Larch	Construction	2 x 4	11	6	10	1	9	0	8	2	11	7	10	1	9	0	8	2
		2 x 6	17	6	15	11	14	8	13	11	20	0	18	2	16	11	15	11
		2 x 8	23	10	21	8	20	1	18	11	27	4	24	10	23	0	21	7
		2 x 10	29	9	27	1	25	1	23	7	34	1	31	0	28	9	27	0
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	17	6	15	11	14	8	13	11	20	0	18	2	16	5	15	0
		2 x 8	23	10	21	8	20	1	18	11	27	4	24	10	22	5	20	6
		2 x 10	29	9	27	1	25	1	23	7	34	1	31	0	28	0	25	7
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	21	6	18	7	16	8	15	2	21	6	18	7	16	8	15	2
		2 x 10	29	0	25	7	22	6	20	6	29	0	25	7	22	6	20	6
Pacific Coast Hemlock	Construction	2 x 4	10	8	9	2	8	4	7	7	10	8	9	2	8	4	7	7
		2 x 6	17	1	15	6	14	5	13	7	19	7	17	10	16	6	15	6
		2 x 8	23	4	21	2	19	8	18	6	26	8	24	4	22	6	21	2
		2 x 10	29	1	26	6	24	7	23	1	33	5	30	5	28	1	26	6
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	17	1	15	6	14	5	13	7	19	7	17	10	16	5	15	0
		2 x 8	23	4	21	2	19	8	18	6	26	8	24	4	22	5	20	6
		2 x 10	29	1	26	6	24	7	23	1	33	5	30	5	28	0	25	7
	Utilty	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	19	10	17	2	15	5	14	0	19	10	17	2	15	5	14	0
		2 x 10	26	8	23	7	20	10	18	11	26	8	23	7	20	10	18	11
Spruce (All western species) Lodgepole Pine, Ponderosa Pine	Construction	2 x 4	9	7	8	4	7	5	6	10	9	7	8	4	7	5	6	10
		2 x 6	15	5	14	0	12	7	11	6	16	2	14	1	12	7	11	6
		2 x 8	21	0	19	1	17	8	16	8	24	1	21	11	19	11	18	2
		2 x 10	26	3	23	11	22	1	20	11	30	1	27	5	24	11	22	9
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	12	7	10	11	9	8	8	11	12	7	10	11	9	8	8	11
		2 x 8	20	2	17	6	15	7	14	4	20	2	17	6	15	7	14	4
		2 x 10	26	3	23	0	20	4	18	7	26	4	23	0	20	4	18	7
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	17	10	15	5	13	10	12	7	17	10	15	5	13	10	12	7
		2 x 10	24	0	21	2	18	7	17	0	24	0	21	2	18	7	17	0
Western Red Cedar, Western White Pine (1)	Construction	2 x 4	9	0	7	10	7	0	6	5	9	0	7	10	7	0	6	5
		2 x 6	14	11	13	7	12	7	11	6	16	4	14	1	12	7	11	6
		2 x 8	20	5	18	6	17	2	16	2	23	4	20	11	18	8	17	1
		2 x 10	25	6	23	1	21	6	20	3	29	1	26	1	23	5	21	5
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	12	11	11	2	10	0	9	2	12	11	11	2	10	0	9	2
		2 x 8	19	0	16	6	14	8	13	6	19	0	16	6	14	8	13	6
		2 x 10	24	8	21	7	19	1	17	7	24	8	21	7	19	1	17	7
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	16	8	14	6	12	11	11	10	16	8	14	6	12	11	11	10
		2 x 10	22	6	19	11	17	5	15	11	22	6	19	11	17	5	15	11
Pacific Coast Yellow Cedar	Construction	2 x 4	10	4	9	0	8	0	7	4	10	4	9	0	8	0	7	4
		2 x 6	15	11	14	5	13	5	12	7	18	2	16	2	14	5	13	2
		2 x 8	21	7	19	8	18	4	17	2	24	10	22	6	20	1	18	4
		2 x 10	27	0	24	7	22	11	21	6	31	0	28	1	26	1	24	5
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	14	10	12	10	11	5	10	5	14	10	12	10	11	5	10	5
		2 x 8	21	7	18	10	16	10	15	4	21	8	18	10	16	10	15	4
		2 x 10	27	0	24	7	21	10	19	11	28	2	24	8	21	10	19	11
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	19	2	16	7	14	11	13	7	19	2	16	7	14	11	13	7
		2 x 10	25	11	22	10	20	1	18	5	25	11	22	10	20	1	18	5

Continued on next page

TABLE B-1 — (Cont'd)

CEILING JOISTS — ATTIC NOT ACCESSIBLE BY A STAIRWAY

Species	Grade	Nominal Size	LIVE LOAD 10 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce (2) Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 4	9	7	8	4	7	5	6	10	9	7	8	4	7	5	6	10
		2 x 6	15	5	14	0	13	0	12	2	17	8	16	0	14	7	13	4
		2 x 8	21	0	19	1	17	8	16	8	24	1	21	11	19	11	18	2
		2 x 10	26	3	23	11	22	1	20	11	30	1	27	5	24	11	22	9
	No. 2 (Standard)	2 x 4	8	6	7	4	6	6	6	0	8	6	7	4	6	6	6	0
		2 x 6	15	5	14	0	12	7	11	6	16	4	14	1	12	7	11	6
		2 x 8	21	0	19	1	17	8	16	8	24	1	20	11	18	8	17	1
		2 x 10	26	3	23	11	22	1	20	11	30	1	26	5	23	7	21	7
Jack Pine (3)	No. 1 (Construction)	2 x 4	10	4	9	0	8	0	7	4	10	4	9	0	8	0	7	4
		2 x 6	15	11	14	5	13	5	12	7	18	2	16	6	15	4	14	4
		2 x 8	21	7	19	8	18	4	17	2	24	10	22	6	20	11	19	6
		2 x 10	27	0	24	7	22	11	21	6	31	0	28	1	26	1	24	5
	No. 2 (Standard)	2 x 4	9	1	7	11	7	1	6	5	9	1	7	11	7	1	6	5
		2 x 6	15	11	14	5	13	5	12	5	17	6	15	2	13	7	12	5
		2 x 8	21	7	19	8	18	4	17	2	24	10	22	6	20	1	18	4
		2 x 10	27	0	24	7	22	11	21	6	31	0	28	1	25	5	23	1
White Pine Red Pine	No. 1	2 x 4	9	10	8	11	8	4	7	10	11	4	10	2	9	2	8	5
		2 x 6	14	11	13	7	12	7	11	11	17	1	15	4	13	8	12	6
		2 x 8	20	5	18	6	17	2	16	2	23	4	20	11	18	8	17	1
		2 x 10	25	6	23	1	21	6	20	3	29	1	26	1	23	5	21	5
	Merchantable and No. 2	2 x 4	9	10	8	11	8	2	7	6	10	6	9	1	8	2	7	6
		2 x 6	14	11	13	7	12	7	11	6	16	4	14	1	12	7	11	6
		2 x 8	20	5	18	6	17	2	16	0	22	8	19	7	17	7	16	0
		2 x 10	25	6	23	1	21	6	20	2	28	8	24	8	22	2	20	2
	No. 1 Dimension	2 x 4	9	0	7	10	7	0	6	5	9	0	7	10	7	0	6	5
		2 x 6	14	11	13	4	11	11	10	10	15	4	13	4	11	11	10	10
		2 x 8	20	5	18	6	16	10	15	4	21	8	18	10	16	10	15	4
		2 x 10	25	6	23	1	21	6	20	3	28	10	24	11	22	4	20	4
	No. 2 Dimension (4)	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	11	10	10	2	9	2	8	5	11	10	10	2	9	2	8	5
		2 x 8	16	8	14	6	12	11	11	10	16	8	14	6	12	11	11	10
		2 x 10	22	6	19	7	17	5	15	11	22	6	19	7	17	5	15	11
Poplar	No. 1 (Construction)	2 x 4	9	0	7	10	7	0	6	5	9	0	7	10	7	0	6	5
		2 x 6	14	11	13	7	12	7	11	11	17	1	15	4	13	8	12	6
		2 x 8	20	5	18	6	17	2	16	2	23	4	20	11	18	8	17	1
		2 x 10	25	6	23	1	21	6	20	3	29	1	26	1	23	5	21	5
	No. 2 (Standard)	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	14	11	13	4	11	11	10	11	15	4	13	4	11	11	10	11
		2 x 8	20	5	18	6	17	2	16	0	22	8	19	7	17	7	16	0
		2 x 10	25	6	23	1	21	6	20	2	28	8	24	8	22	2	20	2

Notes to Table B-1:

(1) When either of these species is graded by Western Wood Products Association Rules, the spans of 2 x 6 members shall be reduced as follows:
Construction Grade — 6 per cent.
Standard Grade — 8 per cent.

(2) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(3) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (1).

(4) When graded by Eastern Pine Grading Committee Rules, spans for No. 2 Dimension Grade may be increased as follows:
2 x 6, 2 x 8 — 10 per cent.
2 x 10 — 15 per cent.

TABLE B-2

FLOOR JOISTS — LIVING QUARTERS

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist spacing							
			12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir, Western Larch	Construction (dense and non-dense)	2 x 6	11	0	10	0	9	4	8	8
		2 x 8	15	0	13	7	12	8	11	11
		2 x 10	19	0	17	4	16	0	15	1
		2 x 12	23	0	20	11	19	5	18	4
	Standard	2 x 6	11	0	10	0	9	4	8	6
		2 x 8	15	0	13	7	12	8	11	7
		2 x 10	19	0	17	4	16	0	14	8
		2 x 12	23	0	20	11	19	5	17	10
	Utility	2 x 6	—		—		—		—	
		2 x 8	12	2	10	6	9	5	8	7
		2 x 10	16	8	14	6	13	0	11	10
		2 x 12	19	8	17	0	15	2	13	11
Pacific Coast Hemlock	Construction	2 x 6	10	10	9	10	9	1	8	7
		2 x 8	14	8	13	4	12	5	11	8
		2 x 10	18	7	16	11	15	8	14	10
		2 x 12	22	6	20	6	19	0	17	11
	Standard	2 x 6	10	10	9	10	9	1	8	6
		2 x 8	14	8	13	4	12	5	11	7
		2 x 10	18	7	16	11	15	8	14	8
		2 x 12	22	6	20	6	19	0	17	10
	Utility	2 x 6	—		—		—		—	
		2 x 8	11	2	9	8	8	8	7	11
		2 x 10	15	5	13	5	11	11	10	11
		2 x 12	18	0	15	7	14	0	12	8
Spruce, all western species Lodgepole Pine, Ponderosa Pine	Construction	2 x 6	9	2	8	0	7	1	6	6
		2 x 8	13	4	12	0	11	2	10	4
		2 x 10	16	10	15	2	14	2	13	0
		2 x 12	20	4	18	6	17	1	15	10
	Standard	2 x 6	7	1	6	2	5	6	5	1
		2 x 8	11	5	9	11	8	10	8	1
		2 x 10	15	0	13	0	11	7	10	7
		2 x 12	19	4	16	8	15	0	13	7
	Utility	2 x 6	—		—		—		—	
		2 x 8	10	1	8	8	7	10	7	1
		2 x 10	13	6	12	0	10	8	9	6
		2 x 12	16	2	14	0	12	7	11	6
Western Red Cedar Western White Pine (1)	Construction	2 x 6	9	2	8	0	7	2	6	6
		2 x 8	12	10	11	8	10	7	9	8
		2 x 10	16	4	14	10	13	5	12	3
		2 x 12	19	8	17	11	16	2	14	10
	Standard	2 x 6	7	4	6	4	5	8	5	3
		2 x 8	10	10	9	4	8	4	7	7
		2 x 10	14	1	12	2	10	11	10	0
		2 x 12	18	2	15	8	14	1	12	10
	Utility	2 x 6	—		—		—		—	
		2 x 8	9	6	8	2	7	4	6	8
		2 x 10	13	0	11	4	10	1	9	3
		2 x 12	15	4	13	2	11	10	10	10
Pacific Coast Yellow Cedar	Construction	2 x 6	10	0	9	1	8	2	7	6
		2 x 8	13	7	12	5	11	6	10	10
		2 x 10	17	4	15	8	14	7	13	8
		2 x 12	20	11	19	0	17	7	16	7
	Standard	2 x 6	8	5	7	2	6	6	5	11
		2 x 8	12	4	10	7	9	6	8	8
		2 x 10	16	1	14	0	12	6	11	5
		2 x 12	20	8	18	0	16	1	14	8
	Utility	2 x 6	—		—		—		—	
		2 x 8	10	11	9	5	8	5	7	8
		2 x 10	14	11	12	11	11	6	10	6
		2 x 12	17	6	15	1	13	6	12	5

Continued on next page

TABLE B-2 — (Cont'd)

FLOOR JOISTS — LIVING QUARTERS

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft — All Ceilings — Joist spacing							
			12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [2] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 6	9	8	8	10	8	2	7	6
		2 x 8	13	4	12	0	11	2	10	4
		2 x 10	16	10	15	2	14	2	13	0
		2 x 12	20	4	18	6	17	1	16	1
	No. 2 (Standard)	2 x 6	9	2	8	0	7	1	6	6
		2 x 8	13	4	11	10	10	7	9	8
		2 x 10	16	10	15	2	13	7	12	5
		2 x 12	20	4	18	6	17	1	16	1
Jack Pine [3]	No. 1 (Construction)	2 x 6	10	0	9	1	8	5	7	11
		2 x 8	13	7	12	5	11	6	10	10
		2 x 10	17	4	15	8	14	7	13	8
		2 x 12	20	11	19	0	17	7	16	7
	No. 2 (Standard)	2 x 6	9	11	8	7	7	8	7	0
		2 x 8	13	7	12	5	11	5	10	5
		2 x 10	17	4	15	8	14	6	13	4
		2 x 12	20	11	19	0	17	7	16	7
White Pine Red Pine	No. 1	2 x 6	9	5	8	7	7	10	7	1
		2 x 8	12	10	11	8	10	7	9	8
		2 x 10	16	4	14	10	13	5	12	2
		2 x 12	19	8	17	11	16	7	15	7
	Merchantable and No. 2	2 x 6	9	2	8	0	7	2	6	6
		2 x 8	12	10	11	1	9	11	9	1
		2 x 10	16	4	14	2	12	8	11	7
		2 x 12	19	8	17	11	16	7	15	6
	No. 1 Dimension	2 x 6	8	8	7	6	6	8	6	1
		2 x 8	12	4	10	7	9	6	8	8
		2 x 10	16	4	14	2	12	8	11	7
		2 x 12	19	8	17	11	16	2	14	10
	No. 2 Dimension [4]	2 x 6	6	8	5	10	5	2	4	8
		2 x 8	9	6	8	2	7	4	6	8
		2 x 10	13	0	11	4	10	1	9	2
		2 x 12	16	6	14	4	12	10	11	8
Poplar	No. 1 (Construction)	2 x 6	9	5	8	7	7	10	7	1
		2 x 8	12	10	11	8	10	7	9	8
		2 x 10	16	4	14	10	13	5	12	2
		2 x 12	19	8	17	11	16	7	15	7
	No. 2 (Standard)	2 x 6	8	8	7	6	6	8	6	1
		2 x 8	12	10	11	1	9	11	9	1
		2 x 10	16	4	14	2	12	8	11	7
		2 x 12	19	8	17	11	16	7	15	6

Notes to Table B-2:

(1) When either of these species is graded by Western Wood Products Association Rules, the spans of 2 x 6 members shall be reduced as follows:
Construction Grade — 6 per cent.
Standard Grade — 8 per cent.

(2) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(3) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (1)

(4) When graded by Eastern Pine Grading Committee Rules, spans for No. 2 Dimension Grade may be increased as follows:
2 x 6, 2 x 8 — 10 per cent.
2 x 10, 2 x 12 — 15 per cent.

TABLE B-3

CEILING JOISTS — ATTIC ACCESSIBLE BY A STAIRWAY AND FLOOR JOISTS IN BEDROOMS

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir, Western Larch	Con-struction	2 x 6	12	1	11	0	10	2	9	7	13	11	12	7	11	8	10	8
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	14	5
		2 x 10	20	11	19	0	17	8	16	7	23	11	21	10	20	2	18	7
		2 x 12	25	4	23	0	21	5	20	1	29	0	26	4	24	6	22	6
	Standard	2 x 6	12	1	11	0	10	2	9	7	13	7	11	10	10	6	9	7
		2 x 8	16	6	15	0	13	11	13	1	18	6	16	1	14	5	13	1
		2 x 10	20	11	19	0	17	8	16	7	23	6	20	4	18	2	16	7
		2 x 12	25	4	23	0	21	5	20	1	28	5	24	7	22	0	20	1
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	10	11	11	10	8	9	9	13	10	11	11	10	8	9	9
		2 x 10	19	0	16	5	14	8	13	5	19	0	16	5	14	8	13	5
		2 x 12	22	4	19	4	17	2	15	8	22	4	19	4	17	2	15	8
Pacific Coast Hemlock	Con-struction	2 x 6	11	11	10	10	10	0	9	5	13	7	12	4	11	5	10	9
		2 x 8	16	2	14	8	13	7	12	10	18	6	16	10	15	7	14	8
		2 x 10	20	6	18	7	17	4	16	4	23	5	21	4	19	10	18	7
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	10	23	11	22	6
	Standard	2 x 6	11	11	10	10	10	0	9	5	13	7	11	10	10	6	9	7
		2 x 8	16	2	14	8	13	7	12	10	18	6	16	1	14	5	13	1
		2 x 10	20	6	18	7	17	4	16	4	23	5	20	4	18	2	16	7
		2 x 12	24	10	22	6	20	11	19	8	28	5	24	7	22	0	20	1
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	12	8	11	0	9	10	9	0	12	8	11	0	9	10	9	0
		2 x 10	17	6	15	1	13	6	12	4	17	6	15	1	13	6	12	4
		2 x 12	20	5	17	8	15	10	14	5	20	5	17	8	15	10	14	5
Spruce, all western species Lodgepole Pine, Pondersoa Pine	Con-struction	2 x 6	10	5	9	0	8	1	7	5	10	5	9	0	8	1	7	5
		2 x 8	14	7	13	2	12	4	11	7	16	6	14	4	12	8	11	7
		2 x 10	18	6	16	10	15	7	14	8	20	10	18	0	16	1	14	8
		2 x 12	22	5	20	4	18	11	17	8	25	2	21	11	19	6	17	10
	Standard	2 x 6	8	1	7	0	6	2	5	8	8	1	7	0	6	2	5	8
		2 x 8	12	11	11	2	10	0	9	2	12	11	11	2	10	0	9	2
		2 x 10	17	0	14	8	13	1	12	0	17	0	14	8	13	1	12	0
		2 x 12	21	11	18	11	16	11	15	6	21	11	18	11	16	11	15	6
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	5	9	11	8	10	8	1	11	5	9	11	8	10	8	1
		2 x 10	15	8	13	7	12	2	11	1	15	8	13	7	12	2	11	1
		2 x 12	18	4	15	11	14	2	13	0	18	4	15	11	14	2	13	0
Western Red Cedar Western White Pine [1]	Con-struction	2 x 6	10	5	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 8	14	1	12	10	11	11	10	11	15	6	13	5	12	0	10	11
		2 x 10	17	11	16	4	15	1	13	11	19	7	17	0	15	2	13	11
		2 x 12	21	8	19	8	18	4	16	10	23	8	20	7	18	5	16	10
	Standard	2 x 6	8	4	7	2	6	5	5	10	8	4	7	2	6	5	5	10
		2 x 8	12	2	10	7	9	5	8	7	12	2	10	7	9	5	8	7
		2 x 10	16	0	13	10	12	5	11	4	16	0	13	10	12	5	11	4
		2 x 12	20	7	17	10	15	11	14	6	20	7	17	10	15	11	14	6
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	10	8	9	4	8	4	7	7	10	8	9	4	8	4	7	7
		2 x 10	14	8	12	10	11	5	10	5	14	8	12	10	11	5	10	5
		2 x 12	17	4	15	0	13	5	12	2	17	4	15	0	13	5	12	2
Pacific Coast Yellow Cedar	Con-struction	2 x 6	11	0	10	0	9	4	8	6	12	0	10	4	9	4	8	6
		2 x 8	15	0	13	7	12	8	11	11	16	7	14	5	12	11	11	9
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	5	17	4	15	10
		2 x 12	23	0	20	11	19	5	18	4	26	4	23	6	21	0	19	2
	Standard	2 x 6	9	6	8	2	7	4	6	8	9	6	8	2	7	4	6	8
		2 x 8	13	11	12	0	10	8	9	10	13	11	12	0	10	8	9	10
		2 x 10	18	4	15	10	14	2	12	11	18	4	15	10	14	2	12	11
		2 x 12	23	0	20	4	18	2	16	7	23	6	20	4	18	2	16	7
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	12	4	10	7	9	6	8	8	12	4	10	7	9	6	8	8
		2 x 10	16	11	14	7	13	1	11	11	16	11	14	7	13	1	11	11
		2 x 12	19	10	17	1	15	4	14	0	19	10	17	1	15	4	14	0

Continued on next page

TABLE B-3 — (Cont'd)

CEILING JOISTS — ATTIC ACCESSIBLE BY A STAIRWAY AND FLOOR JOISTS IN BEDROOMS

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [2] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 6	10	8	9	8	9	0	8	6	12	1	10	6	9	4	8	6
		2 x 8	14	7	13	2	12	4	11	7	16	6	14	4	12	8	11	7
		2 x 10	18	6	16	10	15	7	14	8	20	10	18	0	16	1	14	8
		2 x 12	22	5	20	4	18	11	17	8	25	7	23	4	21	0	19	2
	No. 2 (Standard)	2 x 6	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 8	14	7	13	2	12	0	10	11	15	6	13	5	12	0	10	11
		2 x 10	18	6	16	10	15	4	14	0	19	10	17	2	15	4	14	0
		2 x 12	22	5	20	4	18	11	17	8	25	7	22	10	20	5	18	7
Jack Pine [3]	No. 1 (Construction)	2 x 6	11	0	10	0	9	4	8	8	12	7	11	2	10	0	9	2
		2 x 8	15	0	13	7	12	8	11	11	17	2	15	4	13	8	12	6
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	5	17	4	15	10
		2 x 12	23	0	20	11	19	5	18	4	26	4	23	11	22	2	20	7
	No. 2 (Standard)	2 x 6	11	0	9	8	8	8	7	11	11	2	9	8	8	8	7	11
		2 x 8	15	0	13	7	12	8	11	8	16	7	14	5	12	11	11	8
		2 x 10	19	0	17	4	16	0	15	0	21	2	18	5	16	6	15	0
		2 x 12	23	0	20	11	19	5	18	4	26	4	23	11	21	11	19	11
White Pine Red Pine	No. 1	2 x 6	10	5	9	5	8	8	8	0	11	4	9	10	8	10	8	0
		2 x 8	14	1	12	10	11	11	10	11	15	6	13	5	12	0	10	11
		2 x 10	17	11	16	4	15	1	13	11	19	7	17	0	15	2	13	11
		2 x 12	21	8	19	8	18	4	17	2	24	10	22	1	19	8	18	0
	Merchantable and No. 2	2 x 6	10	5	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 8	14	1	12	7	11	2	10	4	14	6	12	7	11	2	10	4
		2 x 10	17	11	16	1	14	5	13	2	18	7	16	1	14	5	13	2
		2 x 12	21	8	19	8	18	4	17	2	24	8	21	5	19	2	17	6
	No. 1 Dimension	2 x 6	9	10	8	6	7	7	6	11	9	10	8	6	7	7	6	11
		2 x 8	13	11	12	0	10	8	9	10	13	11	12	0	10	8	9	10
		2 x 10	17	11	16	1	14	5	13	2	18	7	16	1	14	5	13	2
		2 x 12	21	8	19	8	18	4	16	10	23	8	20	7	18	5	16	10
	No. 2 Dimension [4]	2 x 6	7	7	6	7	5	11	5	4	7	7	6	7	5	11	5	4
		2 x 8	10	8	9	4	8	4	7	7	10	8	9	4	8	4	7	7
		2 x 10	14	8	12	10	11	5	10	5	14	8	12	10	11	5	10	5
		2 x 12	18	8	16	2	14	6	13	2	18	8	16	2	14	6	13	2
Poplar	No. 1 (Construction)	2 x 6	10	5	9	5	8	8	8	0	11	4	9	10	8	10	8	0
		2 x 8	14	1	12	10	11	11	10	11	15	6	13	5	12	0	10	11
		2 x 10	17	11	16	4	15	1	13	11	19	7	17	0	15	2	13	11
		2 x 12	21	8	19	8	18	4	17	2	24	10	22	1	19	8	18	0
	No. 2 (Standard)	2 x 6	9	10	8	6	7	7	6	11	9	10	8	6	7	7	6	11
		2 x 8	14	1	12	7	11	2	10	4	14	6	12	7	11	2	10	4
		2 x 10	17	11	16	1	14	5	13	2	18	7	16	1	14	5	13	2
		2 x 12	21	8	19	8	18	4	17	2	24	8	21	5	19	2	17	6

Notes to Table B-3:

(1) When either of these species is graded by Western Wood Products Association Rules, the spans of 2 x 6 members shall be reduced as follows:
Construction Grade — 6 per cent
Standard Grade — 8 per cent.

(2) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(3) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (1).

(4) When graded by Eastern Pine Grading Committee Rules, spans for No. 2 Dimension Grade may be increased as follows:
2 x 6, 2 x 8 — 10 per cent
2 x 10, 2 x 12 — 15 per cent.

TABLE B-4

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir, Western Larch	Construction (dense and non-dense)	2 x 6	10	2	9	4	8	7	8	1	11	8	10	7	9	11	9	4
		2 x 8	13	11	12	8	11	10	11	1	15	11	14	6	13	6	12	8
		2 x 10	17	8	16	0	14	11	14	0	20	2	18	5	17	0	16	0
		2 x 12	21	2	19	2	17	11	16	10	24	2	22	1	20	5	19	2
	Standard	2 x 6	10	2	9	4	8	7	8	1	11	8	10	2	9	1	8	4
		2 x 8	13	11	12	8	11	10	11	1	15	11	13	11	12	5	11	4
		2 x 10	17	8	16	0	14	11	14	0	20	2	17	7	15	8	14	5
		2 x 12	21	2	19	2	17	11	16	10	24	2	21	1	18	10	17	4
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	11	10	4	9	2	8	5	11	11	10	4	9	2	8	5
		2 x 10	16	5	14	2	12	8	11	7	16	5	14	2	12	8	11	7
		2 x 12	19	1	16	6	14	10	13	6	19	1	16	6	14	10	13	6
Pacific Coast Hemlock	Construction	2 x 6	10	0	9	1	8	5	7	11	11	5	10	5	9	8	9	1
		2 x 8	13	7	12	5	11	6	10	10	15	7	14	2	13	2	12	5
		2 x 10	17	4	15	8	14	7	13	8	19	10	18	0	16	8	15	8
		2 x 12	20	10	19	0	17	6	16	5	23	10	21	7	20	0	18	10
	Standard	2 x 6	10	0	9	1	8	5	7	11	11	5	10	2	9	1	8	4
		2 x 8	13	7	12	5	11	6	10	10	15	7	13	11	12	5	11	4
		2 x 10	17	4	15	8	14	7	13	8	19	10	17	7	15	8	14	5
		2 x 12	20	10	19	0	17	6	16	5	23	10	21	1	18	10	17	4
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	0	9	6	8	6	7	10	11	0	9	6	8	6	7	10
		2 x 10	15	1	13	1	11	8	10	8	15	1	13	1	11	8	10	8
		2 x 12	17	7	15	2	13	7	12	6	17	7	15	2	13	7	12	6
Spruce, all western species Lodgepole Pine, Ponderosa Pine	Construction	2 x 6	9	0	7	10	6	11	6	5	9	0	7	10	6	11	6	5
		2 x 8	12	4	11	2	10	5	9	10	14	1	12	4	11	0	10	1
		2 x 10	15	7	14	2	13	1	12	5	17	10	15	7	14	0	12	8
		2 x 12	18	8	17	0	15	8	14	11	21	5	18	8	16	10	15	2
	Standard	2 x 6	7	0	6	1	5	5	5	0	7	0	6	1	5	5	5	0
		2 x 8	11	2	9	8	8	7	7	11	11	2	9	8	8	7	7	11
		2 x 10	14	8	12	8	11	5	10	5	14	8	12	8	11	5	10	5
		2 x 12	18	8	16	2	14	6	13	2	18	8	16	2	14	6	13	2
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	9	11	8	6	7	7	7	0	9	11	8	6	7	7	7	0
		2 x 10	13	7	11	10	10	6	9	7	13	7	11	10	10	6	9	7
		2 x 12	15	10	13	8	12	2	11	2	15	10	13	8	12	2	11	2
Western Red Cedar Western White Pine [2]	Construction	2 x 6	8	8	7	10	7	0	6	5	9	0	7	10	7	0	6	5
		2 x 8	11	11	10	10	10	0	9	6	13	5	11	7	10	5	9	6
		2 x 10	15	1	13	8	12	8	12	0	17	0	14	8	13	1	12	0
		2 x 12	18	1	16	5	15	2	14	5	20	5	17	7	15	8	14	5
	Standard	2 x 6	7	2	6	2	5	7	5	1	7	2	6	2	5	7	5	1
		2 x 8	10	6	9	1	8	2	7	5	10	6	9	1	8	2	7	5
		2 x 10	13	10	12	0	10	8	9	10	13	10	12	0	10	8	9	10
		2 x 12	17	7	15	4	13	7	12	6	17	7	15	4	13	7	12	6
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	9	4	8	0	7	2	6	6	9	4	8	0	7	2	6	6
		2 x 10	12	8	11	0	9	11	9	0	12	8	11	0	9	11	9	6
		2 x 12	14	10	12	10	11	6	10	6	14	10	12	10	11	6	10	6
Pacific Coast Yellow Cedar	Construction	2 x 6	9	4	8	5	7	10	7	4	10	4	9	0	8	0	7	4
		2 x 8	12	8	11	6	10	8	10	0	14	5	12	5	11	1	10	2
		2 x 10	16	0	14	7	13	6	12	8	18	5	16	8	15	0	13	8
		2 x 12	19	2	17	7	16	2	15	2	22	1	20	0	18	0	16	5
	Standard	2 x 6	8	2	7	1	6	4	5	10	8	2	7	1	6	4	5	10
		2 x 8	12	0	10	5	9	4	8	6	12	0	10	5	9	4	8	6
		2 x 10	15	10	13	8	12	2	11	2	15	10	13	8	12	2	11	2
		2 x 12	19	2	17	5	15	6	14	2	20	1	17	5	15	6	14	2
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	10	7	9	2	8	2	7	6	10	7	9	2	8	2	7	6
		2 x 10	14	7	12	7	11	4	10	4	14	7	12	7	11	4	10	4
		2 x 12	17	0	14	8	13	2	12	0	17	0	14	8	13	2	12	0

Continued on next page

TABLE B-4 — (Cont'd)

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [3] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 6	9	0	8	2	7	7	7	2	10	4	9	0	8	1	7	5
		2 x 8	12	4	11	2	10	5	9	10	14	1	12	4	11	0	10	1
		2 x 10	15	7	14	2	13	1	12	5	17	10	15	7	14	0	12	8
		2 x 12	18	8	17	0	15	8	14	11	21	5	19	5	18	0	16	4
	No. 2 (Standard)	2 x 6	9	0	7	10	7	0	6	5	9	0	7	10	7	0	6	5
		2 x 8	12	4	11	2	10	5	9	6	13	5	11	7	10	5	9	6
		2 x 10	15	7	14	2	13	1	12	1	17	1	14	10	13	4	12	1
		2 x 12	18	8	17	0	15	8	14	11	21	5	19	5	17	7	16	0
Jack Pine [4]	No. 1 (Construction)	2 x 6	9	4	8	5	7	10	7	5	10	7	9	8	8	8	7	11
		2 x 8	12	8	11	6	10	8	10	0	14	6	13	2	11	10	10	10
		2 x 10	16	0	14	7	13	6	12	8	18	5	16	8	15	0	13	8
		2 x 12	19	2	17	7	16	2	15	2	22	1	20	0	18	7	17	6
	No. 2 (Standard)	2 x 6	9	4	8	5	7	6	6	11	9	8	8	5	7	6	6	1
		2 x 8	12	8	11	6	10	8	10	0	14	5	12	5	11	1	10	2
		2 x 10	16	0	14	7	13	6	12	8	18	5	15	11	14	2	13	0
		2 x 12	19	2	17	7	16	2	15	2	22	1	20	0	18	7	17	2
White Pine Red Pine	No. 1	2 x 6	8	8	7	11	7	5	6	11	9	10	8	6	7	7	6	11
		2 x 8	11	11	10	10	10	0	9	6	13	5	11	7	10	5	9	6
		2 x 10	15	1	13	8	12	8	12	0	17	0	14	8	13	1	12	0
		2 x 12	18	1	16	5	15	2	14	5	20	10	18	10	16	10	15	5
	Merchantable and No. 2	2 x 6	8	8	7	10	7	0	6	5	9	0	7	10	7	0	6	5
		2 x 8	11	11	10	10	9	8	8	11	12	7	10	11	9	8	8	11
		2 x 10	15	1	13	8	12	6	11	5	16	1	13	11	12	6	11	5
		2 x 12	18	1	16	5	15	2	14	5	20	10	18	4	16	6	15	0
	No. 1 Dimension	2 x 6	8	6	7	5	6	7	6	0	8	6	7	5	6	7	6	0
		2 x 8	11	11	10	5	9	4	8	6	12	0	10	5	9	4	8	6
		2 x 10	15	1	13	8	12	6	11	5	16	1	13	11	12	6	11	5
		2 x 12	18	1	16	5	15	2	14	5	20	4	17	6	15	9	14	5
	No. 2 Dimension [5]	2 x 6	6	7	5	8	5	1	4	7	6	7	5	8	5	1	4	7
		2 x 8	9	4	8	0	7	2	6	6	9	4	8	0	7	2	6	6
		2 x 10	12	8	11	0	9	11	9	0	12	8	11	0	9	11	9	0
		2 x 12	15	10	13	8	12	5	11	2	15	10	13	8	12	5	11	2
Polar	No. 1 (Construction)	2 x 6	8	8	7	11	7	5	6	11	9	10	8	6	7	7	6	11
		2 x 8	11	11	10	10	10	0	9	6	13	5	11	7	10	5	9	6
		2 x 10	15	1	13	8	12	8	12	0	17	0	14	8	13	1	12	0
		2 x 12	18	1	16	5	15	2	14	5	20	10	18	10	16	10	15	5
	No. 2 (Standard)	2 x 6	8	6	7	5	6	7	6	0	8	6	7	5	6	7	6	0
		2 x 8	11	11	10	10	9	8	8	11	12	6	10	11	9	8	8	11
		2 x 10	15	1	13	8	12	6	11	5	16	1	13	11	12	6	11	5
		2 x 12	18	1	16	5	15	2	14	5	20	10	18	4	16	6	15	0

Notes to Table B-4:

(1) Roof joists refer to horizontal or sloping roof framing members that support the ceiling as well as roof but do not enclose an attic.

(2) When either of these species is graded by Western Wood Products Association Rules, reduce the spans of 2 x 6 members as follows:
Construction Grade — 6 per cent
Standard Grade — 8 per cent.

(3) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(4) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (2).

(5) When graded by Eastern Grading Committee Rules, spans for No. 2 Dimension may be increased as follows:
2 x 6, 2 x 8 — 10 per cent
2 x 10, 2 x 12 — 15 per cent.

TABLE B-5

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir, Western Larch	Construction (dense and non-dense)	2 x 6	11	0	10	0	9	4	8	8	12	7	11	5	10	7	10	0
		2 x 8	15	0	13	7	12	8	11	11	17	2	15	7	14	6	13	7
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	10	16	5	17	4
		2 x 12	23	0	20	11	19	5	18	4	26	2	23	10	22	1	20	10
	Standard	2 x 6	11	0	10	0	9	4	8	8	12	7	11	2	10	0	9	1
		2 x 8	15	0	13	7	12	8	11	11	17	2	15	2	13	7	12	5
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	4	17	2	15	8
		2 x 12	23	0	20	11	19	5	18	4	26	2	23	2	20	7	18	10
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	1	11	4	10	1	9	2	13	1	11	4	10	1	9	2
		2 x 10	18	0	15	6	13	11	12	8	18	0	15	6	13	11	12	8
		2 x 12	21	0	18	0	16	2	14	10	21	0	18	0	16	2	14	10
Pacific Coast Hemlock	Construction	2 x 6	10	10	9	10	9	1	8	7	12	4	11	2	10	5	9	10
		2 x 8	14	8	13	4	12	5	11	8	16	10	15	4	14	2	13	4
		2 x 10	18	7	16	11	15	8	14	10	21	4	19	5	18	0	16	11
		2 x 12	22	6	20	6	19	0	17	11	25	7	23	4	21	7	20	4
	Standard	2 x 6	10	10	9	10	9	1	8	7	12	4	11	2	10	0	9	1
		2 x 8	14	8	13	4	12	5	11	8	16	10	15	2	13	7	12	5
		2 x 10	18	7	16	11	15	8	14	10	21	4	19	4	17	2	15	8
		2 x 12	22	6	20	6	19	0	17	11	25	7	23	2	20	7	18	10
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	12	0	10	5	9	4	8	6	12	0	10	5	9	4	8	6
		2 x 10	16	6	14	4	12	10	11	8	16	6	14	4	12	10	11	8
		2 x 12	19	2	16	7	14	11	13	7	19	2	16	7	14	11	13	7
Spruce, all western species Lodgepole Pine, Ponderosa Pine	Construction	2 x 6	9	8	8	6	7	7	6	11	9	11	8	6	7	7	6	11
		2 x 8	13	4	12	0	11	2	10	6	15	2	13	6	12	1	11	0
		2 x 10	16	10	15	2	14	2	13	4	19	2	17	1	15	4	14	0
		2 x 12	20	4	18	6	17	1	16	1	23	0	20	6	18	5	16	10
	Standard	2 x 6	7	7	6	7	5	11	5	5	7	7	6	7	5	11	5	5
		2 x 8	12	2	10	7	9	6	8	7	12	2	10	7	9	6	8	7
		2 x 10	16	1	13	11	12	6	11	5	16	1	13	11	12	6	11	5
		2 x 12	20	4	17	8	15	11	14	6	20	6	17	8	15	11	14	6
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	10	10	9	5	8	5	7	7	10	10	9	5	8	5	7	7
		2 x 10	14	11	12	11	11	6	10	6	14	11	12	11	11	6	10	6
		2 x 12	17	4	15	0	13	5	12	2	17	4	15	0	13	5	12	2
Western Red Cedar, Western White Pine [2]	Construction	2 x 6	9	5	8	7	7	8	7	0	9	11	8	7	7	8	7	0
		2 x 8	12	10	11	8	10	10	10	2	14	8	12	8	11	5	10	5
		2 x 10	16	4	14	10	13	8	12	11	18	7	16	1	14	5	13	1
		2 x 12	19	8	17	11	16	7	15	7	22	4	19	4	17	4	15	8
	Standard	2 x 6	7	11	6	10	6	1	5	7	7	11	6	10	6	1	5	7
		2 x 8	11	6	10	0	8	11	8	2	11	6	10	0	8	11	8	2
		2 x 10	15	1	13	1	11	8	10	8	15	1	13	1	11	8	10	8
		2 x 12	19	2	16	8	14	11	13	7	19	2	16	8	14	11	13	7
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	10	1	8	10	7	11	7	2	10	1	8	10	7	11	7	2
		2 x 10	14	0	12	1	10	10	9	11	14	0	12	1	10	10	9	11
		2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6
Pacific Coast Yellow Cedar	Construction	2 x 6	10	0	9	1	8	5	7	11	11	4	9	10	8	10	8	0
		2 x 8	13	7	12	5	11	6	10	10	15	7	13	7	12	2	11	1
		2 x 10	17	4	15	8	14	7	13	8	19	10	18	0	16	5	15	0
		2 x 12	20	11	19	0	17	7	16	7	23	10	21	7	19	8	18	0
	Standard	2 x 6	9	0	7	10	6	11	6	4	9	0	7	10	6	11	6	4
		2 x 8	13	1	11	5	10	2	9	4	13	1	11	5	10	2	9	4
		2 x 10	17	4	15	0	13	5	12	2	17	4	15	0	13	5	12	2
		2 x 12	20	11	19	0	17	0	15	6	22	0	19	1	17	0	15	6
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	7	10	1	9	0	8	2	11	7	10	1	9	0	8	2
		2 x 10	16	0	13	10	12	5	11	4	16	0	13	10	12	5	11	4
		2 x 12	18	7	16	1	14	5	13	2	18	7	16	1	14	5	13	2

Continued on next page

TABLE B-5 — (Cont'd)

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [3] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 6	9	8	8	10	8	2	7	8	11	1	9	11	8	11	8	1
		2 x 8	13	4	12	0	11	2	10	6	15	2	13	6	12	1	11	0
		2 x 10	16	10	15	2	14	2	13	4	19	2	17	1	15	4	14	0
		2 x 12	20	4	18	6	17	1	16	1	23	0	21	0	19	5	18	0
	No. 2 (Standard)	2 x 6	9	8	8	7	7	8	7	0	9	11	8	7	7	8	7	0
		2 x 8	13	4	12	0	11	2	10	5	14	8	12	8	11	5	10	5
		2 x 10	16	10	15	2	14	2	13	4	18	10	16	4	14	6	13	4
		2 x 12	20	4	18	6	17	1	16	1	23	0	21	0	19	1	17	7
Jack Pine [4]	No. 1 (Construction)	2 x 6	10	0	9	1	8	5	7	11	11	5	10	5	9	6	8	8
		2 x 8	13	7	12	5	11	6	10	10	15	7	14	2	13	0	11	10
		2 x 10	17	4	15	8	14	7	13	8	19	10	18	0	16	5	15	0
		2 x 12	20	11	19	0	17	7	16	7	23	10	21	7	20	0	18	10
	No. 2 (Standard)	2 x 6	10	0	9	1	8	2	7	6	10	7	9	2	8	2	7	6
		2 x 8	13	7	12	5	11	6	10	10	15	7	13	7	12	2	11	1
		2 x 10	17	4	15	8	14	7	13	8	19	10	17	5	15	7	14	2
		2 x 12	20	11	19	0	17	7	16	7	23	10	21	7	20	0	18	8
White Pine Red Pine	No. 1	2 x 6	9	5	8	7	7	11	7	6	10	8	9	4	8	4	7	7
		2 x 8	12	10	11	8	10	10	10	2	14	8	12	8	11	5	10	5
		2 x 10	16	4	14	10	13	8	12	11	18	7	16	1	14	5	13	1
		2 x 12	19	8	17	11	16	7	15	7	22	4	20	4	18	6	16	10
	Merchantable and No. 2	2 x 6	9	5	8	7	7	8	7	0	9	11	8	7	7	8	7	0
		2 x 8	12	10	11	8	10	8	9	8	13	10	11	11	10	7	9	8
		2 x 10	16	4	14	10	13	8	12	6	17	7	15	4	13	8	12	6
		2 x 12	19	8	17	11	16	7	15	7	22	4	20	2	18	1	16	6
	No. 1 Dimension	2 x 6	9	4	8	1	7	2	6	7	9	4	8	1	7	2	6	7
		2 x 8	12	10	11	5	10	2	9	4	13	1	11	5	10	2	9	4
		2 x 10	16	4	14	10	13	8	12	6	17	7	15	4	13	8	12	6
		2 x 12	19	8	17	11	16	7	15	7	22	2	19	4	17	4	15	9
	No. 2 Dimension [5]	2 x 6	7	2	6	2	5	7	5	1	7	2	6	2	5	7	5	1
		2 x 8	10	1	8	10	7	11	7	2	10	1	8	10	7	11	7	2
		2 x 10	14	0	12	1	10	10	9	11	14	0	12	1	10	10	9	11
		2 x 12	17	6	15	1	13	6	12	5	17	6	15	1	13	6	12	5
Poplar	No. 1 (Construction)	2 x 6	9	5	8	7	7	11	7	6	10	8	9	4	8	4	7	7
		2 x 8	12	10	11	8	10	10	10	2	14	8	12	8	11	5	10	5
		2 x 10	16	4	14	10	13	8	12	11	18	7	16	1	14	5	13	1
		2 x 12	19	8	17	11	16	7	15	7	22	4	20	4	18	6	16	10
	No. 2 (Standard)	2 x 6	9	4	8	1	7	2	6	7	9	4	8	1	7	2	6	7
		2 x 8	12	10	11	8	10	8	9	8	13	8	11	11	10	8	9	8
		2 x 10	16	4	14	10	13	8	12	6	17	7	15	4	13	8	12	6
		2 x 12	19	8	17	11	16	7	15	7	22	4	20	2	18	1	16	6

Notes to Table B-5:

(1) Roof joists refer to horizontal or sloping roof framing members that support the ceiling as well as roof but do not enclose an attic.

(2) When either of these species is graded by Western Wood Products Association Rules, reduce the spans of 2 x 6 members as follows:
Construction Grade — 6 per cent
Standard Grade — 8 per cent.

(3) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(4) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (2).

(5) When graded by Eastern Grading Committee Rules, spans for No. 2 Dimension may be increased as follows:
2 x 6, 2 x 8 — 10 per cent
2 x 10, 2 x 12 — 15 per cent.

TABLE B-6

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir, Western Larch	Construction (dense and non-dense)	2 x 6	12	1	11	0	10	2	9	7	13	11	12	7	11	8	11	0
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	15	0
		2 x 10	20	11	19	0	17	8	16	7	23	11	21	10	20	2	19	0
		2 x 12	25	4	23	0	21	5	20	1	29	0	26	4	24	6	23	0
	Standard	2 x 6	12	1	11	0	10	2	9	7	13	11	12	6	11	2	10	2
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	0	15	2	13	11
		2 x 10	20	11	19	0	17	8	16	7	23	11	21	6	19	4	17	7
		2 x 12	25	4	23	0	21	5	20	1	29	0	25	10	23	2	21	1
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	14	7	12	7	11	4	10	4	14	7	12	7	11	4	10	4
		2 x 10	20	1	17	5	15	6	14	2	20	1	17	5	15	6	14	2
		2 x 12	23	5	20	4	18	0	16	6	23	5	20	4	18	0	16	6
Pacific Coast Hemlock	Construction	2 x 6	11	11	10	10	10	0	9	5	13	7	12	4	11	5	10	10
		2 x 8	16	2	14	8	13	7	12	10	18	6	16	10	15	7	14	8
		2 x 10	20	6	18	7	17	4	16	4	23	5	21	4	19	10	18	7
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	10	23	11	22	6
	Standard	2 x 6	11	11	10	10	10	0	9	5	13	7	12	4	11	2	10	2
		2 x 8	16	2	14	8	13	7	12	10	18	6	16	10	15	2	13	11
		2 x 10	20	6	18	7	17	4	16	4	23	5	21	4	19	4	17	7
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	10	23	2	21	1
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	5	11	7	10	5	9	6	13	5	11	7	10	5	9	6
		2 x 10	18	6	16	0	14	4	13	1	18	6	16	0	14	4	13	1
		2 x 12	21	6	18	7	16	7	15	2	21	6	18	7	16	7	15	2
Spruce, all western species Lodgepole Pine, Ponderosa Pine	Construction	2 x 6	10	8	9	7	8	6	7	10	11	0	9	7	8	6	7	10
		2 x 8	14	7	13	2	12	4	11	7	16	8	15	1	13	6	12	4
		2 x 10	18	6	16	10	15	7	14	8	21	1	19	1	17	1	15	7
		2 x 12	22	5	20	4	18	11	17	8	25	7	22	11	20	6	18	8
	Standard	2 x 6	8	6	7	5	6	7	6	1	8	6	7	5	6	7	6	1
		2 x 8	13	8	11	10	10	7	9	8	13	8	11	10	10	7	9	8
		2 x 10	18	0	15	7	13	11	12	8	18	0	15	7	13	11	12	8
		2 x 12	22	5	19	10	17	8	16	2	22	11	19	10	17	8	16	2
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	12	1	10	5	9	5	8	6	12	1	10	5	9	5	8	6
		2 x 10	16	7	14	5	12	11	11	10	16	7	14	5	12	11	11	10
		2 x 12	19	4	16	10	15	0	13	8	19	4	16	10	15	0	13	8
Western Red Cedar Western White Pine [2]	Con-	2 x 6	10	5	9	5	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 8	14	1	12	10	11	11	11	2	16	2	14	2	12	8	11	7
		2 x 10	17	11	16	4	15	1	14	2	20	6	18	0	16	1	14	8
		2 x 12	21	8	19	8	18	4	17	2	24	10	21	7	19	4	17	7
	Standard	2 x 6	8	10	7	7	6	10	6	2	8	10	7	7	6	10	6	2
		2 x 8	12	11	11	2	10	0	9	1	12	11	11	2	10	0	9	1
		2 x 10	16	11	14	7	13	1	12	0	16	11	14	7	13	1	12	0
		2 x 12	21	6	18	7	16	8	15	4	21	6	18	7	16	8	15	4
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	4	9	10	8	10	8	0	11	4	9	10	8	10	8	0
		2 x 10	15	7	13	6	12	1	11	0	15	7	13	6	12	1	11	0
		2 x 12	18	2	15	8	14	1	12	10	18	2	15	8	14	1	12	10
Pacific Coast Yellow Cedar	Construction	2 x 6	11	0	10	0	9	4	8	8	12	7	11	0	9	10	9	0
		2 x 8	15	0	13	7	12	8	11	11	17	2	15	2	13	7	12	5
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	10	18	5	16	10
		2 x 12	23	0	20	11	19	5	18	4	26	4	23	11	22	1	20	2
	Standard	2 x 6	10	0	8	8	7	10	7	1	10	0	8	8	7	10	7	1
		2 x 8	14	8	12	8	11	5	10	5	14	8	12	8	11	5	10	5
		2 x 10	19	0	16	10	15	0	13	8	19	5	16	10	15	0	13	8
		2 x 12	23	0	20	11	19	1	17	5	24	8	21	5	19	1	17	5
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	0	11	4	10	1	9	2	13	0	11	4	10	1	9	2
		2 x 10	17	11	15	6	13	10	12	7	17	11	15	6	13	10	12	7
		2 x 12	20	10	18	0	16	1	14	8	20	10	18	0	16	1	14	8

Continued on next page

TABLE B-6 — (Cont'd)

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [3] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 6	10	8	9	8	9	0	8	6	12	2	11	1	9	11	9	0
		2 x 8	14	7	13	2	12	4	11	7	16	8	15	1	13	6	13	4
		2 x 10	18	6	16	10	15	7	14	8	21	1	19	1	17	1	15	7
		2 x 12	22	5	20	4	18	11	17	8	25	7	23	4	21	7	20	0
	No. 2 (Standard)	2 x 6	10	8	9	7	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 8	14	7	13	2	12	4	11	7	16	5	14	2	12	8	11	7
		2 x 10	18	6	16	10	15	7	14	8	21	0	18	2	16	4	14	10
		2 x 12	22	5	20	4	18	11	17	8	25	7	23	4	21	6	19	6
Jack Pine [4]	No. 1 (Construction)	2 x 6	11	0	10	0	9	4	8	8	12	7	11	5	10	7	9	8
		2 x 8	15	0	13	7	12	8	11	11	17	2	15	7	14	6	13	2
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	10	18	5	16	10
		2 x 12	23	0	20	11	19	5	18	4	26	4	23	11	22	2	20	11
	No. 2 (Standard)	2 x 6	11	0	10	0	9	2	8	5	11	11	10	4	9	2	8	5
		2 x 8	15	0	13	7	12	8	11	11	17	2	15	2	13	7	12	5
		2 x 10	19	0	17	4	16	0	15	1	21	10	19	6	17	5	15	11
		2 x 12	23	0	20	11	19	5	18	4	26	4	23	11	22	2	20	11
White Pine Red Pine	No. 1	2 x 6	10	5	9	5	8	8	8	2	11	11	10	5	9	4	8	6
		2 x 8	14	1	12	10	11	11	11	2	16	2	14	2	12	8	11	7
		2 x 10	17	11	16	4	15	1	14	2	20	6	18	0	16	1	14	8
		2 x 12	21	8	19	8	18	4	17	2	24	10	22	6	20	8	18	11
	Merchantable and No. 2	2 x 6	10	5	9	5	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 8	14	1	12	10	11	11	10	11	15	5	13	4	11	11	10	11
		2 x 10	17	11	16	4	15	1	13	11	19	8	17	1	15	4	13	11
		2 x 12	21	8	19	8	18	4	17	2	24	10	22	6	20	2	18	4
	No. 1 Dimension	2 x 6	10	5	9	0	8	1	7	5	10	5	9	0	8	1	7	5
		2 x 8	14	1	12	8	11	5	10	5	14	8	12	8	11	5	10	5
		2 x 10	17	11	16	4	15	1	13	11	19	8	17	1	15	4	13	11
		2 x 21	21	8	19	8	18	4	17	2	24	10	21	6	19	4	17	6
	No. 2 Dimension [5]	2 x 6	8	0	7	0	6	2	5	8	8	0	7	0	6	2	5	8
		2 x 8	11	4	9	0	8	10	8	0	11	4	9	10	8	10	8	0
		2 x 10	15	7	13	6	12	1	11	0	15	7	13	6	12	1	11	0
		2 x 12	19	6	16	10	15	1	13	8	19	6	16	10	15	1	13	8
Poplar	No. 1 (Construction)	2 x 6	10	5	9	5	8	8	8	2	11	11	10	5	9	4	8	6
		2 x 8	14	1	12	10	11	11	11	2	16	2	14	2	12	8	11	7
		2 x 10	17	11	16	4	15	1	14	2	20	6	18	0	16	1	14	8
		2 x 12	21	8	19	8	18	4	17	2	24	10	22	6	20	8	18	11
	No. 2 (Standard)	2 x 6	10	5	9	0	8	1	7	5	10	5	9	0	8	1	7	5
		2 x 8	14	1	12	10	11	11	10	11	15	5	13	4	11	11	10	11
		2 x 10	17	11	16	4	15	1	13	11	19	8	17	1	15	4	13	11
		2 x 12	21	8	19	8	18	4	17	2	24	10	22	6	20	2	18	4

Notes to Table B-6:

(1) Roof joists refer to horizontal or sloping roof framing members that support the ceiling as well as roof but do not enclose an attic.

(2) When either of these species is graded by Western Wood Products Association Rules, reduce the spans of 2 x 6 members as follows:
Construction Grade — 6 per cent.
Standard Grade — 8 per cent.

(3) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(4) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (2).

(5) When graded by Eastern Grading Committee Rules, spans for No. 2 Dimension may be increased as follows:
2 x 6, 2 x 8 — 10 per cent.
2 x 10, 2 x 12 — 15 per cent.

TABLE B-7

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 20 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Construction (dense and non-dense)	2 x 6	13	10	12	7	11	8	11	0	15	11	14	5	13	5	12	7
		2 x 8	18	11	17	2	15	11	15	0	21	8	19	8	18	3	17	2
		2 x 10	23	11	21	9	20	2	19	0	27	5	24	11	23	2	21	9
		2 x 12	29	0	26	4	24	6	23	0	33	2	30	2	28	0	26	4
	Standard	2 x 6	13	10	12	7	11	8	11	0	15	11	14	5	12	10	11	9
		2 x 8	18	11	17	2	15	11	15	0	21	8	19	8	17	7	16	0
		2 x 10	23	11	21	9	20	2	19	0	27	5	24	10	22	3	20	4
		2 x 12	29	0	26	4	24	6	23	0	33	2	30	1	26	11	24	7
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	16	10	14	7	13	1	11	11	16	10	14	7	13	1	11	11
		2 x 10	23	2	20	1	17	11	16	5	23	2	20	1	17	11	16	5
		2 x 12	27	3	23	7	21	1	19	3	27	3	23	7	21	1	19	3
Pacific Coast Hemlock	Construction	2 x 6	13	7	12	4	11	5	10	9	15	6	14	1	13	1	12	4
		2 x 8	18	6	16	10	15	7	14	8	21	2	19	3	17	10	16	10
		2 x 10	23	5	21	4	19	9	18	7	26	10	24	5	22	8	21	4
		2 x 12	28	5	25	9	23	11	22	6	32	6	29	6	27	5	25	9
	Standard	2 x 6	13	7	12	4	11	5	10	9	15	6	14	1	12	10	11	9
		2 x 8	18	6	16	10	15	7	14	8	21	2	19	3	17	7	16	0
		2 x 10	23	5	21	4	19	9	18	7	26	10	24	5	22	3	20	4
		2 x 12	28	5	25	9	23	11	22	6	32	6	29	6	26	11	24	7
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	15	6	13	5	12	0	11	0	15	6	13	5	12	0	11	0
		2 x 10	21	4	18	6	16	6	15	1	21	4	18	6	16	6	15	1
		2 x 12	24	11	21	7	19	4	17	8	24	11	21	7	19	4	17	8
Spruce, all western species Lodgepole Pine Ponderosa Pine	Construction	2 x 6	12	3	11	0	9	10	9	0	12	9	11	0	9	10	9	0
		2 x 8	16	8	15	2	14	1	13	3	19	1	17	4	15	7	14	3
		2 x 10	21	2	19	2	17	10	16	9	24	2	22	0	19	9	18	0
		2 x 12	25	7	23	3	21	7	20	4	29	4	26	7	23	11	21	10
	Standard	2 x 6	9	11	8	7	7	8	7	0	9	11	8	7	7	8	7	0
		2 x 8	15	9	13	8	12	3	11	2	15	9	13	8	12	3	11	2
		2 x 10	20	9	17	11	16	1	14	8	20	9	17	11	16	1	14	8
		2 x 12	25	7	23	2	20	8	18	11	26	9	23	2	20	8	18	11
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	11	12	1	10	10	9	10	13	11	12	1	10	10	9	10
		2 x 10	19	2	16	7	14	10	13	7	19	2	16	7	14	10	13	7
		2 x 12	22	5	19	5	17	5	15	10	22	5	19	5	17	5	15	10
Western Red Cedar Western White Pine [2]	Construction	2 x 6	11	10	10	9	9	11	9	1	12	9	11	1	9	11	9	1
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	5	14	8	13	5
		2 x 10	20	6	18	7	17	3	16	3	23	5	20	9	18	7	16	11
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	2	22	6	20	6
	Standard	2 x 6	10	1	8	9	7	10	7	2	10	1	8	9	7	10	7	2
		2 x 8	14	11	12	11	11	6	10	6	14	11	12	11	11	6	10	6
		2 x 10	19	6	16	11	15	1	13	10	19	6	16	11	15	1	13	10
		2 x 12	24	10	21	9	19	6	17	9	25	2	21	9	19	6	17	9
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 10	18	0	15	7	13	11	12	9	18	0	15	7	13	11	12	9
		2 x 12	21	2	18	4	16	5	15	0	21	2	18	4	16	5	15	0
Pacific Coast Yellow Cedar	Construction	2 x 6	12	7	11	5	10	8	10	0	14	5	12	8	11	4	10	4
		2 x 8	17	2	15	7	14	6	13	8	19	8	17	7	15	9	14	4
		2 x 10	21	9	19	9	18	4	17	3	24	11	22	8	21	0	19	4
		2 x 12	26	4	23	11	22	3	20	11	30	2	27	5	25	5	23	5
	Standard	2 x 6	11	7	10	0	9	0	8	2	11	7	10	0	9	0	8	2
		2 x 8	17	0	14	8	13	2	12	0	17	0	14	8	13	2	12	0
		2 x 10	21	9	19	4	17	4	15	10	22	4	19	4	17	4	15	10
		2 x 12	26	4	23	11	22	3	20	4	28	8	24	10	22	3	20	4
	Utility	2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	15	0	13	0	11	8	10	7	15	0	13	0	11	8	10	7
		2 x 10	20	7	17	10	16	0	14	7	20	7	17	10	16	0	14	7
		2 x 12	24	2	21	0	18	9	17	1	24	2	21	0	18	9	17	1

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TABLE B-7 — (Cont'd)

ROOF JOISTS [1]

Species	Grade	Nominal Size	LIVE LOAD 20 lb per sq ft													
			Gypsum Board or Plastered Ceiling						Other Ceilings							
			Joist spacing						Joist spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [3] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 6	12	3	11	1	10	4	9	9	14	0	12	9	11	5	10	5
		2 x 8	16	8	15	2	14	1	13	3	19	1	17	4	15	7	14	3
		2 x 10	21	2	19	2	17	10	16	9	24	2	22	0	19	9	18	0
		2 x 12	25	7	23	3	21	7	20	4	29	4	26	7	24	9	23	3
	No. 2 (Standard)	2 x 6	12	3	11	1	9	11	9	0	12	9	11	1	9	11	9	0
		2 x 8	16	8	15	2	14	1	13	3	18	11	16	5	14	8	13	5
		2 x 10	21	2	19	2	17	10	16	9	24	2	21	0	18	9	17	2
		2 x 12	25	7	23	3	21	7	20	4	29	4	26	7	24	9	22	9
Jack Pine [4]	No. 1 (Construction)	2 x 6	12	7	11	5	10	8	10	0	14	5	13	1	12	2	11	2
		2 x 8	17	2	15	7	14	6	13	8	19	8	17	10	16	7	15	3
		2 x 10	21	9	19	9	18	4	17	3	24	11	22	8	21	0	19	4
		2 x 12	26	4	23	11	22	3	20	11	30	2	27	5	25	5	23	11
	No. 2 (Standard)	2 x 6	12	7	11	5	10	8	9	8	13	9	11	11	10	8	9	8
		2 x 8	17	2	15	7	14	6	13	8	19	8	17	7	15	9	14	4
		2 x 10	21	9	19	9	18	4	17	3	24	11	22	6	21	0	18	4
		2 x 12	26	4	23	11	22	3	20	11	30	2	27	5	25	5	23	11
White Pine Red Pine	No. 1	2 x 6	11	10	10	9	10	0	9	5	13	7	12	0	10	9	9	10
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	5	14	8	13	5
		2 x 10	20	6	18	7	17	3	16	3	23	5	20	9	18	7	16	11
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	9	23	11	22	0
	Merchantable and No. 2	2 x 6	11	10	10	9	9	11	9	0	12	9	11	1	9	11	9	0
		2 x 8	16	2	14	8	13	8	12	7	17	9	15	4	13	9	12	7
		2 x 10	20	6	18	7	17	3	16	1	22	9	19	9	17	8	16	1
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	9	23	5	21	5
	No. 1 Dimension	2 x 6	11	10	10	5	9	4	8	6	12	0	10	5	9	4	8	0
		2 x 8	16	2	14	8	13	2	12	0	17	0	14	8	13	2	12	0
		2 x 10	20	6	18	7	17	3	16	1	22	9	19	9	17	8	16	1
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	2	22	6	20	6
	No. 2 Dimension [5]	2 x 6	9	3	8	0	7	2	6	7	9	3	8	0	7	2	6	7
		2 x 8	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 10	18	0	15	7	13	11	12	9	18	0	15	7	13	11	12	9
		2 x 12	22	10	19	9	17	8	16	2	22	10	19	9	17	8	16	2
Poplar	No. 1 (Construction)	2 x 6	11	10	10	9	10	0	9	5	13	7	12	0	10	9	9	10
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	5	14	8	13	5
		2 x 10	20	6	18	7	17	3	16	3	23	5	20	9	18	7	16	11
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	9	23	11	22	0
	No. 2 (Standard)	2 x 6	11	10	10	5	9	4	8	6	12	0	10	5	9	4	8	6
		2 x 8	16	2	14	8	13	8	12	7	17	9	15	4	13	9	12	7
		2 x 10	20	6	18	7	17	3	16	1	22	9	19	9	17	8	16	1
		2 x 12	24	10	22	6	20	11	19	8	28	5	25	9	23	5	21	5

Notes to Table B-7:

(1) Roof joists refer to horizontal or sloping roof framing members that support the ceiling as well as roof but do not enclose an attic.

(2) When either of these species is graded by Western Wood Products Association Rules, reduce the spans of 2 x 6 members as follows:
Construction Grade — 6 per cent.
Standard Grade — 8 per cent.

(3) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(4) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (2).

(5) When graded by Eastern Grading Committee Rules, spans for No. 2 Dimension may be increased as follows:
2 x 6, 2 x 8 — 10 per cent.
2 x 10, 2 x 12 — 15 per cent.

TABLE B-8

RAFTERS [1]

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft								LIVE LOAD 40 lb per sq ft							
			Rafter spacing								Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir, Western Larch	Construction	2 x 4	6	8	5	10	5	1	4	8	7	4	6	5	5	8	5	2
		2 x 6	12	11	11	8	10	6	9	7	13	11	12	7	11	7	10	7
		2 x 8	17	7	16	0	14	5	13	1	18	11	17	2	15	10	14	6
		2 x 10	22	2	20	2	18	2	16	7	24	0	21	10	20	1	18	4
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	12	2	10	6	9	5	8	7	13	5	11	7	10	5	9	6
		2 x 8	16	7	14	5	12	10	11	8	18	4	15	11	14	2	12	11
		2 x 10	21	0	18	2	16	4	14	11	23	2	20	1	18	0	16	5
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	12	4	10	8	9	7	8	8	13	7	11	10	10	6	9	7
		2 x 10	17	0	14	8	13	1	12	0	18	8	16	2	14	6	13	2
Pacific Coast Hemlock	Construction	2 x 4	6	1	5	4	4	8	4	4	6	10	5	11	5	2	4	10
		2 x 6	12	7	11	5	10	6	9	7	13	7	12	4	11	5	10	7
		2 x 8	17	2	15	7	14	5	13	1	18	6	16	10	15	7	14	6
		2 x 10	21	10	19	10	18	2	16	7	23	5	21	4	19	10	18	4
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	12	2	10	6	9	5	8	7	13	5	11	7	10	5	9	6
		2 x 8	16	7	14	5	12	10	11	8	18	4	15	11	14	2	12	11
		2 x 10	21	0	18	2	16	4	14	11	23	2	20	1	18	0	16	5
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	5	9	10	8	10	8	0	12	6	10	11	9	8	8	11
		2 x 10	15	7	13	6	12	1	11	0	17	2	14	11	13	5	12	2
Spruce, all western species Lodgepole Pine Ponderosa Pine	Construction	2 x 4	5	6	4	10	4	4	3	11	6	1	5	2	4	8	4	4
		2 x 6	9	4	8	1	7	2	6	7	10	4	8	11	8	0	7	2
		2 x 8	14	8	12	10	11	5	10	5	16	2	14	1	12	7	11	6
		2 x 10	18	8	16	1	14	5	13	2	20	7	17	10	15	11	14	7
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	7	2	6	2	5	7	5	1	8	0	6	11	6	2	5	7
		2 x 8	11	7	10	0	9	0	8	2	12	10	11	0	9	11	9	0
		2 x 10	15	2	13	2	11	10	10	8	16	10	14	6	13	0	11	11
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	10	2	8	10	7	11	7	2	11	4	9	10	8	8	8	0
		2 x 10	14	0	12	2	10	11	9	11	15	6	13	5	12	0	11	0
Western Red Cedar Western White Pine [2]	Construction	2 x 4	5	2	4	6	4	0	3	8	5	8	4	11	4	5	4	0
		2 x 6	9	5	8	1	7	2	6	7	10	4	8	11	8	0	7	4
		2 x 8	13	10	12	0	10	8	9	10	15	4	13	2	11	10	10	10
		2 x 10	17	6	15	2	13	7	12	5	19	5	16	10	15	0	13	8
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	7	5	6	5	5	10	5	2	8	2	7	1	6	4	5	10
		2 x 8	10	11	9	5	8	5	7	8	12	0	10	5	9	4	8	6
		2 x 10	14	4	12	5	11	1	10	1	15	10	13	8	12	2	11	1
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	9	7	8	4	7	5	6	10	10	7	9	2	8	2	7	6
		2 x 10	13	2	11	5	10	2	9	4	14	7	12	7	11	4	10	4
Pacific Coast Yellow Cedar	Construction	2 x 4	5	11	5	1	4	7	4	2	6	6	5	8	5	1	4	7
		2 x 6	10	8	9	4	8	4	7	7	11	10	10	2	9	1	8	4
		2 x 8	14	11	12	11	11	7	10	6	16	5	14	2	12	8	11	7
		2 x 10	20	0	17	5	15	6	14	2	21	10	19	1	17	1	15	7
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	8	6	7	4	6	7	6	0	9	4	8	1	7	2	6	7
		2 x 8	12	5	10	10	9	7	8	2	13	8	11	11	10	7	9	8
		2 x 10	16	4	14	2	12	8	11	7	18	0	15	7	14	0	12	10
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	0	9	6	8	6	7	10	12	1	10	6	9	5	8	7
		2 x 10	15	1	13	1	11	8	10	8	16	7	14	5	12	11	11	10

Continued on next page

TABLE B-8 — (Cont'd)

RAFTERS [1]

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft								LIVE LOAD 40 lb per sq ft							
			Rafter spacing								Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [3] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 4	5	6	4	10	4	4	3	11	6	1	5	2	4	8	4	4
		2 x 6	10	10	9	5	8	5	7	7	11	11	10	4	9	2	8	5
		2 x 8	14	8	12	10	11	5	10	5	16	2	14	1	12	7	11	6
		2 x 10	18	8	16	2	14	5	13	2	20	7	17	10	15	11	14	7
	No. 2	2 x 4	4	10	4	3	3	9	3	5	5	5	4	7	4	2	3	9
		2 x 6	9	5	8	1	7	2	6	7	10	4	8	11	8	0	7	4
		2 x 8	13	11	12	0	10	8	9	10	15	4	13	2	11	10	10	10
		2 x 10	17	8	15	5	13	8	12	6	19	7	16	11	15	2	13	10
Jack Pine [4]	No. 1 (Construction)	2 x 4	5	11	5	1	4	7	4	2	6	6	5	8	5	1	4	7
		2 x 6	11	7	10	0	9	0	8	2	12	7	11	1	9	11	9	0
		2 x 8	15	10	13	8	12	4	11	2	17	2	15	1	13	6	12	4
		2 x 10	20	0	17	5	15	6	14	2	21	10	19	1	17	1	15	7
	No. 2 (Standard)	2 x 4	5	2	4	6	4	1	3	8	5	9	5	0	4	6	4	1
		2 x 6	10	0	8	8	7	10	7	1	11	1	9	7	8	7	7	10
		2 x 8	14	11	12	11	11	6	10	6	16	5	14	2	12	8	11	7
		2 x 10	19	0	16	6	14	8	13	5	21	0	18	2	16	2	14	10
White Pine Red Pine	No. 1	2 x 4	6	10	5	11	5	4	4	10	7	6	6	6	5	10	5	4
		2 x 6	10	2	8	10	7	11	7	2	11	2	9	8	8	8	7	11
		2 x 8	13	10	12	0	10	8	9	10	15	4	13	2	11	10	10	10
		2 x 10	17	6	15	2	13	7	12	5	19	5	16	10	15	0	13	5
	Merchantable and No. 2	2 x 4	6	1	5	2	4	8	4	4	6	8	5	10	5	2	4	8
		2 x 6	9	5	8	1	7	2	6	7	10	4	8	11	8	0	7	4
		2 x 8	13	0	11	3	10	1	9	2	14	4	12	5	11	1	10	1
		2 x 10	16	8	14	5	12	11	11	10	18	5	15	11	14	2	13	0
	No. 1 Dimension	2 x 4	5	2	4	6	4	0	3	8	5	8	4	11	4	5	4	0
		2 x 6	8	10	7	7	6	10	6	2	9	8	8	5	7	6	6	11
		2 x 8	12	5	10	10	9	7	8	10	13	8	11	11	10	7	9	8
		2 x 10	16	8	14	5	12	11	11	10	18	5	15	11	14	2	13	0
	No. 2 Dimension [5]	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	6	10	5	11	5	4	4	10	7	6	6	6	5	10	5	4
		2 x 8	9	7	8	4	7	5	6	10	10	7	9	2	8	2	7	6
		2 x 10	13	2	11	5	10	2	9	4	14	7	12	7	11	4	10	4
Poplar	No. 1 (Construction)	2 x 4	5	2	4	6	4	0	3	8	5	8	4	11	4	5	4	0
		2 x 6	10	2	8	10	7	11	7	2	11	2	9	8	8	8	7	11
		2 x 8	13	10	12	0	10	8	9	10	15	4	13	2	11	10	10	10
		2 x 10	17	6	15	2	13	7	12	5	19	5	16	10	15	0	13	8
	No. 2 (Standard)	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	8	10	7	7	6	10	6	2	9	8	8	5	7	6	6	11
		2 x 8	13	0	11	2	10	1	9	2	14	4	12	5	11	1	10	1
		2 x 10	16	8	14	5	12	11	11	10	18	5	15	11	14	2	13	0

Notes to Table B-8:

(1) Rafters refer to sloping roof framing members which do not support a ceiling and which enclose an attic.

(2) When either of these species is graded by Western Wood Products Association Rules, reduce the spans of 2 x 6 members as follows:
Construction Grade — 6 per cent.
Standard Grade — 8 per cent.

(3) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(4) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (2).

(5) When graded by Eastern Grading Committee Rules, spans for No. 2 Dimension may be increased as follows:
2 x 6, 2 x 8 —10 per cent.
2 x 10 — 15 per cent.

TABLE B-9

RAFTERS [1]

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft — Rafter spacing								LIVE LOAD 20 lb per sq ft — Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Construction	2 x 4	8	4	7	2	6	5	5	11	9	9	8	5	7	7	6	11
		2 x 6	15	4	13	11	12	11	12	0	17	6	15	11	14	9	13	10
		2 x 8	20	10	18	11	17	7	16	5	23	10	21	8	20	1	15	11
		2 x 10	26	5	24	0	22	2	20	8	30	2	27	5	25	5	23	11
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	15	2	13	1	11	10	10	8	17	6	15	6	13	10	12	7
		2 x 8	20	8	17	11	16	0	14	7	23	10	21	1	18	10	17	3
		2 x 10	26	2	22	8	20	4	18	6	30	2	26	8	23	11	21	10
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	15	5	13	4	11	11	10	11	18	1	15	8	14	0	12	10
		2 x 10	21	2	18	4	16	5	15	0	24	11	21	7	19	3	17	7
Pacific Coast Hemlock	Construction	2 x 4	7	7	6	7	5	11	5	5	9	0	9	9	7	0	6	4
		2 x 6	14	11	13	7	12	7	11	11	17	1	15	6	14	5	13	7
		2 x 8	20	5	18	6	17	2	16	2	23	4	21	2	19	8	18	6
		2 x 10	25	10	23	5	21	10	20	6	29	6	26	10	24	11	23	5
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	14	11	13	1	11	10	10	8	17	1	15	6	13	10	12	7
		2 x 8	20	5	17	11	16	0	14	7	23	4	21	1	18	10	17	3
		2 x 10	25	10	22	8	20	4	18	6	29	6	26	8	23	11	21	10
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	14	2	12	4	11	0	10	0	16	8	14	5	12	11	11	10
		2 x 10	19	6	16	11	15	1	13	10	22	11	19	10	17	9	16	3
Spruce, all western species Lodgepole Pine Ponderosa Pine	Construction	2 x 4	6	11	5	11	5	4	4	10	8	1	7	0	6	3	5	8
		2 x 6	11	7	10	0	9	0	8	4	13	8	11	10	10	8	9	8
		2 x 8	18	5	15	11	14	2	13	0	21	0	18	9	16	9	15	3
		2 x 10	23	4	20	1	18	0	16	5	26	8	23	8	21	2	19	4
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	9	0	7	10	7	0	6	4	10	8	9	3	8	3	7	6
		2 x 8	14	5	12	6	11	2	10	2	16	11	14	8	13	2	12	0
		2 x 10	19	0	16	5	14	8	13	5	22	4	19	4	17	3	15	9
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	12	8	11	0	9	11	9	0	15	0	13	0	11	7	10	7
		2 x 10	17	6	15	2	13	7	12	5	20	7	17	10	16	0	14	7
Western Red Cedar Western White Pine [2]	Construction	2 x 4	6	6	5	7	5	0	4	7	7	7	6	7	5	11	5	4
		2 x 6	11	8	10	1	9	0	8	2	13	9	11	11	10	8	9	9
		2 x 8	17	4	15	0	13	5	12	2	20	4	17	7	15	9	14	4
		2 x 10	21	11	19	0	17	0	15	6	25	9	22	4	19	11	18	2
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	9	2	8	0	7	2	6	6	10	10	9	4	8	4	7	7
		2 x 8	13	7	11	10	10	6	9	7	16	0	13	10	12	5	11	4
		2 x 10	17	10	15	5	13	10	12	7	21	0	18	2	16	3	14	10
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	11	11	10	5	9	4	8	5	14	1	12	2	10	11	9	11
		2 x 10	16	5	14	2	12	8	11	7	19	4	16	9	15	0	13	8
Pacific Coast Yellow Cedar	Construction	2 x 4	7	5	6	5	5	8	5	2	8	8	7	6	6	9	6	2
		2 x 6	13	4	11	7	10	4	9	5	15	9	13	7	12	2	11	1
		2 x 8	18	6	16	1	14	5	13	1	21	8	18	11	16	11	15	5
		2 x 10	24	0	21	7	19	5	17	8	27	5	24	11	22	9	20	10
	Standard	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	10	7	9	1	8	2	7	6	12	5	10	10	9	7	8	10
		2 x 8	15	6	13	5	12	0	11	0	18	3	15	9	14	1	12	11
		2 x 10	20	5	17	8	15	10	14	5	24	0	20	9	18	7	17	0
	Utility	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	—		—		—		—		—		—		—		—	
		2 x 8	13	8	11	11	10	7	9	8	16	2	14	0	12	6	11	5
		2 x 10	18	10	16	4	14	7	13	4	22	2	19	2	17	2	15	8

Continued on next page

TABLE B-9 — (Cont'd)

RAFTERS [1]

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft — Rafter spacing								LIVE LOAD 20 lb per sq ft — Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Eastern Spruce [3] Balsam Fir Eastern Hemlock	No. 1 (Construction)	2 x 4	6	11	5	11	5	4	4	10	8	1	7	0	6	3	5	8
		2 x 6	13	6	11	8	10	5	9	6	15	5	13	9	12	3	11	2
		2 x 8	18	6	15	11	14	2	13	0	21	0	18	9	16	9	15	3
		2 x 10	23	4	20	1	18	0	16	5	26	8	23	8	21	2	19	4
	No. 2 (Standard)	2 x 4	6	1	5	2	4	8	4	3	7	2	6	2	5	6	5	0
		2 x 6	11	8	10	1	9	0	8	2	13	9	11	11	10	8	9	8
		2 x 8	17	4	15	0	13	5	12	2	20	4	17	7	15	9	14	4
		2 x 10	22	1	19	2	17	1	15	7	26	0	22	6	20	2	18	5
Jack Pine [4]	No. 1 (Construction)	2 x 4	7	5	6	5	5	8	5	2	8	8	7	6	6	9	6	2
		2 x 6	13	11	12	6	11	2	10	2	15	11	14	5	13	2	12	0
		2 x 8	18	11	17	1	15	4	13	11	21	8	19	8	18	0	16	5
		2 x 10	24	0	21	7	19	5	17	8	27	5	24	11	22	9	20	10
	No. 2 (Standard)	2 x 4	6	6	5	8	5	0	4	7	7	8	6	7	5	11	5	5
		2 x 6	12	6	10	10	9	8	8	11	14	9	12	9	11	5	10	5
		2 x 8	18	6	16	1	14	5	13	1	21	8	18	11	16	11	15	5
		2 x 10	23	8	20	6	18	5	16	10	27	5	24	2	21	7	19	9
White Pine Red Pine	No. 1	2 x 4	8	6	7	4	6	7	6	0	9	10	8	8	7	9	7	1
		2 x 6	12	8	11	0	9	10	9	0	14	11	12	11	11	7	10	6
		2 x 8	17	4	15	0	13	5	12	2	20	4	17	7	15	9	14	4
		2 x 10	21	11	19	0	17	0	15	6	25	9	22	4	19	11	18	2
	Merchantable and No. 2	2 x 4	7	6	6	6	5	10	5	4	8	10	7	8	6	10	6	3
		2 x 6	11	8	10	1	9	0	8	2	13	9	11	11	10	8	9	8
		2 x 8	16	2	14	0	12	6	11	6	19	1	16	6	14	9	13	6
		2 x 10	20	10	18	0	16	1	14	8	24	5	21	2	18	11	17	4
	No. 1 Dimension	2 x 4	6	6	5	7	5	0	4	7	7	7	6	7	5	11	5	4
		2 x 6	11	0	9	6	8	6	7	10	12	11	11	2	10	0	9	2
		2 x 8	15	6	13	5	12	0	11	0	18	3	15	9	14	1	12	11
		2 x 10	20	10	18	0	16	1	14	8	24	5	21	2	18	11	17	4
	No. 2 Dimension [5]	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	8	6	7	4	6	7	6	0	9	11	8	7	7	8	7	0
		2 x 8	11	11	10	4	9	4	8	5	14	1	12	2	10	11	9	11
		2 x 10	16	5	14	2	12	8	11	7	19	4	16	9	15	0	13	8
Poplar	No. 1 (Construction)	2 x 4	6	6	5	7	5	0	4	7	7	7	6	7	5	11	5	4
		2 x 6	12	8	11	0	9	10	9	0	14	11	12	11	11	7	10	6
		2 x 8	17	4	15	0	13	5	12	2	20	4	17	7	15	9	14	4
		2 x 10	21	11	19	0	17	0	15	6	25	9	22	4	19	11	18	2
	No. 2 (Standard)	2 x 4	—		—		—		—		—		—		—		—	
		2 x 6	11	0	9	6	8	6	7	10	12	11	11	2	10	0	9	2
		2 x 8	16	2	14	0	12	6	11	6	19	1	16	6	14	9	13	6
		2 x 10	20	10	18	0	16	1	14	8	24	5	21	2	18	11	17	4

Notes to Table B-9:

(1) Rafters refer to sloping roof framing members which do not support a ceiling and which enclose an attic.

(2) When either of these species is graded by Western Wood Products Association Rules, reduce the spans of 2 x 6 members as follows:
Construction Grade — 6 per cent
Standard Grade — 8 per cent.

(3) When Eastern Spruce is graded by Western Wood Products Association Rules, spans for Western Spruce apply.

(4) When graded by Western Wood Products Association Rules, spans for Pacific Coast Yellow Cedar shall apply with the span reductions as in (2).

(5) When graded by Eastern Grading Committee Rules, spans for No. 2 Dimension may be increased as follows:
2 x 6, 2 x 8 — 10 per cent
2 x 10, — 15 per cent.

TABLE B-10

BUILD-UP WOOD BEAMS IN BASEMENTS CELLARS AND CRAWL SPACES, TWO-STOREY DWELLINGS [1, 4]

Species	Grade	Supported Joist Length [2, 3]	Size of built up beam, inches [5, 6, 7]									
			3-2 x 8		4-2 x 8		3-2 x 10		4-2 x 10		3-2 x 12		4-2 x 12	
		ft	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch Pacific Coast Hemlock	Construction	8	9	6	10	11	12	0	13	10	14	6	16	9
		10	8	6	9	9	10	9	12	5	13	0	15	0
		12	7	8	8	11	9	8	11	4	11	8	13	8
		14	6	9	8	3	8	6	10	6	10	4	12	8
		16	6	0	7	7	7	8	9	8	9	3	11	8
	Standard	8	8	6	9	9	10	9	12	5	13	0	15	0
		10	7	5	8	9	9	4	11	1	11	4	13	5
		12	6	4	8	0	8	1	10	1	9	9	12	3
		14	5	8	7	1	7	2	9	0	8	8	10	10
		16	5	1	6	4	6	5	8	0	7	9	9	9
Pacific Coast Yellow Cedar Eastern Larch Jack Pine	No. 1 (Construction)	8	7	11	9	4	10	0	11	10	12	1	14	4
		10	6	7	8	4	8	4	10	6	10	0	12	9
		12	5	8	7	2	7	2	9	0	8	8	10	11
		14	5	0	6	3	6	4	8	0	7	9	9	8
		16	4	7	5	8	5	9	7	2	7	0	8	8
	No. 2 (Standard)	8	6	4	7	4	8	4	9	8	10	9	12	5
		10	5	8	6	7	7	6	8	8	9	7	11	1
		12	5	2	6	0	6	10	7	11	8	8	10	1
		14	4	10	5	6	6	4	7	4	7	9	9	4
		16	4	6	5	2	5	9	6	10	7	0	8	8
Fir (Amabilis and Grandis) Balsam Fir Eastern Hemlock Pine (Lodgepole and Ponderosa) Spruce (all species)	No. 1 (Construction)	8	7	6	8	8	9	6	11	0	11	6	13	4
		10	6	3	7	9	7	11	9	10	9	7	11	11
		12	5	5	6	10	6	10	8	8	8	4	10	5
		14	4	10	6	0	6	1	7	8	7	5	9	3
		16	4	4	5	5	5	6	6	10	6	8	8	4
	No. 2 (Standard)	8	5	11	6	10	7	9	9	0	10	0	11	6
		10	5	3	6	1	6	11	8	0	8	11	10	4
		12	4	10	5	7	6	4	7	4	8	2	9	5
		14	4	6	5	2	5	10	6	9	7	5	8	9
		16	4	2	4	10	5	6	6	4	6	8	8	2
Western Red Cedar Red Pine Pine (Eastern and Western White) Poplar (Aspen, Largetooth Aspen, and Balsam Poplar)	No. 1 (Construction) (No. 1 Dimension)	8	6	4	7	4	8	6	9	10	10	6	12	6
		10	5	8	6	7	7	3	8	9	8	9	11	0
		12	5	0	6	0	6	3	7	10	7	7	9	6
		14	4	5	5	6	5	7	7	0	6	10	8	5
		16	4	0	4	11	5	1	6	3	6	2	7	7
	No. 2 (Standard) (No. 2 Dimension)	8	4	11	5	8	6	9	7	9	8	6	9	10
		10	4	4	5	1	6	0	6	11	7	8	8	10
		12	4	0	4	7	5	6	6	4	7	0	8	1
		14	3	8	4	3	5	1	5	11	6	5	7	5
		16	3	6	4	0	4	9	5	6	6	0	7	0

Notes to Table B-10:

(1) This table provides maximum allowable spans for main beams or girders which are built up from nominal 2 in. members in the species, sizes and grades indicated. Allowable spans for solid wood beams, glued-laminated wood beams or built-up beams in sizes or grades other than shown shall be determined in accordance with good engineering practice.

(2) Supported joist length means ½ the sum of the joist spans on both sides of the beam.

(3) For supported joist lengths intermediate between those shown in the table, straightline interpolation may be used in determing the maximum beam span.

(4) Beams of 1½-storey dwellings shall be taken from the table for 2-storey dwellings.

(5) The 2-in. members shall be laid on edge and fastened together with a double row of common nails not less than 3½ in. in length. Nails shall be spaced not more than 18 in. apart in each row with the end nails placed 4 in. to 6 in. from the end of each piece.

(6) Where built-up wood beams are employed over a single span, the length of each individual piece used to fabricate the beam shall equal the length of the beam.

(7) Where built-up wood beams are continued over more than one span and where lengths of individual pieces are less than the total length of the complete beam, the location of butt joints shall conform to Articles 23 H(3) and 23 H(4).

TABLE B-11

BUILT-UP WOOD BEAMS IN BASEMENTS CELLARS AND CRAWL SPACES, ONE-STOREY DWELLINGS [1, 4]

Species	Grade	Supported Joist Length [2, 3]	Size of built up beam, inches [5, 6, 7]									
			3-2 x 8		4-2 x 8		3-2 x 10		4-2 x 10		3-2 x 12		4-2 x 12	
		ft	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch Pacific Coast Hemlock	Construction	8	12	6	14	6	15	11	18	4	19	3	22	2
		10	11	3	12	11	14	2	16	5	17	2	19	10
		12	10	3	11	10	13	0	15	0	15	8	18	1
		14	9	6	10	11	12	0	13	10	14	6	16	9
		16	8	10	10	3	11	3	13	0	13	7	15	8
	Standard	8	11	3	12	11	14	2	16	5	17	2	19	10
		10	10	0	11	7	12	8	14	8	15	5	17	9
		12	9	2	10	7	11	7	13	5	14	0	16	2
		14	8	6	9	9	10	9	12	5	13	0	15	0
		16	7	11	9	2	10	0	11	7	12	2	14	0
Pacific Coast Yellow Cedar Eastern Larch Jack Pine	No. 1 (Construction)	8	10	8	12	4	13	6	15	8	16	5	18	11
		10	9	7	11	0	12	1	14	0	14	8	16	11
		12	8	9	10	1	11	1	12	9	13	5	15	5
		14	7	11	9	4	10	0	11	10	12	1	14	4
		16	7	0	8	9	8	11	11	1	10	9	13	5
	No. 2 (Standard)	8	8	5	9	8	11	1	12	9	14	2	16	5
		10	7	6	8	8	9	11	11	5	12	8	14	8
		12	6	10	7	11	9	0	10	5	11	7	13	5
		14	6	4	7	4	8	4	9	8	10	9	12	5
		16	5	11	6	10	7	10	9	0	10	0	11	7
Fir (Amabilis & Grandis) Balsam Fir Eastern Hemlock Pine (Lodgepole and Ponderosa) Spruce (all species)	No. 1 (Construction)	8	9	11	11	6	12	7	14	7	15	3	17	7
		10	8	11	10	3	11	3	13	0	13	8	15	9
		12	8	1	9	5	10	3	11	11	12	6	14	5
		14	7	6	8	8	9	6	11	0	11	6	13	4
		16	6	9	8	1	8	6	10	3	10	4	12	6
	No. 2 (Standard)	8	7	10	9	0	10	3	11	10	13	3	15	3
		10	7	0	8	1	9	2	10	7	11	10	13	8
		12	6	4	7	4	8	5	9	8	10	9	12	6
		14	5	11	6	10	7	9	9	0	10	0	11	6
		16	5	6	6	4	7	3	8	5	9	4	10	9
Western Red Cedar Red Pine Pine (Eastern and Western White) Poplar (Aspen, Largetooth Aspen, and Balsam Poplar)	No. 1 (Construction) (No. 1 Dimension)	8	8	5	9	8	11	3	13	0	14	4	16	7
		10	7	6	8	8	10	1	11	8	12	10	14	10
		12	6	10	7	11	9	2	10	7	11	9	13	6
		14	6	4	7	4	8	6	9	10	10	6	12	6
		16	5	11	6	10	7	9	9	2	9	5	11	9
	No. 2 (Standard) (No. 2 Dimension)	8	6	6	7	6	8	11	10	3	11	4	13	1
		10	5	9	6	8	8	0	9	2	10	1	11	8
		12	5	3	6	1	7	3	8	5	9	3	10	8
		14	4	11	5	8	6	9	7	9	8	6	9	10
		16	4	7	5	3	6	4	7	3	8	0	9	3

Notes to Table B-11:

(1) This table provides maximum allowable spans for main beams or girders which are built up from nominal 2 in. members in the species, sizes and grades indicated. Allowable spans for solid wood beams, glued-laminated wood beams or built-up beams in sizes or grades other than shown shall be determined in accordance with good engineering practice.

(2) Supported joist length means ½ the sum of the joist spans on both sides of the beam.

(3) For supported joist lengths intermediate between those shown in the table, straightline interpolation may be used in determining the maximum beam span.

(4) Beams of 1½-storey dwellings shall be taken from the table for 2-storey dwellings.

(5) The 2-in. members shall be laid on edge and fastened together with a double row of common nails not less than 3½ in. in length. Nails shall be spaced not more than 18 in. apart in each row with the end nails placed 4 in. to 6 in. from the end of each piece.

(6) Where built-up wood beams are employed over a single span, the length of each individual piece used to fabricate the beam shall equal the length of the beam.

(7) Where built-up wood beams are continued over more than one span and where lengths of individual pieces are less than the total length of the complete beam, the location of butt joints shall conform to Articles 23 H(3) and 23 H(4).

APPENDIX C

SPAN TABLES FOR STEEL BEAMS

TABLE C-1

STEEL BEAMS IN BASEMENTS, CELLARS, AND CRAWL SPACES IN DWELLINGS [1, 3, 4]

No. of Storeys	Minimum Depth, in.	Minimum Weight/Foot, lb.	Width [2] of Floor to be Supported				
			8 ft	10 ft	12 ft	14 ft	16 ft
1	4	7.7	10	9	8.5	8	7.5
	5	10.0	12.5	11.5	11	10.5	10
	6	12.5	15	14	13	12.5	12
	7	15.3	18	17	16	15	14.5
	8	18.4	21	19.5	18.5	17.5	16.5
2	4	7.7	8	7.5	7	6.5	6
	5	10.0	10.5	9.5	8.5	8	7.5
	6	12.5	12.5	11.5	10.5	9.5	9
	7	15.3	15	14	13	12	11
	8	18.4	17.5	16	15	14	13

Notes to Table C-1:

(1) This table applies only to beams with laterally supported top flanges. A beam may be considered to be laterally supported if wood joists bear on its top flange at intervals of 24 in. or less over its entire length and if all the load being applied to this beam is transmitted through the joists and if 1-in. by 2-in. wood strips in contact with the top flange are nailed on both sides of the beam to the bottom of the joists supported. Other additional methods of positive lateral support are acceptable.

(2) Supported joist length means ½ the sum of the joist spans on both sides of the beam.

(3) For supported joist lengths intermediate between those shown in the table, straightline interpolation may be used in determining the maximum beam span.

(4) This table provides maximum spans for main steel beams or girders, of the sizes and weights indicated. Allowable spans for steel beams in sizes, weights or shapes other than shown, shall be determined in accordance with good engineering practice.

APPENDIX D

SPAN TABLES FOR WOOD JOISTS, RAFTERS AND BEAMS

(Based on grading rules shown in Table 3C in Section 3)

FOREWORD

In these span tables, the term "rafter" refers to a sloping wood framing member which supports the roof sheathing but does not support a ceiling, and encloses an attic space. The term "roof joist" refers to a horizontal or sloping wood framing member that supports the roof sheathing and the ceiling finish but does not enclose an attic space.

Where rafters or roof joists are intended for use in a locality having a higher design roof snow load than shown in the tables, the maximum member spacing may be calculated as the product of the member spacing and snow load shown in the span tables divided by the design roof snow load for the locality being considered. The following are examples of how this principle can be applied:

(1) *For a 60 psf design snow load,* use spans for 30 psf and 24 in. o.c. spacing but space members 12 in. o.c., or use spans for 40 psf and 24 in. o.c. spacing but space members 16 in. o.c.

(2) *For a 70 psf design snow load,* use spans for 50 psf and 24 in. o.c. spacing but space members 16 in. o.c.

(3) *For a 80 psf design snow load,* use spans for 40 psf and 24 in. o.c. spacing but space members 12 in. o.c.

Design Basis

The design loads and deflection limits used in calculating the span tables are those specified in Section 4 of this Code.

The lumber sizes assumed in the calculations are those dressed to Canadian standard sizes for yard lumber in accordance with CSA O141-1970. These sizes, based on lumber having a moisture content of 19 per cent are as follows:

Nominal Size	Dressed Size at 19% M.C.
2 in. x 4 in.	1½ in. x 3½ in.
2 in. x 6 in.	1½ in. x 5½ in.
2 in. x 8 in.	1½ in. x 7¼ in.
2 in. x 10 in.	1½ in. x 9¼ in.
2 in. x 12 in.	1½ in. x 11¼ in.

For moisture contents other than 19%, provision is made in CSA O141-1970 to allow for the size variations that occur as a result of changes in lumber moisture content.

The descriptions of the grades of lumber specified in the span tables are contained in the 1971 "NLGA Standard Grading Rules for Canadian Lumber" published by the National Lumber Grades Authority, Vancouver. The design stresses used in calculating the span tables have been determined in conformance with CSA O86-1970.

Use of Tables

The allowable spans in the following tables are measured from face or edge of support to face or edge of support.

In the case of sloping roof framing members, the spans are expressed in terms of the horizontal distance between supports rather than the length of the sloping member. The snow loads are also expressed in terms of the horizontal projection of the sloping roof. Spans for odd size lumber (i.e., 2 in. x 5 in., 2 in. x 7 in., etc.), may be estimated by straight line interpolation in the tables. Spans for 2 in. x 5 in. lumber of Construction, Standard, or Utility grades may be 30 per cent greater than the spans listed for 2 in. x 4 in. lumber.

These span tables may be used where members support a uniform live load only. Where the members are designed to support a concentrated load, the members must be designed in conformance with Section 4.3 of the National Building Code of Canada 1970.

Grade Marking of Lumber

Facsimiles of typical grade marks of lumber graded in accordance with the 1971 "NLGA Standard Grading Rules for Canadian Lumber" by associations and grading agencies certified by the Canadian Lumber Standards Administrative Board to grade mark lumber in Canada are shown in Appendix F.

TABLE D-1

CEILING JOISTS — ATTIC NOT ACCESSIBLE BY A STAIRWAY (LIVE LOAD 10 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 10 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	11	6	10	5	9	8	9	1	13	2	11	11	11	1	10	5
		2 x 6	18	1	16	5	15	3	14	4	20	8	18	10	17	5	16	5
		2 x 8	23	10	21	8	20	1	18	11	27	4	24	10	23	0	21	8
		2 x 10	30	5	27	8	25	8	24	2	34	10	31	8	29	5	27	8
		2 x 12	37	0	33	8	31	3	29	4	42	5	38	6	35	9	33	8
	No. 1	2 x 4	11	6	10	5	9	8	9	1	13	2	11	11	11	1	10	5
		2 x 6	18	1	16	5	15	3	14	4	20	8	18	10	17	5	16	5
		2 x 8	23	10	21	8	20	1	18	11	27	4	24	10	23	0	21	8
		2 x 10	30	5	27	8	25	8	24	2	34	10	31	8	29	5	27	8
		2 x 12	37	0	33	8	31	3	29	4	42	5	38	6	35	9	33	8
	No. 2	2 x 4	11	1	10	1	9	4	8	10	12	8	11	7	10	9	10	1
		2 x 6	17	6	15	10	14	9	13	10	20	0	18	2	16	5	15	0
		2 x 8	23	0	20	11	19	5	18	3	26	4	23	11	21	8	19	9
		2 x 10	29	5	26	8	24	9	23	4	33	8	30	7	27	7	25	2
		2 x 12	35	9	32	6	30	2	28	4	40	11	37	2	33	7	30	8
	No. 3	2 x 4	10	8	9	5	8	5	7	8	10	11	9	5	8	5	7	8
		2 x 6	16	1	13	11	12	5	11	4	16	1	13	11	12	5	11	4
		2 x 8	21	3	18	4	16	5	15	0	21	3	18	4	16	5	15	0
		2 x 10	27	1	23	5	21	0	19	2	27	1	23	5	21	0	19	2
		2 x 12	32	11	28	6	25	6	23	3	32	11	28	6	25	6	23	3
	Con-struction	2 x 4	10	8	9	8	9	0	8	5	12	2	10	9	9	7	8	9
	Standard	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
	Utility	2 x 4	6	5	5	7	5	0	4	7	6	5	5	7	5	0	4	7
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	10	10	9	10	9	2	8	7	12	5	11	3	10	6	9	10
		2 x 6	17	1	15	6	14	4	13	6	19	6	17	9	16	6	15	6
		2 x 8	22	6	20	5	19	0	17	10	25	9	23	5	21	9	20	5
		2 x 10	28	8	26	1	24	2	22	9	32	10	29	10	27	9	26	1
		2 x 12	34	11	31	9	29	5	27	8	40	0	36	4	33	9	31	9
	No. 1	2 x 4	10	10	9	10	9	2	8	7	12	5	11	3	10	6	9	10
		2 x 6	17	1	15	6	14	4	13	6	19	6	17	7	15	9	14	5
		2 x 8	22	6	20	5	19	0	17	10	25	9	23	3	20	9	19	0
		2 x 10	28	8	26	1	24	2	22	9	32	10	29	8	26	6	24	3
		2 x 12	34	11	31	9	29	5	27	8	40	0	36	1	32	3	29	5
	No. 2	2 x 4	10	6	9	6	8	10	8	4	12	0	10	11	9	10	8	11
		2 x 6	16	6	14	11	13	11	12	9	18	1	15	8	14	0	12	9
		2 x 8	21	9	19	9	18	4	16	10	23	11	20	8	18	6	16	10
		2 x 10	27	9	25	2	23	4	21	6	30	6	26	5	23	7	21	6
		2 x 12	33	9	30	8	28	5	26	2	37	1	32	1	28	9	26	2
	No. 3	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
		2 x 6	13	9	11	11	10	8	9	9	13	9	11	11	10	8	9	9
		2 x 8	18	2	15	9	14	1	12	10	18	2	15	9	14	1	12	10
		2 x 10	23	2	20	1	17	11	16	5	23	2	20	1	17	11	16	5
		2 x 12	28	2	24	5	21	10	19	11	28	2	24	5	21	10	19	11
	Con-struction	2 x 4	10	1	9	2	8	2	7	5	10	7	9	2	8	2	7	5
	Standard	2 x 4	7	11	6	10	6	1	5	7	7	11	6	10	6	1	5	7
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8

Continued on next page

TABLE D-1 — (Cont'd)

CEILING JOISTS — ATTIC NOT ACCESSIBLE BY A STAIRWAY (LIVE LOAD 10 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 10 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	10	2	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 6	16	0	14	7	13	6	12	9	18	4	16	8	15	6	14	7
		2 x 8	21	2	19	3	17	10	16	9	24	3	22	0	20	5	19	3
		2 x 10	27	0	24	6	22	9	21	5	30	11	28	1	26	1	24	6
		2 x 12	32	10	29	10	27	8	26	1	37	7	34	2	31	9	29	10
	No. 1	2 x 4	10	2	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 6	16	0	14	7	13	6	12	9	18	4	16	8	15	1	13	9
		2 x 8	21	2	19	3	17	10	16	9	24	3	22	0	19	11	18	2
		2 x 10	27	0	24	6	22	9	21	5	30	11	28	1	25	5	23	2
		2 x 12	32	10	29	10	27	8	26	1	37	7	34	2	30	11	28	2
	No. 2	2 x 4	9	10	8	11	8	4	7	10	11	3	10	3	9	4	8	7
		2 x 6	15	6	14	1	13	1	12	4	17	7	15	3	13	8	12	5
		2 x 8	20	5	18	7	17	3	16	3	23	3	20	1	18	0	16	5
		2 x 10	26	1	23	9	22	0	20	9	29	8	25	8	23	0	21	0
		2 x 12	31	9	28	10	26	9	25	2	36	1	31	3	27	11	25	6
	No. 3	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
		2 x 6	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 8	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 10	22	1	19	2	17	1	15	7	22	1	19	2	17	1	15	7
		2 x 12	26	11	23	3	20	10	19	0	26	11	23	3	20	10	19	0
	Con-struction	2 x 4	9	6	8	7	7	11	7	3	10	3	8	10	7	11	7	3
	Standard	2 x 4	7	11	6	10	6	1	5	7	7	11	6	10	6	1	5	7
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 4	9	10	8	11	8	3	7	9	11	3	10	3	9	6	8	11
		2 x 6	15	6	14	1	13	0	12	3	17	8	16	1	14	11	14	1
		2 x 8	20	5	18	6	17	2	16	2	23	4	21	3	19	8	18	6
		2 x 10	26	0	23	8	21	11	20	8	29	10	27	1	25	2	23	8
		2 x 12	31	8	28	9	26	9	25	2	36	3	32	11	30	7	28	9
	No. 1	2 x 4	9	10	8	11	8	3	7	9	11	3	10	3	9	6	8	11
		2 x 6	15	6	14	1	13	0	12	3	17	8	16	1	14	9	13	5
		2 x 8	20	5	18	6	17	2	16	2	23	4	21	3	19	5	17	9
		2 x 10	26	0	23	8	21	11	20	8	29	10	27	1	24	10	22	8
		2 x 12	31	8	28	9	26	9	25	2	36	3	32	11	30	2	27	7
	No. 2	2 x 4	9	6	8	7	8	0	7	6	10	10	9	10	9	2	8	4
		2 x 6	14	11	13	6	12	7	11	10	17	1	14	10	13	3	12	1
		2 x 8	19	8	17	10	16	7	15	7	22	6	19	7	17	6	15	11
		2 x 10	25	1	22	9	21	2	19	11	28	8	25	0	22	4	20	4
		2 x 12	30	6	27	8	25	9	24	2	34	11	30	4	27	2	24	9
	No. 3	2 x 4	8	9	7	7	6	9	6	2	8	9	7	7	6	9	6	2
		2 x 6	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 8	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 10	22	1	19	2	17	1	15	7	22	1	19	2	17	1	15	7
		2 x 12	26	11	23	3	20	10	19	0	26	11	23	3	20	10	19	0
	Con-struction	2 x 4	9	1	8	3	7	8	7	0	9	10	8	7	7	8	7	0
	Standard	2 x 4	7	5	6	5	5	9	5	3	7	5	6	5	5	9	5	3
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8

Continued on next page

TABLE D-1 — (Cont'd)

CEILING JOISTS — ATTIC NOT ACCESSIBLE BY A STAIRWAY (LIVE LOAD 10 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 10 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	10	4	9	4	8	8	8	2	11	10	10	9	10	0	9	4
		2 x 6	16	3	14	9	13	8	12	11	18	7	16	11	15	8	14	9
		2 x 8	21	5	19	5	18	1	17	0	24	6	22	3	20	8	19	5
		2 x 10	27	4	24	10	23	1	21	8	31	4	28	5	26	5	24	10
		2 x 12	33	3	30	3	28	0	26	5	38	1	34	7	32	1	30	3
	No. 1	2 x 4	10	4	9	4	8	8	8	2	11	10	10	9	10	0	9	4
		2 x 6	16	3	14	9	13	8	12	11	18	7	16	11	15	8	14	9
		2 x 8	21	5	19	5	18	1	17	0	24	6	22	3	20	8	19	5
		2 x 10	27	4	24	10	23	1	21	8	31	4	28	5	26	5	24	10
		2 x 12	33	3	30	3	28	0	26	5	38	1	34	7	32	1	30	3
	No. 2	2 x 4	10	0	9	1	8	5	7	11	11	5	10	4	9	7	9	1
		2 x 6	15	8	14	3	13	3	12	5	17	11	16	4	15	2	14	1
		2 x 8	20	8	18	9	17	5	16	5	23	8	21	6	20	0	18	7
		2 x 10	26	5	24	0	22	3	20	11	30	3	27	5	25	6	23	8
		2 x 12	32	1	29	2	27	1	25	6	36	9	33	5	31	0	28	10
	No. 3	2 x 4	9	7	8	8	7	11	7	3	10	3	8	10	7	11	7	3
		2 x 6	15	0	12	11	11	7	10	7	15	0	12	11	11	7	10	7
		2 x 8	19	9	17	1	15	3	13	11	19	9	17	1	15	3	13	11
		2 x 10	25	2	21	10	19	6	17	10	25	2	21	10	19	6	17	10
		2 x 12	30	8	26	7	23	9	21	8	30	8	26	7	23	9	21	8
	Construction	2 x 4	9	7	8	8	8	1	7	7	11	0	10	0	8	11	8	1
	Standard	2 x 4	8	9	7	7	6	9	6	2	8	9	7	7	6	9	6	2
	Utility	2 x 4	5	11	5	1	4	7	4	2	5	11	5	1	4	7	4	2
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	9	11	9	0	8	4	7	11	11	5	10	4	9	7	9	0
		2 x 6	15	8	14	2	13	2	12	5	17	11	16	3	15	1	14	2
		2 x 8	20	7	18	9	17	5	16	4	23	7	21	5	19	11	18	9
		2 x 10	26	4	23	11	22	2	20	11	30	2	27	5	25	5	23	11
		2 x 12	32	0	29	1	27	0	25	5	36	8	33	4	30	11	29	1
	No. 1	2 x 4	9	11	9	0	8	4	7	11	11	5	10	4	9	7	9	0
		2 x 6	15	8	14	2	13	2	12	5	17	11	16	3	15	1	13	9
		2 x 8	20	7	18	9	17	5	16	4	23	7	21	5	19	11	18	2
		2 x 10	26	4	23	11	22	2	20	11	30	2	27	5	25	5	23	2
		2 x 12	32	0	29	1	27	0	25	5	36	8	33	4	30	11	28	2
	No. 2	2 x 4	9	7	8	9	8	1	7	7	11	0	10	0	9	3	8	7
		2 x 6	15	1	13	9	12	9	12	0	17	4	15	3	13	8	12	5
		2 x 8	19	11	18	1	16	10	15	10	22	10	20	1	18	0	16	5
		2 x 10	25	5	23	1	21	5	20	2	29	2	25	8	23	0	21	0
		2 x 12	31	0	28	1	26	1	24	7	35	5	31	3	27	11	25	6
	No. 3	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
		2 x 6	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 8	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 10	22	1	19	2	17	1	15	7	22	1	19	2	17	1	15	7
		2 x 12	26	11	23	3	20	10	19	0	26	11	23	3	20	10	19	0
	Construction	2 x 4	9	3	8	4	7	9	7	3	10	3	8	10	7	11	7	3
	Standard	2 x 4	7	11	6	10	6	1	5	7	7	11	6	10	6	1	5	7
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8

TABLE D-2

FLOOR JOISTS — LIVING QUARTERS
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist spacing							
			12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft.*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	7	3	6	7	6	1	5	9
		2 x 6	11	4	10	4	9	7	9	0
		2 x 8	15	0	13	8	12	8	11	11
		2 x 10	19	2	17	5	16	2	15	2
		2 x 12	23	4	21	2	19	8	18	6
	No. 1	2 x 4	7	3	6	7	6	1	5	9
		2 x 6	11	4	10	4	9	7	9	0
		2 x 8	15	0	13	8	12	8	11	11
		2 x 10	19	2	17	5	16	2	15	2
		2 x 12	23	4	21	2	19	8	18	6
	No. 2	2 x 4	7	0	6	4	5	11	5	6
		2 x 6	11	0	10	0	9	3	8	5
		2 x 8	14	6	13	2	12	3	11	2
		2 x 10	18	6	16	10	15	7	14	3
		2 x 12	22	6	20	5	19	0	17	4
	No. 3	2 x 4	6	2	5	4	4	9	4	4
		2 x 6	9	1	7	10	7	0	6	5
		2 x 8	12	0	10	4	9	3	8	6
		2 x 10	15	4	13	3	11	10	10	10
		2 x 12	18	7	16	1	14	5	13	2
	Construction	2 x 4	6	8	6	1	5	5	4	11
	Standard	2 x 4	5	2	4	5	4	0	3	8
	Utility	2 x 4	3	8	3	2	2	10	2	7
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	6	10	6	2	5	9	5	5
		2 x 6	10	9	9	9	9	0	8	6
		2 x 8	14	2	12	10	11	11	11	3
		2 x 10	18	1	16	5	15	3	14	4
		2 x 12	22	0	20	0	18	6	17	5
	No. 1	2 x 4	6	10	6	2	5	9	5	5
		2 x 6	10	9	9	9	8	11	8	1
		2 x 8	14	2	12	10	11	9	10	9
		2 x 10	18	1	16	5	15	0	13	8
		2 x 12	22	0	20	0	18	3	16	9
	No. 2	2 x 4	6	7	6	0	5	6	5	0
		2 x 6	10	3	8	10	7	11	7	3
		2 x 8	13	6	11	8	10	5	9	6
		2 x 10	17	3	14	11	13	4	12	2
		2 x 12	20	11	18	2	16	3	14	10
	No. 3	2 x 4	5	2	4	5	4	0	3	8
		2 x 6	7	9	6	9	6	0	5	6
		2 x 8	10	3	8	10	7	11	7	3
		2 x 10	13	1	11	4	10	2	9	3
		2 x 12	15	11	13	10	12	4	11	3
	Construction	2 x 4	5	11	5	2	4	7	4	2
	Standard	2 x 4	4	5	3	10	3	5	3	2
	Utility	2 x 4	2	11	2	7	2	3	2	1

Continued on next page

TABLE D-2 — (Cont'd)

FLOOR JOISTS — LIVING QUARTERS
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist spacing							
			12 in		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	6	5	5	10	5	5	5	1
		2 x 6	10	1	9	2	8	6	8	0
		2 x 8	13	4	12	1	11	3	10	7
		2 x 10	17	0	15	5	14	4	13	6
		2 x 12	20	8	18	9	17	5	16	5
	No. 1	2 x 4	6	5	5	10	5	5	5	1
		2 x 6	10	1	9	2	8	6	7	9
		2 x 8	13	4	12	1	11	3	10	3
		2 x 10	17	0	15	5	14	4	13	1
		2 x 12	20	8	18	9	17	5	15	11
	No. 2	2 x 4	6	2	5	7	5	3	4	10
		2 x 6	9	9	8	7	7	8	7	0
		2 x 8	12	10	11	4	10	2	9	3
		2 x 10	16	5	14	6	13	0	11	10
		2 x 12	20	0	17	8	15	9	14	5
	No. 3	2 x 4	5	2	4	5	4	0	3	8
		2 x 6	7	5	6	5	5	9	5	3
		2 x 8	9	9	8	6	7	7	6	11
		2 x 10	12	6	10	10	9	8	8	10
		2 x 12	15	2	13	2	11	9	10	9
	Construction	2 x 4	5	9	5	0	4	5	4	1
	Standard	2 x 4	4	5	3	10	3	5	3	2
	Utility	2 x 4	2	11	2	7	2	3	2	1
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	6	2	5	7	5	2	4	11
		2 x 6	9	9	8	10	8	2	7	9
		2 x 8	12	10	11	8	10	10	10	2
		2 x 10	16	5	14	11	13	10	13	0
		2 x 12	19	11	18	1	16	10	15	10
	No. 1	2 x 4	6	2	5	7	5	2	4	11
		2 x 6	9	9	8	10	8	2	7	7
		2 x 8	12	10	11	8	10	10	10	0
		2 x 10	16	5	14	11	13	10	12	10
		2 x 12	19	11	18	1	16	10	15	7
	No. 2	2 x 4	5	11	5	5	5	0	4	8
		2 x 6	9	4	8	4	7	6	6	10
		2 x 8	12	4	11	1	9	10	9	0
		2 x 10	15	9	14	1	12	7	11	6
		2 x 12	19	2	17	2	15	4	14	0
	No. 3	2 x 4	4	11	4	3	3	10	3	6
		2 x 6	7	5	6	5	5	9	5	3
		2 x 8	9	9	8	6	7	7	6	11
		2 x 10	12	6	10	10	9	8	8	10
		2 x 12	15	2	13	2	11	9	10	9
	Construction	2 x 4	5	7	4	10	4	4	3	11
	Standard	2 x 4	4	2	3	8	3	3	2	11
	Utility	2 x 4	2	11	2	7	2	3	2	1

Continued on next page

TABLE D-2 — (Cont'd)

FLOOR JOISTS — LIVING QUARTERS
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist spacing							
			12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	6	6	5	11	5	6	5	2
		2 x 6	10	3	9	3	8	7	8	1
		2 x 8	13	6	12	3	11	4	10	8
		2 x 10	17	2	15	8	14	6	13	8
		2 x 12	20	11	19	0	17	8	16	7
	No. 1	2 x 4	6	6	5	11	5	6	5	2
		2 x 6	10	3	9	3	8	7	8	1
		2 x 8	13	6	12	3	11	4	10	8
		2 x 10	17	2	15	8	14	6	13	8
		2 x 12	20	11	19	0	17	8	16	7
	No. 2	2 x 4	6	3	5	8	5	3	5	0
		2 x 6	9	10	8	11	8	4	7	10
		2 x 8	13	0	11	10	11	0	10	4
		2 x 10	16	7	15	1	14	0	13	2
		2 x 12	20	3	18	4	17	0	16	0
	No. 3	2 x 4	5	9	5	0	4	5	4	1
		2 x 6	8	5	7	4	6	6	6	0
		2 x 8	11	2	9	8	8	8	7	10
		2 x 10	14	3	12	4	11	0	10	1
		2 x 12	17	4	15	0	13	5	12	3
	Construction	2 x 4	6	0	5	6	5	0	4	7
	Standard	2 x 4	4	11	4	3	3	10	3	6
	Utility	2 x 4	3	4	2	10	2	7	2	4
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	6	3	5	8	5	3	4	11
		2 x 6	9	10	8	11	8	3	7	10
		2 x 8	13	0	11	9	10	11	10	3
		2 x 10	16	7	15	1	14	0	13	2
		2 x 12	20	2	18	4	17	0	16	0
	No. 1	2 x 4	6	3	5	8	5	3	4	11
		2 x 6	9	10	8	11	8	3	7	9
		2 x 8	13	0	11	9	10	11	10	3
		2 x 10	16	7	15	1	14	0	13	1
		2 x 12	20	2	18	4	17	0	15	11
	No. 2	2 x 4	6	0	5	6	5	1	4	9
		2 x 6	9	6	8	7	7	8	7	0
		2 x 8	12	7	11	4	10	2	9	3
		2 x 10	16	0	14	6	13	0	11	10
		2 x 12	19	6	17	8	15	9	14	5
	No. 3	2 x 4	5	2	4	5	4	0	3	8
		2 x 6	7	5	6	5	5	9	5	3
		2 x 8	9	9	8	6	7	7	6	11
		2 x 10	12	6	10	10	9	8	8	10
		2 x 12	15	2	13	2	11	9	10	9
	Construction	2 x 4	5	9	5	0	4	5	4	1
	Standard	2 x 4	4	5	3	10	3	5	3	2
	Utility	2 x 4	2	11	2	7	2	3	2	1

TABLE D-3

FLOOR JOISTS — BEDROOMS, AND IN ATTICS ACCESSIBLE BY A STAIRWAY (LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	7	11	7	3	6	8	6	4	9	1	8	3	7	8	7	3
		2 x 6	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	4
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	15	0
		2 x 10	21	1	19	2	17	9	16	9	24	2	21	11	20	4	19	2
		2 x 12	25	8	23	4	21	8	20	4	29	4	26	8	24	9	23	4
	No. 1	2 x 4	7	11	7	3	6	8	6	4	9	1	8	3	7	8	7	3
		2 x 6	12	6	11	4	10	7	9	11	14	4	13	0	11	8	10	7
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	4	14	0
		2 x 10	21	1	19	2	17	9	16	9	24	2	21	11	19	7	17	11
		2 x 12	25	8	23	4	21	8	20	4	29	4	26	8	23	10	21	9
	No. 2	2 x 4	7	8	7	0	6	6	6	1	8	10	8	0	7	2	6	6
		2 x 6	12	1	11	0	10	2	9	7	13	7	11	9	10	6	9	7
		2 x 8	15	11	14	6	13	5	12	8	17	11	15	6	13	10	12	8
		2 x 10	20	4	18	6	17	2	16	2	22	10	19	9	17	8	16	2
		2 x 12	24	9	22	6	20	11	19	7	27	9	24	1	21	6	19	7
	No. 3	2 x 4	6	11	6	0	5	5	4	11	6	11	6	0	5	5	4	11
		2 x 6	10	3	8	11	7	11	7	3	10	3	8	11	7	11	7	3
		2 x 8	13	7	11	9	10	6	9	7	13	7	11	9	10	6	9	7
		2 x 10	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 12	21	1	18	3	16	4	14	11	21	1	18	3	16	4	14	11
	Con-struction	2 x 4	7	4	6	8	6	1	5	7	7	11	6	10	6	1	5	7
	Standard	2 x 4	5	10	5	1	4	6	4	1	5	10	5	1	4	6	4	1
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	3	6	9
		2 x 6	11	10	10	9	9	11	9	4	13	6	12	2	10	11	9	11
		2 x 8	15	7	14	2	13	2	12	4	17	10	16	1	14	4	13	1
		2 x 10	19	11	18	1	16	9	15	9	22	9	20	6	18	4	16	9
		2 x 12	24	2	22	0	20	5	19	2	27	8	24	11	22	4	20	4
	No. 1	2 x 4	7	6	6	10	6	4	5	11	8	7	7	9	6	11	6	4
		2 x 6	11	10	10	9	9	11	9	2	13	0	11	3	10	1	9	2
		2 x 8	15	7	14	2	13	2	12	2	17	2	14	10	13	4	12	2
		2 x 10	19	11	18	1	16	9	15	6	21	11	19	0	17	0	15	6
		2 x 12	24	2	22	0	20	5	18	10	26	8	23	1	20	8	18	10
	No. 2	2 x 4	7	3	6	7	6	1	5	9	8	1	7	0	6	3	5	9
		2 x 6	11	5	10	0	9	0	8	2	11	7	10	0	9	0	8	2
		2 x 8	15	1	13	3	11	10	10	10	15	3	13	3	11	10	10	10
		2 x 10	19	2	16	11	15	1	13	9	19	6	16	11	15	1	13	9
		2 x 12	23	4	20	7	18	4	16	9	23	9	20	7	18	4	16	9
	No. 3	2 x 4	5	10	5	1	4	6	4	1	5	10	5	1	4	6	4	1
		2 x 6	8	10	7	7	6	10	6	3	8	10	7	7	6	10	6	3
		2 x 8	11	7	10	1	9	0	8	2	11	7	10	1	9	0	8	2
		2 x 10	14	10	12	10	11	6	10	6	14	10	12	10	11	6	10	6
		2 x 12	18	1	15	7	14	0	12	9	18	1	15	7	14	0	12	9
	Con-struction	2 x 4	6	9	5	10	5	3	4	9	6	9	5	10	5	3	4	9
	Standard	2 x 4	5	1	4	4	3	11	3	7	5	1	4	4	3	11	3	7
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4

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TABLE D-3 — (Cont'd)

FLOOR JOISTS — BEDROOMS, AND IN ATTICS ACCESSIBLE BY A STAIRWAY (LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist spacing						Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	10	6	5
		2 x 6	11	1	10	1	9	4	8	10	12	9	11	7	10	6	9	7
		2 x 8	14	8	13	4	12	4	11	7	16	9	15	3	13	10	12	8
		2 x 10	18	9	17	0	15	9	14	10	21	5	19	6	17	8	16	2
		2 x 12	22	9	20	8	19	2	18	1	26	1	23	8	21	6	19	7
	No. 1	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	8	6	1
		2 x 6	11	1	10	1	9	4	8	10	12	6	10	9	9	8	8	10
		2 x 8	14	8	13	4	12	4	11	7	16	5	14	3	12	9	11	7
		2 x 10	18	9	17	0	15	9	14	10	21	0	18	2	16	3	14	10
		2 x 12	22	9	20	8	19	2	18	1	25	6	22	1	19	9	18	1
	No. 2	2 x 4	6	10	6	2	5	9	5	5	7	9	6	8	6	0	5	5
		2 x 6	10	9	9	9	8	9	7	11	11	3	9	9	8	9	7	11
		2 x 8	14	2	12	10	11	6	10	6	14	10	12	10	11	6	10	6
		2 x 10	18	1	16	5	14	8	13	5	19	0	16	5	14	8	13	5
		2 x 12	22	0	20	0	17	11	16	4	23	1	20	0	17	11	16	4
	No. 3	2 x 4	5	10	5	1	4	6	4	1	5	10	5	1	4	6	4	1
		2 x 6	8	5	7	3	6	6	5	11	8	5	7	3	6	6	5	11
		2 x 8	11	1	9	7	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 10	14	2	12	3	10	11	10	0	14	2	12	3	10	11	10	0
		2 x 12	17	2	14	11	13	4	12	2	17	2	14	11	13	4	12	2
	Con-struction	2 x 4	6	6	5	8	5	1	4	7	6	6	5	8	5	1	4	7
	Standard	2 x 4	5	1	4	4	3	11	3	7	5	1	4	4	3	11	3	7
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	3	9	5
		2 x 8	14	2	12	10	11	11	11	2	16	2	14	8	13	7	12	5
		2 x 10	18	0	16	5	15	3	14	4	20	8	18	9	17	4	15	10
		2 x 12	21	11	19	11	18	6	17	5	25	2	22	10	21	1	19	3
	No. 1	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	5	5	10
		2 x 6	10	9	9	9	9	0	8	6	12	2	10	6	9	5	8	7
		2 x 8	14	2	12	10	11	11	11	2	16	1	13	11	12	5	11	4
		2 x 10	18	0	16	5	15	3	14	4	20	6	17	9	15	11	14	6
		2 x 12	21	11	19	11	18	6	17	5	24	11	21	7	19	4	17	8
	No. 2	2 x 4	6	7	5	11	5	6	5	2	7	6	6	6	5	10	5	4
		2 x 6	10	4	9	4	8	6	7	9	10	11	9	6	8	6	7	9
		2 x 8	13	7	12	4	11	2	10	2	14	5	12	6	11	2	10	2
		2 x 10	17	4	15	9	14	3	13	0	18	5	16	0	14	3	13	0
		2 x 12	21	2	19	2	17	5	15	10	22	5	19	5	17	5	15	10
	No. 3	2 x 4	5	7	4	10	4	4	3	11	5	7	4	10	4	4	3	11
		2 x 6	8	5	7	3	6	6	5	11	8	5	7	3	6	6	5	11
		2 x 8	11	1	9	7	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 10	14	2	12	3	10	11	10	0	14	2	12	3	10	11	10	0
		2 x 12	17	2	14	11	13	4	12	2	17	2	14	11	13	4	12	2
	Con-struction	2 x 4	6	4	5	5	4	11	4	5	6	4	5	5	4	11	4	5
	Standard	2 x 4	4	9	4	1	3	8	3	4	4	9	4	1	3	8	3	4
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4

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TABLE D-3 — (Cont'd)

FLOOR JOISTS — BEDROOMS, AND IN ATTICS ACCESSIBLE BY A STAIRWAY (LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist spacing						Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5	6	11	6	6
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8	10	10	10	3
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5	14	4	13	6
		2 x 10	18	11	17	2	16	0	15	0	21	8	19	8	18	3	17	2
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0	22	3	20	11
	No. 1	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5	6	11	6	6
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8	10	10	9	11
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5	14	4	13	1
		2 x 10	18	11	17	2	16	0	15	0	21	8	19	8	18	3	16	9
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0	22	3	20	4
	No. 2	2 x 4	6	11	6	3	5	10	5	6	7	11	7	2	6	8	6	2
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	0	9	10	9	0
		2 x 8	14	4	13	0	12	1	11	4	16	5	14	7	13	0	11	11
		2 x 10	18	3	16	7	15	5	14	6	20	11	18	7	16	7	15	2
		2 x 12	22	3	20	3	18	9	17	8	25	6	22	7	20	3	18	5
	No. 3	2 x 4	6	6	5	8	5	1	4	7	6	6	5	8	5	1	4	7
		2 x 6	9	7	8	3	7	5	6	9	9	7	8	3	7	5	6	9
		2 x 8	12	8	10	11	9	9	8	11	12	8	10	11	9	9	8	11
		2 x 10	16	2	14	0	12	6	11	5	16	2	14	0	12	6	11	5
		2 x 12	19	7	17	0	15	2	13	10	19	7	17	0	15	2	13	10
	Construction	2 x 4	6	8	6	0	5	7	5	2	7	4	6	4	5	8	5	2
	Standard	2 x 4	5	7	4	10	4	4	3	11	5	7	4	10	4	4	3	11
	Utility	2 x 4	3	9	3	3	2	11	2	8	3	9	3	3	2	11	2	8
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2	6	8	6	3
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	3	10	5	9	7
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	10	13	9	12	8
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0	17	7	16	2
		2 x 12	22	2	20	2	18	9	17	7	25	5	23	1	21	5	19	7
	No. 1	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2	6	8	6	1
		2 x 6	10	10	9	10	9	2	8	7	12	5	10	9	9	8	8	10
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	3	12	9	11	7
		2 x 10	18	3	16	7	15	5	14	6	20	11	18	2	16	3	14	10
		2 x 12	22	2	20	2	18	9	17	7	25	5	22	1	19	9	18	1
	No. 2	2 x 4	6	8	6	0	5	7	5	3	7	7	6	8	6	0	5	5
		2 x 6	10	6	9	6	8	9	7	11	11	3	9	9	8	9	7	11
		2 x 8	13	10	12	7	11	6	10	6	14	10	12	10	11	6	10	6
		2 x 10	17	8	16	0	14	8	13	5	19	0	16	5	14	8	13	5
		2 x 12	21	5	19	6	17	11	16	4	23	1	20	0	17	11	16	4
	No. 3	2 x 4	5	10	5	1	4	6	4	1	5	10	5	1	4	6	4	1
		2 x 6	8	5	7	3	6	6	5	11	8	5	7	3	6	6	5	11
		2 x 8	11	1	9	7	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 10	14	2	12	3	10	11	10	0	14	2	12	3	10	11	10	0
		2 x 12	17	2	14	11	13	4	12	2	17	2	14	11	13	4	12	2
	Construction	2 x 4	6	5	5	8	5	1	4	7	6	6	5	8	5	1	4	7
	Standard	2 x 4	5	1	4	4	3	11	3	7	5	1	4	4	3	11	3	7
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4

TABLE D-4

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 50 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	6	8	6	1	5	8	5	4	7	8	7	0	6	6	6	1
		2 x 6	10	7	9	7	8	11	8	4	12	1	11	0	10	2	9	7
		2 x 8	13	11	12	8	11	9	11	1	15	11	14	6	13	5	12	8
		2 x 10	17	9	16	2	15	0	14	1	20	4	18	6	17	2	16	2
		2 x 12	21	8	19	8	18	3	17	2	24	9	22	6	20	11	19	8
	No. 1	2 x 4	6	8	6	1	5	8	5	4	7	8	7	0	6	6	6	1
		2 x 6	10	7	9	7	8	11	8	4	12	1	11	0	10	1	9	2
		2 x 8	13	11	12	8	11	9	11	1	15	11	14	6	13	3	12	1
		2 x 10	17	9	16	2	15	0	14	1	20	4	18	6	16	11	15	6
		2 x 12	21	8	19	8	18	3	17	2	24	9	22	6	20	7	18	10
	No. 2	2 x 4	6	6	5	11	5	5	5	2	7	5	6	9	6	2	5	8
		2 x 6	10	2	9	3	8	7	8	1	11	8	10	2	9	1	8	3
		2 x 8	13	5	12	3	11	4	10	8	15	5	13	5	12	0	10	11
		2 x 10	17	2	15	7	14	6	13	7	19	8	17	1	15	3	13	11
		2 x 12	20	11	19	0	17	7	16	7	23	11	20	9	18	7	17	0
	No. 3	2 x 4	6	0	5	2	4	8	4	3	6	0	5	2	4	8	4	3
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8	6	10	6	3
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0	11	7	10	7
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9	14	1	12	10
	Con-struction	2 x 4	6	3	5	8	5	3	4	10	6	10	5	11	5	3	4	10
	Standard	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	6	4	5	9	5	4	5	0	7	3	6	7	6	1	5	9
		2 x 6	9	11	9	0	8	5	7	11	11	5	10	4	9	5	8	7
		2 x 8	13	2	11	11	11	1	10	5	15	0	13	8	12	5	11	4
		2 x 10	16	9	15	3	14	2	13	4	19	2	17	5	15	10	14	6
		2 x 12	20	5	18	6	17	2	16	2	23	4	21	3	19	3	17	7
	No. 1	2 x 4	6	4	5	9	5	4	5	0	7	3	6	7	6	0	5	5
		2 x 6	9	11	9	0	8	5	7	11	11	3	9	9	8	8	7	11
		2 x 8	13	2	11	11	11	1	10	5	14	10	12	10	11	6	10	6
		2 x 10	16	9	15	3	14	2	13	4	18	11	16	5	14	8	13	5
		2 x 12	20	5	18	6	17	2	16	2	23	1	20	0	17	10	16	4
	No. 2	2 x 4	6	1	5	6	5	2	4	10	7	0	6	1	5	5	4	11
		2 x 6	9	7	8	8	7	9	7	1	10	0	8	8	7	9	7	1
		2 x 8	12	8	11	5	10	3	9	4	13	2	11	5	10	3	9	4
		2 x 10	16	2	14	7	13	1	11	11	16	10	14	7	13	1	11	11
		2 x 12	19	8	17	9	15	11	14	6	20	6	17	9	15	11	14	6
	No. 3	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
		2 x 6	7	7	6	7	5	11	5	4	7	7	6	7	5	11	5	4
		2 x 8	10	0	8	8	7	9	7	1	10	0	8	8	7	9	7	1
		2 x 10	12	10	11	1	9	11	9	1	12	10	11	1	9	11	9	1
		2 x 12	15	7	13	6	12	1	11	0	15	7	13	6	12	1	11	0
	Con-struction	2 x 4	5	10	5	0	4	6	4	1	5	10	5	0	4	6	4	1
	Standard	2 x 4	4	4	3	9	3	4	3	1	4	4	3	9	3	4	3	1
	Utility	2 x 4	2	11	2	6	2	3	2	0	2	11	2	6	2	3	2	0

Continued on next page

TABLE D-4 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 50 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Pine Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	5	11	5	5	5	0	4	9	6	10	6	2	5	9	5	5
		2 x 6	9	4	8	6	7	11	7	5	10	9	9	9	9	0	8	3
		2 x 8	12	4	11	3	10	5	9	10	14	2	12	10	11	11	10	11
		2 x 10	15	9	14	4	13	4	12	6	18	1	16	5	15	3	13	11
		2 x 12	19	2	17	5	16	2	15	3	22	0	20	0	18	6	17	0
	No. 1	2 x 4	5	11	5	5	5	0	4	9	6	10	6	2	5	9	5	3
		2 x 6	9	4	8	6	7	11	7	5	10	9	9	4	8	4	7	7
		2 x 8	12	4	11	3	10	5	9	10	14	2	12	4	11	0	10	0
		2 x 10	15	9	14	4	13	4	12	6	18	1	15	8	14	1	12	10
		2 x 12	19	2	17	5	16	2	15	3	22	0	19	1	17	1	15	7
	No. 2	2 x 4	5	9	5	3	4	10	4	7	6	7	5	9	5	2	4	9
		2 x 6	9	1	8	3	7	6	6	10	9	9	8	5	7	6	6	10
		2 x 8	11	11	10	10	9	11	9	1	12	10	11	1	9	11	9	1
		2 x 10	15	3	13	10	12	8	11	7	16	5	14	2	12	8	11	7
		2 x 12	18	7	16	10	15	5	14	1	20	0	17	3	15	5	14	1
	No. 3	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
		2 x 6	7	3	6	3	5	7	5	1	7	3	6	3	5	7	5	1
		2 x 8	9	7	8	3	7	5	6	9	9	7	8	3	7	5	6	9
		2 x 10	12	3	10	7	9	5	8	8	12	3	10	7	9	5	8	8
		2 x 12	14	10	12	10	11	6	10	6	14	10	12	10	11	6	10	6
	Con-struction	2 x 4	5	6	4	11	4	4	4	0	5	8	4	11	4	4	4	0
	Standard	2 x 4	4	4	3	9	3	4	3	1	4	4	3	9	3	4	3	1
	Utility	2 x 4	2	11	2	6	2	3	2	0	2	11	2	6	2	3	2	0
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	5	9	5	2	4	10	4	6	6	7	6	0	5	6	5	2
		2 x 6	9	0	8	2	7	7	7	2	10	4	9	5	8	9	8	1
		2 x 8	11	11	10	10	10	0	9	5	13	8	12	5	11	6	10	8
		2 x 10	15	3	13	10	12	10	12	1	17	5	15	10	14	8	13	8
		2 x 12	18	6	16	10	15	7	14	8	21	2	19	3	17	10	16	8
	No. 1	2 x 4	5	9	5	2	4	10	4	6	6	7	6	0	5	6	5	0
		2 x 6	9	0	8	2	7	7	7	2	10	4	9	1	8	2	7	5
		2 x 8	11	11	10	10	10	0	9	5	13	8	12	0	10	9	9	10
		2 x 10	15	3	13	10	12	10	12	1	17	5	15	4	13	9	12	6
		2 x 12	18	6	16	10	15	7	14	8	21	2	18	8	16	8	15	3
	No. 2	2 x 4	5	6	5	0	4	8	4	4	6	4	5	8	5	0	4	7
		2 x 6	8	8	7	11	7	4	6	8	9	6	8	2	7	4	6	8
		2 x 8	11	6	10	5	9	8	8	10	12	6	10	10	9	8	8	10
		2 x 10	14	8	13	4	12	4	11	3	15	11	13	10	12	4	11	3
		2 x 12	17	10	16	2	15	0	13	8	19	5	16	10	15	0	13	8
	No. 3	2 x 4	4	10	4	2	3	9	3	5	4	10	4	2	3	9	3	5
		2 x 6	7	3	6	3	5	7	5	1	7	3	6	3	5	7	5	1
		2 x 8	9	7	8	3	7	5	6	9	9	7	8	3	7	5	6	9
		2 x 10	12	3	10	7	9	5	8	8	12	3	10	7	9	5	8	8
		2 x 12	14	10	12	10	11	6	10	6	14	10	12	10	11	6	10	6
	Con-struction	2 x 4	5	4	4	9	4	3	3	10	5	5	4	9	4	3	3	10
	Standard	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11
	Utility	2 x 4	2	11	2	6	2	3	2	0	2	11	2	6	2	3	2	0

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TABLE D-4 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 50 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	6	0	5	6	5	1	4	9	6	11	6	3	5	10	5	6
		2 x 6	9	6	8	7	8	0	7	6	10	10	9	10	9	2	8	7
		2 x 8	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	4
		2 x 10	16	0	14	6	13	6	12	8	18	3	16	7	15	5	14	6
		2 x 12	19	5	17	8	16	5	15	5	22	3	20	3	18	9	17	8
	No. 1	2 x 4	6	0	5	6	5	1	4	9	6	11	6	3	5	10	5	6
		2 x 6	9	6	8	7	8	0	7	6	10	10	9	10	9	2	8	7
		2 x 8	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	4
		2 x 10	16	0	14	6	13	6	12	8	18	3	16	7	15	5	14	6
		2 x 12	19	5	17	8	16	5	15	5	22	3	20	3	18	9	17	7
	No. 2	2 x 4	5	10	5	3	4	11	4	7	6	8	6	0	5	7	5	3
		2 x 6	9	2	8	4	7	9	7	3	10	6	9	6	8	6	7	9
		2 x 8	12	1	11	0	10	2	9	7	13	10	12	7	11	3	10	3
		2 x 10	15	5	14	0	13	0	12	3	17	8	16	0	14	4	13	1
		2 x 12	18	9	17	0	15	10	14	11	21	6	19	6	17	6	15	11
	No. 3	2 x 4	5	7	4	11	4	4	4	0	5	8	4	11	4	4	4	0
		2 x 6	8	3	7	2	6	5	5	10	8	3	7	2	6	5	5	10
		2 x 8	10	11	9	5	8	5	7	8	10	11	9	5	8	5	7	8
		2 x 10	13	11	12	1	10	9	9	10	13	11	12	1	10	9	9	10
		2 x 12	17	0	14	8	13	2	12	0	17	0	14	8	13	2	12	0
	Construction	2 x 4	5	7	5	1	4	8	4	5	6	4	5	6	4	11	4	6
	Standard	2 x 4	4	10	4	2	3	9	3	5	4	10	4	2	3	9	3	5
	Utility	2 x 4	3	3	2	10	2	6	2	3	3	3	2	10	2	6	2	3
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	5	10	5	3	4	11	4	7	6	8	6	0	5	7	5	3
		2 x 6	9	2	8	3	7	8	7	3	10	5	9	6	8	10	8	3
		2 x 8	12	1	10	11	10	2	9	7	13	9	12	6	11	7	10	11
		2 x 10	15	5	14	0	13	0	12	2	17	7	16	0	14	10	13	11
		2 x 12	18	9	17	0	15	9	14	10	21	5	19	6	18	1	17	0
	No. 1	2 x 4	5	10	5	3	4	11	4	7	6	8	6	0	5	7	5	3
		2 x 6	9	2	8	3	7	8	7	3	10	5	9	4	8	4	7	7
		2 x 8	12	1	10	11	10	2	9	7	13	9	12	4	11	0	10	0
		2 x 10	15	5	14	0	13	0	12	2	17	7	15	8	14	1	12	10
		2 x 12	18	9	17	0	15	9	14	10	21	5	19	1	17	1	15	7
	No. 2	2 x 4	5	7	5	1	4	9	4	5	6	5	5	9	5	2	4	9
		2 x 6	8	10	8	0	7	5	6	10	9	9	8	5	7	6	6	10
		2 x 8	11	8	10	7	9	10	9	1	12	10	11	1	9	11	9	1
		2 x 10	14	10	13	6	12	6	11	7	16	5	14	2	12	8	11	7
		2 x 12	18	1	16	5	15	3	14	1	20	0	17	3	15	5	14	1
	No. 3	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
		2 x 6	7	3	6	3	5	7	5	1	7	3	6	3	5	7	5	1
		2 x 8	9	7	8	3	7	5	6	9	9	7	8	3	7	5	6	9
		2 x 10	12	3	10	7	9	5	8	8	12	3	10	7	9	5	8	8
		2 x 12	14	10	12	10	11	6	10	6	14	10	12	10	11	6	10	6
	Construction	2 x 4	5	4	4	11	4	4	4	0	5	8	4	11	4	4	4	0
	Standard	2 x 4	4	4	3	9	3	4	3	1	4	4	3	9	3	4	3	1
	Utility	2 x 4	2	11	2	6	2	3	2	0	2	11	2	6	2	3	2	0

TABLE D-5

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	7	3	6	7	6	1	5	9	8	3	7	6	7	0	6	7
		2 x 6	11	4	10	4	9	7	9	0	13	0	11	10	11	0	10	4
		2 x 8	15	0	13	8	12	8	11	11	17	2	15	7	14	6	13	8
		2 x 10	19	2	17	5	16	2	15	2	21	11	19	11	18	6	17	5
		2 x 12	23	4	21	2	19	8	18	6	26	8	24	3	22	6	21	2
	No. 1	2 x 4	7	3	6	7	6	1	5	9	8	3	7	6	7	0	6	7
		2 x 6	11	4	10	4	9	7	9	0	13	0	11	10	11	0	10	1
		2 x 8	15	0	13	8	12	8	11	11	17	2	15	7	14	6	13	3
		2 x 10	19	2	17	5	16	2	15	2	21	11	19	11	18	6	16	11
		2 x 12	23	4	21	2	19	8	18	6	26	8	24	3	22	6	20	7
	No. 2	2 x 4	7	0	6	4	5	11	5	6	8	0	7	3	6	9	6	2
		2 x 6	11	0	10	0	9	3	8	9	12	7	11	1	9	11	9	1
		2 x 8	14	6	13	2	12	3	11	6	16	7	14	8	13	1	12	0
		2 x 10	18	6	16	10	15	7	14	8	21	2	18	9	16	9	15	3
		2 x 12	22	6	20	5	19	0	17	10	25	9	22	9	20	4	18	7
	No. 3	2 x 4	6	7	5	8	5	1	4	8	6	7	5	8	5	1	4	8
		2 x 6	9	9	8	5	7	6	6	10	9	9	8	5	7	6	6	10
		2 x 8	12	10	11	1	9	11	9	1	12	10	11	1	9	11	9	1
		2 x 10	16	5	14	2	12	8	11	7	16	5	14	2	12	8	11	7
		2 x 12	20	0	17	3	15	5	14	1	20	0	17	3	15	5	14	1
	Con-struction	2 x 4	6	8	6	1	5	8	5	3	7	6	6	6	5	10	5	3
	Standard	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9	4	3	3	11
	Utility	2 x 4	3	11	3	4	3	0	2	9	3	11	3	4	3	0	2	9
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	6	10	6	2	5	9	5	5	7	10	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	4	9	5
		2 x 8	14	2	12	10	11	11	11	3	16	2	14	9	13	7	12	5
		2 x 10	18	1	16	5	15	3	14	4	20	8	18	9	17	4	15	10
		2 x 12	22	0	20	0	18	6	17	5	25	2	22	10	21	2	19	3
	No. 1	2 x 4	6	10	6	2	5	9	5	5	7	10	7	1	6	7	6	0
		2 x 6	10	9	9	9	9	0	8	6	12	3	10	8	9	6	8	8
		2 x 8	14	2	12	10	11	11	11	3	16	2	14	1	12	7	11	6
		2 x 10	18	1	16	5	15	3	14	4	20	8	18	0	16	1	14	8
		2 x 12	22	0	20	0	18	6	17	5	25	2	21	10	19	7	17	10
	No. 2	2 x 4	6	7	6	0	5	6	5	3	7	6	6	8	5	11	5	5
		2 x 6	10	4	9	5	8	6	7	9	11	0	9	6	8	6	7	9
		2 x 8	13	8	12	5	11	2	10	3	14	6	12	6	11	2	10	3
		2 x 10	17	5	15	10	14	4	13	1	18	6	16	0	14	4	13	1
		2 x 12	21	3	19	3	17	5	15	11	22	6	19	5	17	5	15	11
	No. 3	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9	4	3	3	11
		2 x 6	8	4	7	3	6	5	5	11	8	4	7	3	6	5	5	11
		2 x 8	11	0	9	6	8	6	7	9	11	0	9	6	8	6	7	9
		2 x 10	14	1	12	2	10	10	9	11	14	1	12	2	10	10	9	11
		2 x 12	17	1	14	10	13	3	12	1	17	1	14	10	13	3	12	1
	Con-struction	2 x 4	6	4	5	6	4	11	4	6	6	5	5	6	4	11	4	6
	Standard	2 x 4	4	9	4	2	3	8	3	4	4	9	4	2	3	8	3	4
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3

Continued on next page

TABLE D-5 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist spacing						Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	6	5	5	10	5	5	5	1	7	4	6	8	6	2	5	10
		2 x 6	10	1	9	2	8	6	8	0	11	7	10	6	9	9	9	1
		2 x 8	13	4	12	1	11	3	10	7	15	3	13	10	12	10	12	0
		2 x 10	17	0	15	5	14	4	13	6	19	6	17	8	16	5	15	3
		2 x 12	20	8	18	9	17	5	16	5	23	8	21	6	20	0	18	7
	No. 1	2 x 4	6	5	5	10	5	5	5	1	7	4	6	8	6	2	5	9
		2 x 6	10	1	9	2	8	6	8	0	11	7	10	3	9	2	8	4
		2 x 8	13	4	12	1	11	3	10	7	15	3	13	6	12	1	11	0
		2 x 10	17	0	15	5	14	4	13	6	19	6	17	3	15	5	14	1
		2 x 12	20	8	18	9	17	5	16	5	23	8	20	11	18	9	17	1
	No. 2	2 x 4	6	2	5	7	5	3	4	11	7	1	6	4	5	8	5	2
		2 x 6	9	9	8	10	8	3	7	6	10	8	9	3	8	3	7	6
		2 x 8	12	10	11	8	10	10	9	11	14	1	12	2	10	11	9	11
		2 x 10	16	5	14	11	13	10	12	8	18	0	15	7	13	11	12	8
		2 x 12	20	0	18	2	16	10	15	5	21	10	18	11	16	11	15	5
	No. 3	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9	4	3	3	11
		2 x 6	7	11	6	10	6	2	5	7	7	11	6	10	6	2	5	7
		2 x 8	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 10	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5
		2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6
	Con-struction	2 x 4	5	11	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Standard	2 x 4	4	9	4	2	3	8	3	4	4	9	4	2	3	8	3	4
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	6	2	5	7	5	2	4	11	7	1	6	5	6	0	5	7
		2 x 6	9	9	8	10	8	2	7	9	11	2	10	1	9	5	8	10
		2 x 8	12	10	11	8	10	10	10	2	14	8	13	4	12	5	11	8
		2 x 10	16	5	14	11	13	10	13	0	18	9	17	1	15	10	14	11
		2 x 12	19	11	18	1	16	10	15	10	22	10	20	9	19	3	18	1
	No. 1	2 x 4	6	2	5	7	5	2	4	11	7	1	6	5	6	0	5	6
		2 x 6	9	9	8	10	8	2	7	9	11	2	10	0	8	11	8	2
		2 x 8	12	10	11	8	10	10	10	2	14	8	13	2	11	9	10	9
		2 x 10	16	5	14	11	13	10	13	0	18	9	16	10	15	0	13	9
		2 x 12	19	11	18	1	16	10	15	10	22	10	20	6	18	4	16	8
	No. 2	2 x 4	5	11	5	5	5	0	4	9	6	10	6	2	5	6	5	0
		2 x 6	9	4	8	6	7	11	7	4	10	4	9	0	8	0	7	4
		2 x 8	12	4	11	3	10	5	9	8	13	8	11	10	10	7	9	8
		2 x 10	15	9	14	4	13	4	12	4	17	6	15	1	13	6	12	4
		2 x 12	19	2	17	5	16	2	15	0	21	3	18	5	16	5	15	0
	No. 3	2 x 4	5	3	4	7	4	1	3	9	5	3	4	7	4	1	3	9
		2 x 6	7	11	6	10	6	2	5	7	7	11	6	10	6	2	5	7
		2 x 8	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 10	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5
		2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6
	Con-struction	2 x 4	5	9	5	2	4	7	4	3	6	0	5	2	4	7	4	3
	Standard	2 x 4	4	6	3	11	3	6	3	2	4	6	3	11	3	6	3	2
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3

Continued on next page

TABLE D-5 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING (LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 40 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist spacing						Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	6	6	5	11	5	6	5	2	7	5	6	9	6	3	5	11
		2 x 6	10	3	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 8	13	6	12	3	11	4	10	8	15	5	14	0	13	0	12	3
		2 x 10	17	2	15	8	14	6	13	8	19	8	17	11	16	7	15	8
		2 x 12	20	11	19	0	17	8	16	7	24	0	21	9	20	3	19	0
	No. 1	2 x 4	6	6	5	11	5	6	5	2	7	5	6	9	6	3	5	11
		2 x 6	10	3	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 8	13	6	12	3	11	4	10	8	15	5	14	0	13	0	12	3
		2 x 10	17	2	15	8	14	6	13	8	19	8	17	11	16	7	15	8
		2 x 12	20	11	19	0	17	8	16	7	24	0	21	9	20	3	19	0
	No. 2	2 x 4	6	3	5	8	5	3	5	0	7	2	6	6	6	0	5	8
		2 x 6	9	10	8	11	8	4	7	10	11	4	10	3	9	4	8	6
		2 x 8	13	0	11	10	11	0	10	4	14	11	13	6	12	4	11	3
		2 x 10	16	7	15	1	14	0	13	2	19	0	17	3	15	9	14	4
		2 x 12	20	3	18	4	17	0	16	0	23	2	21	0	19	2	17	6
	No. 3	2 x 4	6	0	5	4	4	9	4	4	6	2	5	4	4	9	4	4
		2 x 6	9	1	7	10	7	0	6	5	9	1	7	10	7	0	6	5
		2 x 8	12	0	10	4	9	3	8	5	12	0	10	4	9	3	8	5
		2 x 10	15	3	13	3	11	10	10	9	15	3	13	3	11	10	10	9
		2 x 12	18	7	16	1	14	5	13	2	18	7	16	1	14	5	13	2
	Con-struction	2 x 4	6	0	5	6	5	1	4	9	6	11	6	0	5	5	4	11
	Standard	2 x 4	5	3	4	7	4	0	3	9	5	3	4	7	4	0	3	9
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	6	3	5	8	5	3	4	11	7	2	6	6	6	0	5	8
		2 x 6	9	10	8	11	8	3	7	10	11	3	10	3	9	6	8	11
		2 x 8	13	0	11	9	10	11	10	3	14	10	13	6	12	6	11	9
		2 x 10	16	7	15	1	14	0	13	2	19	0	17	3	16	0	15	1
		2 x 12	20	2	18	4	17	0	16	0	23	1	21	0	19	6	18	4
	No. 1	2 x 4	6	3	5	8	5	3	4	11	7	2	6	6	6	0	5	8
		2 x 6	9	10	8	11	8	3	7	10	11	3	10	3	9	2	8	4
		2 x 8	13	0	11	9	10	11	10	3	14	10	13	6	12	1	11	0
		2 x 10	16	7	15	1	14	0	13	2	19	0	17	3	15	5	14	1
		2 x 12	20	2	18	4	17	0	16	0	23	1	20	11	18	9	17	1
	No. 2	2 x 4	6	0	5	6	5	1	4	9	6	11	6	3	5	8	5	2
		2 x 6	9	6	8	8	8	0	7	6	10	8	9	3	8	3	7	6
		2 x 8	12	7	11	5	10	7	9	11	14	1	12	2	10	11	9	11
		2 x 10	16	0	14	7	13	6	12	8	18	0	15	7	13	11	12	8
		2 x 12	19	6	17	8	16	5	15	5	21	10	18	11	16	11	15	5
	No. 3	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9	4	3	3	11
		2 x 6	7	11	6	10	6	2	5	7	7	11	6	10	6	2	5	7
		2 x 8	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 10	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5
		2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6
	Con-struction	2 x 4	5	10	5	3	4	9	4	4	6	2	5	4	4	9	4	4
	Standard	2 x 4	4	9	4	2	3	8	3	4	4	9	4	2	3	8	3	4
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3

TABLE D-6

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	7	11	7	3	6	8	6	4	9	1	8	3	7	8	7	3
		2 x 6	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	4
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	15	0
		2 x 10	21	1	19	2	17	9	16	9	24	2	21	11	20	4	19	2
		2 x 12	25	8	23	4	21	8	20	4	29	4	26	8	24	9	23	4
	No. 1	2 x 4	7	11	7	3	6	8	6	4	9	1	8	3	7	8	7	3
		2 x 6	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	3
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	14	10
		2 x 10	21	1	19	2	17	9	16	9	24	2	21	11	20	4	18	11
		2 x 12	25	8	23	4	21	8	20	4	29	4	26	8	24	9	23	1
	No. 2	2 x 4	7	8	7	0	6	6	6	1	8	10	8	0	7	5	6	11
		2 x 6	12	1	11	0	10	2	9	7	13	10	12	5	11	1	10	2
		2 x 8	15	11	14	6	13	5	12	8	18	3	16	5	14	8	13	5
		2 x 10	20	4	18	6	17	2	16	2	23	4	20	11	18	9	17	1
		2 x 12	24	9	22	6	20	11	19	8	28	4	25	6	22	9	20	9
	No. 3	2 x 4	7	4	6	4	5	8	5	2	7	4	6	4	5	8	5	2
		2 x 6	10	11	9	5	8	5	7	8	10	11	9	5	8	5	7	8
		2 x 8	14	4	12	5	11	1	10	2	14	4	12	5	11	1	10	2
		2 x 10	18	4	15	11	14	2	13	0	18	4	15	11	14	2	13	0
		2 x 12	22	4	19	4	17	3	15	9	22	4	19	4	17	3	15	9
	Con-struction	2 x 4	7	4	6	8	6	3	5	10	8	5	7	3	6	6	5	11
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	4	3	9	3	4	3	1	4	4	3	9	3	4	3	1
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	3	6	10
		2 x 6	11	10	10	9	9	11	9	4	13	6	12	3	11	5	10	6
		2 x 8	15	7	14	2	13	2	12	4	17	10	16	2	15	0	13	11
		2 x 10	19	11	18	1	16	9	15	9	22	9	20	8	19	2	17	9
		2 x 12	24	2	22	0	20	5	19	2	27	8	25	2	23	4	21	7
	No. 1	2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	3	6	8
		2 x 6	11	10	10	9	9	11	9	4	13	6	11	11	10	8	9	9
		2 x 8	15	7	14	2	13	2	12	4	17	10	15	9	14	1	12	10
		2 x 10	19	11	18	1	16	9	15	9	22	9	20	1	18	0	16	5
		2 x 12	24	2	22	0	20	5	19	2	27	8	24	6	21	10	20	0
	No. 2	2 x 4	7	3	6	7	6	1	5	9	8	4	7	5	6	8	6	1
		2 x 6	11	5	10	4	9	6	8	8	12	3	10	7	9	6	8	8
		2 x 8	15	1	13	8	12	6	11	5	16	2	14	0	12	6	11	5
		2 x 10	19	2	17	5	16	0	14	7	20	8	17	11	16	0	14	7
		2 x 12	23	4	21	3	19	5	17	9	25	2	21	9	19	5	17	9
	No. 3	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
		2 x 6	9	4	8	1	7	3	6	7	9	4	8	1	7	3	6	7
		2 x 8	12	4	10	8	9	6	8	8	12	4	10	8	9	6	8	8
		2 x 10	15	8	13	7	12	2	11	1	15	8	13	7	12	2	11	1
		2 x 12	19	1	16	7	14	10	13	6	19	1	16	7	14	10	13	6
	Con-struction	2 x 4	7	0	6	2	5	6	5	0	7	2	6	2	5	6	5	0
	Standard	2 x 4	5	4	4	8	4	2	3	9	5	4	4	8	4	2	3	9
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6

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TABLE D-6 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	10	6	5
		2 x 6	11	1	10	1	9	4	8	10	12	9	11	7	10	9	10	1
		2 x 8	14	8	13	4	12	4	11	7	16	9	15	3	14	2	13	4
		2 x 10	18	9	17	0	15	9	14	10	21	5	19	6	18	1	17	0
		2 x 12	22	9	20	8	19	2	18	1	26	1	23	8	22	0	20	8
	No. 1	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	10	6	5
		2 x 6	11	1	10	1	9	4	8	10	12	9	11	5	10	3	9	4
		2 x 8	14	8	13	4	12	4	11	7	16	9	15	1	13	6	12	4
		2 x 10	18	9	17	0	15	9	14	10	21	5	19	3	17	3	15	8
		2 x 12	22	9	20	8	19	2	18	1	26	1	23	5	20	11	19	1
	No. 2	2 x 4	6	10	6	2	5	9	5	5	7	10	7	1	6	4	5	9
		2 x 6	10	9	9	9	9	1	8	5	11	11	10	4	9	3	8	5
		2 x 8	14	2	12	10	11	11	11	1	15	9	13	8	12	2	11	1
		2 x 10	18	1	16	5	15	3	14	2	20	1	17	5	15	7	14	2
		2 x 12	22	0	20	0	18	7	17	3	24	6	21	2	18	11	17	3
	No. 3	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8	6	10	6	3
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0	11	7	10	7
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9	14	1	12	10
	Con-struction	2 x 4	6	7	5	11	5	4	4	11	6	11	6	0	5	4	4	11
	Standard	2 x 4	5	4	4	8	4	2	3	9	5	4	4	8	4	2	3	9
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	4	9	9
		2 x 8	14	2	12	10	11	11	11	2	16	2	14	8	13	8	12	10
		2 x 10	18	0	16	5	15	3	14	4	20	8	18	9	17	5	16	5
		2 x 12	21	11	19	11	18	6	17	5	25	2	22	10	21	2	19	11
	No. 1	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	0	9	1
		2 x 8	14	2	12	10	11	11	11	2	16	2	14	8	13	2	12	0
		2 x 10	18	0	16	5	15	3	14	4	20	8	18	9	16	10	15	4
		2 x 12	21	11	19	11	18	6	17	5	25	2	22	10	20	6	18	8
	No. 2	2 x 4	6	7	5	11	5	6	5	2	7	6	6	10	6	2	5	8
		2 x 6	10	4	9	4	8	8	8	2	11	7	10	0	9	0	8	2
		2 x 8	13	7	12	4	11	6	10	9	15	4	13	3	11	10	10	10
		2 x 10	17	4	15	9	14	8	13	9	19	6	16	11	15	1	13	10
		2 x 12	21	2	19	2	17	10	16	9	23	9	20	7	18	5	16	10
	No. 3	2 x 4	5	11	5	1	4	7	4	2	5	11	5	1	4	7	4	2
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8	6	10	6	3
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0	11	7	10	7
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9	14	1	12	10
	Con-struction	2 x 4	6	4	5	9	5	2	4	9	6	8	5	9	5	2	4	9
	Standard	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6

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TABLE D-6 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb per sq ft													
			Gypsum Board or Plastered Ceiling						Other Ceilings							
			Joist spacing						Joist spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5	6	11	6	6
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8	10	10	10	3
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5	14	4	13	6
		2 x 10	18	11	17	2	16	0	15	0	21	8	19	8	18	3	17	2
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0	22	3	20	11
	No. 1	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5	6	11	6	6
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8	10	10	10	3
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5	14	4	13	6
		2 x 10	18	11	17	2	16	0	15	0	21	8	19	8	18	3	17	2
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0	22	3	20	11
	No. 2	2 x 4	6	11	6	3	5	10	5	6	7	11	7	2	6	8	6	3
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	4	10	5	9	6
		2 x 8	14	4	13	0	12	1	11	4	16	5	14	11	13	9	12	7
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0	17	7	16	1
		2 x 12	22	3	20	3	18	9	17	8	25	6	23	2	21	5	19	7
	No. 3	2 x 4	6	8	6	0	5	4	4	11	6	11	6	0	5	4	4	11
		2 x 6	10	2	8	9	7	10	7	2	10	2	8	9	7	10	7	2
		2 x 8	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5
		2 x 10	17	1	14	9	13	3	12	1	17	1	14	9	13	3	12	1
		2 x 12	20	9	18	0	16	1	14	8	20	9	18	0	16	1	14	8
	Con-struction	2 x 4	6	8	6	0	5	7	5	3	7	7	6	9	6	0	5	6
	Standard	2 x 4	5	11	5	1	4	7	4	2	5	11	5	1	4	7	4	2
	Utility	2 x 4	4	0	3	5	3	1	2	10	4	0	3	5	3	1	2	10
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2	6	8	6	3
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	3	10	5	9	10
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	10	13	9	13	0
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0	17	7	16	7
		2 x 12	22	2	20	2	18	9	17	7	25	5	23	1	21	5	20	2
	No. 1	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2	6	8	6	3
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	3	10	3	9	4
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	10	13	6	12	4
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0	17	3	15	8
		2 x 12	22	2	20	2	18	9	17	7	25	5	23	1	20	11	19	1
	No. 2	2 x 4	6	8	6	0	5	7	5	3	7	7	6	11	6	4	5	9
		2 x 6	10	6	9	6	8	10	8	4	11	11	10	4	9	3	8	5
		2 x 8	13	10	12	7	11	8	10	11	15	9	13	8	12	2	11	1
		2 x 10	17	8	16	0	14	10	14	0	20	1	17	5	15	7	14	2
		2 x 12	21	5	19	6	18	1	17	0	24	6	21	2	18	11	17	3
	No. 3	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8	6	10	6	3
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0	11	7	10	7
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9	14	1	12	10
	Con-struction	2 x 4	6	5	5	10	5	4	4	11	6	11	6	0	5	4	4	11
	Standard	2 x 4	5	4	4	8	4	2	3	9	5	4	4	8	4	2	3	9
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6

TABLE D-7

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 20 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 20 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	9	1	8	3	7	8	7	3	10	5	9	6	8	10	8	3
		2 x 6	14	4	13	0	12	1	11	4	16	5	14	11	13	10	13	0
		2 x 8	18	11	17	2	15	11	15	0	21	8	19	8	18	3	17	2
		2 x 10	24	2	21	11	20	4	19	2	27	8	25	1	23	4	21	11
		2 x 12	29	4	26	8	24	9	23	4	33	8	30	7	28	4	26	8
	No. 1	2 x 4	9	1	8	3	7	8	7	3	10	5	9	6	8	10	8	3
		2 x 6	14	4	13	0	12	1	11	4	16	5	14	11	13	10	13	0
		2 x 8	18	11	17	2	15	11	15	0	21	8	19	8	18	3	17	2
		2 x 10	24	2	21	11	20	4	19	2	27	8	25	1	23	4	21	11
		2 x 12	29	4	26	8	24	9	23	4	33	8	30	7	28	4	26	8
	No. 2	2 x 4	8	10	8	0	7	5	7	0	10	1	9	2	8	6	8	0
		2 x 6	13	10	12	7	11	8	11	0	15	10	14	4	12	10	11	9
		2 x 8	18	3	16	7	15	5	14	6	20	11	18	11	16	11	15	5
		2 x 10	23	4	21	2	19	8	18	6	26	8	24	2	21	7	19	9
		2 x 12	28	4	25	9	23	11	22	6	32	6	29	5	26	4	24	0
	No. 3	2 x 4	8	5	7	4	6	7	6	0	8	6	7	4	6	7	6	0
		2 x 6	12	7	10	11	9	9	8	11	12	7	10	11	9	9	8	11
		2 x 8	16	7	14	4	12	10	11	9	16	7	14	4	12	10	11	9
		2 x 10	21	2	18	4	16	5	15	0	21	2	18	4	16	5	15	0
		2 x 12	25	9	22	4	20	0	18	3	25	9	22	4	20	0	18	3
	Con-struction	2 x 4	8	5	7	8	7	1	6	8	9	8	8	5	7	6	6	10
	Standard	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
	Utility	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	8	7	7	10	7	3	6	10	9	10	8	11	8	4	7	10
		2 x 6	13	6	12	3	11	5	10	9	15	6	14	1	13	1	12	2
		2 x 8	17	10	16	2	15	0	14	2	20	5	18	7	17	3	16	0
		2 x 10	22	9	20	8	19	2	18	1	26	1	23	8	22	0	20	6
		2 x 12	27	8	25	2	23	4	22	0	31	9	28	10	26	9	24	11
	No. 1	2 x 4	8	7	7	10	7	3	6	10	9	10	8	11	8	4	7	9
		2 x 6	13	6	12	3	11	5	10	9	15	6	13	9	12	4	11	3
		2 x 8	17	10	16	2	15	0	14	2	20	5	18	2	16	3	14	10
		2 x 10	22	9	20	8	19	2	18	1	26	1	23	3	20	9	18	11
		2 x 12	27	8	25	2	23	4	22	0	31	9	28	3	25	3	23	1
	No. 2	2 x 4	8	4	7	6	7	0	6	7	9	6	8	7	7	8	7	0
		2 x 6	13	1	11	10	11	0	10	0	14	2	12	3	11	0	10	0
		2 x 8	17	3	15	8	14	6	13	2	18	8	16	2	14	6	13	2
		2 x 10	22	0	20	0	18	6	16	10	23	10	20	8	18	6	16	10
		2 x 12	26	9	24	4	22	6	20	6	29	0	25	2	22	6	20	6
	No. 3	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
		2 x 6	10	9	9	4	8	4	7	7	10	9	9	4	8	4	7	7
		2 x 8	14	3	12	4	11	0	10	0	14	3	12	4	11	0	10	0
		2 x 10	18	2	15	8	14	1	12	10	18	2	15	8	14	1	12	10
		2 x 12	22	1	19	1	17	1	15	7	22	1	19	1	17	1	15	7
	Con-struction	2 x 4	8	0	7	2	6	5	5	10	8	3	7	2	6	5	5	10
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11

Continued on next page

TABLE D-7 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 20 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 20 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist spacing						Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	8	1	7	4	6	10	6	5	9	3	8	5	7	10	7	4
		2 x 6	12	9	11	7	10	9	10	1	14	7	13	3	12	3	11	7
		2 x 8	16	9	15	3	14	2	13	4	19	3	17	5	16	2	15	3
		2 x 10	21	5	19	6	18	1	17	0	24	6	22	3	20	8	19	6
		2 x 12	26	1	23	8	22	0	20	3	29	10	27	1	25	2	23	8
	No. 1	2 x 4	8	1	7	4	6	10	6	5	9	3	8	5	7	10	7	4
		2 x 6	12	9	11	7	10	9	10	1	14	7	13	2	11	10	10	9
		2 x 8	16	9	15	3	14	2	13	4	19	3	17	5	15	7	14	3
		2 x 10	21	5	19	6	18	1	17	0	24	6	22	3	19	11	18	2
		2 x 12	26	1	23	8	22	0	20	8	29	10	27	1	24	2	22	1
	No. 2	2 x 4	7	10	7	1	6	7	6	2	8	11	8	2	7	4	6	8
		2 x 6	12	4	11	2	10	4	9	9	13	9	11	11	10	8	9	9
		2 x 8	16	3	14	9	13	8	12	10	18	2	15	9	14	1	12	10
		2 x 10	20	9	18	10	17	6	16	5	23	3	20	1	18	0	16	5
		2 x 12	25	2	22	11	21	3	20	0	28	3	24	6	21	10	20	0
	No. 3	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
		2 x 6	10	3	8	11	7	11	7	3	10	3	8	11	7	11	7	3
		2 x 8	13	7	11	9	10	6	9	7	13	7	11	9	10	6	9	7
		2 x 10	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 12	21	1	18	3	16	4	14	10	21	1	18	3	16	4	14	10
	Con-struction	2 x 4	7	6	6	10	6	2	5	8	8	0	6	11	6	2	5	8
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	7	9	7	1	6	7	6	2	8	11	8	1	7	6	7	1
		2 x 6	12	3	11	2	10	4	9	9	14	1	12	9	11	10	11	2
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	10	15	7	14	8
		2 x 10	20	8	18	9	17	5	16	5	23	8	21	6	19	11	18	9
		2 x 12	25	2	22	10	21	2	19	11	28	9	26	2	24	3	22	10
	No. 1	2 x 4	7	9	7	1	6	7	6	2	8	11	8	1	7	6	7	1
		2 x 6	12	3	11	2	10	4	9	9	14	1	12	9	11	6	10	6
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	10	15	3	13	11
		2 x 10	20	8	18	9	17	5	16	5	23	8	21	6	19	5	17	9
		2 x 12	25	2	22	10	21	2	19	11	28	9	26	2	23	8	21	7
	No. 2	2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	2	6	6
		2 x 6	11	10	10	9	9	11	9	4	13	5	11	7	10	4	9	6
		2 x 8	15	7	14	2	13	2	12	4	17	8	15	4	13	8	12	6
		2 x 10	19	11	18	1	16	9	15	9	22	7	19	6	17	6	15	11
		2 x 12	24	2	22	0	20	5	19	2	27	5	23	9	21	3	19	5
	No. 3	2 x 4	6	10	5	11	5	3	4	10	6	10	5	11	5	3	4	10
		2 x 6	10	3	8	11	7	11	7	3	10	3	8	11	7	11	7	3
		2 x 8	13	7	11	9	10	6	9	7	13	7	11	9	10	6	9	7
		2 x 10	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 12	21	1	18	3	16	4	14	10	21	1	18	3	16	4	14	10
	Con-struction	2 x 4	7	3	6	7	6	0	5	5	7	9	6	8	6	0	5	5
	Standard	2 x 4	5	10	5	0	4	6	4	1	5	10	5	0	4	6	4	1
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11

Continued on next page

TABLE D-7 — (Cont'd)

ROOF JOISTS — SUPPORTING CEILING
(LIVE LOAD 20 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 20 lb per sq ft													
			Gypsum Board or Plastered Ceiling								Other Ceilings					
			Joist spacing								Joist spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	8	2	7	5	6	11	6	6	9	4	8	6	7	11	7	5
		2 x 6	12	11	11	8	10	10	10	3	14	9	13	5	12	5	11	8
		2 x 8	17	0	15	5	14	4	13	6	19	5	17	8	16	5	15	5
		2 x 10	21	8	19	8	18	3	17	2	24	10	22	7	20	11	19	8
		2 x 12	26	5	24	0	22	3	20	11	30	3	27	5	25	6	24	0
	No. 1	2 x 4	8	2	7	5	6	11	6	6	9	4	8	6	7	11	7	5
		2 x 6	12	11	11	8	10	10	10	3	14	9	13	5	12	5	11	8
		2 x 8	17	0	15	5	14	4	13	6	19	5	17	8	16	5	15	5
		2 x 10	21	8	19	8	18	3	17	2	24	10	22	7	20	11	19	8
		2 x 12	26	5	24	0	22	3	20	11	30	3	27	5	25	6	24	0
	No. 2	2 x 4	7	11	7	2	6	8	6	3	9	1	8	3	7	7	7	2
		2 x 6	12	5	11	4	10	6	9	10	14	3	12	11	12	0	11	0
		2 x 8	16	5	14	11	13	10	13	0	18	9	17	1	15	10	14	6
		2 x 10	20	11	19	0	17	8	16	7	24	0	21	9	20	3	18	7
		2 x 12	25	6	23	2	21	6	20	3	29	2	26	6	24	7	22	7
	No. 3	2 x 4	7	7	6	11	6	2	5	8	8	0	6	11	6	2	5	8
		2 x 6	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 8	15	5	13	5	12	0	10	11	15	5	13	5	12	0	10	11
		2 x 10	19	9	17	1	15	3	13	11	19	9	17	1	15	3	13	11
		2 x 12	24	0	20	9	18	7	17	0	24	0	20	9	18	7	17	0
	Con-struction	2 x 4	7	7	6	11	6	5	6	0	8	8	7	9	7	0	6	4
	Standard	2 x 4	6	10	5	11	5	3	4	10	6	10	5	11	5	3	4	10
	Utility	2 x 4	4	7	4	0	3	7	3	3	4	7	4	0	3	7	3	3
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	7	11	7	2	6	8	6	3	9	0	8	2	7	7	7	2
		2 x 6	12	5	11	3	10	5	9	10	14	2	12	11	12	0	11	3
		2 x 8	16	4	14	10	13	9	13	0	18	9	17	0	15	10	14	10
		2 x 10	20	11	19	0	17	7	16	7	23	11	21	9	20	2	19	0
		2 x 12	25	5	23	1	21	5	20	2	29	1	26	5	24	6	23	1
	No. 1	2 x 4	7	11	7	2	6	8	6	3	9	0	8	2	7	7	7	2
		2 x 6	12	5	11	3	10	5	9	10	14	2	12	11	11	10	10	9
		2 x 8	16	4	14	10	13	9	13	0	18	9	17	0	15	7	14	3
		2 x 10	20	11	19	0	17	7	16	7	23	11	21	9	19	11	18	2
		2 x 12	25	5	23	1	21	5	20	2	29	1	26	5	24	2	22	1
	No. 2	2 x 4	7	7	6	11	6	5	6	0	8	9	7	11	7	4	6	8
		2 x 6	12	0	10	11	10	1	9	6	13	9	11	11	10	8	9	9
		2 x 8	15	10	14	4	13	4	12	7	18	1	15	9	14	1	12	10
		2 x 10	20	2	18	4	17	0	16	0	23	1	20	1	18	0	16	5
		2 x 12	24	7	22	4	20	9	19	6	28	1	24	6	21	10	20	0
	No. 3	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
		2 x 6	10	3	8	11	7	11	7	3	10	3	8	11	7	11	7	3
		2 x 8	13	7	11	9	10	6	9	7	13	7	11	9	10	6	9	7
		2 x 10	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 12	21	1	18	3	16	4	14	10	21	1	18	3	16	4	14	10
	Con-struction	2 x 4	7	4	6	8	6	2	5	8	8	0	6	11	6	2	5	8
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11

TABLE D-8

RAFTERS — NOT SUPPORTING CEILINGS (LIVE LOADS 50 AND 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft								LIVE LOAD 40 lb per sq ft							
			Rafter spacing								Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	8	5	7	8	7	1	6	8	9	1	8	3	7	8	7	3
		2 x 6	13	4	12	1	11	3	10	4	14	4	13	0	12	1	11	4
		2 x 8	17	7	15	11	14	10	13	8	18	11	17	2	15	11	15	0
		2 x 10	22	5	20	4	18	11	17	5	24	2	21	11	20	4	19	2
		2 x 12	27	3	24	9	23	0	21	3	29	4	26	8	24	9	23	4
	No. 1	2 x 4	8	5	7	8	7	1	6	6	9	1	8	3	7	8	7	2
		2 x 6	13	4	11	8	10	5	9	6	14	4	12	10	11	6	10	6
		2 x 8	17	7	15	4	13	9	12	6	18	11	17	0	15	2	13	10
		2 x 10	22	5	19	7	17	7	16	0	24	2	21	8	19	4	17	8
		2 x 12	27	3	23	10	21	4	19	6	29	4	26	4	23	7	21	6
	No. 2	2 x 4	8	2	7	2	6	5	5	10	8	10	7	11	7	1	6	5
		2 x 6	12	2	10	6	9	5	8	7	13	5	11	7	10	4	9	5
		2 x 8	16	0	13	10	12	5	11	4	17	8	15	3	13	8	12	6
		2 x 10	20	5	17	8	15	10	14	5	22	6	19	6	17	5	15	11
		2 x 12	24	10	21	6	19	3	17	7	27	5	23	9	21	3	19	5
	No. 3	2 x 4	6	3	5	5	4	10	4	5	6	10	5	11	5	4	4	10
		2 x 6	9	2	8	0	7	1	6	6	10	2	8	9	7	10	7	2
		2 x 8	12	2	10	6	9	5	8	7	13	5	11	7	10	4	9	6
		2 x 10	15	6	13	5	12	0	10	11	17	1	14	10	13	3	12	1
		2 x 12	18	10	16	4	14	7	13	4	20	10	18	0	16	1	14	8
	Con-struction	2 x 4	7	1	6	2	5	6	5	0	7	10	6	9	6	1	5	6
	Standard	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
	Utility	2 x 4	3	8	3	2	2	10	2	7	4	1	3	6	3	2	2	10
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	8	0	7	3	6	7	6	0	8	7	7	10	7	3	6	8
		2 x 6	12	7	10	11	9	9	8	11	13	6	12	0	10	9	9	10
		2 x 8	16	7	14	4	12	10	11	9	17	10	15	10	14	2	12	11
		2 x 10	21	2	18	4	16	5	15	0	22	9	20	3	18	1	16	6
		2 x 12	25	9	22	4	20	0	18	3	27	8	24	8	22	0	20	1
	No. 1	2 x 4	8	0	6	11	6	2	5	8	8	7	7	8	6	10	6	3
		2 x 6	11	8	10	1	9	0	8	3	12	10	11	2	9	11	9	1
		2 x 8	15	4	13	4	11	11	10	10	17	0	14	8	13	2	12	0
		2 x 10	19	7	17	0	15	2	13	10	21	8	18	9	16	9	15	4
		2 x 12	23	10	20	8	18	6	16	10	26	4	22	10	20	5	18	7
	No. 2	2 x 4	7	3	6	3	5	7	5	1	8	0	6	11	6	2	5	8
		2 x 6	10	4	9	0	8	0	7	4	11	5	9	11	8	10	8	1
		2 x 8	13	8	11	10	10	7	9	8	15	1	13	1	11	8	10	8
		2 x 10	17	5	15	1	13	6	12	4	19	3	16	8	14	11	13	7
		2 x 12	21	3	18	5	16	5	15	0	23	5	20	3	18	2	16	7
	No. 3	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
		2 x 6	7	10	6	10	6	1	5	7	8	8	7	6	6	9	6	2
		2 x 8	10	5	9	0	8	0	7	4	11	6	9	11	8	10	8	1
		2 x 10	13	3	11	6	10	3	9	4	14	8	12	8	11	4	10	4
		2 x 12	16	2	14	0	12	6	11	5	17	10	15	5	13	10	12	7
	Con-struction	2 x 4	6	0	5	3	4	8	4	3	6	8	5	9	5	2	4	8
	Standard	2 x 4	4	6	3	11	3	6	3	2	5	0	4	4	3	10	3	6
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4

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TABLE D-8 — (Cont'd)

RAFTERS — NOT SUPPORTING CEILINGS
(LIVE LOADS 50 and 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft — Rafter spacing								LIVE LOAD 40 lb per sq ft — Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	7	6	6	10	6	4	5	10	8	1	7	4	6	10	6	5
		2 x 6	11	10	10	6	9	5	8	7	12	9	11	7	10	4	9	5
		2 x 8	15	7	13	10	12	5	11	4	16	9	15	3	13	8	12	6
		2 x 10	19	11	17	8	15	10	14	5	21	5	19	6	17	5	15	11
		2 x 12	24	2	21	6	19	3	17	7	26	1	23	8	21	3	19	5
	No. 1	2 x 4	7	6	6	8	5	11	5	5	8	1	7	4	6	7	6	0
		2 x 6	11	2	9	8	8	8	7	10	12	4	10	8	9	6	8	8
		2 x 8	14	9	12	9	11	5	10	5	16	3	14	1	12	7	11	6
		2 x 10	18	9	16	3	14	6	13	3	20	9	17	11	16	1	14	8
		2 x 12	22	10	19	9	17	8	16	2	25	3	21	10	19	6	17	10
	No. 2	2 x 4	6	11	6	0	5	4	4	11	7	8	6	7	5	11	5	5
		2 x 6	10	1	8	9	7	10	7	1	11	2	9	8	8	7	7	10
		2 x 8	13	4	11	6	10	4	9	5	14	8	12	9	11	4	10	4
		2 x 10	17	0	14	8	13	2	12	0	18	9	16	3	14	6	13	3
		2 x 12	20	8	17	11	16	0	14	7	22	10	19	9	17	8	16	1
	No. 3	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
		2 x 6	7	6	6	6	5	10	5	4	8	3	7	2	6	5	5	10
		2 x 8	9	11	8	7	7	8	7	0	10	11	9	6	8	6	7	9
		2 x 10	12	8	10	11	9	9	8	11	14	0	12	1	10	10	9	10
		2 x 12	15	5	13	4	11	11	10	10	17	0	14	8	13	2	12	0
	Con-struction	2 x 4	5	10	5	1	4	6	4	1	6	5	5	7	5	0	4	7
	Standard	2 x 4	4	6	3	11	3	6	3	2	5	0	4	4	3	10	3	6
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	7	3	6	7	6	1	5	8	7	9	7	1	6	7	6	2
		2 x 6	11	5	10	3	9	2	8	5	12	3	11	2	10	2	9	3
		2 x 8	15	0	13	7	12	2	11	1	16	2	14	8	13	5	12	3
		2 x 10	19	2	17	4	15	6	14	2	20	8	18	9	17	1	15	7
		2 x 12	23	4	21	1	18	10	17	3	25	2	22	10	20	10	19	0
	No. 1	2 x 4	7	3	6	5	5	9	5	3	7	9	7	1	6	4	5	9
		2 x 6	10	11	9	5	8	5	7	8	12	0	10	5	9	4	8	6
		2 x 8	14	4	12	5	11	1	10	2	15	10	13	9	12	3	11	2
		2 x 10	18	4	15	11	14	2	13	0	20	3	17	6	15	8	14	4
		2 x 12	22	4	19	4	17	3	15	9	24	8	21	4	19	1	17	5
	No. 2	2 x 4	6	9	5	10	5	3	4	9	7	5	6	5	5	9	5	3
		2 x 6	9	10	8	6	7	7	6	11	10	10	9	4	8	4	7	8
		2 x 8	12	11	11	2	10	0	9	2	14	3	12	4	11	1	10	1
		2 x 10	16	6	14	3	12	9	11	8	18	3	15	9	14	1	12	10
		2 x 12	20	1	17	5	15	7	14	2	22	2	19	2	17	2	15	8
	No. 3	2 x 4	5	0	4	4	3	10	3	6	5	6	4	9	4	3	3	11
		2 x 6	7	6	6	6	5	10	5	4	8	3	7	2	6	5	5	10
		2 x 8	9	11	8	7	7	8	7	0	10	11	9	6	8	6	7	9
		2 x 10	12	8	10	11	9	9	8	11	14	0	12	1	10	10	9	10
		2 x 12	15	5	13	4	11	11	10	10	17	0	14	8	13	2	12	0
	Con-struction	2 x 4	5	8	4	11	4	4	4	0	6	3	5	5	4	10	4	5
	Standard	2 x 4	4	3	3	8	3	3	3	0	4	8	4	1	3	8	3	4
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4

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TABLE D-8 — (Cont'd)

RAFTERS — NOT SUPPORTING CEILINGS (LIVE LOADS 50 AND 40 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 50 lb per sq ft — Rafter spacing								LIVE LOAD 40 lb per sq ft — Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	7	7	6	11	6	5	6	0	8	2	7	5	6	11	6	6
		2 x 6	11	11	10	10	10	1	9	6	12	11	11	8	10	10	10	3
		2 x 8	15	9	14	4	13	4	12	6	17	0	15	5	14	4	13	6
		2 x 10	20	2	18	3	17	0	16	0	21	8	19	8	18	3	17	2
		2 x 12	24	6	22	3	20	8	19	5	26	5	24	0	22	3	20	11
	No. 1	2 x 4	7	7	6	11	6	5	6	0	8	2	7	5	6	11	6	6
		2 x 6	11	11	10	10	9	9	8	11	12	11	11	8	10	9	9	10
		2 x 8	15	9	14	4	12	10	11	9	17	0	15	5	14	2	12	11
		2 x 10	20	2	18	3	16	5	15	0	21	8	19	8	18	1	16	6
		2 x 12	24	6	22	3	20	0	18	3	26	5	24	0	22	0	20	1
	No. 2	2 x 4	7	4	6	8	6	1	5	6	7	11	7	2	6	8	6	1
		2 x 6	11	5	9	10	8	10	8	1	12	5	10	11	9	9	8	11
		2 x 8	15	1	13	0	11	8	10	8	16	5	14	4	12	10	11	9
		2 x 10	19	2	16	8	14	10	13	7	20	11	18	4	16	5	15	0
		2 x 12	23	4	20	3	18	1	16	6	25	6	22	4	20	0	18	3
	No. 3	2 x 4	5	10	5	1	4	6	4	1	6	5	5	7	5	0	4	7
		2 x 6	8	7	7	5	6	7	6	1	9	5	8	2	7	4	6	8
		2 x 8	11	4	9	9	8	9	8	0	12	6	10	10	9	8	8	10
		2 x 10	14	5	12	6	11	2	10	2	15	11	13	9	12	4	11	3
		2 x 12	17	7	15	2	13	7	12	5	19	5	16	9	15	0	13	8
	Con-struction	2 x 4	6	7	5	8	5	1	4	8	7	3	6	3	5	7	5	1
	Standard	2 x 4	5	0	4	4	3	10	3	6	5	6	4	9	4	3	3	11
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	8	3	2	2	10	2	7
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	7	4	6	8	6	2	5	10	7	11	7	2	6	8	6	3
		2 x 6	11	6	10	5	9	5	8	7	12	5	11	3	10	4	9	5
		2 x 8	15	2	13	9	12	5	11	4	16	4	14	10	13	8	12	6
		2 x 10	19	5	17	7	15	10	14	5	20	11	19	0	17	5	15	11
		2 x 12	23	7	21	5	19	3	17	7	25	5	23	1	21	3	19	5
	No. 1	2 x 4	7	4	6	8	5	11	5	5	7	11	7	2	6	7	6	0
		2 x 6	11	2	9	8	8	8	7	10	12	4	10	8	9	6	8	8
		2 x 8	14	9	12	9	11	5	10	5	16	3	14	1	12	7	11	6
		2 x 10	18	9	16	3	14	6	13	3	20	9	17	11	16	1	14	8
		2 x 12	22	10	19	9	17	8	16	2	25	3	21	10	19	6	17	10
	No. 2	2 x 4	6	11	6	0	5	4	4	11	7	7	6	7	5	11	5	5
		2 x 6	10	1	8	9	7	10	7	1	11	2	9	8	8	7	7	10
		2 x 8	13	4	11	6	10	4	9	5	14	8	12	9	11	4	10	4
		2 x 10	17	0	14	8	13	2	12	0	18	9	16	3	14	6	13	3
		2 x 12	20	8	17	11	16	0	14	7	22	10	19	9	17	8	16	1
	No. 3	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
		2 x 6	7	6	6	6	5	10	5	4	8	3	7	2	6	5	5	10
		2 x 8	9	11	8	7	7	8	7	0	10	11	9	6	8	6	7	9
		2 x 10	12	8	10	11	9	9	8	11	14	0	12	1	10	10	9	10
		2 x 12	15	5	13	4	11	11	10	10	17	0	14	8	13	2	12	0
	Con-struction	2 x 4	5	10	5	1	4	6	4	1	6	5	5	7	5	0	4	7
	Standard	2 x 4	4	6	3	11	3	6	3	2	5	0	4	4	3	10	3	6
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4

TABLE D-9

RAFTERS — NOT SUPPORTING CEILINGS (LIVE LOADS 30 AND 20 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb. per sq. ft.								LIVE LOAD 20 lb. per sq. ft.							
			Rafter spacing								Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Douglas Fir Western Larch	Select Structural	2 x 4	10	0	9	1	8	5	7	11	11	6	10	5	9	8	9	1
		2 x 6	15	9	14	4	13	4	12	6	18	1	16	5	15	3	14	4
		2 x 8	20	10	18	11	17	7	16	6	23	10	21	8	20	1	18	11
		2 x 10	26	7	24	2	22	5	21	1	30	5	27	8	25	8	24	2
		2 x 12	32	4	29	4	27	3	25	8	37	0	33	8	31	3	29	4
	No. 1	2 x 4	10	0	9	1	8	5	7	11	11	6	10	5	9	8	9	1
		2 x 6	15	9	14	4	13	0	11	10	18	1	16	5	15	3	14	0
		2 x 8	20	10	18	11	17	2	15	8	23	10	21	8	20	1	18	5
		2 x 10	26	7	24	2	21	11	20	0	30	5	27	8	25	8	23	6
		2 x 12	32	4	29	4	26	8	24	4	37	0	33	8	31	3	28	7
	No. 2	2 x 4	9	8	8	10	8	0	7	4	11	1	10	1	9	4	8	7
		2 x 6	15	2	13	1	11	9	10	8	17	6	15	5	13	9	12	7
		2 x 8	20	0	17	3	15	5	14	1	23	0	20	4	18	2	16	7
		2 x 10	25	6	22	1	19	9	18	0	29	5	26	0	23	3	21	2
		2 x 12	31	0	26	10	24	0	21	11	35	9	31	7	28	3	25	9
	No. 3	2 x 4	7	9	6	9	6	0	5	6	9	2	7	11	7	1	6	5
		2 x 6	11	6	9	11	8	11	8	1	13	6	11	8	10	6	9	7
		2 x 8	15	2	13	1	11	9	10	8	17	10	15	5	13	10	12	7
		2 x 10	19	4	16	9	15	0	13	8	22	9	19	9	17	8	16	1
		2 x 12	23	6	20	5	18	3	16	8	27	8	24	0	21	5	19	7
	Con-struction	2 x 4	8	10	7	8	6	10	6	3	10	5	9	0	8	1	7	4
	Standard	2 x 4	6	6	5	8	5	0	4	7	7	8	6	8	5	11	5	5
	Utility	2 x 4	4	7	4	0	3	7	3	3	5	5	4	8	4	2	3	10
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select Structural	2 x 4	9	6	8	7	8	0	7	6	10	10	9	10	9	2	8	7
		2 x 6	14	11	13	6	12	2	11	1	17	1	15	6	14	4	13	1
		2 x 8	19	8	17	10	16	0	14	8	22	6	20	5	18	11	17	3
		2 x 10	25	1	22	9	20	6	18	8	28	8	26	1	24	1	22	0
		2 x 12	30	6	27	8	24	11	22	9	34	11	31	9	29	4	26	9
	No. 1	2 x 4	9	6	8	7	7	9	7	1	10	10	9	10	9	1	8	4
		2 x 6	14	6	12	7	11	3	10	3	17	1	14	10	13	3	12	1
		2 x 8	19	2	16	7	14	10	13	7	22	6	19	7	17	6	15	11
		2 x 10	24	6	21	2	18	11	17	4	28	8	24	11	22	4	20	4
		2 x 12	29	9	25	9	23	1	21	1	34	11	30	4	27	2	24	9
	No. 2	2 x 4	9	0	7	10	7	0	6	5	10	6	9	3	8	3	7	6
		2 x 6	12	11	11	2	10	0	9	2	15	3	13	2	11	9	10	9
		2 x 8	17	1	14	9	13	2	12	1	20	1	17	5	15	7	14	2
		2 x 10	21	9	18	10	16	10	15	5	25	8	22	2	19	10	18	1
		2 x 12	26	6	22	11	20	6	18	9	31	2	27	0	24	2	22	0
	No. 3	2 x 4	6	6	5	8	5	0	4	7	7	8	6	8	5	11	5	5
		2 x 6	9	10	8	6	7	7	6	11	11	7	10	0	8	11	8	2
		2 x 8	13	0	11	3	10	0	9	2	15	3	13	3	11	10	10	9
		2 x 10	16	7	14	4	12	10	11	8	19	6	16	11	15	1	13	9
		2 x 12	20	2	17	5	15	7	14	3	23	9	20	6	18	4	16	9
	Con-struction	2 x 4	7	6	6	6	5	10	5	4	8	10	7	8	6	10	6	3
	Standard	2 x 4	5	8	4	11	4	4	4	0	6	8	5	9	5	2	4	8
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1

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TABLE D-9 — (Cont'd)

RAFTERS — NOT SUPPORTING CEILINGS (LIVE LOADS 30 AND 20 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb. per sq. ft. — Rafter spacing								LIVE LOAD 20 lb. per sq. ft. — Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select Structural	2 x 4	8	11	8	1	7	6	7	1	10	2	9	3	8	7	8	1
		2 x 6	14	0	12	9	11	9	10	8	16	0	14	7	13	6	12	7
		2 x 8	18	6	16	9	15	5	14	1	21	2	19	3	17	10	16	7
		2 x 10	23	7	21	5	19	9	18	0	27	0	24	6	22	9	21	2
		2 x 12	28	8	26	1	24	0	21	11	32	10	29	10	27	8	25	9
	No. 1	2 x 4	8	11	8	1	7	5	6	9	10	2	9	3	8	7	8	0
		2 x 6	13	11	12	1	10	9	9	10	16	0	14	2	12	8	11	7
		2 x 8	18	4	15	11	14	3	13	0	21	2	18	9	16	9	15	3
		2 x 10	23	5	20	3	18	2	16	7	27	0	23	11	21	4	19	6
		2 x 12	28	6	24	8	22	1	20	2	32	10	29	1	26	0	23	9
	No. 2	2 x 4	8	7	7	6	6	8	6	1	9	10	8	10	7	10	7	2
		2 x 6	12	7	10	11	9	9	8	11	14	10	12	10	11	6	10	6
		2 x 8	16	7	14	4	12	10	11	9	19	7	16	11	15	2	13	10
		2 x 10	21	2	18	4	16	5	15	0	24	11	21	7	19	4	17	8
		2 x 12	25	9	22	4	20	0	18	3	30	4	26	3	23	6	21	5
	No. 3	2 x 4	6	6	5	8	5	0	4	7	7	8	6	8	5	11	5	5
		2 x 6	9	4	8	1	7	3	6	7	11	0	9	7	8	6	7	9
		2 x 8	12	4	10	8	9	7	8	9	14	7	12	7	11	3	10	3
		2 x 10	15	9	13	8	12	3	11	2	18	7	16	1	14	5	13	2
		2 x 12	19	3	16	8	14	10	13	7	22	7	19	7	17	6	16	0
	Con-struction	2 x 4	7	4	6	4	5	8	5	2	8	7	7	5	6	8	6	1
	Standard	2 x 4	5	8	4	11	4	4	4	0	6	8	5	9	5	2	4	8
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1
Western Red Cedar Red Pine Western White Pine White Pine	Select Structural	2 x 4	8	7	7	9	7	3	6	10	9	10	8	11	8	3	7	9
		2 x 6	13	6	12	3	11	5	10	6	15	6	14	1	13	0	12	3
		2 x 8	17	10	16	2	15	0	13	10	20	5	18	6	17	2	16	2
		2 x 10	22	9	20	8	19	2	17	8	26	0	23	8	21	11	20	8
		2 x 12	27	8	25	2	23	4	21	6	31	8	28	9	26	9	25	2
	No. 1	2 x 4	8	7	7	9	7	2	6	6	9	10	8	11	8	3	7	8
		2 x 6	13	6	11	9	10	6	9	7	15	6	13	10	12	5	11	4
		2 x 8	17	10	15	6	13	11	12	8	20	5	18	3	16	4	14	11
		2 x 10	22	9	19	10	17	9	16	2	26	0	23	4	20	10	19	1
		2 x 12	27	8	24	1	21	7	19	8	31	8	28	5	25	5	23	2
	No. 2	2 x 4	8	3	7	4	6	6	5	11	9	6	8	7	7	8	7	0
		2 x 6	12	3	10	7	9	6	8	8	14	5	12	6	11	2	10	2
		2 x 8	16	2	14	0	12	6	11	5	19	0	16	5	14	8	13	5
		2 x 10	20	7	17	10	15	11	14	7	24	3	21	0	18	9	17	2
		2 x 12	25	1	21	8	19	5	17	8	29	6	25	6	22	10	20	10
	No. 3	2 x 4	6	3	5	5	4	10	4	5	7	4	6	4	5	8	5	2
		2 x 6	9	4	8	1	7	3	6	7	11	0	9	7	8	6	7	9
		2 x 8	12	4	10	8	9	7	8	9	14	7	12	7	11	3	10	3
		2 x 10	15	9	13	8	12	3	11	2	18	7	16	1	14	5	13	2
		2 x 12	19	3	16	8	14	10	13	7	22	7	19	7	17	6	16	0
	Con-struction	2 x 4	7	1	6	1	5	5	5	0	8	4	7	2	6	5	5	10
	Standard	2 x 4	5	4	4	7	4	1	3	9	6	3	5	5	4	10	4	5
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1

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TABLE D-9 — (Cont'd)

RAFTERS — NOT SUPPORTING CEILINGS (LIVE LOADS 30 AND 20 lb per sq ft)

Species	Grade	Nominal Size	LIVE LOAD 30 lb. per sq. ft. Rafter spacing								LIVE LOAD 20 lb. per sq. ft. Rafter spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		inches	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*	*ft*	*in.*
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select Structural	2 x 4	9	0	8	2	7	7	7	2	10	4	9	4	8	8	8	2
		2 x 6	14	2	12	11	11	11	11	3	16	3	14	9	13	8	12	11
		2 x 8	18	8	17	0	15	9	14	10	21	5	19	5	18	1	17	0
		2 x 10	23	10	21	8	20	2	18	11	27	4	24	10	23	1	21	8
		2 x 12	29	1	26	5	24	6	23	1	33	3	30	3	28	0	26	5
	No. 1	2 x 4	9	0	8	2	7	7	7	2	10	4	9	4	8	8	8	2
		2 x 6	14	2	12	11	11	11	11	1	16	3	14	9	13	8	12	11
		2 x 8	18	8	17	0	15	9	14	8	21	5	19	5	18	1	17	0
		2 x 10	23	10	21	8	20	2	18	8	27	4	24	10	23	1	21	8
		2 x 12	29	1	26	5	24	6	22	9	33	3	30	3	28	0	26	5
	No. 2	2 x 4	8	8	7	11	7	4	6	11	10	0	9	1	8	5	7	11
		2 x 6	13	8	12	4	11	0	10	1	15	8	14	3	13	0	11	10
		2 x 8	18	1	16	3	14	6	13	3	20	8	18	9	17	1	15	7
		2 x 10	23	1	20	9	18	7	16	11	26	5	24	0	21	10	19	11
		2 x 12	28	0	25	3	22	7	20	7	32	1	29	2	26	7	24	3
	No. 3	2 x 4	7	4	6	4	5	8	5	2	8	7	7	5	6	8	6	1
		2 x 6	10	8	9	3	8	3	7	7	12	7	10	11	9	9	8	11
		2 x 8	14	1	12	3	10	11	10	0	16	7	14	4	12	10	11	9
		2 x 10	18	0	15	7	13	11	12	9	21	2	18	4	16	5	15	0
		2 x 12	21	11	19	0	17	0	15	6	25	9	22	4	20	0	18	3
	Con-struction	2 x 4	8	3	7	1	6	4	5	10	9	7	8	4	7	6	6	10
	Standard	2 x 4	6	3	5	5	4	10	4	5	7	4	6	4	5	8	5	2
	Utility	2 x 4	4	2	3	8	3	3	2	11	4	11	4	3	3	10	3	6
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select Structural	2 x 4	8	8	7	11	7	4	6	10	9	11	9	0	8	4	7	11
		2 x 6	13	8	12	5	11	6	10	8	15	8	14	2	13	2	12	5
		2 x 8	18	0	16	4	15	2	14	1	20	7	18	9	17	5	16	4
		2 x 10	23	0	20	11	19	5	18	0	26	4	23	11	22	2	20	11
		2 x 12	28	0	25	5	23	7	21	11	32	0	29	1	27	0	25	5
	No. 1	2 x 4	8	8	7	11	7	4	6	9	9	11	9	0	8	4	7	11
		2 x 6	13	8	12	1	10	9	9	10	15	8	14	2	12	8	11	7
		2 x 8	18	0	15	11	14	3	13	0	20	7	18	9	16	9	15	3
		2 x 10	23	0	20	3	18	2	16	7	26	4	23	11	21	4	19	6
		2 x 12	28	0	24	8	22	1	20	2	32	0	29	1	26	0	23	9
	No. 2	2 x 4	8	5	7	6	6	8	6	1	9	7	8	9	7	10	7	2
		2 x 6	12	7	10	11	9	9	8	11	14	10	12	10	11	6	10	6
		2 x 8	16	7	14	4	12	10	11	9	19	7	16	11	15	2	13	10
		2 x 10	21	2	18	4	16	5	15	0	24	11	21	7	19	4	17	8
		2 x 12	25	9	22	4	20	0	18	3	30	4	26	3	23	6	21	5
	No. 3	2 x 4	6	6	5	8	5	0	4	7	7	8	6	8	5	11	5	5
		2 x 6	9	4	8	1	7	3	6	7	11	0	9	7	8	6	7	9
		2 x 8	12	4	10	8	9	7	8	9	14	7	12	7	11	3	10	3
		2 x 10	15	9	13	8	12	3	11	2	18	7	16	1	14	5	13	2
		2 x 12	19	3	16	8	14	10	13	7	22	7	19	7	17	6	16	0
	Con-struction	2 x 4	7	4	6	4	5	8	5	2	8	7	7	5	6	8	6	1
	Standard	2 x 4	5	8	4	11	4	4	4	0	6	8	5	9	5	2	4	8
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1

TABLE D-10
MAXIMUM SPANS FOR BUILT-UP WOOD BEAMS IN BASEMENTS, CELLARS AND CRAWL SPACES, ONE STOREY HOUSES [2] [5]

Species	Grade [1]	Supported Joist Length ft. [3] [4]	Size of built-up beam, inches [6] [7] [8]											
			3 – 2 x 8		4 – 2 x 8		3 – 2 x 10		4 – 2 x 10		3 – 2 x 12		4 – 2 x 12	
			ft.	*in.*	*ft.*	*in.*	*ft.*	*in.*	*ft.*	*in.*	*ft.*	*in.*	*ft.*	*in.*
Douglas Fir Western Larch	No. 1	8	12	0	13	10	15	4	17	8	18	7	21	6
		10	10	9	12	5	13	8	15	10	16	8	19	3
		12	9	9	11	4	12	6	14	5	15	2	17	7
		14	8	10	10	5	11	4	13	4	13	9	16	3
		16	7	11	9	9	10	1	12	6	12	3	15	2
	No. 2	8	10	10	12	6	13	9	15	11	16	9	19	5
		10	9	8	11	2	12	4	14	3	15	0	17	4
		12	8	10	10	2	11	3	13	0	13	8	15	10
		14	8	2	9	5	10	5	12	0	12	8	14	8
		16	7	7	8	10	9	9	11	3	11	10	13	8
Pacific Coast Hemlock Amabilis Fir Grand Fir	No. 1	8	10	4	12	0	13	3	15	4	16	1	18	7
		10	9	3	10	9	11	10	13	8	14	5	16	8
		12	8	6	9	9	10	10	12	6	13	2	15	2
		14	7	7	9	1	9	8	11	7	11	9	14	1
		16	6	9	8	6	8	8	10	10	10	6	13	2
	No. 2	8	9	3	10	8	11	9	13	7	14	4	16	7
		10	8	3	9	6	10	6	12	2	12	10	14	10
		12	7	6	8	8	9	7	11	1	11	8	13	6
		14	7	0	8	1	8	11	10	3	10	10	12	6
		16	6	6	7	6	8	4	9	7	10	1	11	8
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	No. 1	8	11	2	12	11	14	4	16	6	17	5	20	1
		10	10	0	11	7	12	10	14	9	15	7	18	0
		12	9	2	10	7	11	8	13	6	14	2	16	5
		14	8	5	9	9	10	9	12	6	13	1	15	2
		16	7	6	9	2	9	7	11	8	11	8	14	2
	No. 2	8	10	2	11	9	13	0	15	0	15	9	18	3
		10	9	1	10	6	11	7	13	5	14	1	16	4
		12	8	3	9	7	10	7	12	3	12	10	14	10
		14	7	8	8	10	9	9	11	4	11	11	13	9
		16	7	2	8	3	9	2	10	7	11	2	12	10
Balsam Fir Lodgepole Pine Ponderosa Pine Spruces (all species) Alpine Fir	No. 1	8	9	11	11	6	12	8	14	8	15	5	17	10
		10	8	4	10	3	10	8	13	1	13	0	15	11
		12	7	2	9	2	9	2	11	8	11	1	14	3
		14	6	4	8	0	8	0	10	3	9	9	12	5
		16	5	8	7	2	7	3	9	2	8	10	11	1
Aspen Poplar Large-Toothed Aspen Poplar Balsam Poplar	No. 2	8	9	0	10	4	11	6	13	3	13	11	16	1
		10	8	0	9	3	10	3	11	10	12	6	14	5
		12	7	2	8	6	9	2	10	10	11	1	13	2
		14	6	4	7	10	8	0	10	0	9	9	12	2
		16	5	8	7	2	7	3	9	2	8	10	11	1
Western Red Cedar Red Pine Western White Pine White Pine	No. 1	8	9	8	11	2	12	5	14	4	15	1	17	5
		10	8	8	10	0	11	1	12	10	13	6	15	7
		12	7	8	9	2	9	9	11	8	11	11	14	2
		14	6	9	8	6	8	7	10	10	10	5	13	2
		16	6	0	7	8	7	8	9	9	9	4	11	11
	No. 2	8	8	9	10	1	11	2	12	10	13	7	15	8
		10	7	10	9	0	10	0	11	6	12	1	14	0
		12	7	1	8	3	9	1	10	6	11	1	12	9
		14	6	7	7	7	8	5	9	9	10	3	11	10
		16	6	0	7	1	7	8	9	1	9	4	11	1

Notes to Table D-10:

(1) Graded in conformance with 1971 "NLGA Standard Grading Rules for Canadian Lumber" published by the National Lumber Grades Authority, Vancouver.

(2) These tables provide maximum allowable spans for main beams or girders which are built up from nominal 2 in. members in the species, sizes and grades indicated. Allowable spans for solid wood beams, glued-laminated wood beams, or built-up beams in sizes or grades other than shown, shall be determined from standard engineering formulae.

(3) Supported joist length means ½ the sum of the joist spans on both sides of the beam.

(4) For supported joist lengths intermediate between those shown in the tables, straight line interpolation may be used in determining the maximum beam span.

(5) Beams for 1½ storey houses shall be taken from the table for 2 storey houses.

(6) The 2 in. members shall be laid on edge and fastened together with a double row of common nails not less than 3½ in. in length. Nails shall be spaced not more than 18 in. apart in each row with the end nails placed 4 in. to 6 in. from the end of each piece.

(7) Where built up wood beams are employed over a single span, the length of each individual piece used to fabricate the beam shall equal the length of the beam.

(8) Where built up wood beams are continued over more than one span and where lengths of individual pieces are less than the total length of the complete beam, the location of butt joints shall conform to Articles 23 H(3) and 23 H(4) of this Code.

TABLE D-11
MAXIMUM SPANS FOR BUILT-UP WOOD BEAMS IN BASEMENTS, CELLARS AND CRAWL SPACES, TWO STORY HOUSES (2) (5)

Species	Grade (1)	Supported Joist Length ft. (3) (4)	Size of built-up beam, inches (6) (7) (8)											
			3 – 2 x 8		4 – 2 x 8		3 – 2 x 10		4 – 2 x 10		3 – 2 x 12		4 – 2 x 12	
			ft.	*in.*	*ft.*	*in.*	*ft.*	*in.*	*ft.*	*in.*	*ft.*	*in.*	*ft.*	*in.*
Douglas Fir Western Larch	No. 1	8	8	10	10	5	11	4	13	4	13	9	16	3
		10	7	4	9	4	9	4	11	11	11	5	14	6
		12	6	4	8	0	8	0	10	3	9	9	12	5
		14	5	7	7	0	7	1	9	0	8	8	10	11
		16	5	0	6	4	6	5	8	0	7	10	9	9
	No. 2	8	8	2	9	5	10	5	12	0	12	8	14	8
		10	7	3	8	5	9	4	10	9	11	4	13	1
		12	6	4	7	8	8	0	9	10	9	9	11	11
		14	5	7	7	0	7	1	9	0	8	8	10	11
		16	5	0	6	4	6	5	8	0	7	10	9	9
Pacific Coast Hemlock Amabilis Fir Grand Fir	No. 1	8	7	7	9	1	9	8	11	7	11	9	14	1
		10	6	4	8	0	8	0	10	3	9	9	12	5
		12	5	5	6	10	6	11	8	9	8	6	10	8
		14	4	10	6	1	6	2	7	9	7	6	9	5
		16	4	4	5	5	5	7	6	11	6	10	8	6
	No. 2	8	7	0	8	1	8	11	10	3	10	10	12	6
		10	6	3	7	2	7	11	9	2	9	8	11	2
		12	5	5	6	7	6	11	8	5	8	6	10	2
		14	4	10	6	1	6	2	7	9	7	6	9	5
		16	4	4	5	5	5	7	6	11	6	10	8	6
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	No. 1	8	8	5	9	9	10	9	12	6	13	1	15	2
		10	7	0	8	9	8	11	11	2	10	10	13	7
		12	6	0	7	7	7	8	9	9	9	4	11	10
		14	5	4	6	8	6	10	8	7	8	3	10	5
		16	4	10	6	0	6	2	7	8	7	6	9	4
	No. 2	8	7	8	8	10	9	9	11	4	11	11	13	9
		10	6	10	7	11	8	9	10	1	10	8	12	4
		12	6	0	7	3	7	8	9	3	9	4	11	3
		14	5	4	6	8	6	10	8	6	8	3	10	5
		16	4	10	6	0	6	2	7	8	7	6	9	4
Balsam Fir Lodgepole Pine Ponderosa Pine Spruces (all species) Alpine Fir Aspen Poplar Large-toothed Aspen Poplar Balsam Poplar	No. 1	8	6	4	8	0	8	0	10	3	9	9	12	5
		10	5	3	6	8	6	9	8	6	8	2	10	4
		12	4	7	5	9	5	10	7	4	7	2	8	11
		14	4	1	5	1	5	3	6	6	6	5	7	11
		16	3	9	4	7	4	9	5	10	5	10	7	2
	No. 2	8	6	4	7	10	8	0	10	0	9	9	12	2
		10	5	3	6	8	6	9	8	6	8	2	10	4
		12	4	7	5	9	5	10	7	4	7	2	8	11
		14	4	1	5	1	5	3	6	6	6	5	7	11
		16	3	9	4	7	4	9	5	10	5	10	7	2
Western Red Cedar Red Pine Western White Pine White Pine	No. 1	8	6	9	8	6	8	7	10	10	10	5	13	2
		10	5	7	7	1	7	2	9	1	8	9	11	0
		12	4	10	6	1	6	3	7	10	7	7	9	6
		14	4	4	5	5	5	7	6	11	6	9	8	5
		16	3	11	4	10	5	1	6	3	6	2	7	7
	No. 2	8	6	7	7	7	8	5	9	9	10	3	11	10
		10	5	7	6	10	7	2	8	8	8	9	10	7
		12	4	10	6	1	6	3	7	10	7	7	9	6
		14	4	4	5	5	5	7	6	11	6	9	8	5
		16	3	11	4	10	5	1	6	3	6	2	7	7

Notes to Table D-11:

(1) Graded in conformance with 1971 "NLGA Standard Grading Rules for Canadian Lumber" published by the National Lumber Grades Authority, Vancouver.

(2) These tables provide maximum allowable spans for main beams or girders which are built up from nominal 2 in. members in the species, sizes and grades indicated. Allowable spans for solid wood beams, glued-laminated wood beams, or built-up beams in sizes or grades other than shown, shall be determined from standard engineering formulae.

(3) Supported joist length means ½ the sum of the joist spans on both sides of the beam.

(4) For supported joist lengths intermediate between those shown in the tables, straight line interpolation may be used in determining the maximum beam span.

(5) Beams for 1½ storey houses shall be taken from the table for 2 storey houses.

(6) The 2 in. members shall be laid on edge and fastened together with a double row of common nails not less than 3½ in. in length. Nails shall be spaces not more than 18 in. apart in each row with the end nails placed 4 in. to 6 in. from the end of each piece.

(7) Where built up wood beams are employed over a single span, the length of each individual piece used to fabricate the beam shall equal the length of the beam.

(8) Where built up wood beams are continued over more than one span and where lengths of individual pieces are less than the total length of the complete beam, the location of butt joints shall conform to Article 23 H(3) and 23 H(4) of this Code.

APPENDIX E

GRADE MARKINGS OF CANADIAN LUMBER

(FOR LUMBER GRADED TO THE RULES SHOWN IN TABLE 3B, IN SECTION 3)

FOREWORD

The grade mark of a CLS certified agency on a piece of lumber indicates its assigned grade, species or species combination, the responsible grader or mill of origin, and the CLS certified agency under whose supervision the grading or marking was done.

Canadian lumber conforming to CSA 0141-1965 "Softwood Lumber" is graded in conformance with the following grading rules for species shown.

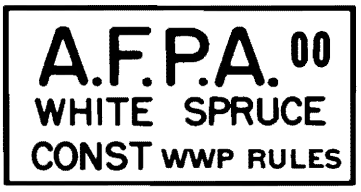
Grading Rule	Species
British Columbia Lumber Manufacturers Association (BCLMA) No. 59 Standard Grading and Dressing Rules, Aug. 1959, Revised September 1, 1967.	Douglas Fir Pacific Coast Hemlock Sitka Spruce Western Red Cedar Pacific Coast Yellow Cedar
Canadian Lumbermen's Association (CLA) Standard Grading Rules, revised edition August 1967.	White Pine Red Pine
Eastern Lumber Grading Authority (ESGC) Standard Grading Rules, dated May 14, 1961, as published by the Canadian Lumbermen's Association, the Quebec Lumber Manufacturers' Association and the Maritime Lumber Bureau, revised September 1964.	Eastern Spruce Balsam Fir Jack Pine Eastern Hemlock Poplar Tamarack Eastern Cedar
West Coast Lumber Inspection Bureau (WCLIB) Standard Grading and Dressing Rules, No. 15, March 1956, revised June 1967.	Douglas Fir West Coast Hemlock Sitka Spruce Western Red Cedar
Western Wood Products Association (WWPA) Standard Grading Rules, effective January 1965 and Supplement effective January 1966.	Ponderosa Pine Douglas Fir Western Larch White Fir Engelmann Spruce White Spruce Lodgepole Pine Jack Pine Western White Pine Eastern Spruce Western Red Cedar Western Hemlock
Eastern Pine Grading Committee (EPGC) Rules for White and Red Pine as Published by the Quebec Lumber Manufacturers' Association, revised August 1967.	White Pine Red Pine

These rules will eventually be replaced by the 1971 NLGA Standard Grading Rules for Canadian Lumber published by the National Lumber Grades Authority. The facsimilies of grade marks for the NLGA rules are shown in Appendix F.

Lumber species in Tables B-1 to B-11 in Appendix B are identified by the Standard commercial names for individual species given in CSA O141-1965, "Softwood Lumber." Since a number of these species are marketed together, certain combinations of species are given a single species designation on grade marks. The maximum allowable spans for such species combinations are those for the lowest valued individual species in the combination.

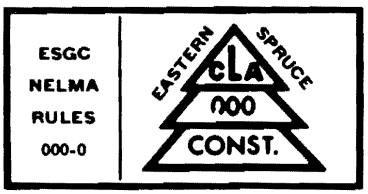
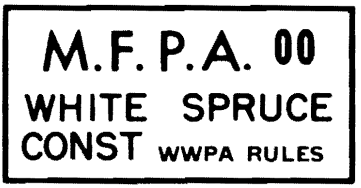
FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

I. LUMBER MANUFACTURING ASSOCIATIONS

FACSIMILE OF GRADE MARK	ASSOCIATION	GRADING RULES
	Alberta Forest Products Association, 10428 — 123 rd Street, Edmonton, Alberta.	W.W.P.A.
	British Columbia Lumber Manufacturers Association, 1477 W. Pender Street, Vancouver 1, B.C.	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
Column 1	Column 2	Column 3

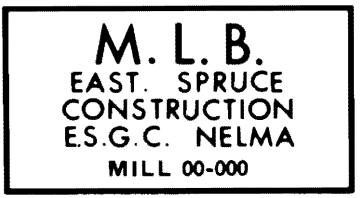
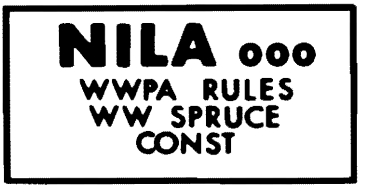
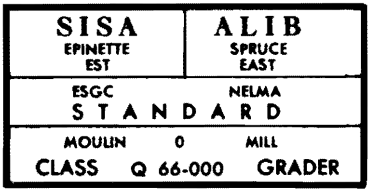
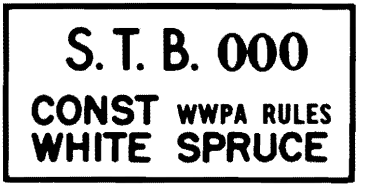
Note: There may be minor modifications to these basic grade marks but the same kind of information must be included.

FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

FACSIMILE OF GRADE MARK	ASSOCIATION	GRADING RULES
	Cariboo-Lumber Manufacturers Association, Box 863, Williams Lake, B.C.	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
	Canadian Lumbermen's Association, 27 Goulbourn Ave., Ottawa 2, Ont.	C.L.A. and E.S.G.C. (N.E.L.M.A.)
	Interior Lumber Manufacturers Association, Suite 4, 44 West Padmore St., Penticton, B.C.	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
	Manitoba Forest Products Association, 559 Oxford St. St. Vital, Winnipeg 9, Man.	W.W.P.A.
Column 1	Column 2	Column 3

Note: There may be minor modifications to these basic grade marks but the same kind of information must be included.

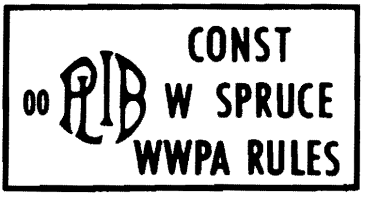
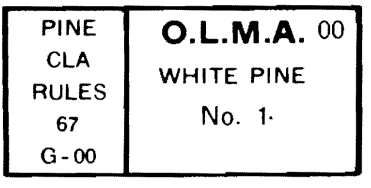
FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

FACSIMILE OF GRADE MARK	ASSOCIATION	GRADING RULES
	Maritime Lumber Bureau, P.O. Box 459, Amherst, N.S.	E.S.G.C. (N.E.L.M.A.) or C.L.A.
	Northern Interior Lumberman's Association, 514-550 Victoria Street, Prince George, B.C.	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
	Atlantic Lumber Inspection Bureau P.O. Box 657, 5 du Parloir Street, Quebec 4, P.Q.	E.L.G.A.
	Saskatchewan Timber Board, M and C Bldg., Prince Albert, Sask.	W.W.P.A.
Column 1	Column 2	Column 3

Note: There may be minor modifications to these basic grade marks but the same kind of information must be included.

FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

II. INDEPENDENT GRADING AGENCIES

FACSIMILE OF GRADE MARK	ASSOCIATION	GRADING RULES
	California Lumber Inspection Service San Jose, California, 95125 (Branch Office: Kamloops, B.C.)	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
	MacDonald Inspection, 125 East 4th Avenue, Vancouver 10, B.C.	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
	Pacific Lumber Inspection Bureau, White-Henry-Stuart Building, Seattle, Wash. 98101 B.C. Division Office, 1460-1055 West Hasting St., Vancouver 1, B.C.	B.C.L.M.A. W.C.L.I.B. or W.W.P.A.
	Ontario Lumber Manufacturers Association, 85 St. Clair Ave. East, Toronto 1, Ont.	C.L.A. E.L.G.A. or W.W.P.A.
Column 1	Column 2	Column 3

Note: There may be minor modifications to these basic grade marks but the same kind of information must be included.

APPENDIX F

GRADE MARKINGS OF CANADIAN LUMBER

(FOR LUMBER GRADED TO THE RULES SHOWN IN TABLE 3C IN SECTION 3)

FOREWORD

The grade mark of a CLS certified agency on a piece of lumber indicates its assigned grade, species or species combination, moisture condition at time or surfacing, the responsible grader or mill or origin, and the CLS certified agency under whose supervision the grading and marking was done.

Canadian Lumber conforming to CSA O141-1970 "Softwood Lumber" is normally graded to the NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. If graded to rules other than the NLGA, the grade mark indicates the grading rule used.

The NLGA rules specify standard grade names and grade name abbreviations for use in grade marks, to provide identification of lumber grades. In a similar fashion, standard species names or standard species abbreviations, symbols or marks are provided in the rules for use in grade marks.

If lumber is graded in accordance with the 1971 NLGA Standard Grading Rules for Canadian Lumber, grade marks will denote its moisture condition at the time of surfacing. "S-DRY" in the mark indicates the lumber was surfaced at a moisture content not exceeding 19 per cent. "MC 15" indicates a moisture content not exceeding 15 per cent. "S-GRN" in the grade mark signifies that the lumber was surfaced at a moisture content higher than 19 per cent at a size to allow for natural shrinkage during seasoning.

Lumber species in Tables D-1 to D-11 in Appendix D are identified by the standard commercial names for individual species given in CSA O141-1970, "Softwood Lumber." Since a number of these species are marketed together, certain combinations of species are given a single species designation on grade marks. The maximum allowable spans for such species combination are those for the lowest valued individual species in the combination.

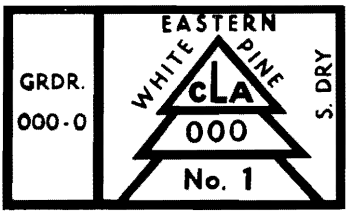
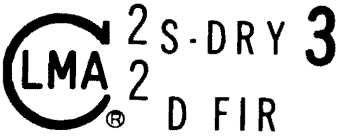
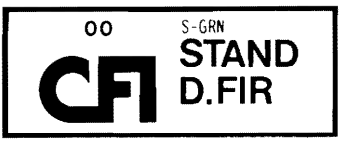
The Various Canadian species and species combinations in the "NLGA Standard Grading Rules for Canadian Lumber" and their standard abbreviations, either of which may appear on the grade marks, are shown in Table F.

TABLE F

SPECIES DESIGNATIONS AND ABBREVIATIONS

Commercial Designation of Species or Species Combination	Abbreviation Permitted on Grade Stamps	Species Included
Douglas fir-Larch	D Fir-L	Douglas fir, Western larch
Hem-Fir	Hem-Fir	Western hemlock, Amabilis fir Grand fir
Eastern hemlock-Tamarack	Hem-Tam	Eastern hemlock, Tamarack
Pacific coast yellow cedar	Y Cedar	Pacific coast yellow cedar
Jack pine	—	Jack pine
Spruce-Pine-Fir	S-P-F	White spruce Engelmann spruce Black spruce Red spruce Lodgepole pine Jack pine Alpine fir Balsam fir
Coast sitka spruce	C Sit Spr	Sitka spruce
Ponderosa pine	P Pine	Ponderosa pine
Red pine	—	Red pine
Western white pine	W W Pine	Western (Idaho) white pine
Eastern white pine	East. White Pine	Eastern white pine
Western cedars	W Cedar	Western red cedar Pacific coast yellow cedar
Poplar	—	Aspen Poplar Large-tooth Aspen Balsam Poplar

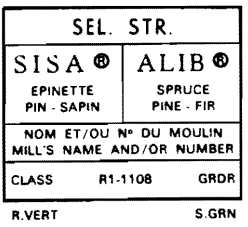
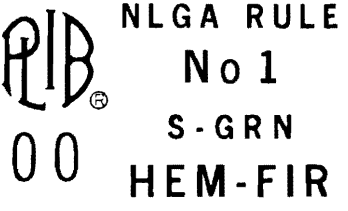
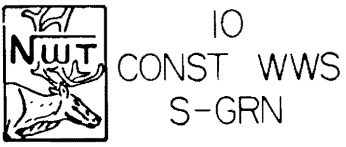
FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

FACSIMILE OF GRADE MARK	ASSOCIATION OR AGENCY
A.F.P.A.® 00 S-GRN S-P-F CONST	Alberta Forest Products Association, 10428 — 123rd Street, Edmonton 40, Alberta.
	Canadian Lumbermen's Association, 27 Goulbourn Avenue Ottawa 2, Ontario.
	Cariboo Lumber Manufacturers Association, Box 863, Williams Lake, B.C.
	Council of the Forest Industries of British Columbia, 1500 Guinness Tower, 1055 West Hastings Street, Vancouver 1, B.C.
DOUG FIR-L ILMA93 CONST S GRN	Interior Lumber Manufacturers Association, Suite 4, 44 West Padmore Street, Penticton, B.C.

FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

FACSIMILE OF GRADE MARK	ASSOCIATION OR AGENCY
M. F. P. A. 20 S-P-F S-GRN STUD	Manitoba Forest Products Association, 559 Oxford Street, Winnipeg 9, Manitoba.
M L B SPRUCE PINE FIR STAND. S. GRN. MILL 11 – 466	Maritime Lumber Bureau, P.O. Box 459, Amherst, Nova Scotia.
NILA® 278 S·P·F 1 S-DRY	Northern Interior Lumbermen's Association, 514 The Royal Bank Building, 550 Victoria Street, Prince George, B.C.
O.L.M.A.® 01-1 CONST. S-DRY SPRUCE - PINE - FIR	Ontario Lumber Manufacturers Association, 85 St. Clair Avenue, East, Toronto 7, Ontario.
S. T. B. ® 101 S-P-F CONST. S-GRN	Saskatchewan Timber Board, M and C Building, Prince Albert, Sask.

FACSIMILES OF GRADE MARKS USED BY CANADIAN LUMBER MANUFACTURING ASSOCIATIONS AND AGENCIES AUTHORIZED TO GRADE MARK LUMBER IN CANADA

FACSIMILE OF GRADE MARK	ASSOCIATION OR AGENCY
	Service d'inspection des sciages de l'Atlantique, Atlantic Lumber Inspection Bureau, A Branch of Quebec Lumber Manufacturers Association, P.O. Box 657, 5 du Parloir Street, Quebec 4, P.Q.
	California Lumber Inspection Service, San Jose, California, 95125. (Branch Office: Kamloops, B.C.)
	MacDonald Inspection, 125 East 4th Avenue, Vancouver 10, B.C.
	Pacific Lumber Inspection Bureau, White-Henry-Stuart Building, Seattle, Washington, 98101. B.C. Division Office, 1460-1055 West Hastings St., Vancouver, B.C.
	N.W.T. Grade Stamping Agency, P.O. Box 2157, Yellowknife, N.W.T.

INDEX

Reference has been made throughout this document to the National Building Code of Canada 1970. Copies of the National Building Code and its supplements can be obtained by writing to:

THE SECRETARY,
ASSOCIATE COMMITTEE ON THE NATIONAL BUILDING CODE,
NATIONAL RESEARCH COUNCIL OF CANADA,
OTTAWA, ONTARIO. K1A 0R6.

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