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INTERPRETATION TO
NATIONAL BUILDING CODE OF CANADA 1980

Part 9: Housing and Small Buildings

May 1984



Indian and Northern
Affairs Canada

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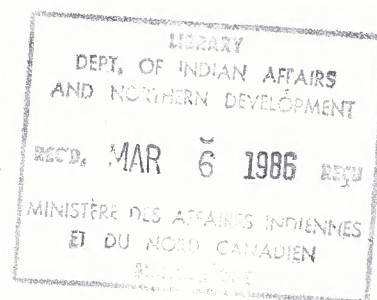
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INTERPRETATION TO
NATIONAL BUILDING CODE OF CANADA 1980

Part 9: Housing and Small Buildings

May 1984



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Interprétation du code national
du bâtiment 1980

**INTERPRETATION
TO
NATIONAL BUILDING CODE
OF CANADA
1980**

**PART 9:
HOUSING AND SMALL BUILDINGS**

Indian and Northern Affairs Canada

Technical Services and Contracts Branch

Ottawa, Ontario K1A 0H4

INTRODUCTION

The material in this publication was developed originally as part of a companion document to the Ontario Indian Housing Council RESIDENTIAL BUILDING CODE FOR INDIAN RESERVES, 1982 edition. It was intended to supplement and complement the Code in order to assist homeowners, builders and band councils who may not have ready access to professional assistance to understand the requirements of the Code. This publication contains that portion of the material which applies without change (other than article numbers) or with very little change, to Part 9 of the National Building Code of Canada, 1980 edition. It is provided for the benefit of Indian reserves using, or desiring to use, the National Building Code. It includes the following:

1. Drawings and written explanations that interpret the more technical requirements of the Code. They are to be used only in conjunction with the Code. They describe minimum requirements for purposes of health, fire and construction safety, and the structural strength of the building. They are not intended as complete or accurate descriptions of the best or recommended ways of constructing a building. They should not be used in place of proper construction documents for the purpose of building.
2. Summaries of standards and codes referenced in the Code are intended to assist users who do not have ready access to these documents. While the summaries are considered accurate they are not complete statements of the contents of the standards and codes. The original versions should be consulted in case of legal dispute.
3. A glossary explaining the more technical terms is given at the end of the summaries.

Together these will make it easier for users of the Code, including band councils, inspectors and homeowners to apply and to follow the Code for the purpose of obtaining housing of an acceptable quality on reserves.

The material provided does not cover all interpretations which might be considered necessary or desirable, but rather those which were available and could readily be adapted.

It is presented for information only, and represents the interpretation of the code text, in the opinion of departmental staff.

Other experts may or may not agree with these opinions. Designers should therefore review specific plans and specifications for particular projects with regard to requirements of the Code. The Department of Indian & Northern Affairs cannot accept responsibility for the legal consequences of following these interpretations.

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SUMMARIES OF STANDARDS REFERRED TO IN PART 9 OF
THE NATIONAL BUILDING CODE OF CANADA

1. Introduction
2. Index of Standards
3. Summaries of Standards
4. Glossary of Technical Terms

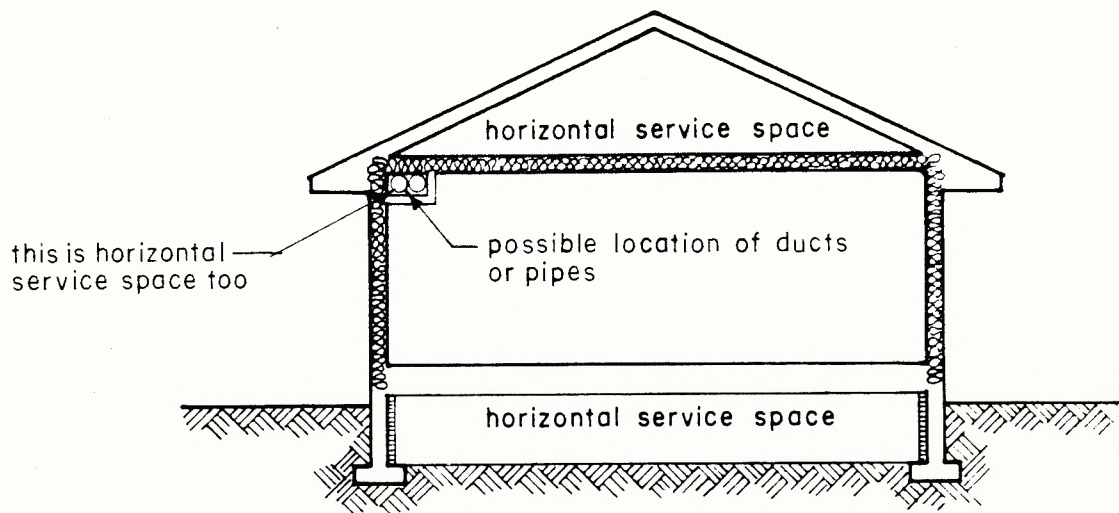
general

SECTION 9.1

definitions

SECTION 9.2

9.2.1 DEFINITION: HORIZONTAL SERVICE SPACE



Note: Water pipes and heating ducts to be located inside an insulated space unless insulated themselves.

INTERPRETATION :

PART 9

NATIONAL BUILDING CODE OF CANADA 1980

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— INTENDED TO EXPLAIN WORDING SPECIFIC TO CODE ARTICLES

— TO BE USED ONLY IN CONJUNCTION WITH THIS CODE

— NOT TO BE USED AS CONSTRUCTION DRAWINGS AND SPECIFICATIONS

Date:

1.2.84

Section:

9.2

**materials, systems
& equipment**

SECTION 9.3

9.3.1.2

SULPHATE RESISTING CEMENT: Sulphates in the soil or ground water, that come into contact with the cement in the concrete, form compounds that expand the concrete so much that it may disintegrate. A special cement has been developed to resist this tendency. The soils with this problem are those high in gypsum, which is made of sulphates of calcium, sodium and magnesium. Local soil tests or experience will indicate if sulphate resisting cement should be used.

9.3.1.5

COMPRESSIVE STRENGTH: Concrete is measured by the force it takes to crush it, for example, 14 MPa (2030 psi) concrete will resist a force of 14 MN on an area of 1 m² or 14 N on 1 mm² (or 2030 lbs. on an area of 1 sq. in.).

Concrete has no strength when it is first made. It gains strength, or becomes harder, as days go by. 28 days after pouring the concrete has become almost as hard as it can ever become. Therefore, the force required to crush it after 28 days is used to judge how good it is. Tests are made on small samples taken and made into cylindrical pieces when the concrete is poured (See standard CAN3-A23.2-M77, "Methods of Test for Concrete" for details of testing procedures.)

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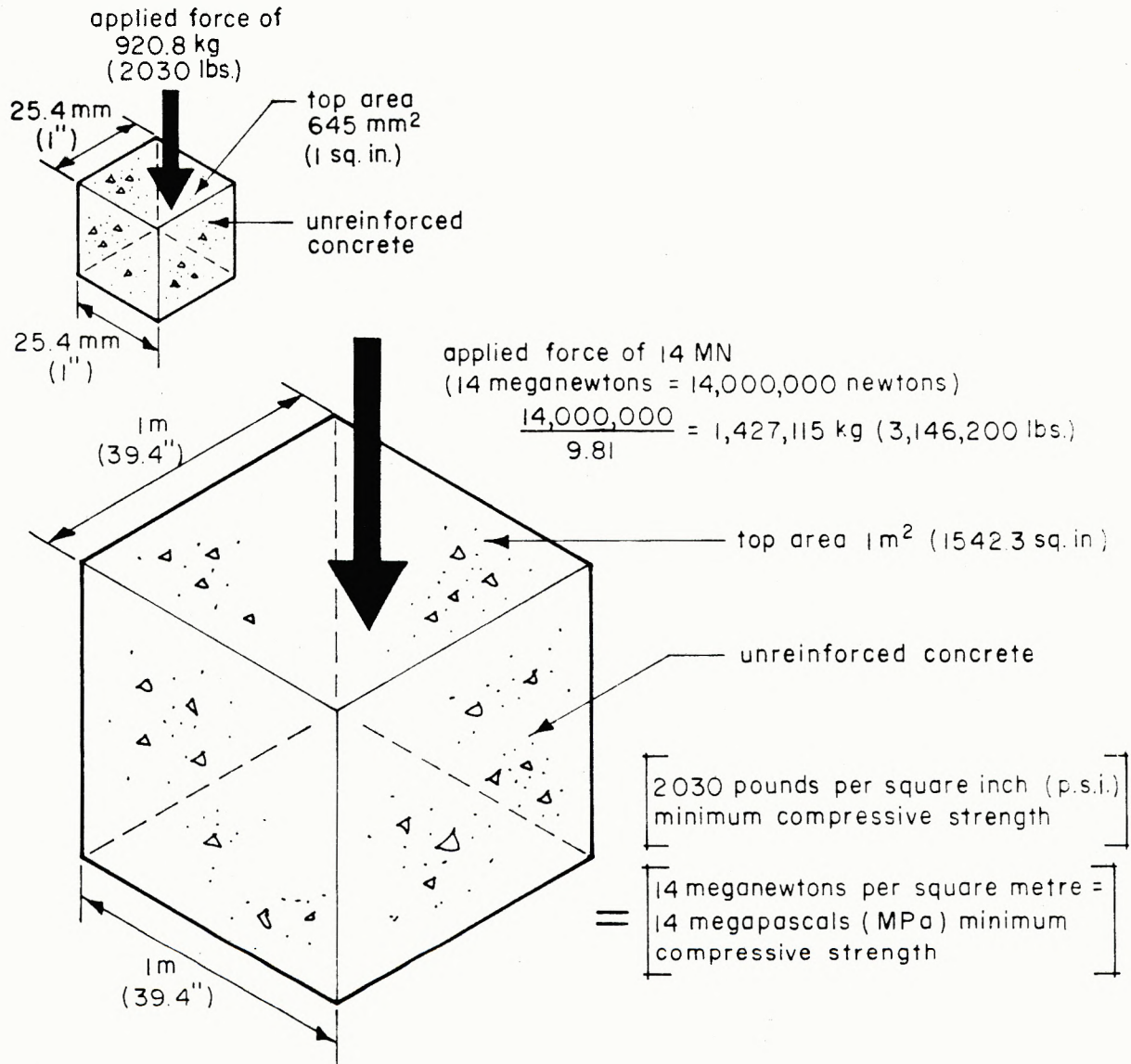
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9.3

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9.3.1.5 COMPRESSIVE STRENGTH OF CONCRETE



The 14 MPa (2030 p.s.i.) concrete can be crushed by the force indicated on the area shown.

9.3.1.7

SLUMP TEST, SLUMP: This test is used to measure or estimate the workability of fresh concrete. Workability means how easy it is to place it into a mold or formwork, to trowel it to a smooth surface, and above all, to obtain a finished product in the form of solid concrete structural work without honeycombs or voids.

Date:

1.2.84

Section:

9.3

9.3.1.7
cont'd

The test includes placing and compacting the fresh concrete to be tested into a standard mold which takes the form of a truncated cone (a cone with the pointed end cut off) 300mm (12") high, sitting large-end down on a flat surface. The distance the concrete "slumps" (or sags) when the mold is removed is the "slump" of the concrete, measured in millimetres (mm) or inches. Generally the "wetter" the concrete, the greater the slump.

The same concrete mix with more mixing water (as indicated by high slump) is probably easier to work with, but suffers greatly in loss of strength compared with the same mix with less mixing water and lower slump. For example, a 37.0 MPa (5400psi) concrete at a water/cement (w/c) ratio of 0.45 [-that is, for every kg (2.2 lbs.) of cement in the concrete mixture there is 0.45 kg (1.0 lb.) of mixing water] may be weakened to a strength of only 21.0 MPa (3000 psi) if water is added to increase the w/c ratio to 0.7. Concrete of other strengths would be similarly weakened if water is added to increase the w/c ratio. Therefore one should always aim at using concrete with the lowest (least) slump which provides just sufficient workability for the job at hand.

The following table can be used as a rough guide.

RANGE OF SLUMP FOR VARIOUS TYPES OF CONSTRUCTION		
TYPE OF CONSTRUCTION	RANGE OF SLUMP, mm (ins.)	
	HAND TAMPING	MACHINE VIBRATION
Reinforced foundation walls and footings	50 - 125 (2 - 5)	25 - 125 (1 - 4)
Plain footings	25 - 100 (1 - 4)	25 - 75 (1 - 3)
Slabs, beams and reinforced walls and columns	75 - 150 (3 - 6)	50 - 100 (2 - 4)

Note that mixes given in Table 9.3.1A (Art 9.3.1.7) only apply for slump up to 100 mm (4"). Different mixes would have to be used with greater slump.

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9.3.2.1 &
9.3.2.2

GRADE MARKING OF LUMBER: The standard grading rules for Canadian lumber are the National Lumber Grades Authority (NLGA) Rules. When a log is sawed into lumber the various pieces vary greatly in quality. Lumber grading is the separation of these pieces of lumber into grades according to quality and the purpose for which the lumber is intended to be used. Grading rules have been established so that lumber from different sawmills will have approximately the same value and can be used for the same purpose regardless of the mill or log from which the lumber was produced.

A number of Canadian timber species (pine, spruce, etc.), are grown, harvested, manufactured and marketed together and are suitable for similar purposes. These species are grouped together for grading purposes. See Appendix A to National Building Code.

The maximum allowable spans for these combinations are listed in the span tables for joists, rafters and beams.

Since the allowable span for a species combination is based on the weakest species in the combination, the use of the span is permitted for any individual species included in the combination.

Lumber grades acceptable for use for 'Boards' and 'Framing' are listed in Table 9.3.2.A.

Lumber which has been graded to the NLGA Rules is marked to show: the grade; the species or the species combination; the moisture content at the time the lumber is surfaced in the mill; the responsible grader or mill; and the certification agency which supervises the grading and marking.

Examples of two of the most common grade stamps in Ontario (12 total in Canada) are

9.3.2.1 &
9.3.2.2
(Cont'd)

(1)	<div> CLA S-P-F 100 STAN S-GRN </div>	(2)	<div> OLMA 01-1 UTIL S-DRY SPRUCE-PINE-FIR </div>
-----	---	-----	---

In these two examples, the letters and numbers indicate the following:

(1) CLA	Canadian Lumbermen's Association (the authorized certification agency).
S-P-F	Spruce-Pine-Fir (the species combination).
100	The number of the responsible grader or mill.
STAN	Standard (the grade of lumber).
S-GRN	Moisture content of over 19% (means the lumber was surfaced at a larger size to allow for natural shrinkage during seasoning).
(2) OLMA	Ontario Lumber Manufacturing Association (the authorized certification agency).
01-1	The number of the responsible grader or mill.
UTIL	Utility (the grade of lumber).
S-DRY	Moisture content of 19% or less.

Other abbreviated marks which may occur in grade stamps include:

MC 15	Moisture content of 15% or less.
ECON	Economy (the grade of lumber).
COM	Common (the grade of lumber).

NLGA rules cover re-inspection of lumber delivered to a buyer upon receipt of a complaint by the buyer on the basis of grade, manufacture, quantity, size or moisture content of a shipment. The buyer may accept delivery of the shipment without losing the right to submit a complaint, provided that the complaint is made to the Certification Agency (named on the grade stamp) within 10 days after the receipt of the shipment (72 hours for complaints on moisture content; 90 days for complaints on grade, if the shipment is wrapped, strapped or in packaged units). See NLGA rules for actual details, which include the necessity for the buyer to pay the cost of re-inspection if only 5% or less of the shipment is found to be below specification or invoice.

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9.3.2.9

5% REDUCTION: This is undersized lumber which may be used only under certain circumstances. This is lumber that has been planed or cut slightly smaller than normal or has shrunk excessively in drying. For instance, a joist sized 38 mm x 184 mm (2" x 8", actual size 1½" x 7¼"), spruce, No. 1 grade, might be used down to actual size 38 mm x 175 mm (1½" x 6 7/8"), provided the span was reduced also, by 5%. In the span-table A-2, for floor joists at 400 mm (16") spacing the permitted span is given as 3.72 m (12'-1"). This would have to be reduced to 3.53 m (11'-6").

Grading rules specify that undersized lumber be marked with the actual reduced size. Since size varies with moisture content, comparison must be made between actual size and "permitted" size at the same moisture content.

Table
9.3.2.A

BOARDS: Pieces of wood cut long and wide in relation to their thickness. Usually 19 mm (nominally, 1") material in 140 mm (6"), 184 mm (8") and 235 mm (10") widths; and used for floor, wall or roof sheathing.

FRAMING: Wood material for the framework supporting the floors, walls and roof of a house. Usually 38 mm (2") thick material in various widths.

STUDS: Wooden framing pieces used in a series vertically to form the supporting framework for walls and partitions. Usually 38 mm x 89 mm or 38 mm x 140 mm (2" x 4" or 2" x 6") material @ 400 mm (16") o.c. or 600 mm (24") o.c. (See drawing 9.23.5.3).

JOISTS: Usually horizontal framing members supporting a floor, ceiling, or flat roof, or sloping roof with ceiling; spaced at regular intervals, usually 400 mm (16") or 600 mm (24"); usually of 38mm (2") thick material by various depths. (See drawing for Table 9.23.3.A and 9.23.13.13)

RAFTERS: Like joists, but with a slope such as 1:3 to support sloping roofs, but not ceilings. (See drawings 9.23.13.6 and 9.23.13.13)

Table
9.3.2.A
cont'd

POSTS (or COLUMNS) AND BEAMS: Thicker material usually supporting the ends of a group of joists, carrying larger loads than studs or joists. They form a supporting framework for floors, walls or roofs; spaced at wider intervals than studs and joists, usually 1.2 m (47") or more, for example, 89 x 140 mm (4" x 6") or 184 x 235 mm (8" x 10"). These may also be built up out of narrower pieces (for example, 38 mm (2") thick) bolted or spiked together. (See drawings 9.15.2.5, 9.17.2.1. and 9.17.4.2)

LINTELS: Horizontal framing members acting as beams carrying the load over openings such as doors or windows. (See drawings 9.23.11.4 and 9.23.11.6.)

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loads

SECTION 9.4

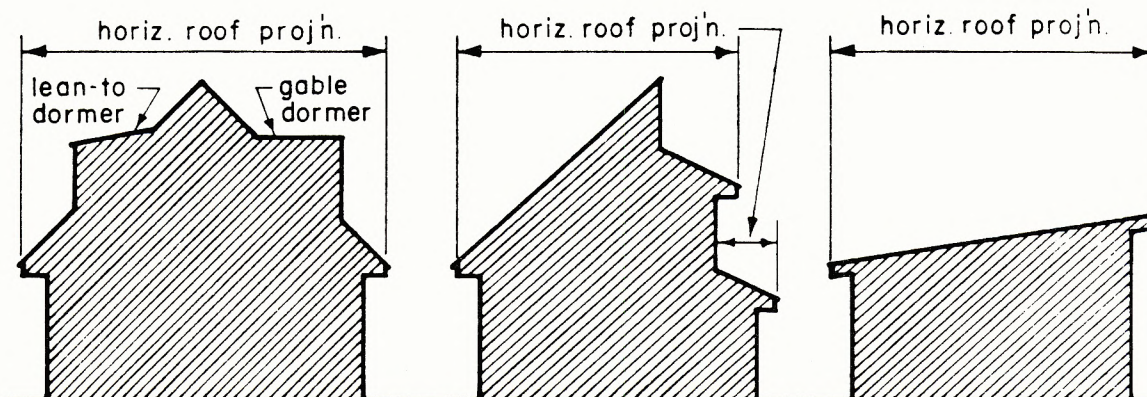
9.4.1.1

DEFLECTION LIMITS: Deflection is downward bending of structural members such as joists, beams or rafters, due to the load carried. Acceptable amounts of deflection means the amounts acceptable under the load given in span tables, etc. This is determined by whether the ceiling supported will be plastered or covered with gypsum board, since these will crack if deflection is too great.

9.4.3.1

DESIGN SNOW LOADS FOR ROOFS: The main weight a roof has to carry is snow, and Chapter 1 of the Supplement to the NBC lists the weight of snow that must be designed for in various parts of the country. Since snow does not accumulate on the roof as deeply as it does on the ground, due to wind and roof slope, the design snow load may be reduced to 60% if there are no higher roofs or trees nearby that would cause more snow to accumulate on the roof.

9.4.3.1 HORIZONTAL ROOF PROJECTIONS



Note: These are examples only; other roof types are possible.

Flat roofs or slopes less than 1 1/2:12 not recommended

9.4.7.1

ULTIMATE BEARING CAPACITY: The load which will cause the soil to fail (settle excessively) causing damage to the structure.

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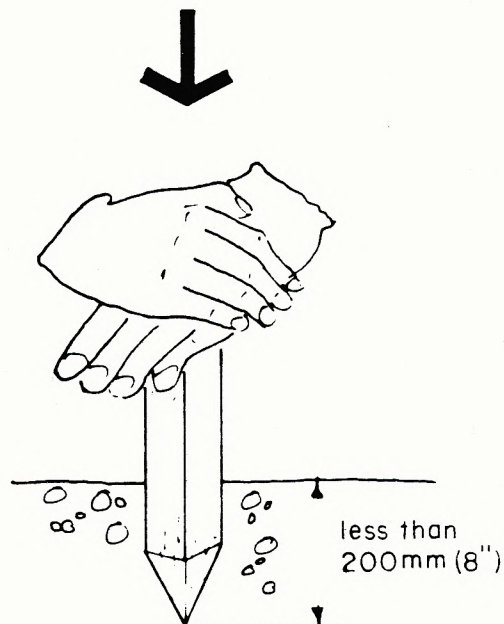
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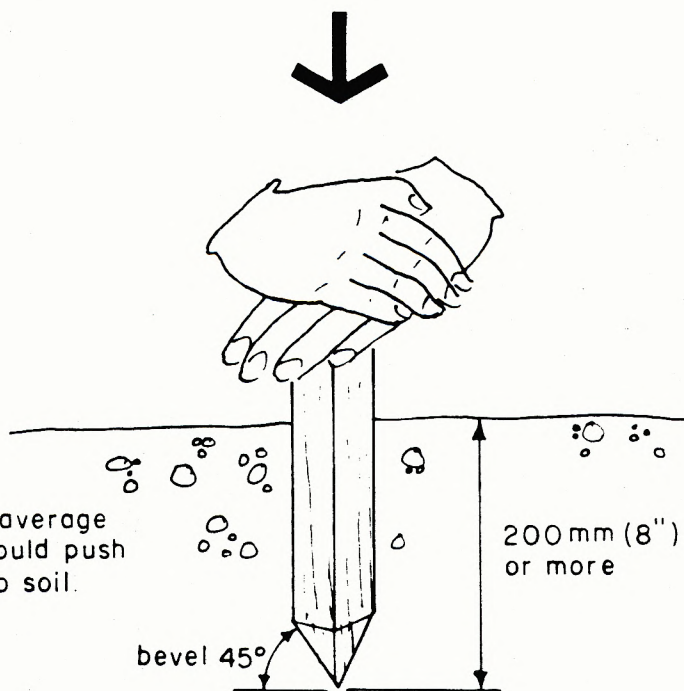
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TABLE 9.4.7.A (I) PICKET TEST (FOR SAND & GRAVEL)
& APPENDIX A



DENSE OR COMPACT

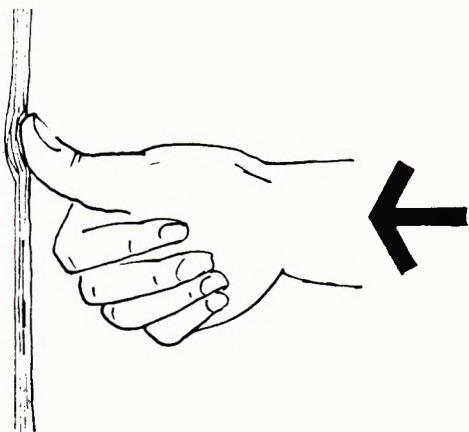


Note: Person of average weight should push picket into soil.

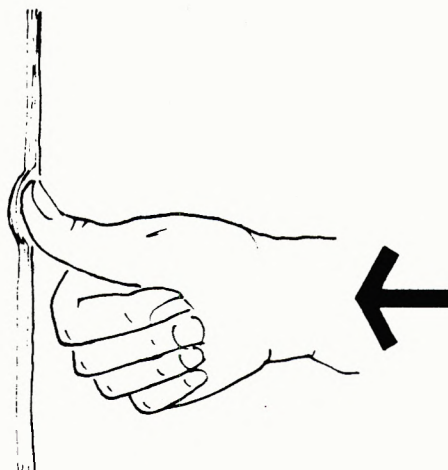
LOOSE

TABLE 9.4.7.A (2) THUMB TEST (FOR CLAY OR SILT) & APPENDIX A

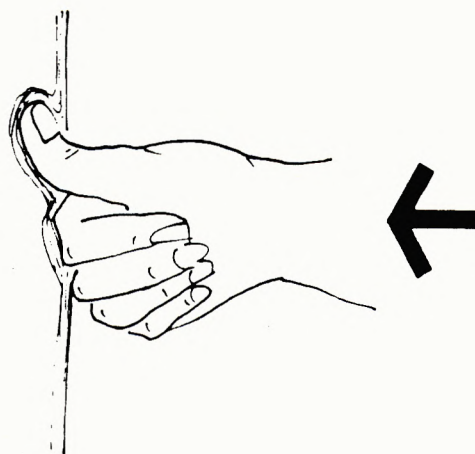
Note: This test is carried out on undisturbed soil in the wall of the test pit.



STIFF
(difficult to indent)



FIRM
(indented by moderate pressure)



SOFT
(easily penetrated by thumb)

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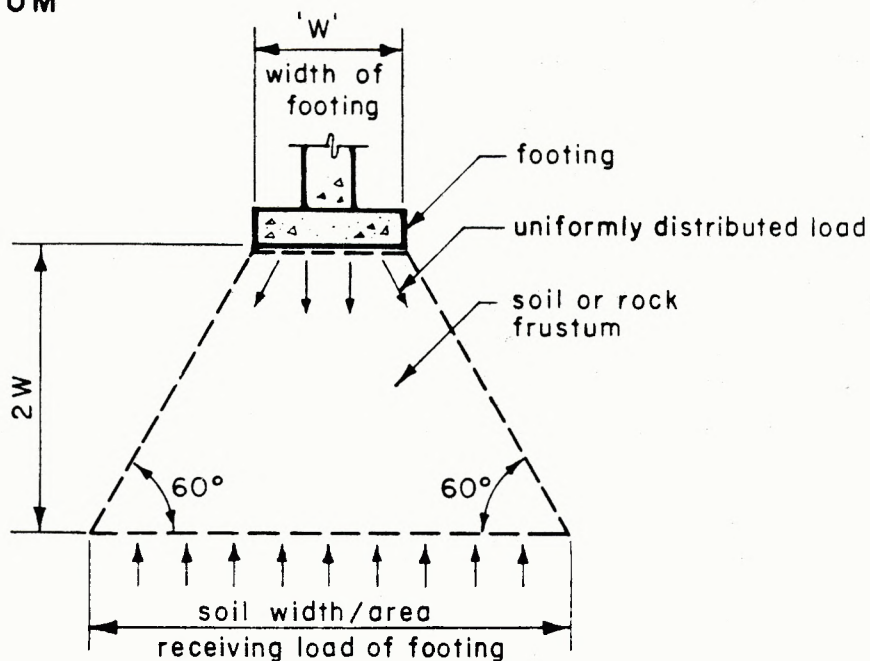
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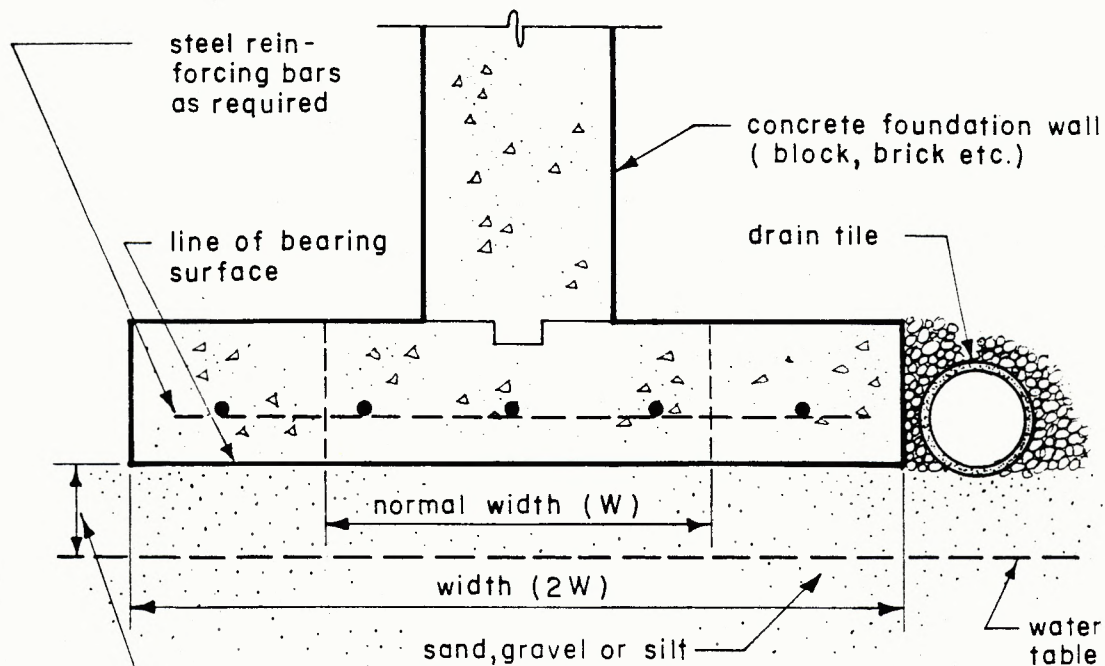
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9.4.7.3 FRUSTUM



This shows how load from a footing is spread downwards

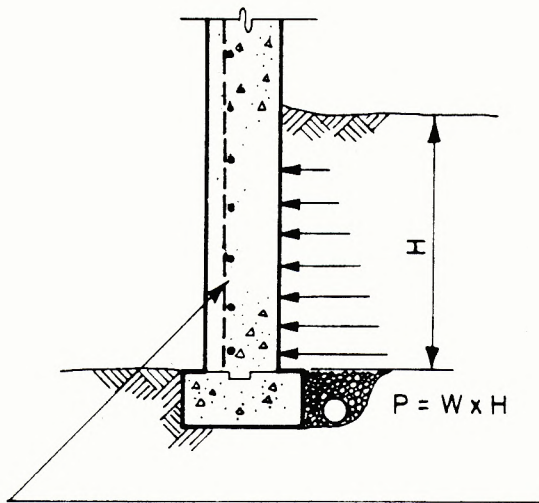
9.4.7.4 & 9.15.3.8 REDUCED ALLOWABLE BEARING PRESSURE



Note: Distance to water table less than width of foundation requires reduced bearing pressure to 1/2 (half) i.e. footing must be twice as big for same load.

Water table: level below which ground is saturated with water.

9.4.7.7 PRESSURE OF RETAINED MATERIAL



Wall must resist a pressure equal to weight times height. Normally this is accomplished when the wall thickness is in accordance with table 9.15.4.A. For greater heights an engineer's design will be needed.

horizontal and vertical steel reinforcing to resist earth pressure designed by a professional engineer, if required due to insufficient wall thickness

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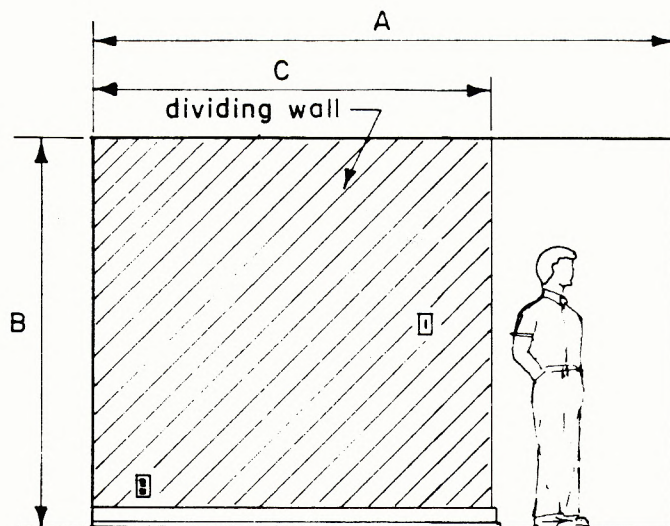
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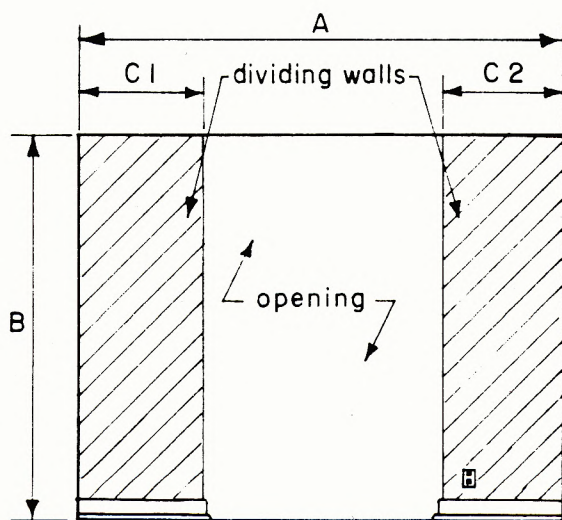
**room & space
dimensions**

SECTION 9.5

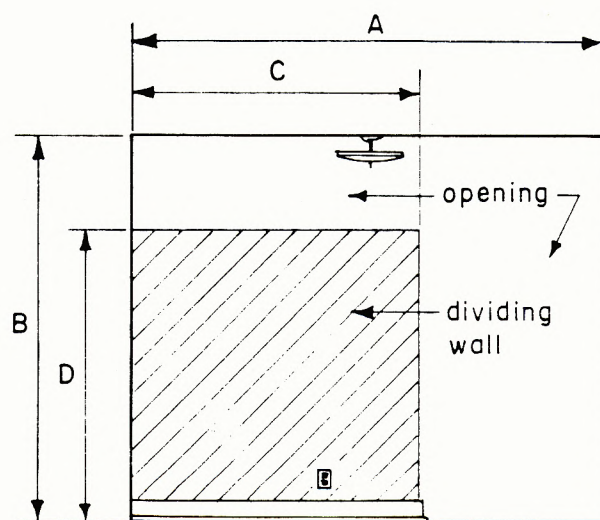
9.5.1.5 DIVIDING WALL BETWEEN COMBINATION ROOMS



If $B \times C$ is more than 60% of $A \times B$ the areas do not form a combination room.



If $(C1 + C2) \times B$ is less than 60% of $A \times B$ the areas form a combination room



If $C \times D$ is less than 60% of $A \times B$ the areas form a combination room

To make a combination room, dividing walls separating two or more rooms must occupy less than sixty per cent of vertical plane or division.

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TABLE 9.5.2.A , PARA.2 HEIGHTS IN BEDROOMS

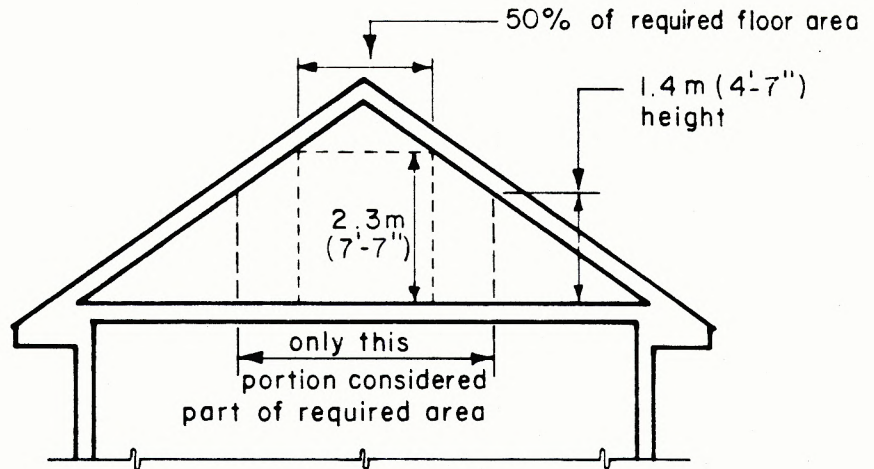


TABLE 9.5.2.A, PARA.3 UNFINISHED BASEMENT OR CELLAR HEIGHTS

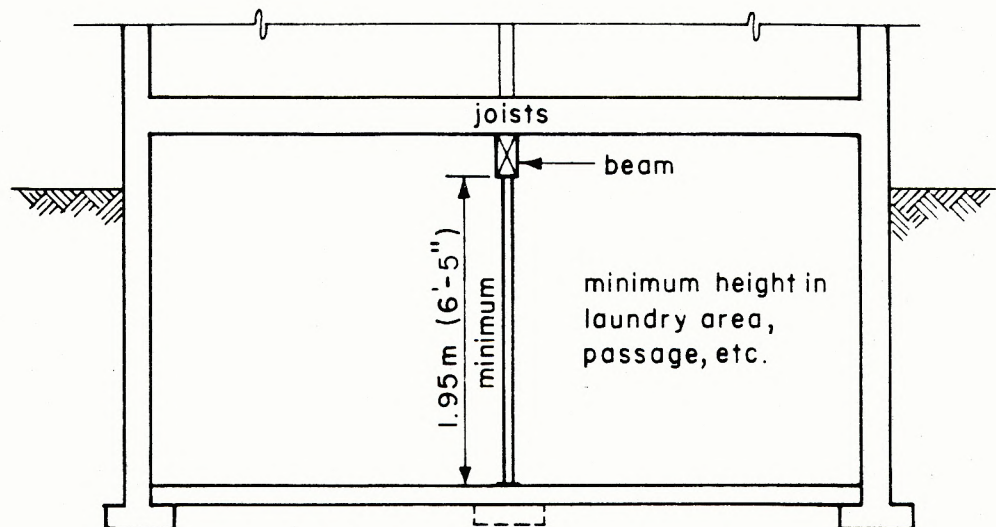
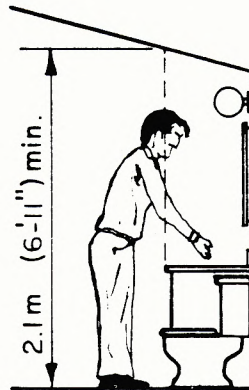
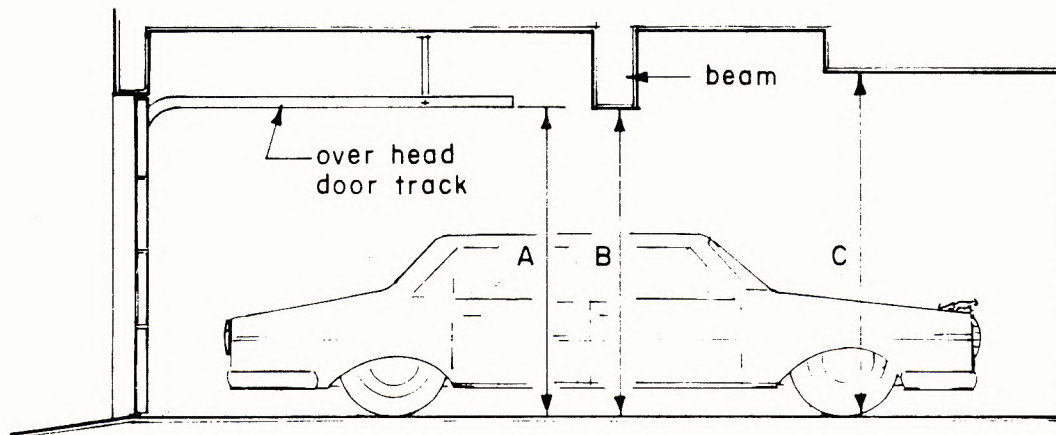


TABLE 9.5.2.A, PARA. 4 HEIGHT FOR BATHROOM OR LAUNDRY AREA



min. height in any area
a person would normally
stand

9.5.2.3 CLEAR HEIGHT IN GARAGE



Clear heights for dimensions A, B and C must be at least 2 m (6'-7")

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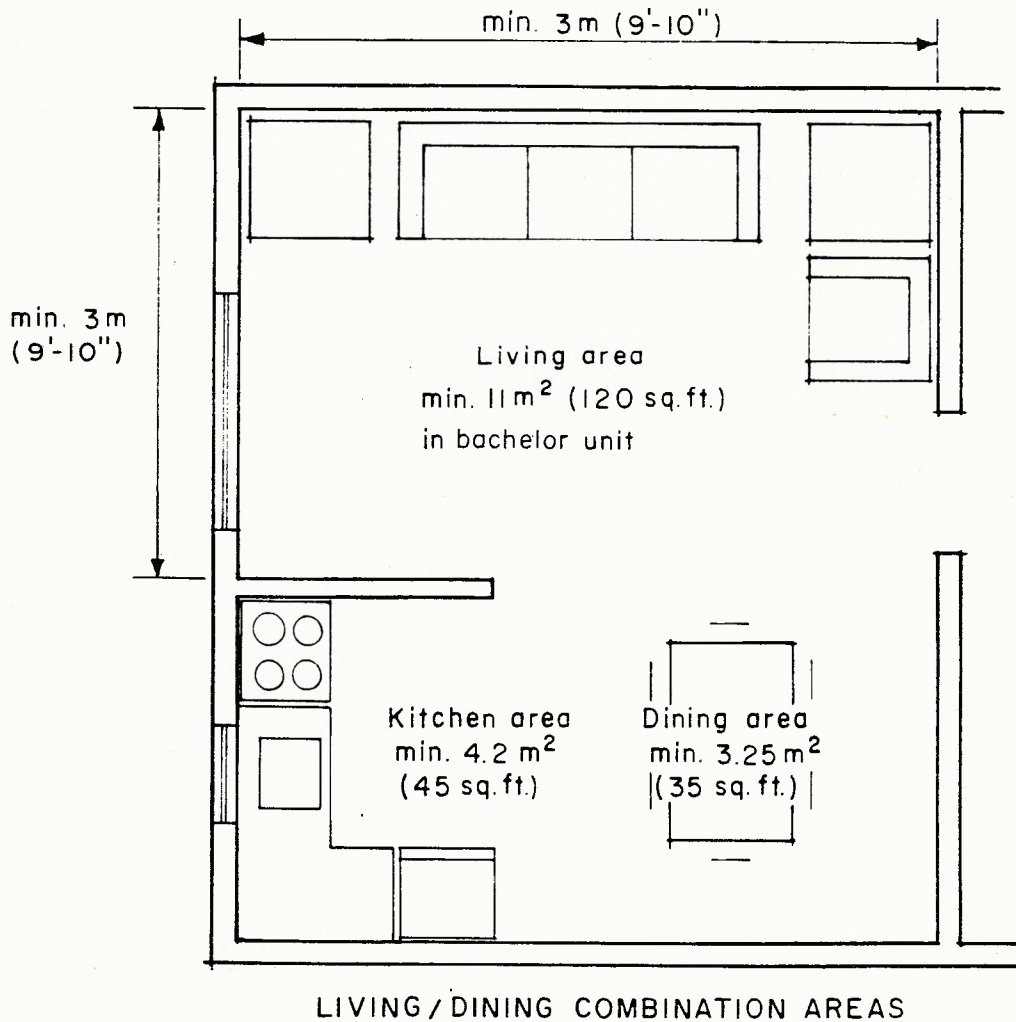
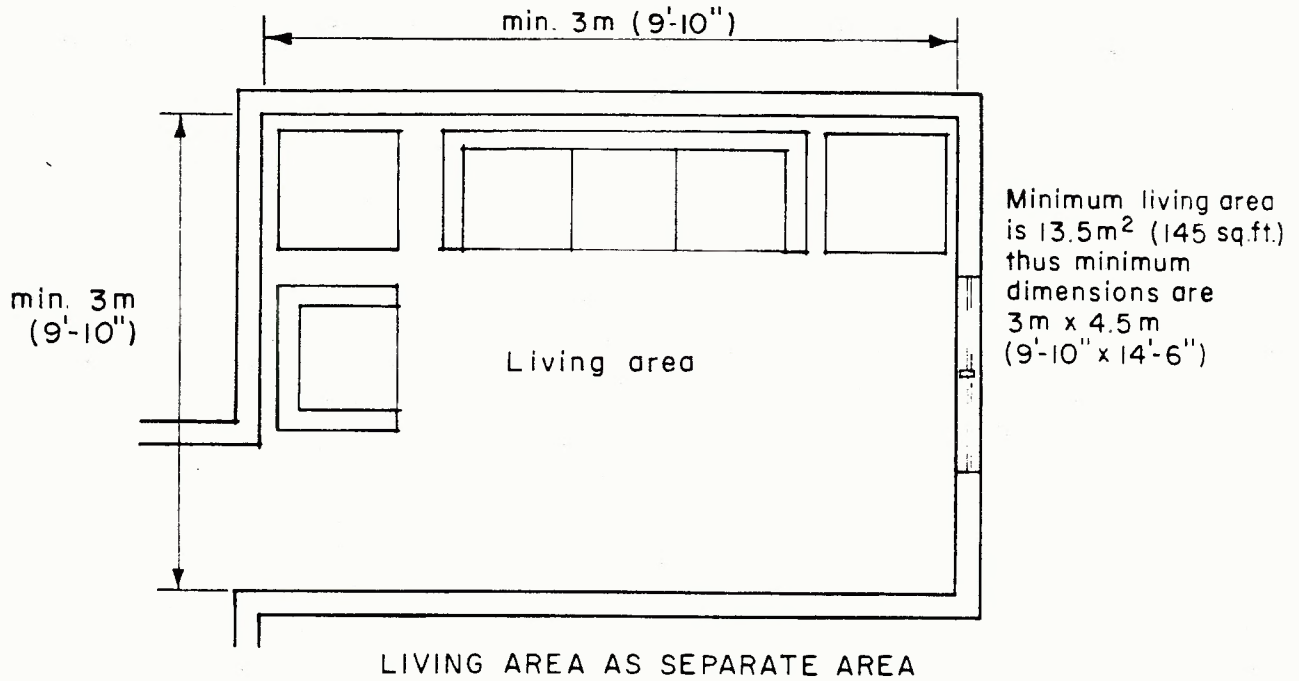
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9.5.3.1 LIVING ROOM & COMBINATION AREAS



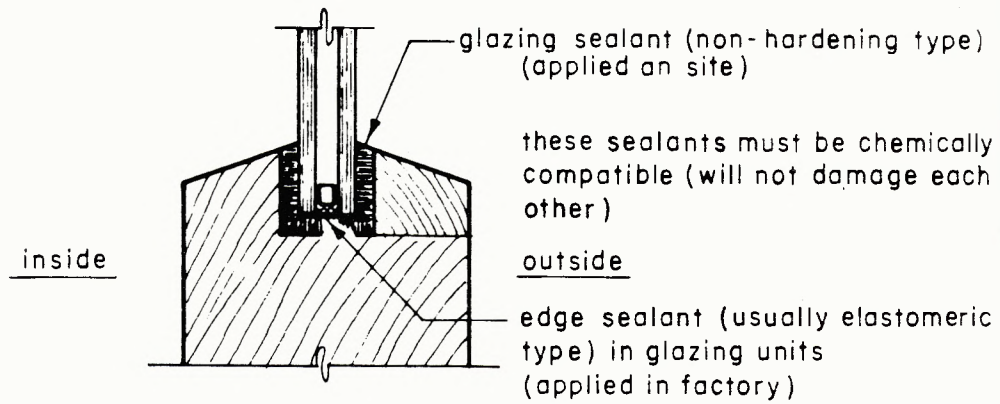
doors

SECTION 9.6

windows

SECTION 9.7

9.7.5.1 SEALANTS FOR GLAZING



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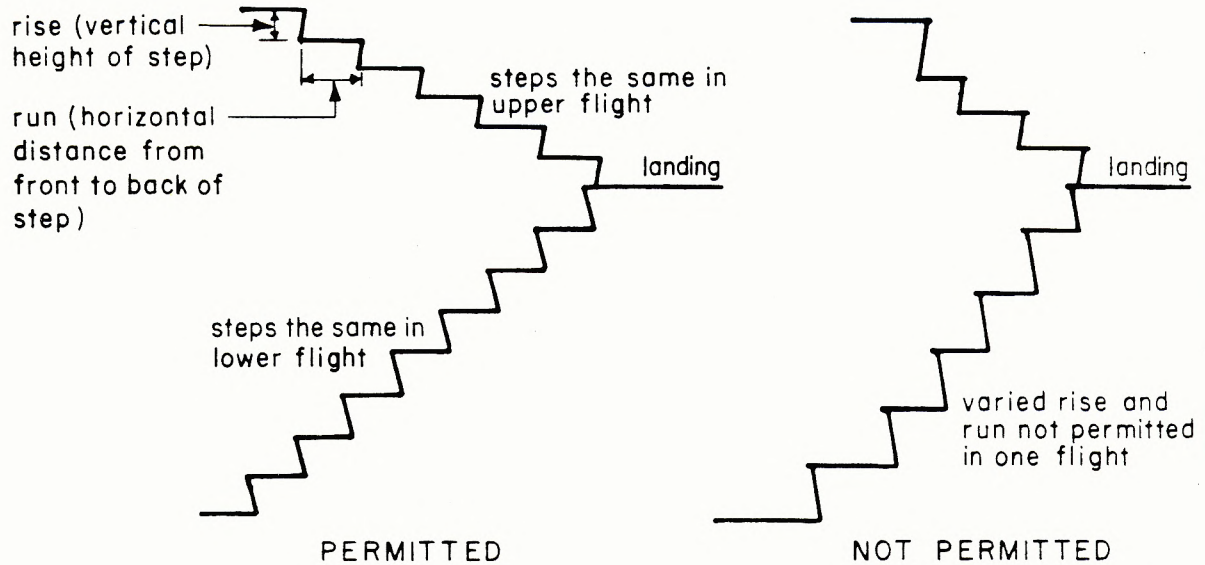
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**stairs, ramps,
handrails & guards**

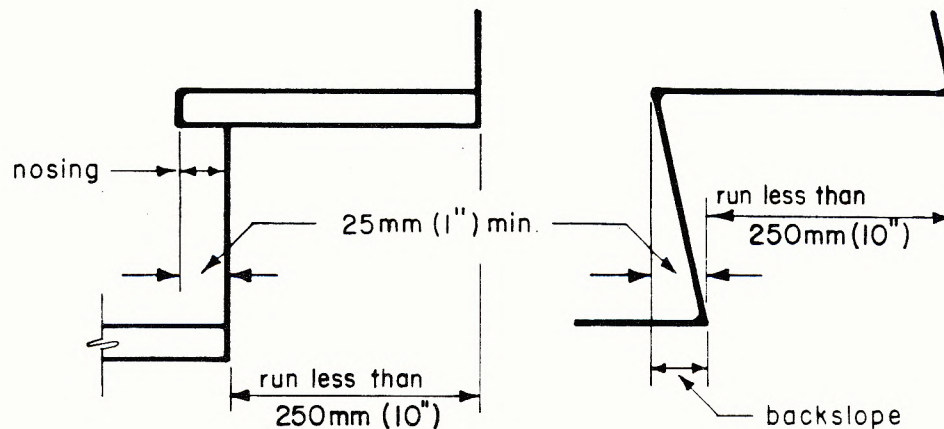
SECTION 9.8

9.8.2.1 UNIFORM TREADS & RISERS



Note: Generally, wherever possible all treads and risers in a stairway should be uniform.

9.8.3.4 NOSING OR BACKSLOPE



Note: Nosing or backslope is mandatory when run is less than 250 mm (10")

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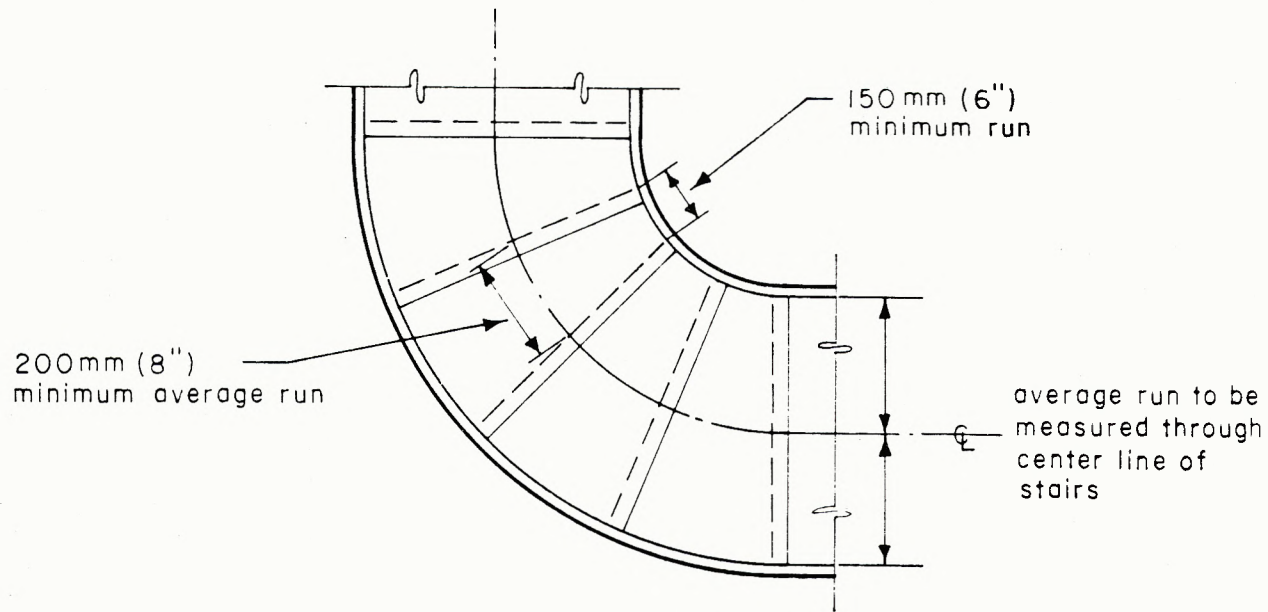
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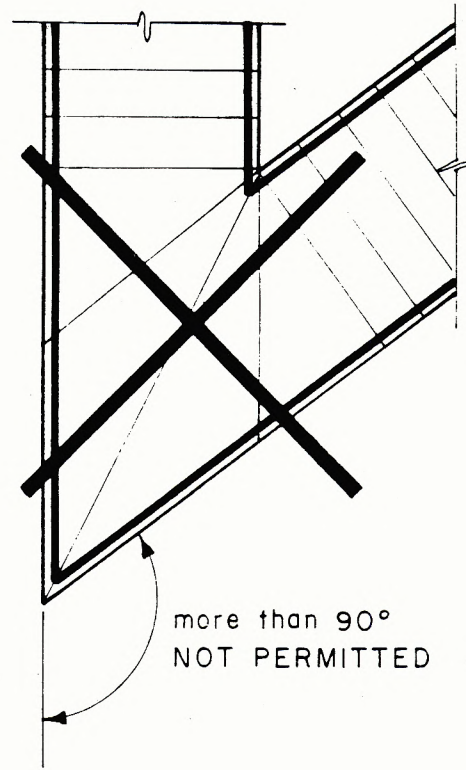
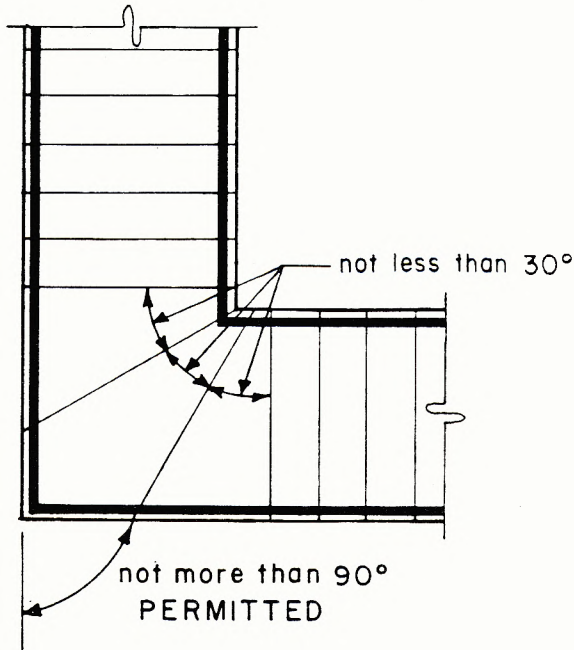
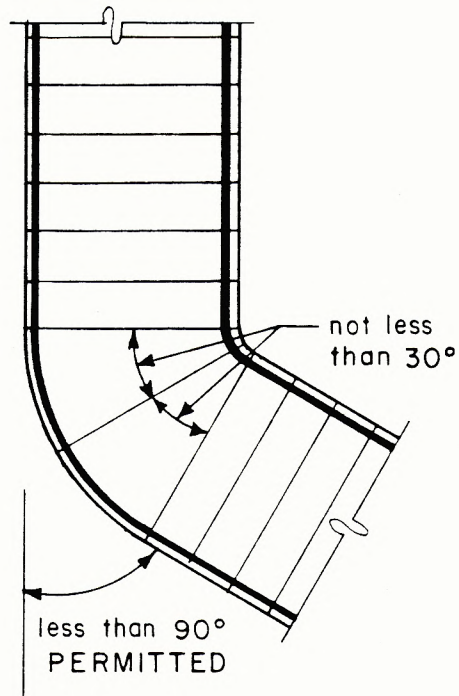
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9.8.5.2 RUNS ON CURVED STAIRS AND WINDERS



CURVED STAIRS

9.8.5.3 USE OF WINDERS & STAIRS



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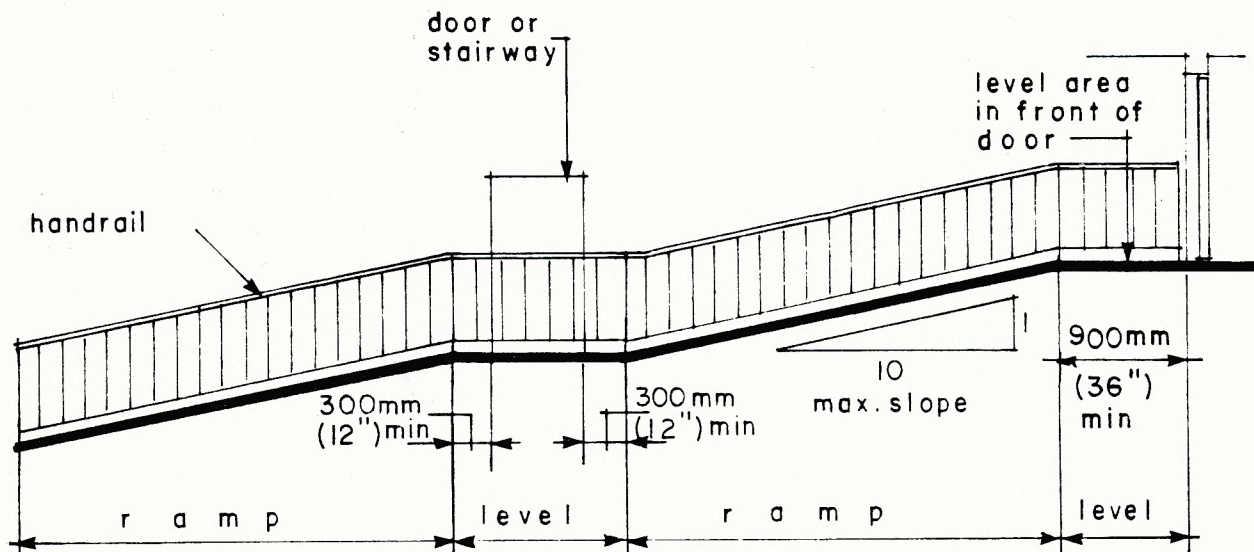
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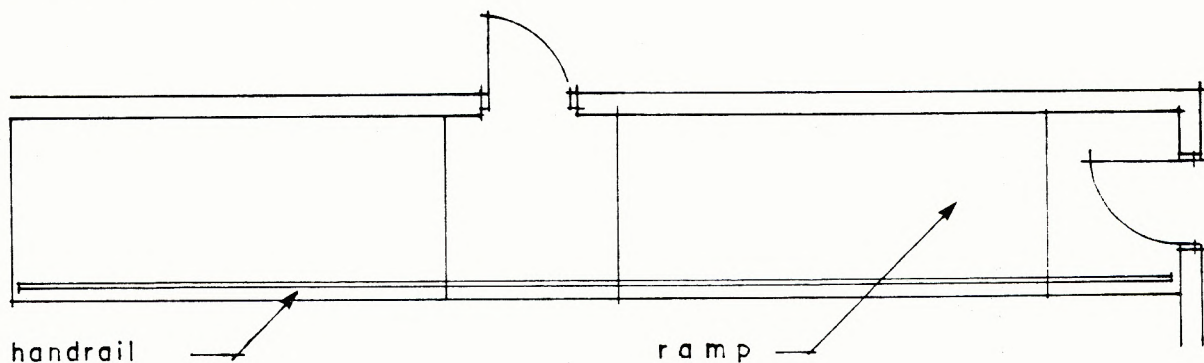
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9.8.6.2 & 9.8.6.3 DOORS OR STAIRS AT RAMPS



ELEVATION



P L A N

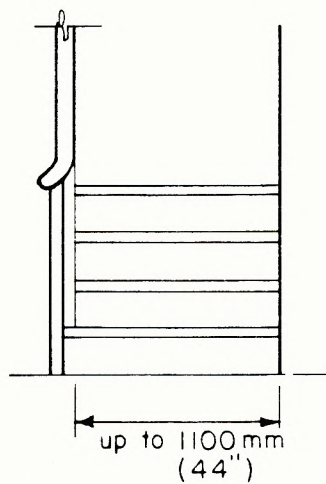
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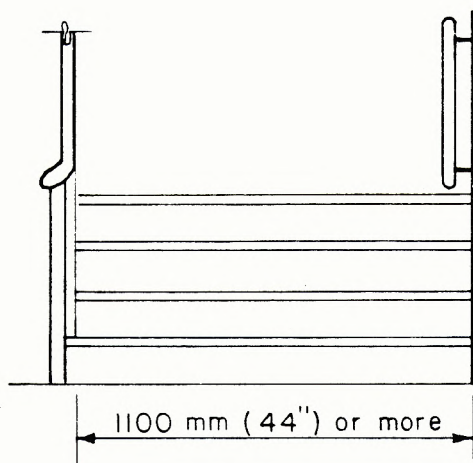
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9.8.7.1 HANDRAILS FOR NARROW & WIDE STAIRS



HANDRAIL ONE SIDE



HANDRAIL BOTH SIDES

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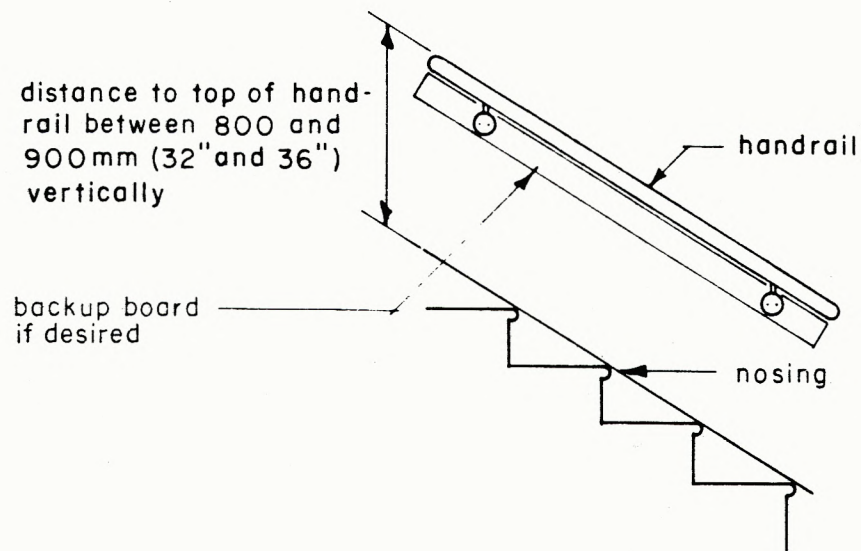
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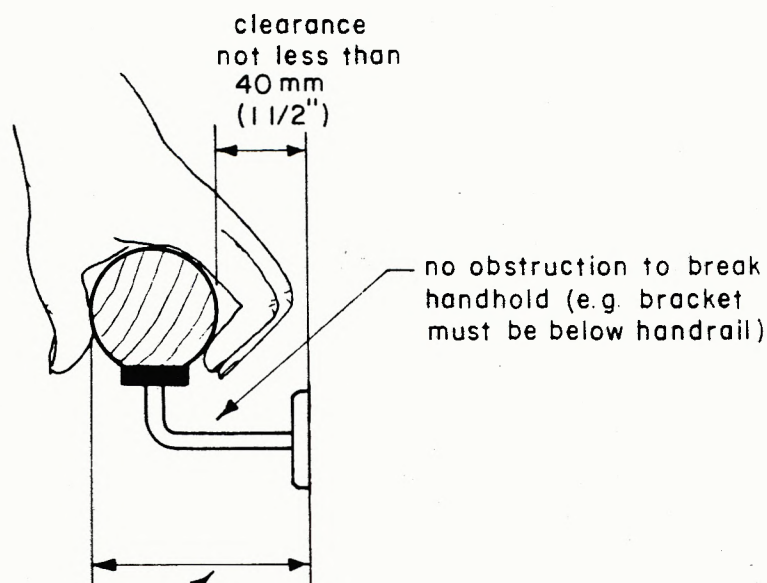
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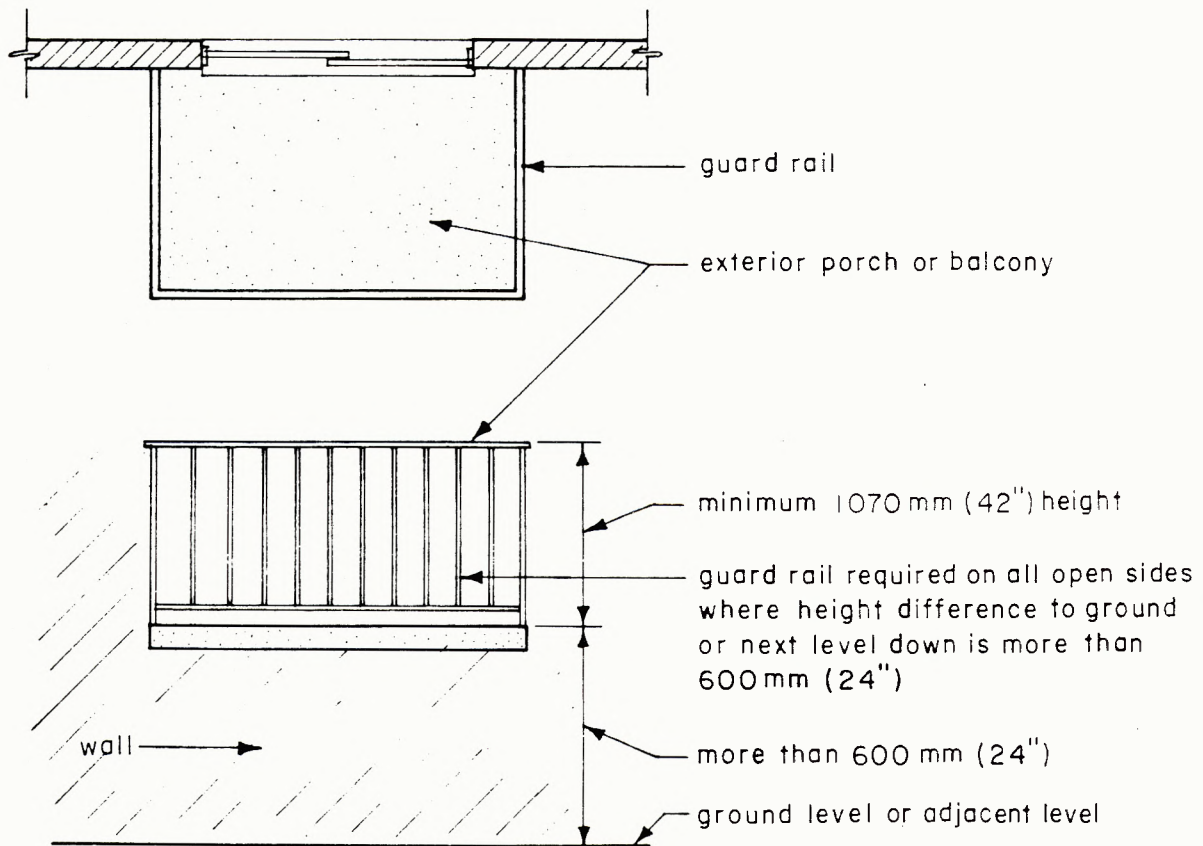
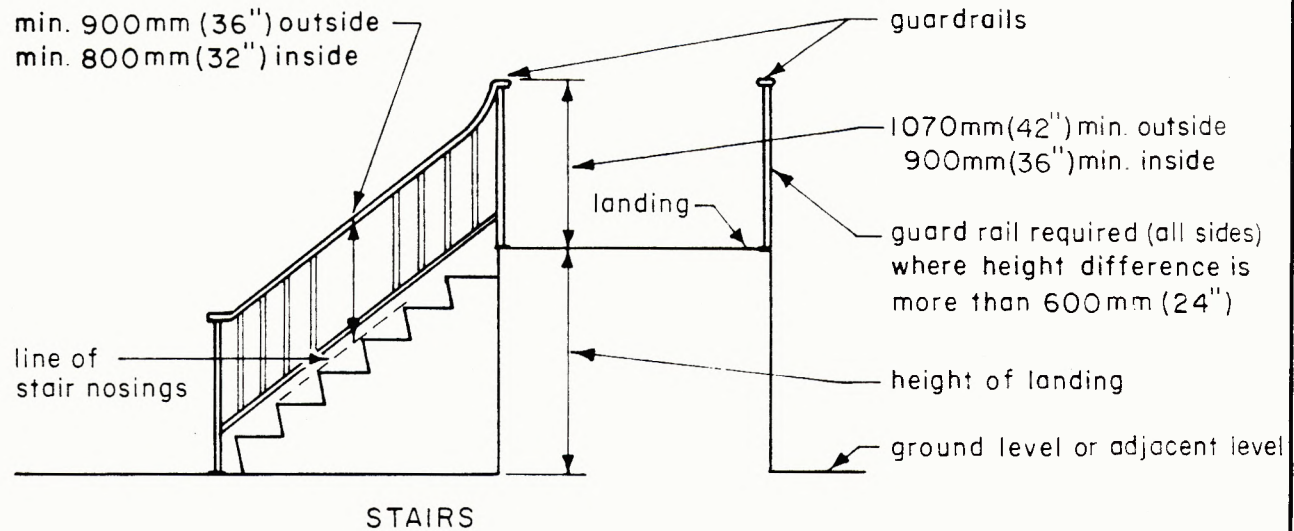
9.8.7.4 HANDRAIL HEIGHT



9.8.7.5, 9.8.7.6 & 9.8.7.7 HANDRAIL CLEARANCE & PROJECTION



9.8.8.1, 9.8.8.3, 9.8.8.4 & 9.8.8.5 HEIGHT OF GUARDS



GUARDS FOR EXTERIOR PORCHES, BALCONIES & ROOFS

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Section:

9.8

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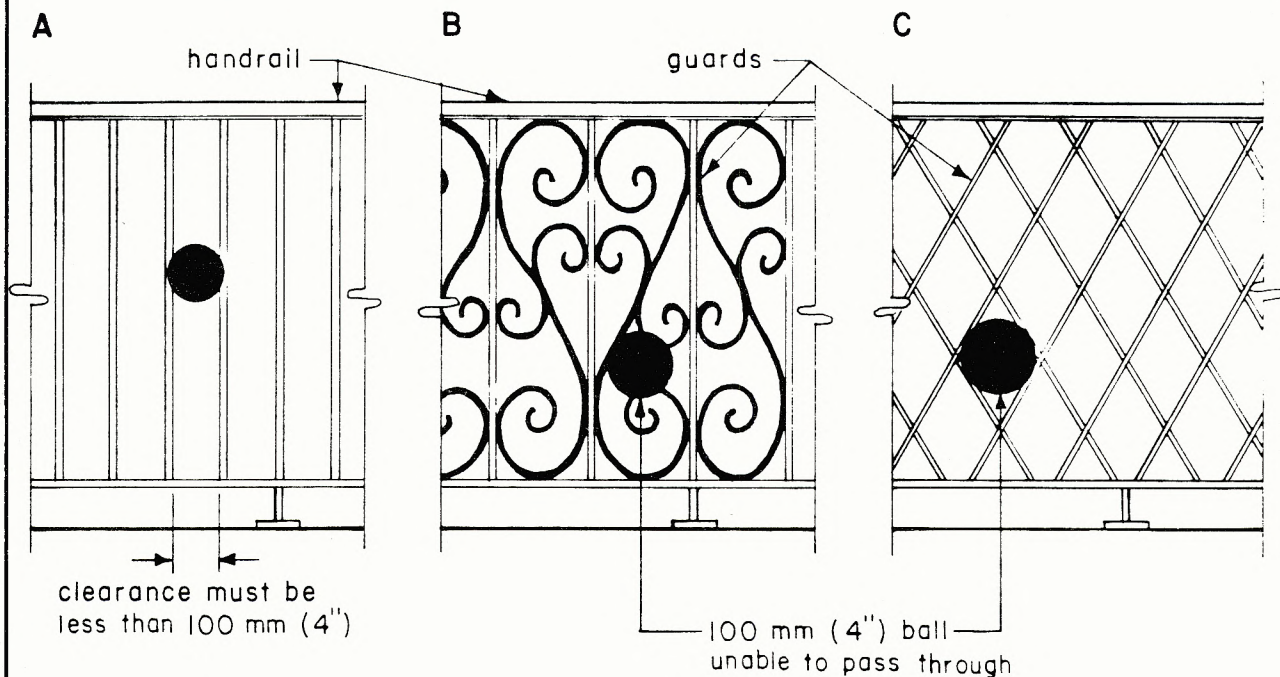
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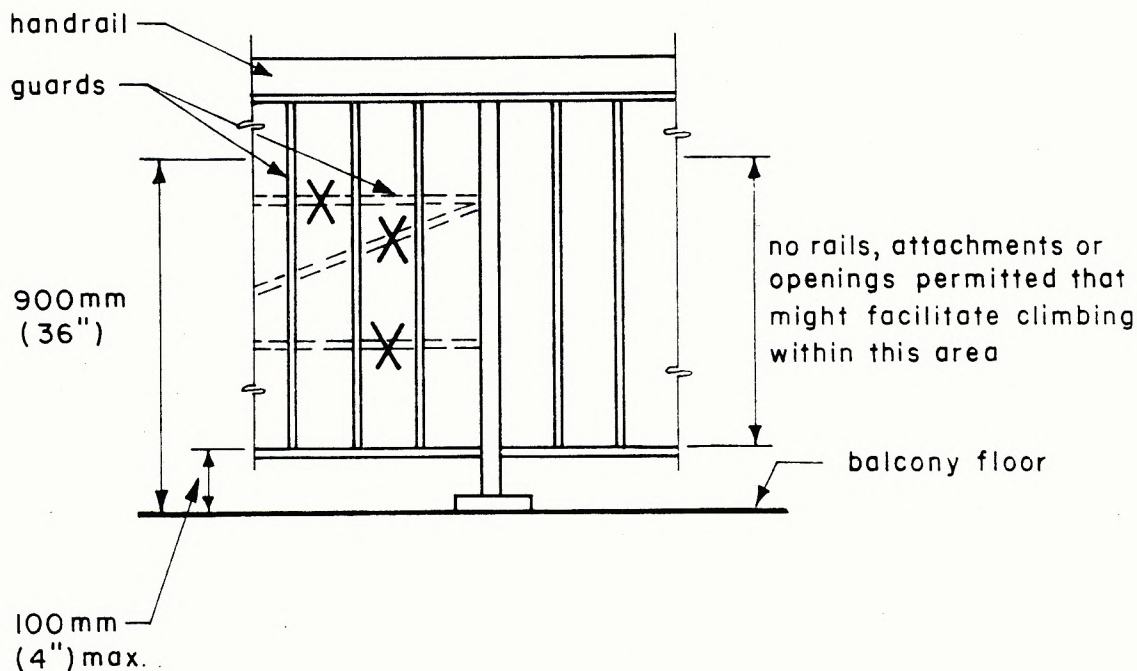
Section:
9.8

9.8.8.7 OPENINGS THROUGH GUARDS AT BALCONIES OR EXIT STAIRS



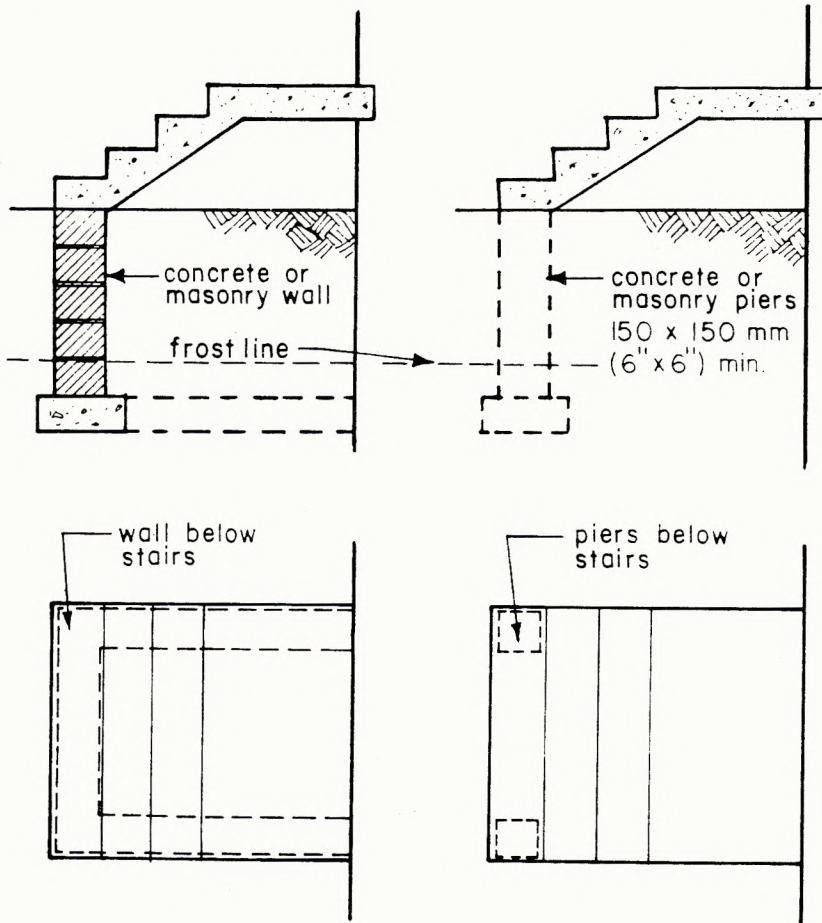
Note: Guards B and C not permitted on balconies because they facilitate climbing. See requirements of 9.8.8.8.

9.8.8.8 CLIMBING OF GUARDS ON BALCONIES



Note: Areas marked with "X" indicate what is not permitted. Also see previous drawing (9.8.8.7) parts B and C for other examples of guards not permitted.

9.8.9.1 SUPPORT FOR EXTERIOR CONCRETE STAIRS



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means of egress

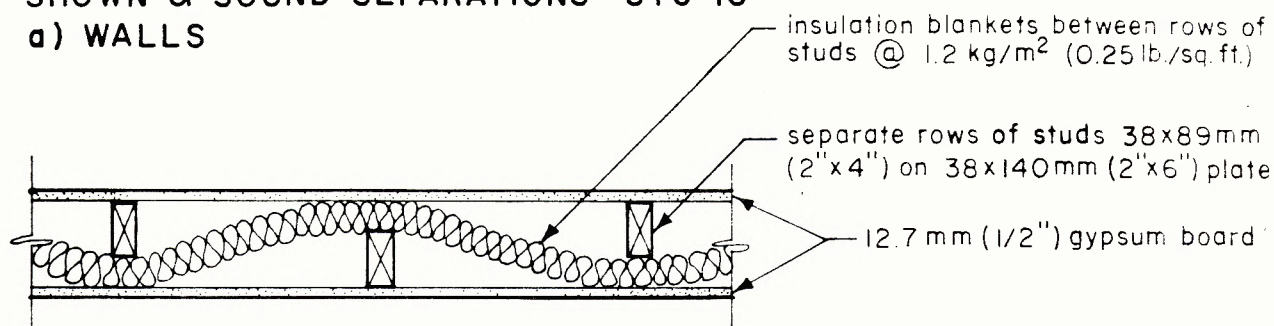
SECTION 9.9

fire protection

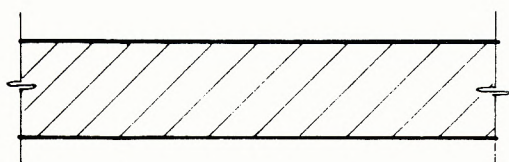
SECTION 9.10

9.10.2.1, 9.10.8.1, 9.10.9.23, & 9.11.2.1 FIRE RESISTANCE RATING AS SHOWN & SOUND SEPARATIONS - STC 45

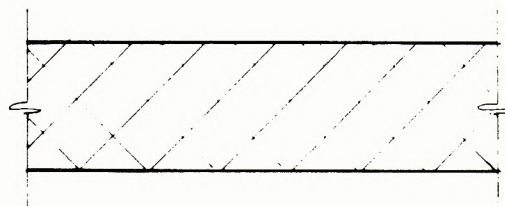
a) WALLS



TYPICAL SEPARATIONS BY DOUBLE INSULATED WOOD FRAME WALL - 3/4 HOUR

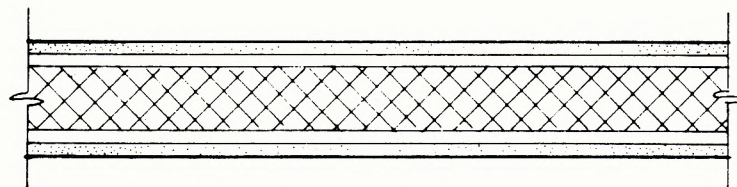


90 mm (4") BRICK * - 1 HOUR

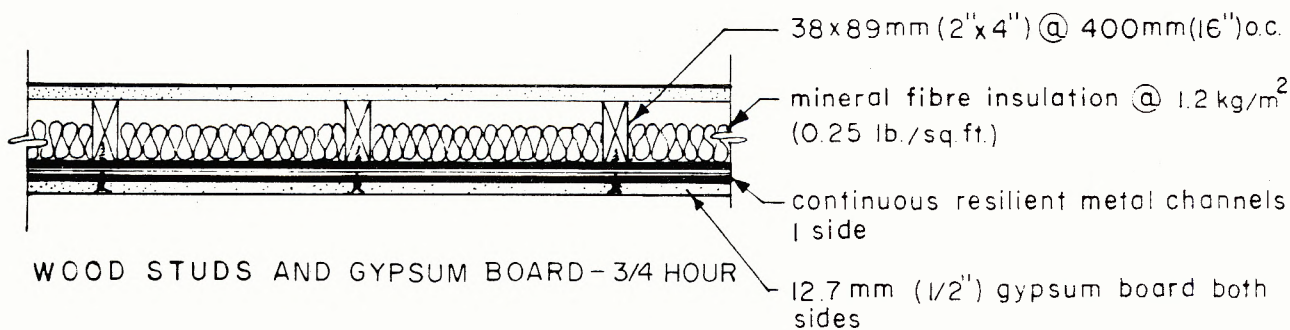


140 mm (6") BLOCK * - 1 HOUR

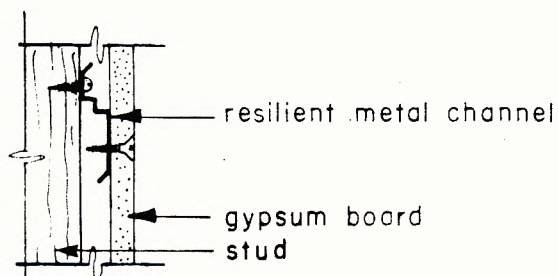
* 2 coats of paint each side



90 mm (4") BLOCK WITH 12.7 mm (1/2") GYPSUM BOARD ON WOOD FURRING BOTH SIDES - 1 HOUR



WOOD STUDS AND GYPSUM BOARD - 3/4 HOUR



DETAIL SECTION

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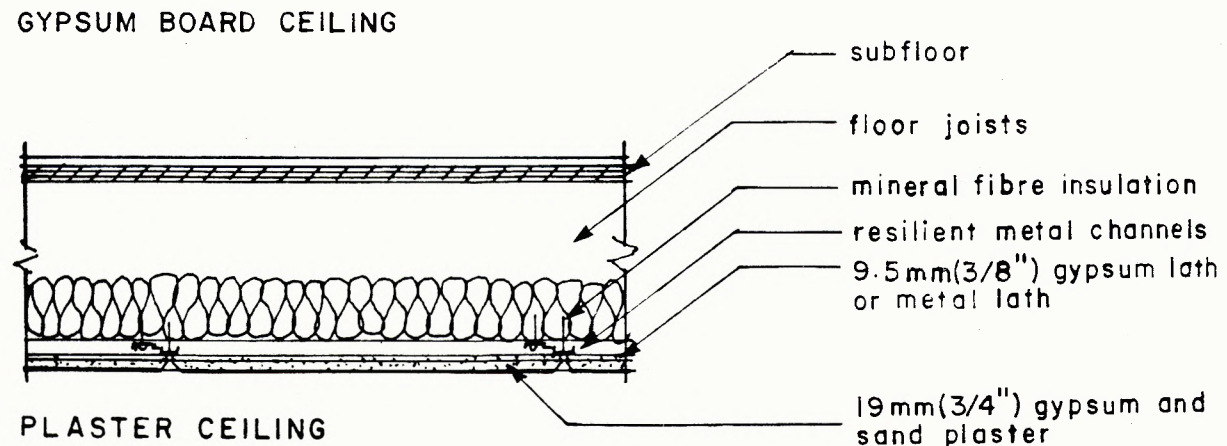
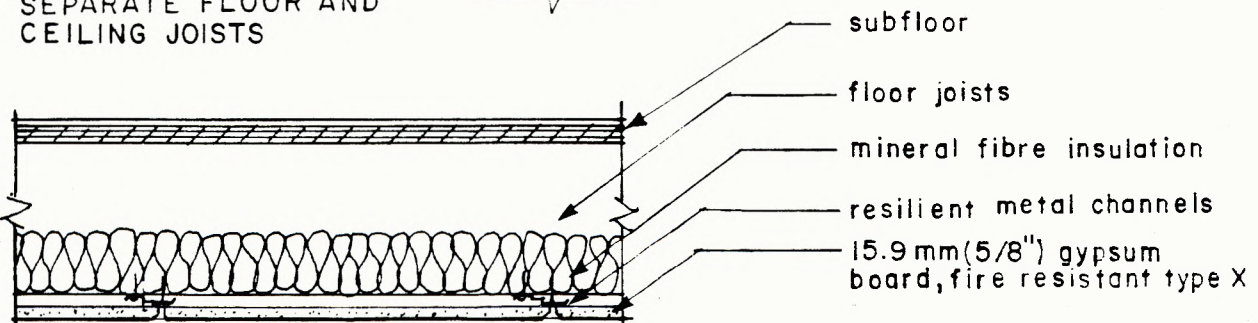
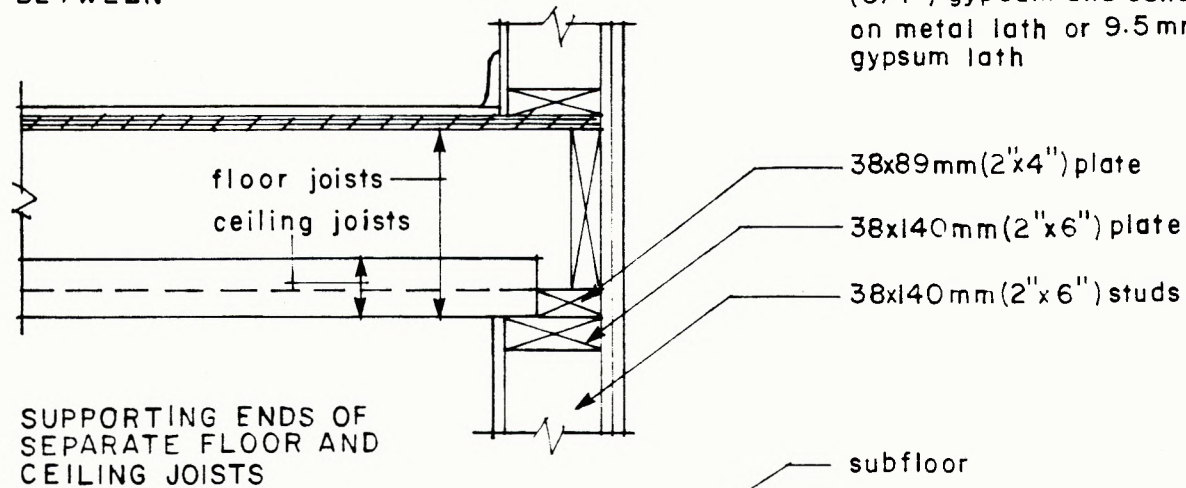
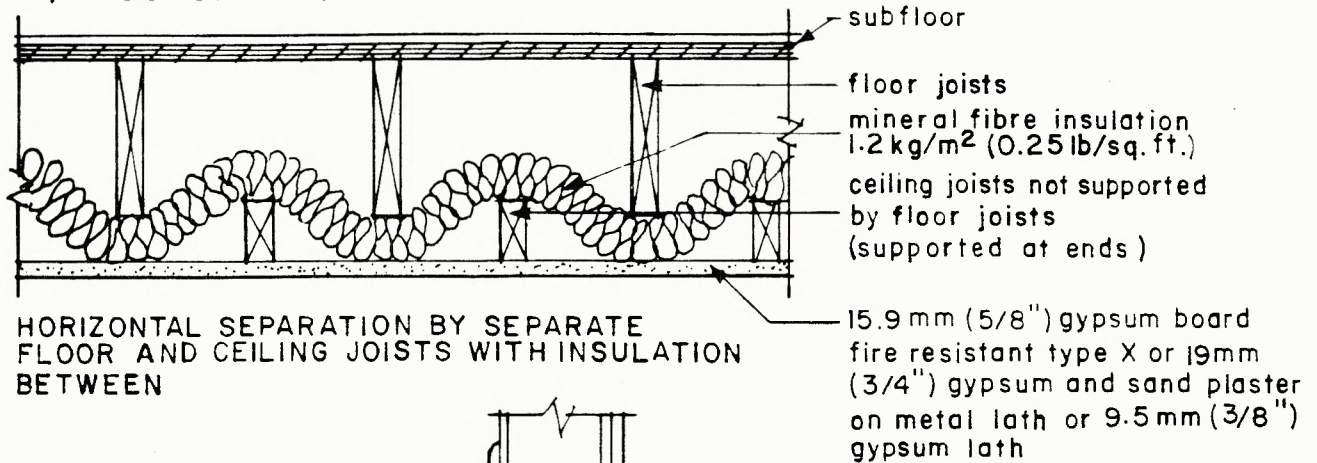
Date:

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Section:

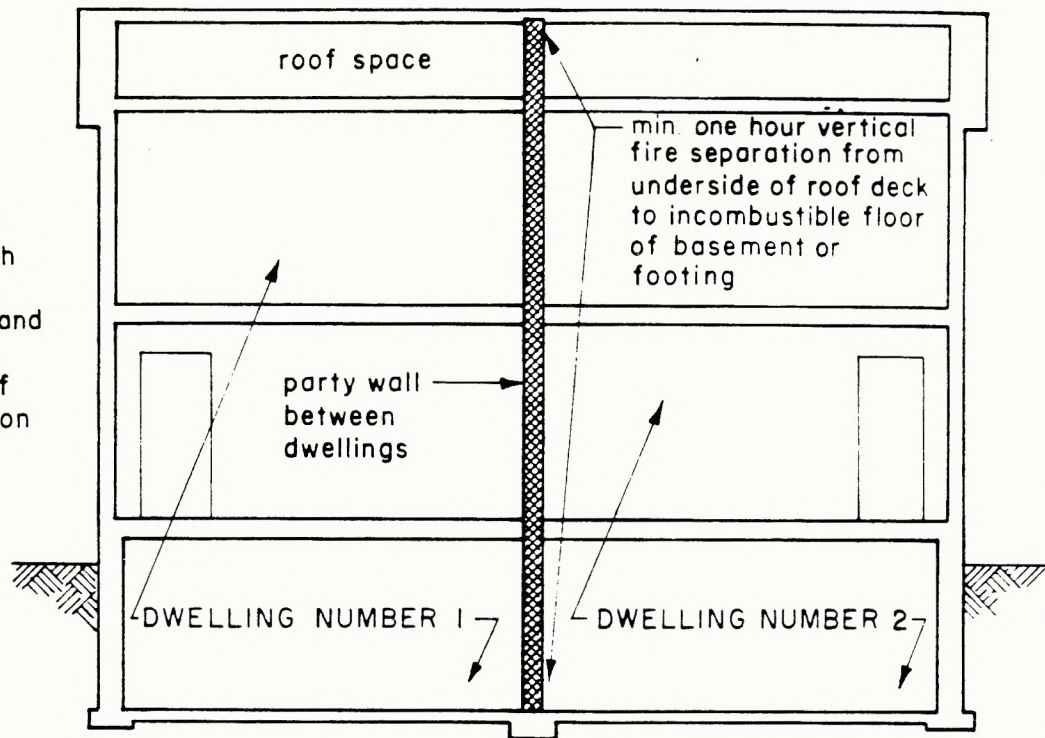
9.10

9.10.2.1, 9.10.8.1, 9.11.2.1 & 9.11.2.2 FIRE RESISTANCE RATING - 3/4 HOUR & SOUND SEPARATIONS - STC 45 b) FLOORS/CEILINGS



9.10.11.2 VERTICAL FIRE SEPARATIONS (PARTY WALLS)

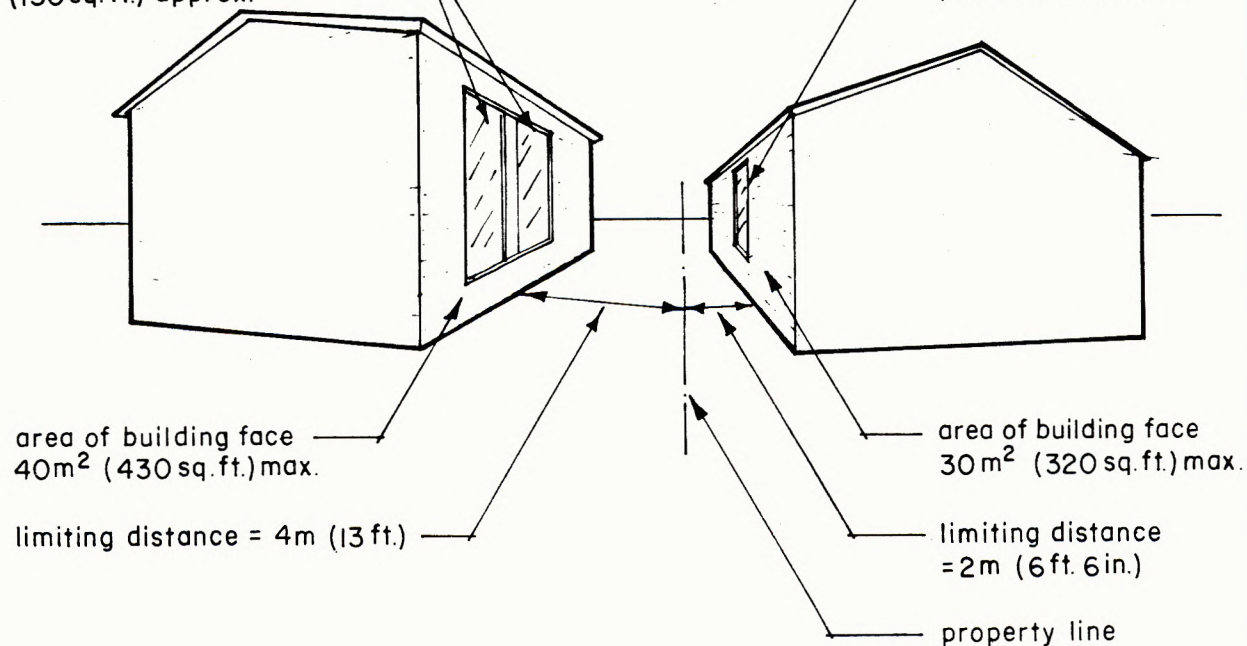
Note: "Rated for... on each side" means able to withstand a test fire on either side of the separation



9.10.15.1 & TABLE 9.10.15.A EXAMPLE OF SPATIAL SEPARATION

total sum of openings 32% of building face = 12 m^2 (130 sq. ft.) approx.

opening 12% of building face = 3.6 m^2 (40 sq. ft.) approx.



Note:

If window and door areas are fixed, table will give limiting distance. If limiting distance is fixed, table gives allowable percentage of openings in building face.

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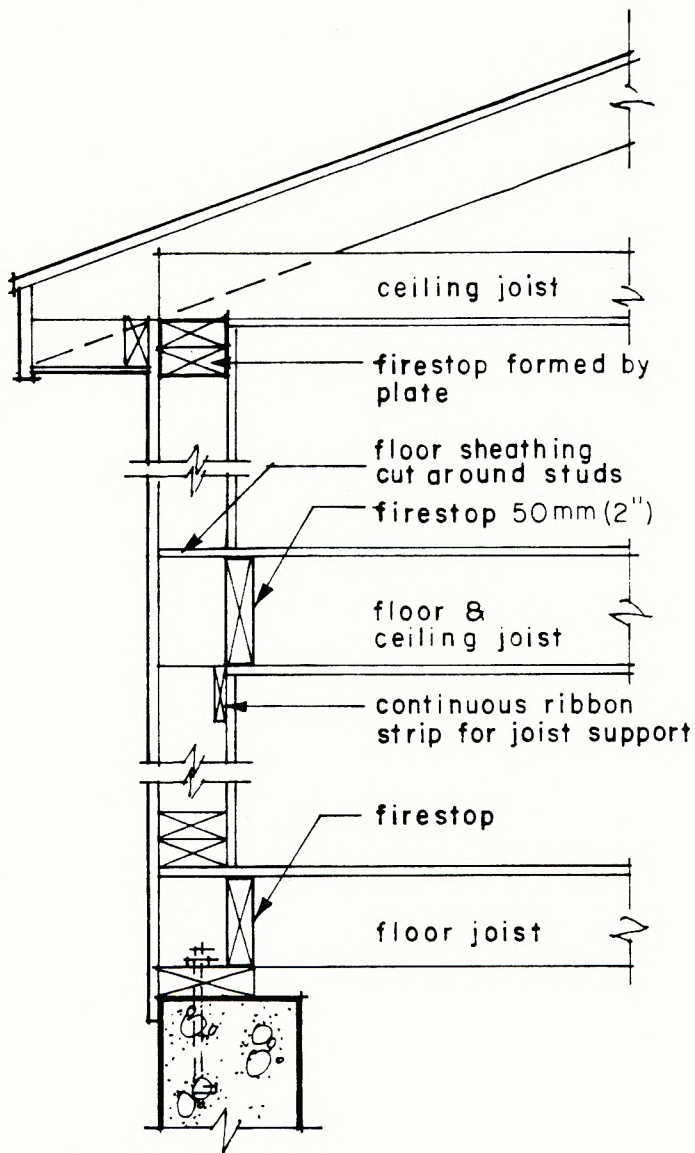
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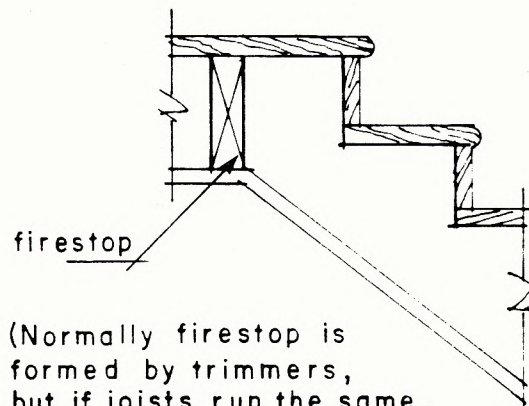
9.10

9.10.16 FIRESTOPS



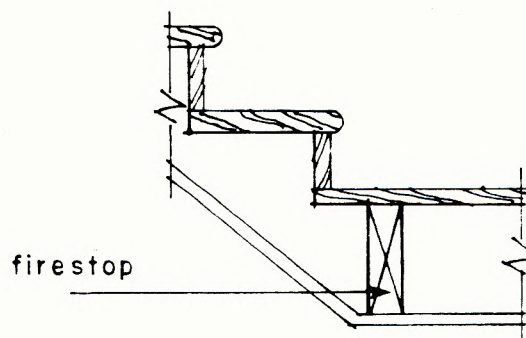
FIRESTOPS AT WALLS
 FOR BALLOON FRAMING

Note: With platform framing
 firestops are provided
 by normal plates at tops &
 bottoms of walls



(Normally firestop is
 formed by trimmers,
 but if joists run the same
 way as stair strings, space
 between must be blocked)

TOP OF STAIR



BOTTOM OF STAIR

FIRESTOPS AT STAIRS

9.10.17.1 &
9.18.7.1

FLAME SPREAD RATING: A measure of the speed with which a burning flame spreads over the surface of a material, measured according to a standard test method. All materials are compared to a scale on which asbestos cement measures zero and red oak 100.

9.10.19.4

PERMANENT CONNECTION: Means installed on an outlet box within the 120 volt A.C. house electrical power circuit, similar to that for lights and other house receptacles.

NO DISCONNECT SWITCH BETWEEN THE OVERCURRENT DEVICE AND THE SMOKE ALARM may be interpreted to mean that there shall be no disconnecting devices or switches installed to interrupt the power supply between the house electrical service entrance box and the smoke detector other than the standard plug-type fuse or an automatic electrical circuit breaker in the power supply panel board.

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9.10

sound control

SECTION 9.11

9.11.1.1

SOUND TRANSMISSION CLASS RATING: The resistance of a division (wall, floor, door, etc.) to the passage (transmission) of noise or sound. The higher the rating, the better the resistance to sound transmission. See drawings 9.10.9 a) and b).

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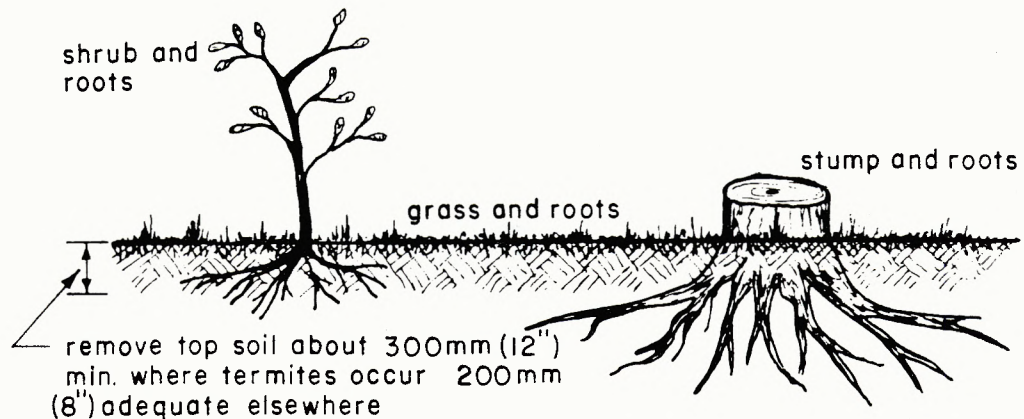
Section:

9.11

excavation

SECTION 9.12

9.12.1.1 TOPSOIL, VEGETABLE MATTER TO BE REMOVED



9.12.1.2 **ORGANIC MATERIAL:** Animal or plant material that might sustain life or growth, which will rot away later, causing voids in the ground.

9.12.2.1 **UNDISTURBED SOIL:** soil in its natural state, not previously moved, dug up or replaced.

TABLE 9.12.2.A

SOIL DRAINAGE, SOIL TYPES: Sites with poor soil drainage tend to be waterlogged and suffer more from frost action. To counteract this, foundations must be carried down below the depth of frost penetration if the soil is susceptible to frost heaving.

Coarse grain soils such as coarse sand and gravel usually provide good drainage if the water table is low enough for water to flow away. Fine grain soils such as silt and clay do not allow water to flow through them freely and usually suffer from frost heave.

One way to find out whether the site has good or poor soil drainage is by the "percolation test".

Percolation tests are usually carried out in association with the design and construction of a septic tank tile field. Basically the tests involve digging holes in the ground and filling them with water. The rate at which the water soaks away is an indication of the drainage characteristics of the site.

In a standard percolation test, if water level in the hole takes more than half an hour to drop 25 mm (1"), the soil is clayey and this is an indication of poor soil drainage.

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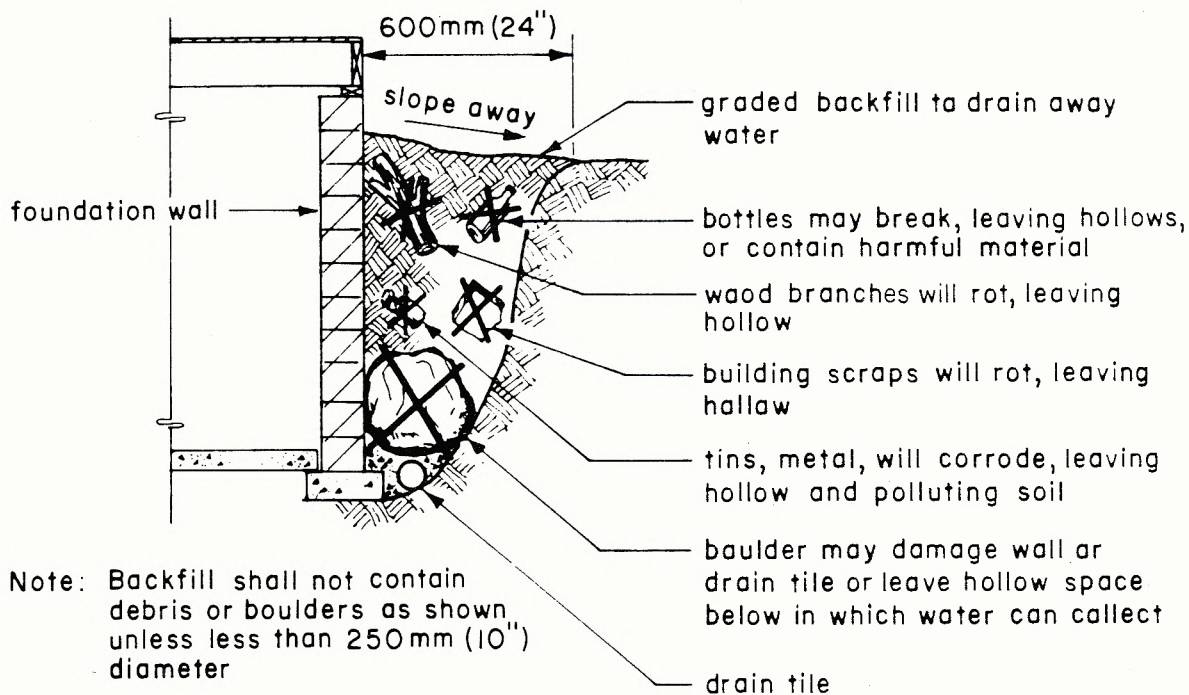
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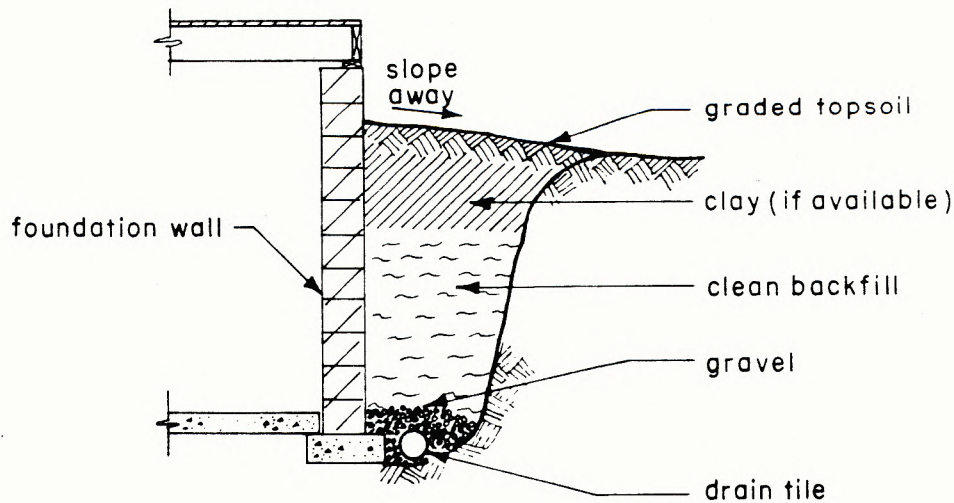
Section:

9.12

9.12.3.2 & 9.12.3.3 BACKFILL GRADED & FREE OF DELETERIOUS DEBRIS & BOULDERS

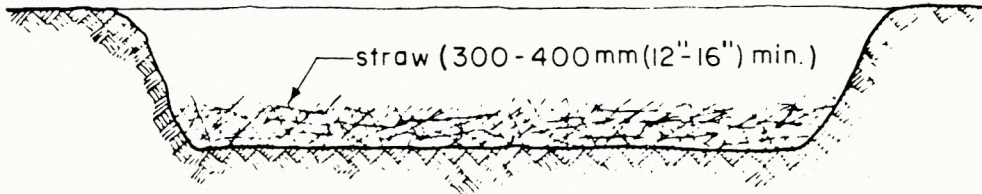


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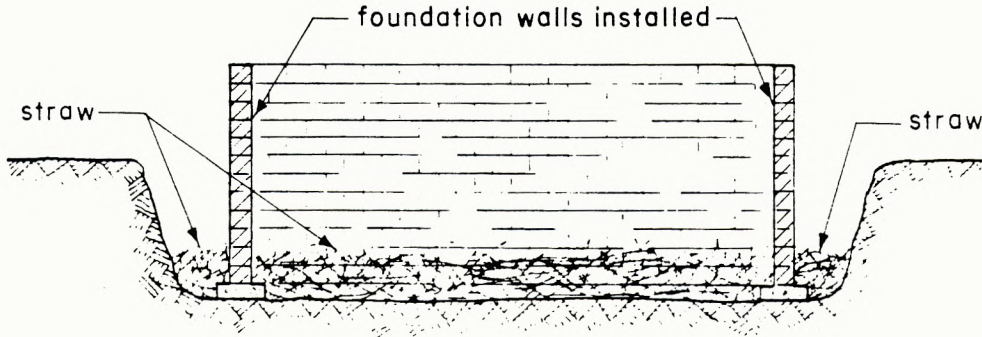
PERMITTED

9.12.1.4 KEEPING EXCAVATION FROM FREEZING

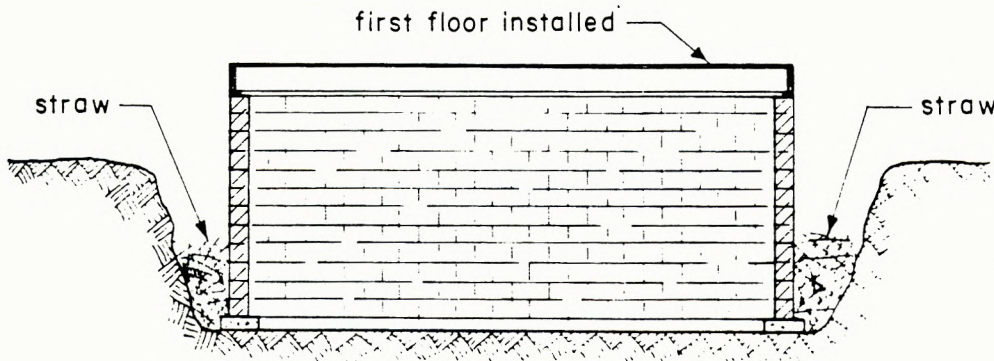


Before building starts

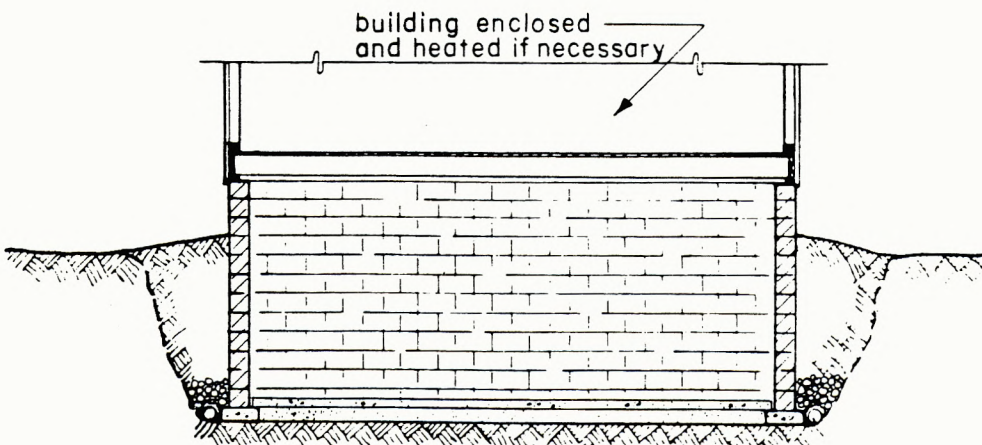
Note: More straw may be required in extreme temperatures, or enclosure and heating.



Until basement is closed in



Basement closed in (may require heat in extreme weather)



Superstructure complete, basement backfilled

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**waterproofing &
dampproofing**

SECTION 9.13

9.13.1.1

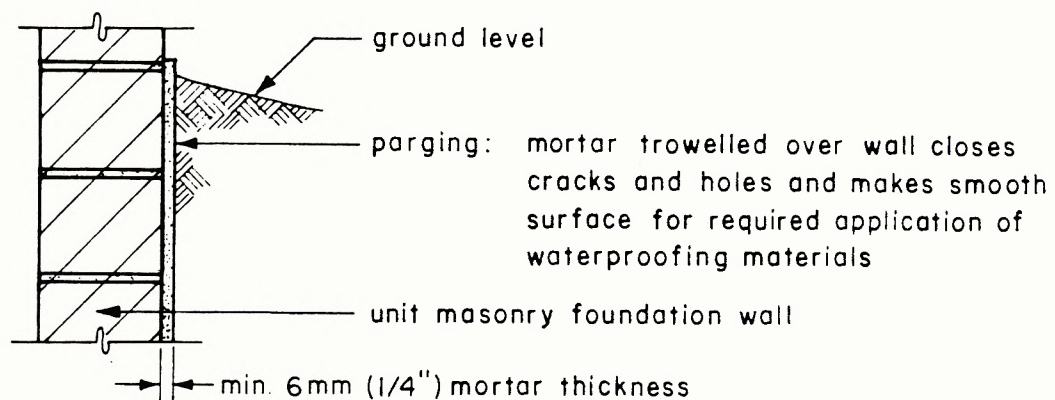
HYDROSTATIC PRESSURE: This occurs when the ground is saturated or under water so the water has no other place to go except under the floor to cause uplift pressure on it, or through the wall or floor. A continuous waterproof membrane is required to keep the water out.

9.13.1.2

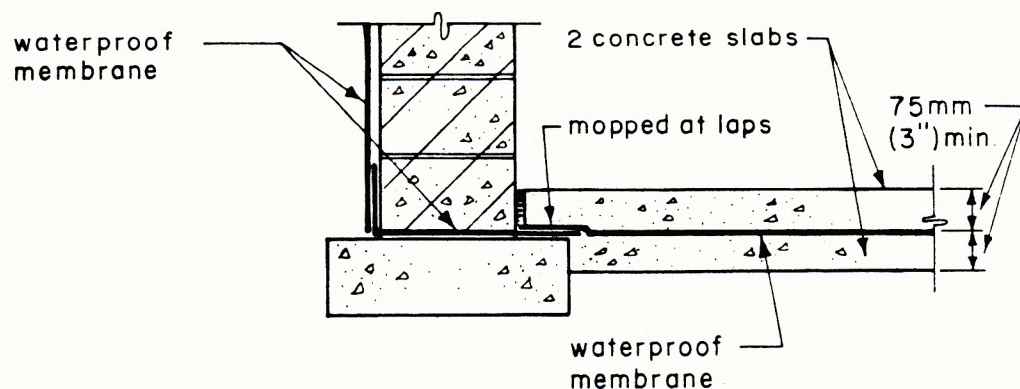
Where there is **NO HYDROSTATIC PRESSURE**, the water level and thus the water pressure is less, so dampproofing is sufficient.

9.13.3.1

PARGING



9.13.4.1 WATERPROOFING FLOORS



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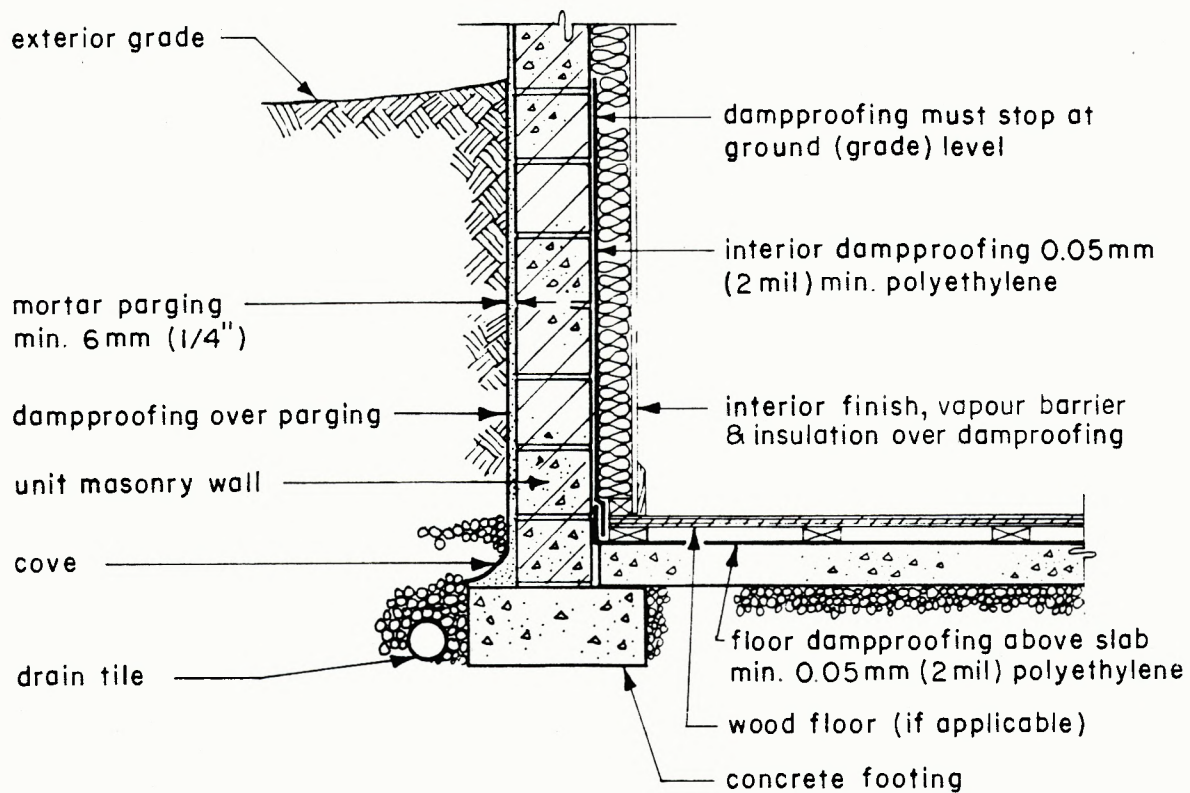
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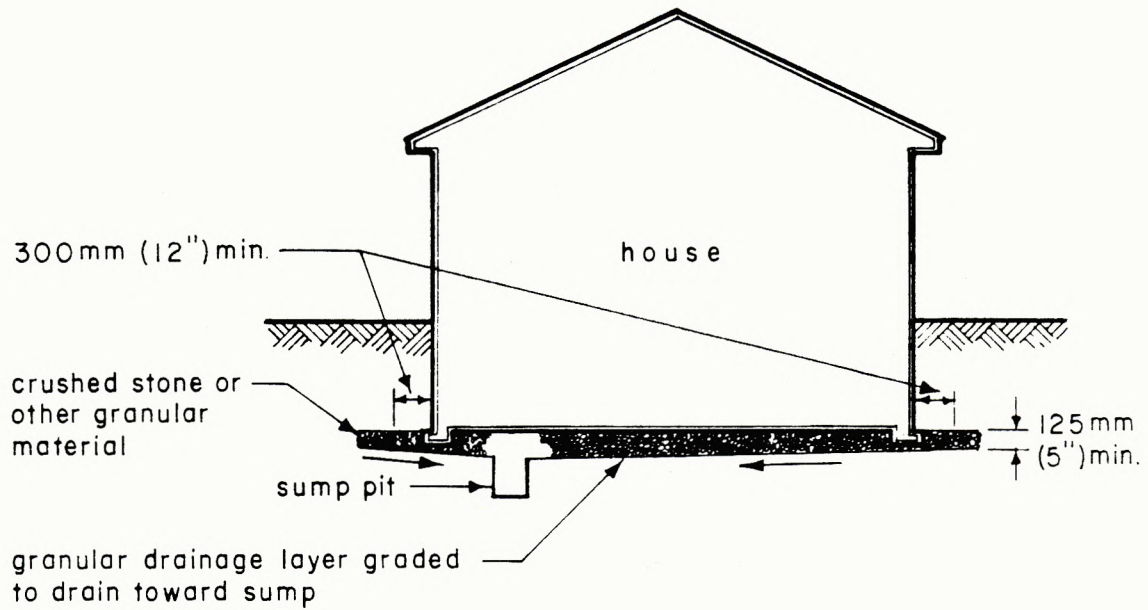
9.13.5.1, 9.13.5.3 & 9.13.6.3 DAMPPROOFING OF WALLS & SLABS



drainage

SECTION 9.14

9.14.4.3 GRANULAR DRAINAGE LAYER



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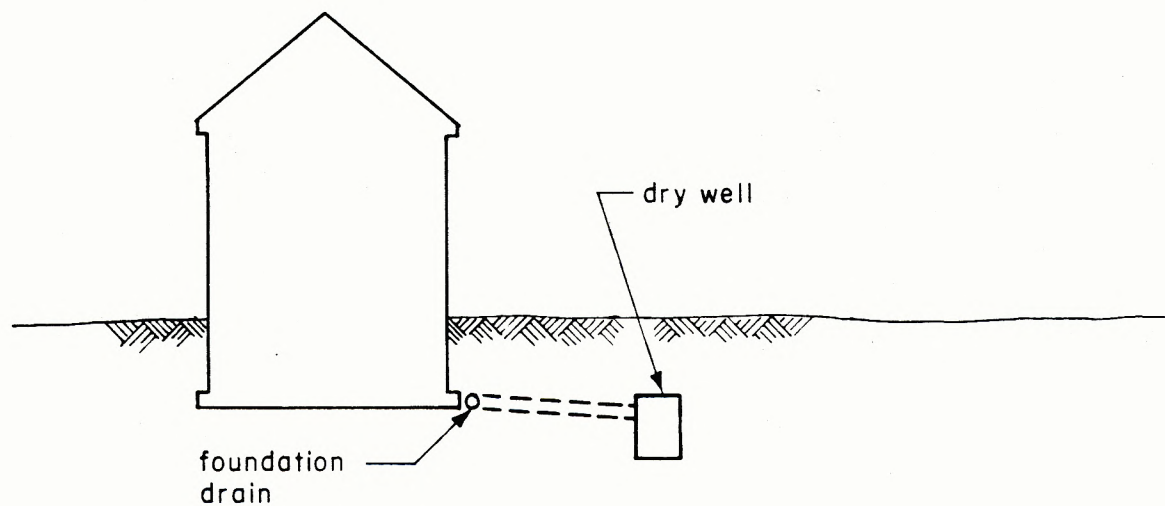
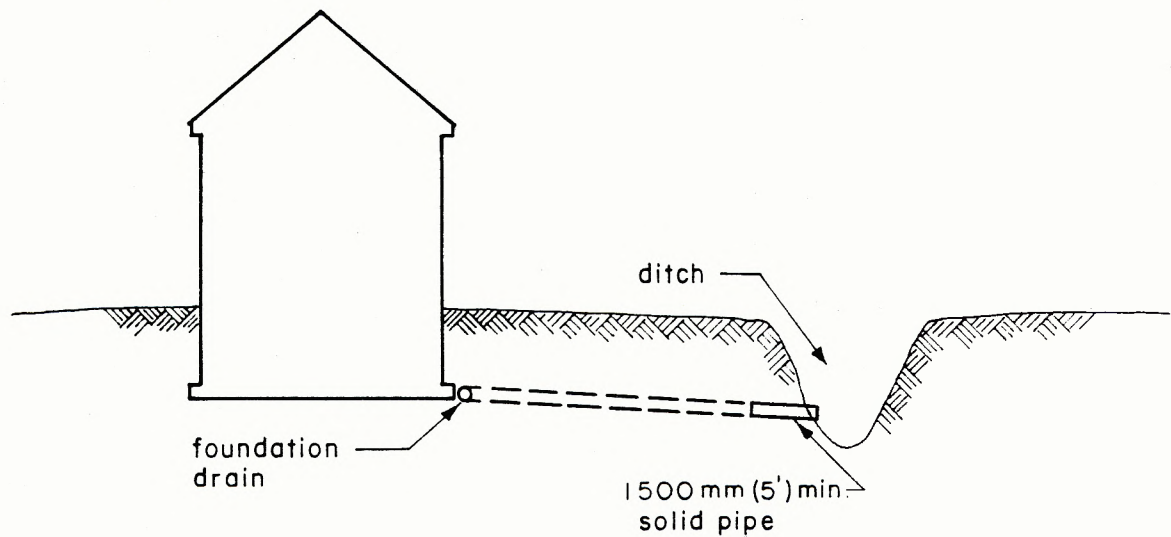
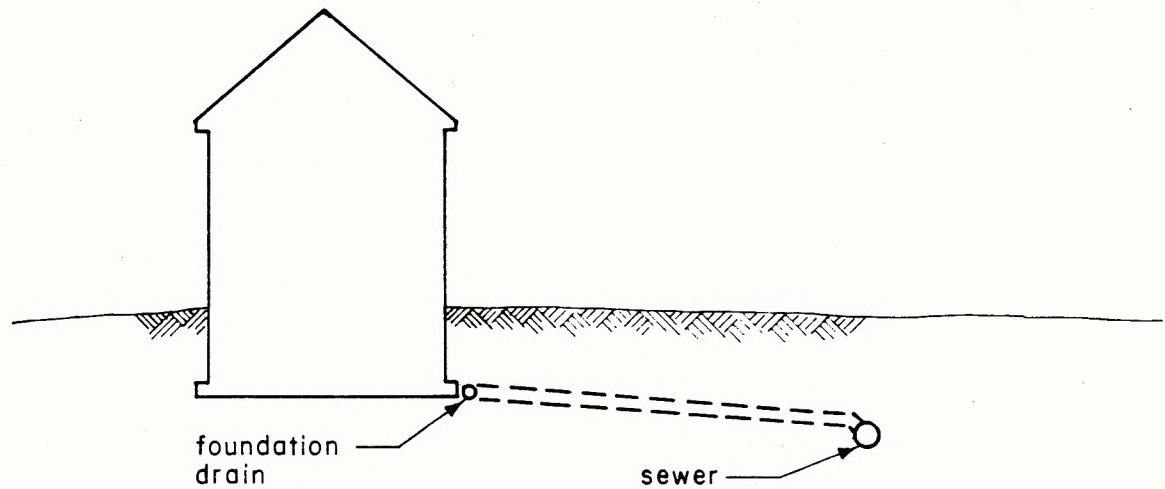
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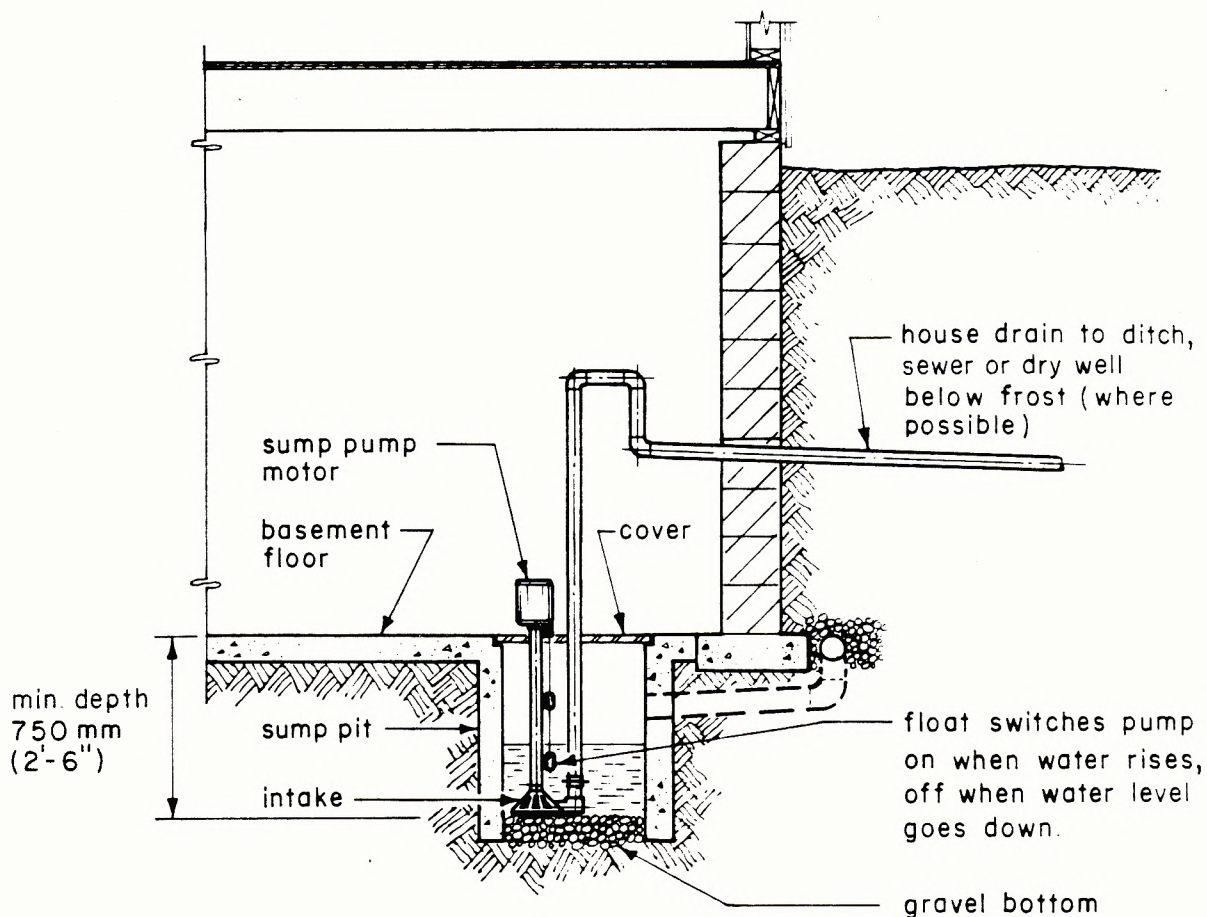
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9.14

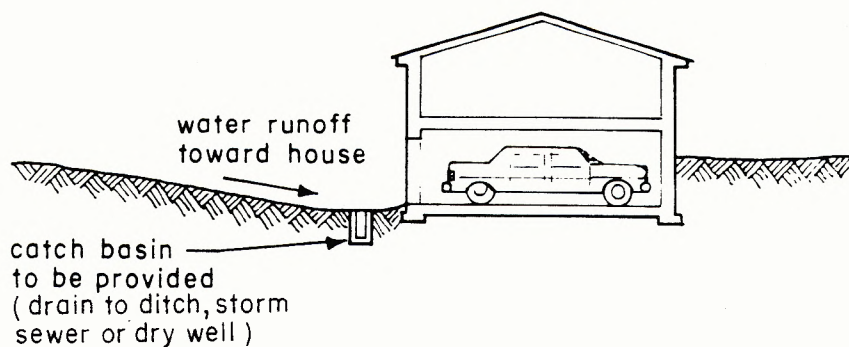
9.14.5.1 DRAINAGE OF FOUNDATION DRAINS



9.14.5.2 AUTOMATIC SUMP PUMP



9.14.6.3 DRIVEWAY CATCH BASIN



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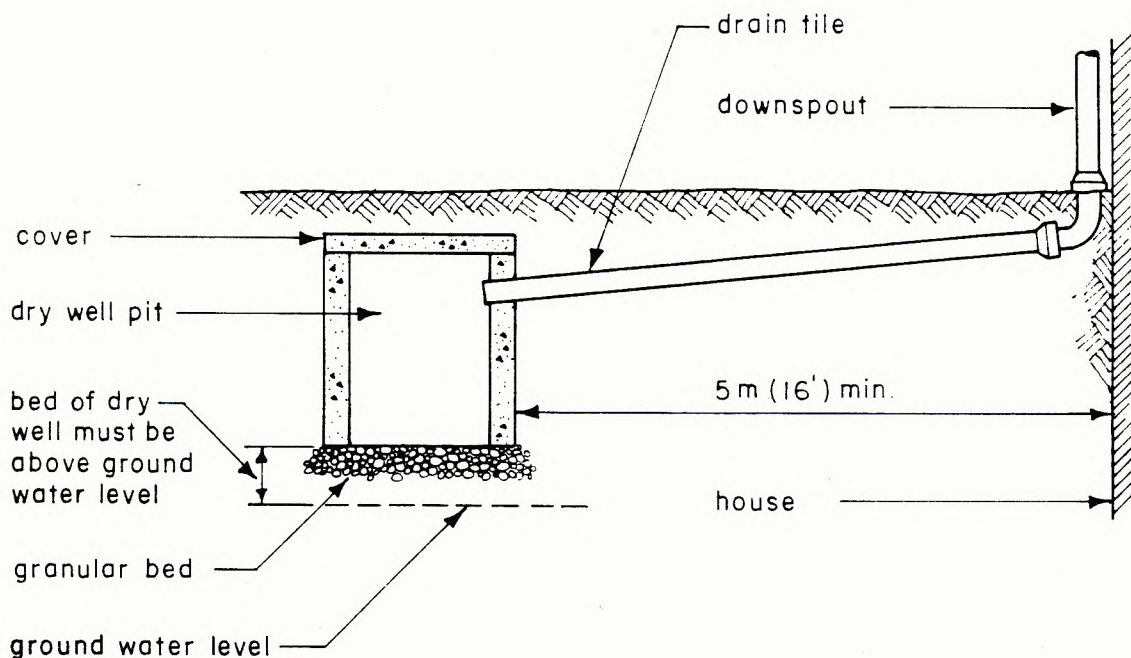
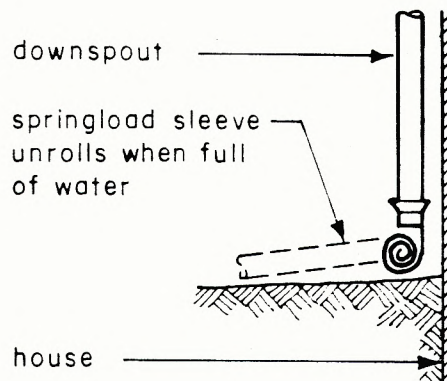
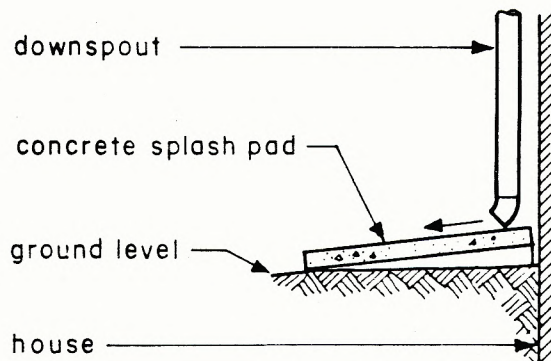
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9.14

9.14.6.4 PREVENTING SOIL EROSION



NOTE: These are some ways to prevent soil erosion (water from downspout washing away earth below.)

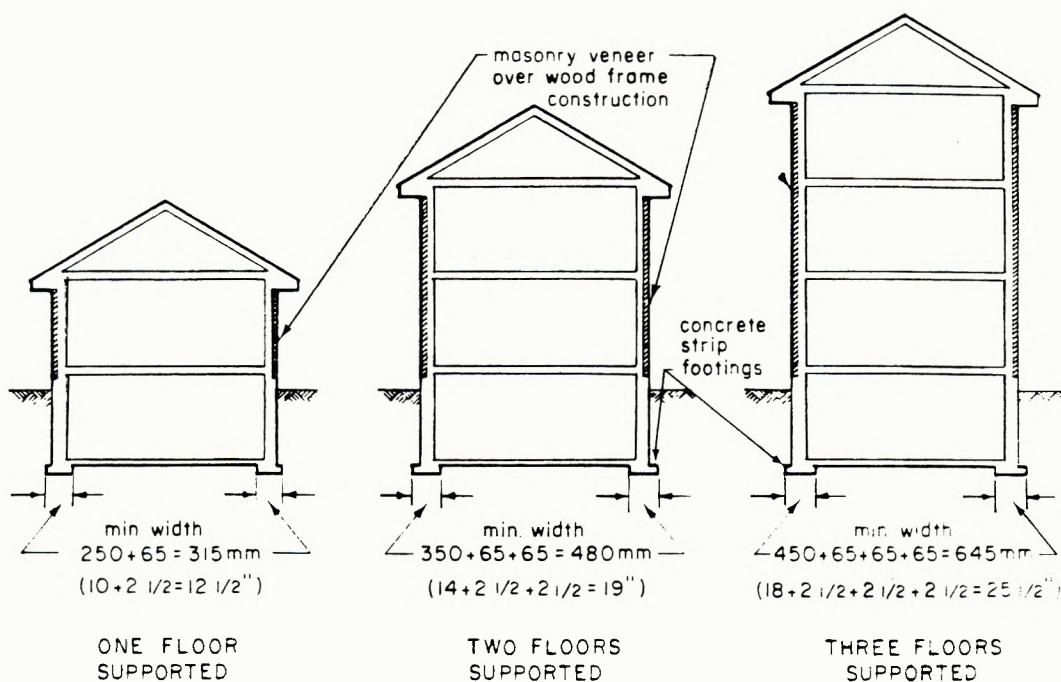
**footings &
foundations**

SECTION 9.15

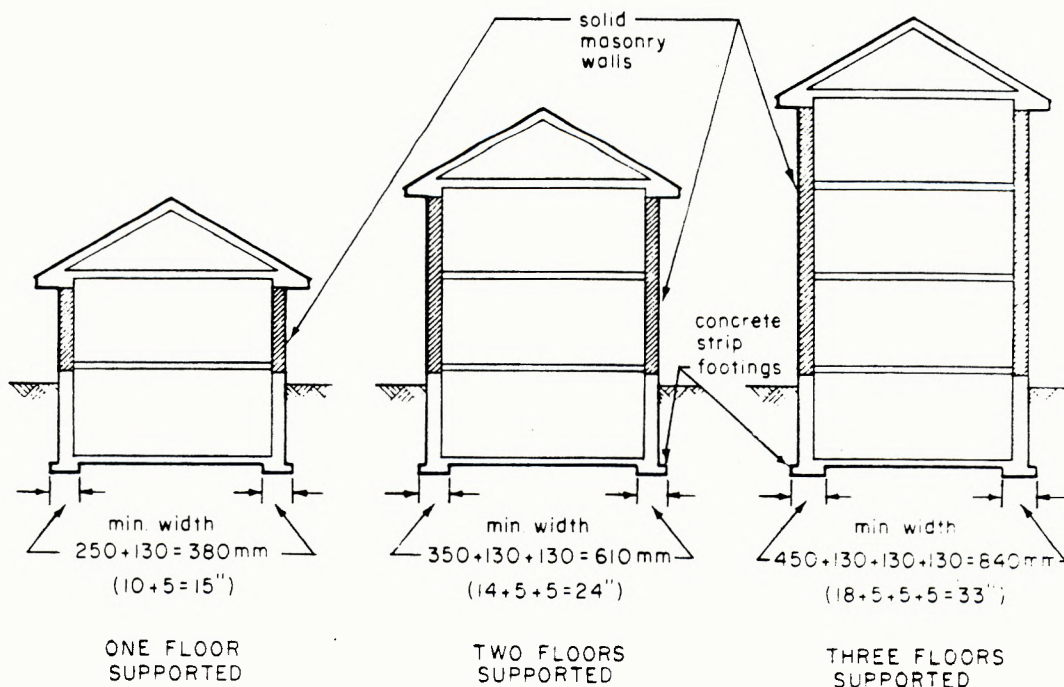
9.15.3.1

MONOLITHIC: When applied to concrete means all poured in one piece.

9.15.3.4 STRIP FOOTING SIZES FOR MASONRY VENEER (TABLE 9.15.3.A)



9.15.3.5 STRIP FOOTINGS FOR SOLID MASONRY WALLS (TABLE 9.15.3.A)



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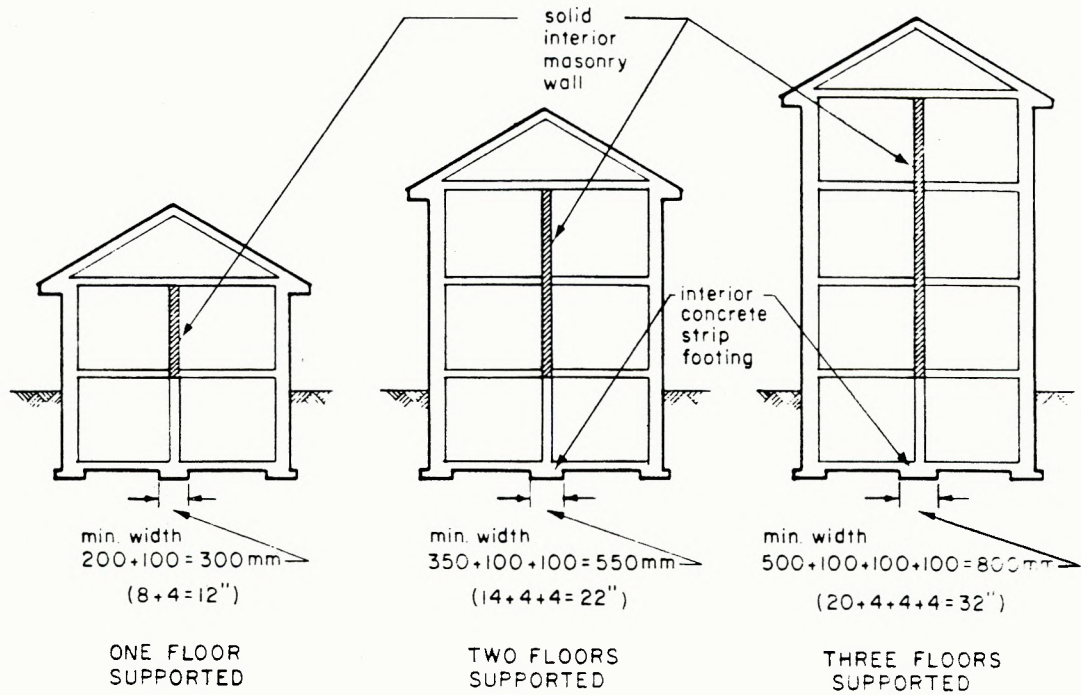
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9.15.3.6 STRIP FOOTINGS FOR INTERIOR MASONRY WALLS (TABLE 9.15.3.A)



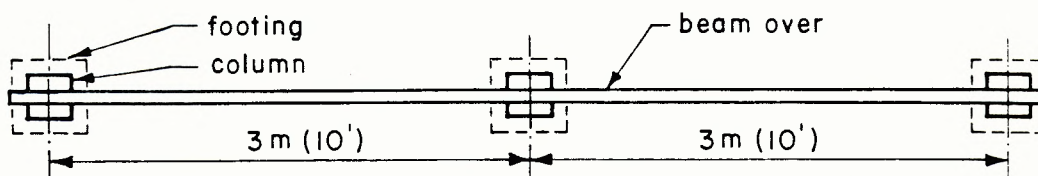
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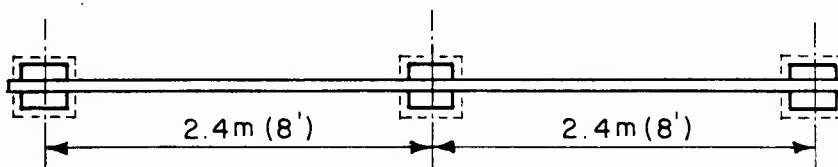
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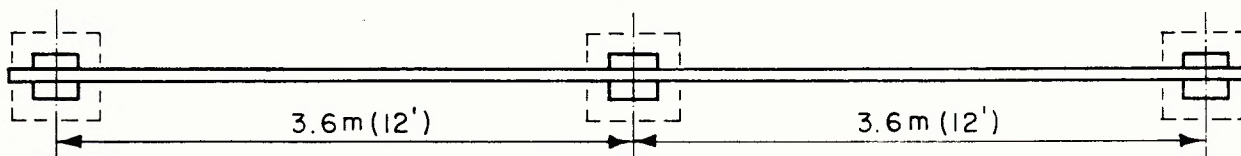
9.15.3.7 FOOTING SIZES FOR COLUMNS IN PROPORTION TO SPACING



- a) Minimum footing sizes as in table 9.15.3.A 3 m (10') spacing of columns
- | | |
|----------|----------------------------------|
| 1 floor | 0.4 m^2 (4.3 sq. ft.) |
| 2 floors | 0.75 m^2 (8.1 sq. ft.) |
| 3 floors | 1.0 m^2 (10.8 sq. ft.) |



- b) Minimum footing sizes for 2.4 m (8') spacing of columns
- | | |
|----------|--|
| 1 floor | $8/10 \times 0.4 = 0.32 \text{ m}^2$ (3.4 sq. ft.) |
| 2 floors | $8/10 \times 0.75 = 0.6 \text{ m}^2$ (6.4 sq. ft.) |
| 3 floors | $8/10 \times 1.0 = 0.8 \text{ m}^2$ (8.6 sq. ft.) |



- c) Minimum footing sizes for 3.6 m (12') spacing of columns
- | | |
|---------|---|
| 1 floor | $12/10 \times 0.4 = 0.48 \text{ m}^2$ (5.2 sq. ft.) |
| 2 floor | $12/10 \times 0.75 = 0.9 \text{ m}^2$ (9.7 sq. ft.) |
| 3 floor | $12/10 \times 1.0 = 1.2 \text{ m}^2$ (13.0 sq. ft.) |

This shows how sizes of footings are decreased to carry smaller loads due to closer spacing of columns (b), or increased to carry larger loads due to greater spacing of columns (c).

9.15.3.8 REDUCED ALLOWABLE BEARING PRESSURE: See drawing 9.4.7.4.

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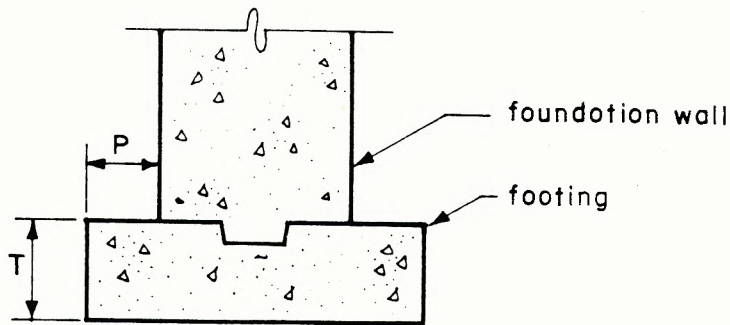
9.15

9.15.3.10 & 9.15.3.11

FOOTINGS

Projection (P)

Thickness (T)
min. 100 mm (4") and
at least equal to
projection (P)

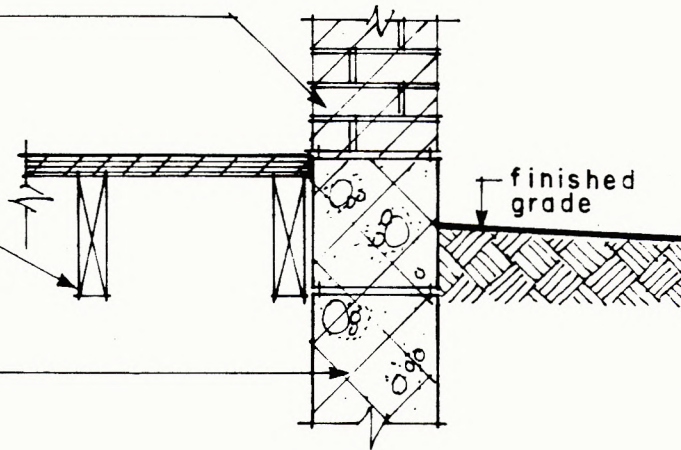


9.15.4.2 a) LATERAL SUPPORT TO FOUNDATION WALLS

solid masonry (brick)
superstructure above
provides lateral support

floor joists parallel
ie. not laterally
supporting

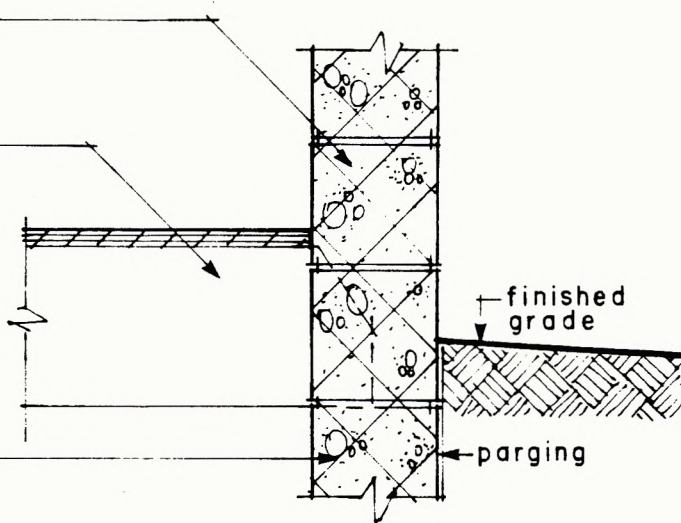
foundation wall



hollow masonry or
wood frame
superstructure

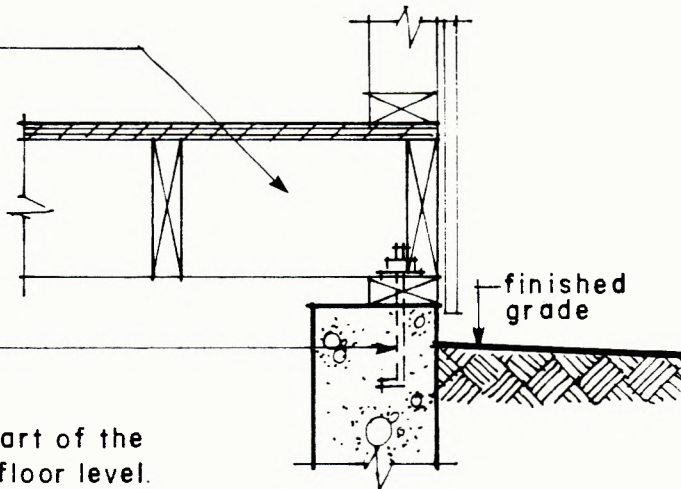
floor joists embedded
in wall provide lateral
support

foundation wall



floor joist nailed to
bolted plate provides
lateral support
(joists may be parallel
or perpendicular to wall)

plate bolted to foundation



Note: Superstructure is the part of the
building above ground floor level.

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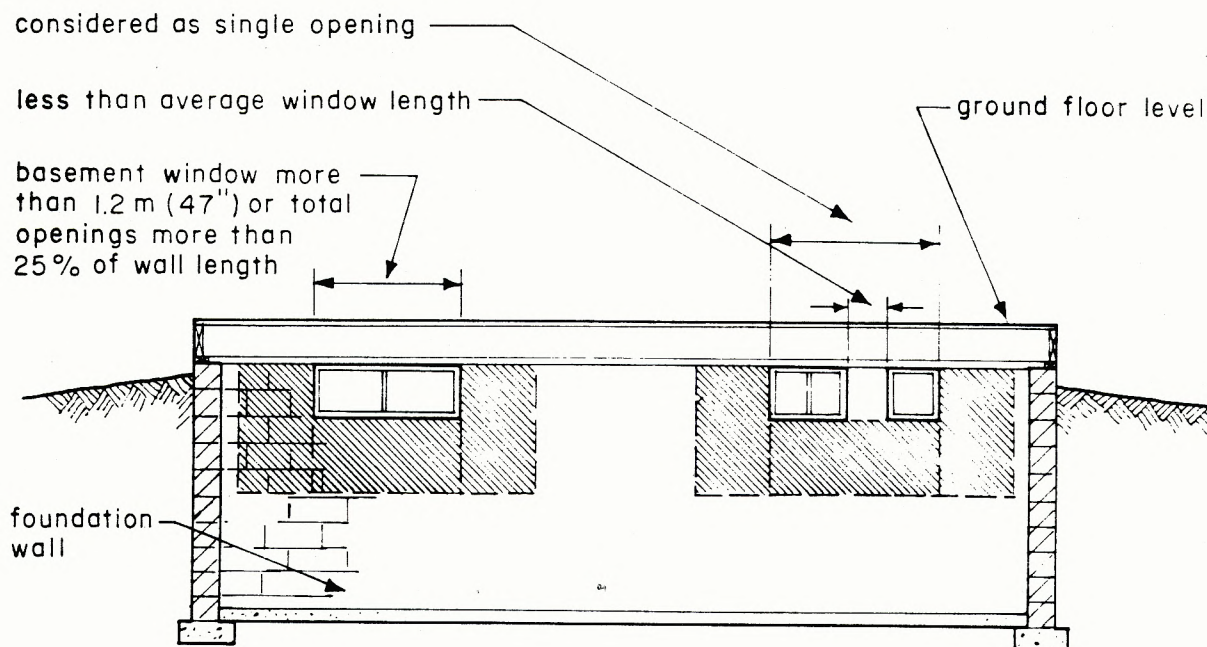
Date:

1.2.84

Section:

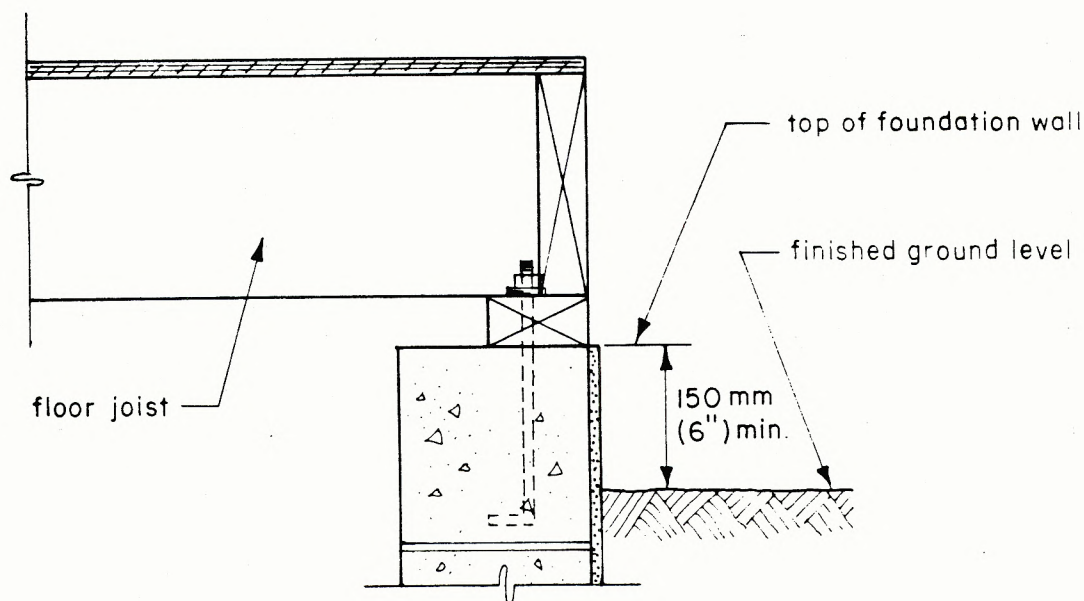
9.15

9.15.4.2 b) REINFORCING AROUND WALL OPENINGS

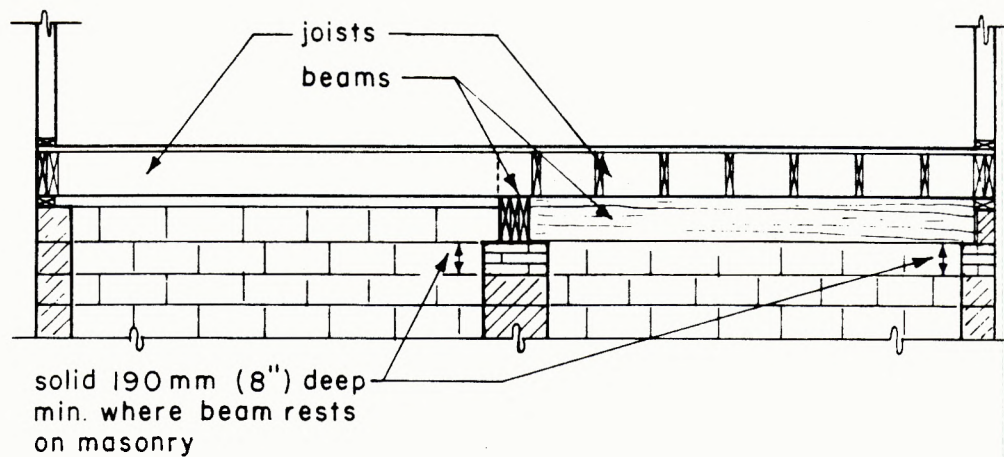


Note: Shaded areas to be reinforced to provide lateral support to openings in foundation walls, if wall beneath opening is thinner than specified in Table 9.15.4.A for unsupported walls.

9.15.4.3 TOP OF FOUNDATION WALL



9.15.5.2 BEAMS SUPPORTED ON MASONRY



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1.2.84

Section:

9.15

slabs on ground

SECTION 9.16

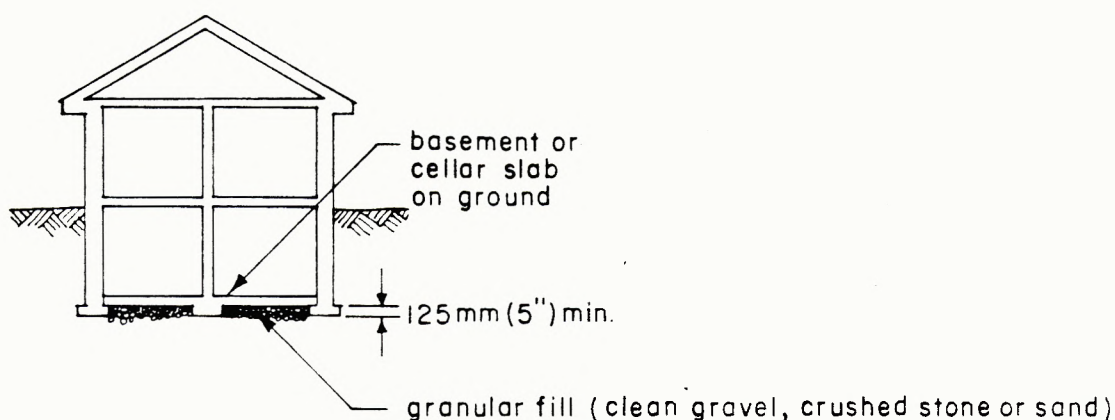
9.16.1.1 &
9.16.1.2

SLABS-ON-GRADE: Slabs resting on top of the ground at or near the level of finished grade around the building, and poured over compacted granular fill. (See drawing 9.16.2.2).

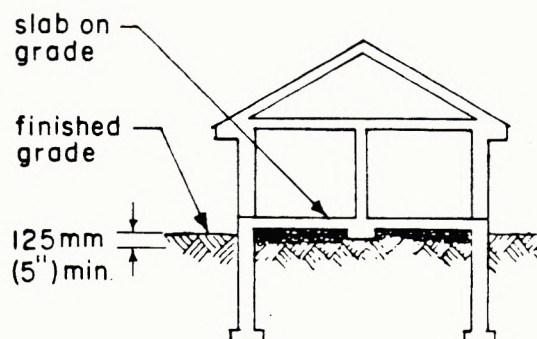
9.16.2.1

GRANULAR FILL: Crushed stone, gravel, sand or similar mineral matter. Where there is no hydrostatic pressure, granular fill may be used in place of dampproofing, as any water below the floor flows through it easily.

9.16.2.1 BASEMENT & CELLAR SLABS ON GROUND



9.16.2.2 SLABS - ON - GRADE



Both soil beneath fill and fill itself shall be compacted under slab

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9.16

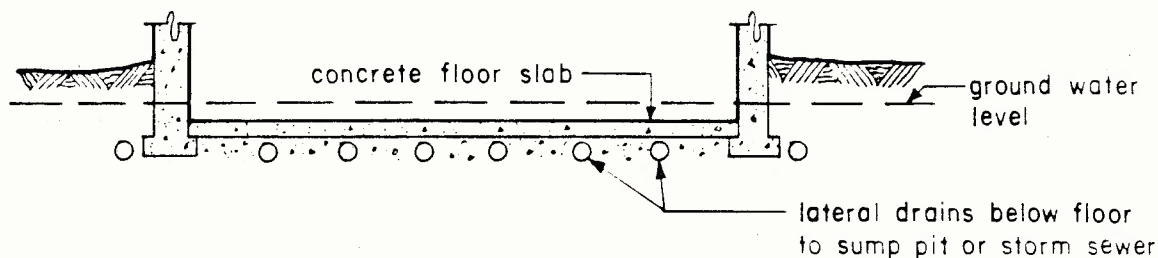
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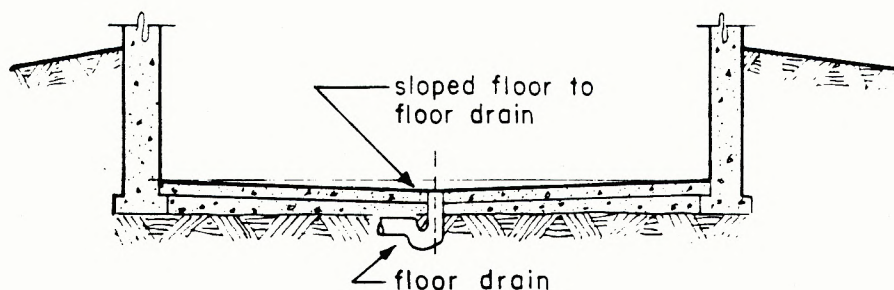
Section:

9.16

9.16.4.1 DRAINAGE BY LATERAL DRAINS



9.16.4.3 FLOOR SLOPED FOR DRAIN



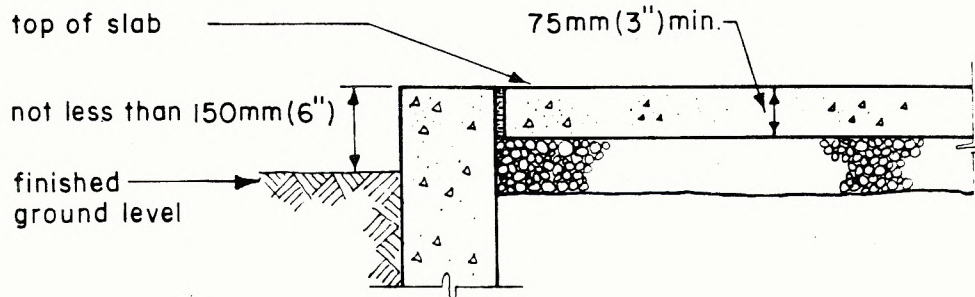
9.16.5.3 &
9.16.6.1

CONCRETE TOPPING: A separate layer of concrete to finish the top of a floor slab. Can be placed at the same time as the base slab, or later (the first method is preferred.)

9.16.6.1

SLABS-ON-GROUND: Slabs resting on the ground whether at or below the ground level around the building (this includes the basement floor -- see drawings 9.13.5.1 and 9.16.2.1).

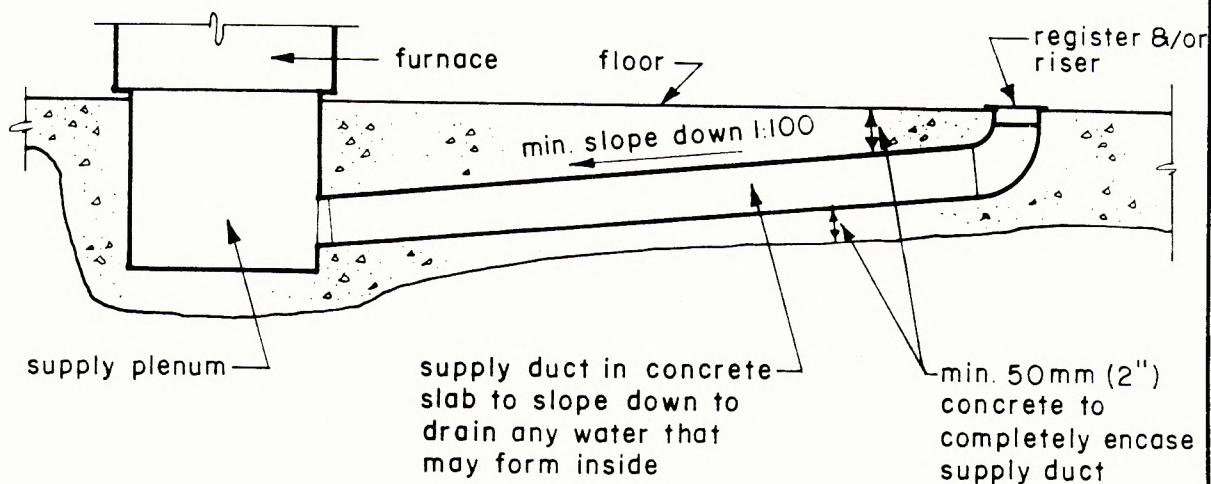
9.16.6.1 & 9.16.6.2 TOP OF SLAB-ON-GRADE



9.16.7.1

CORROSIVE MATERIAL: A material which will cause another material (usually metal) to corrode or rust.

9.16.7.2 DUCTS IN SLABS



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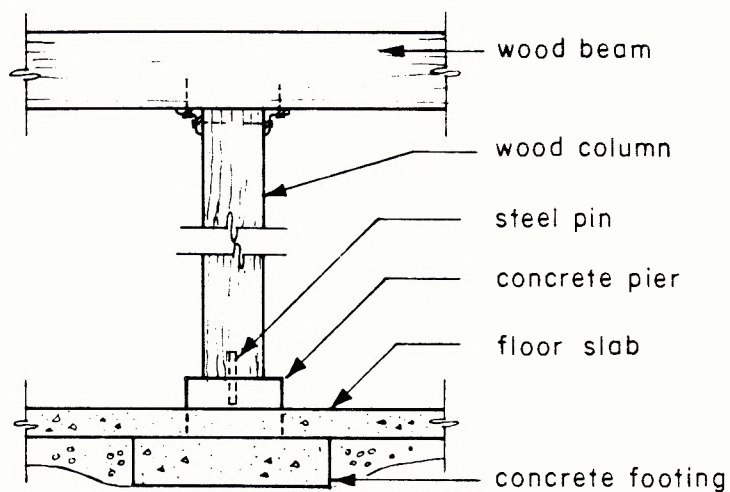
9.16

columns

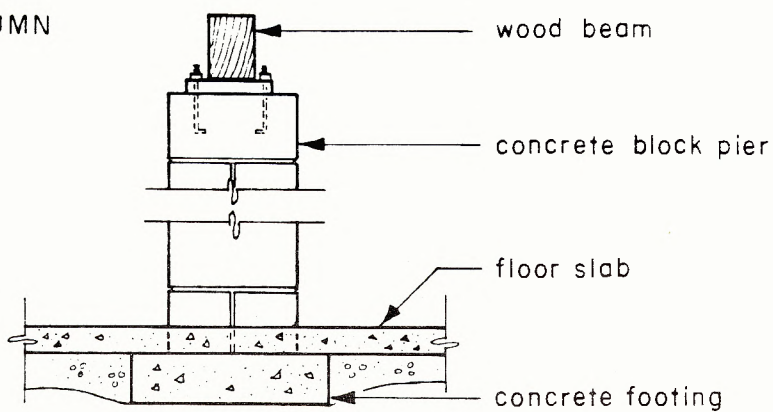
SECTION 9.17

9.17.1.1 COLUMNS

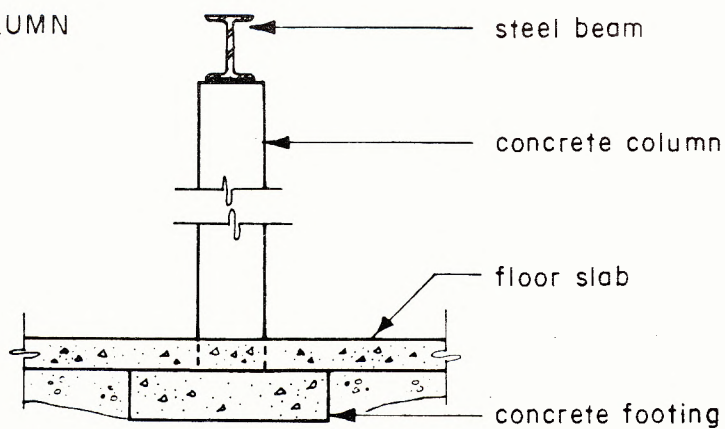
a) WOOD COLUMN



b) MASONRY COLUMN



c) CONCRETE COLUMN



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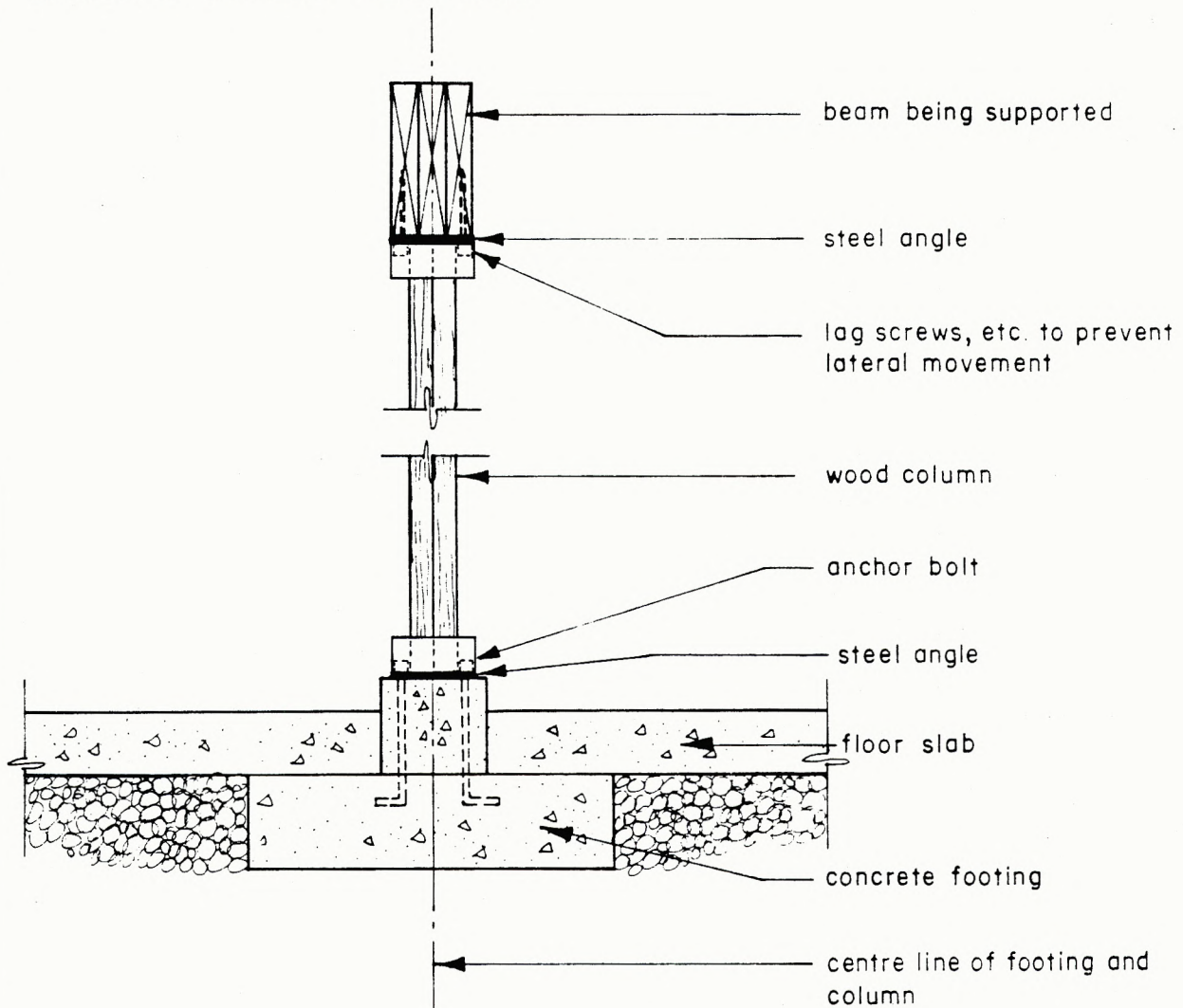
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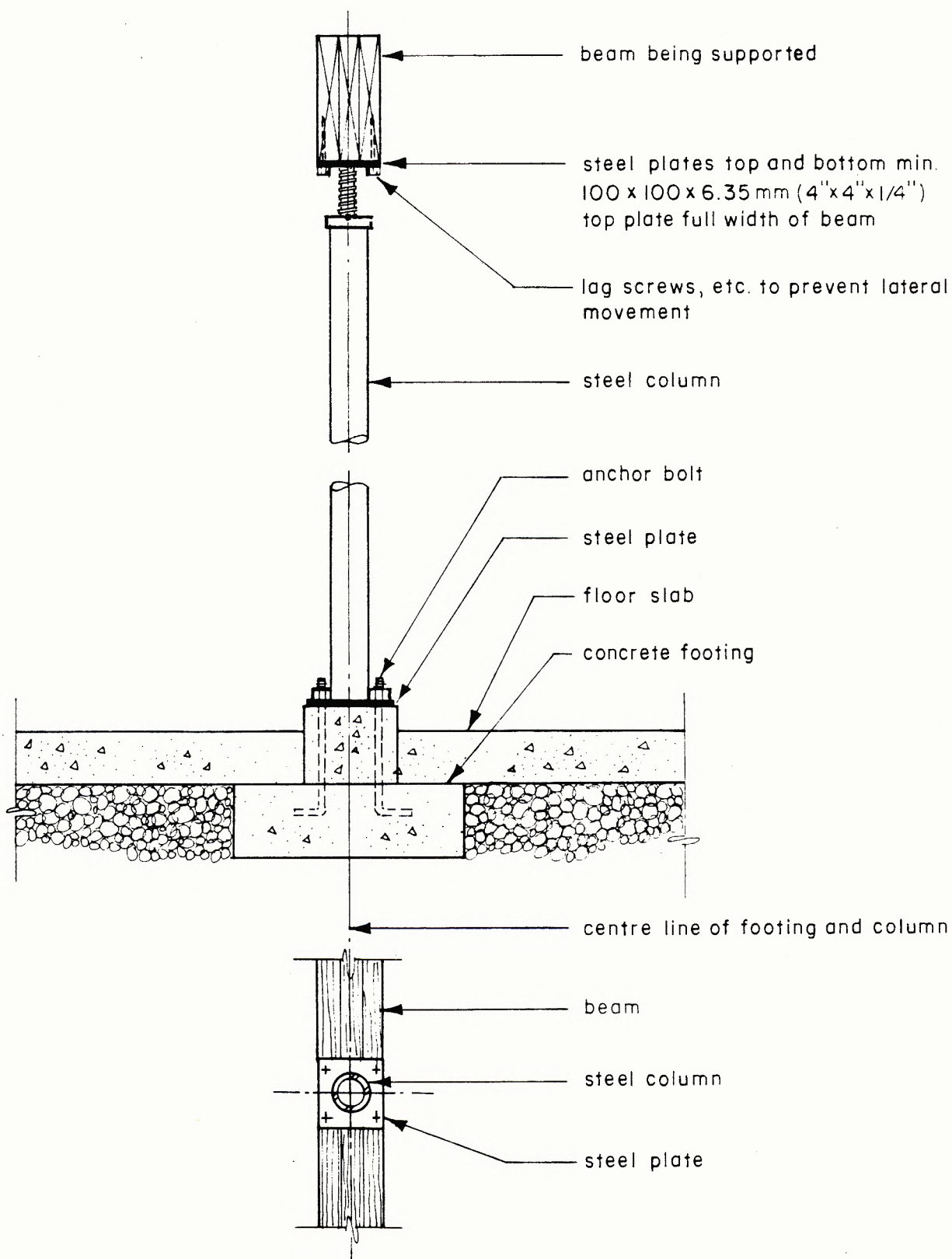
9.17

9.17.2.1 & 9.17.2.2 COLUMNS



Note: For steel column see 9.17.3.3

9.17.3.3 STEEL COLUMNS



BOTTOM VIEW OF BEAM

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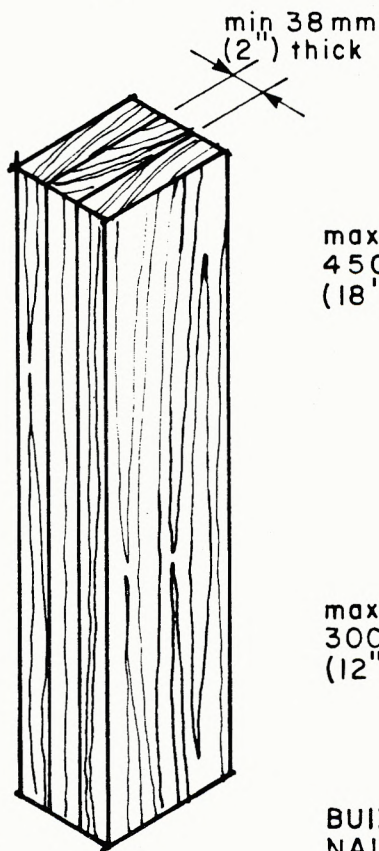
9.17

9.17.4.2 WOOD COLUMNS

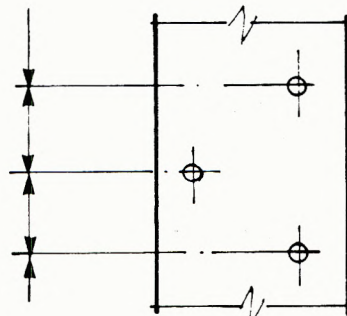
SOLID



**GLUE -
LAMINATED**

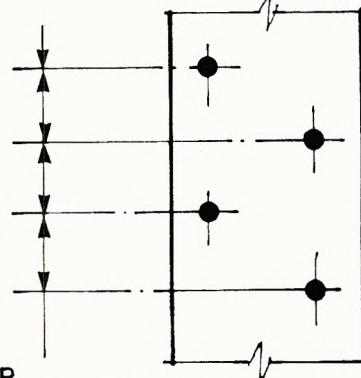


max.
450 mm
(18") o.c.



Bolts
min 9.52 mm
(3/8") diameter

max.
300 mm
(12") o.c.



Nails
min 76 mm
(3") long

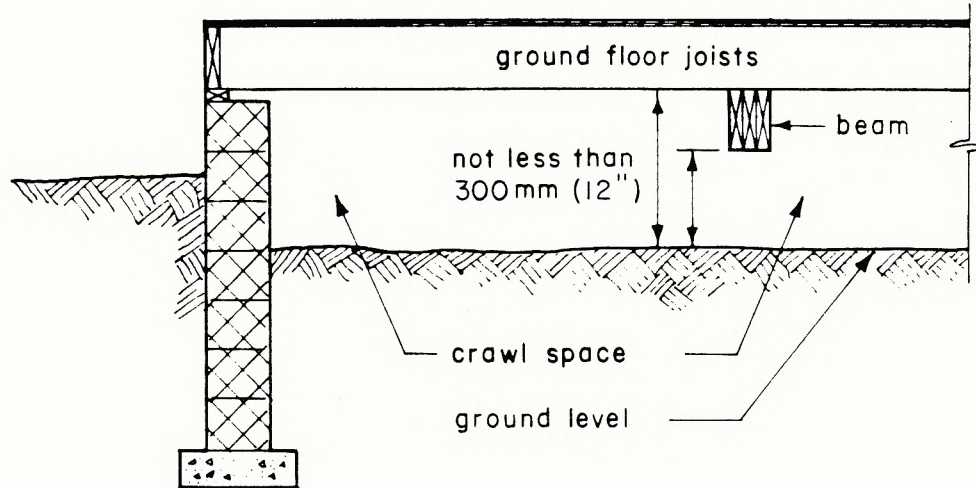
BUILT-UP

**BUILT-UP
NAILING & BOLT PATTERN**

crawl spaces

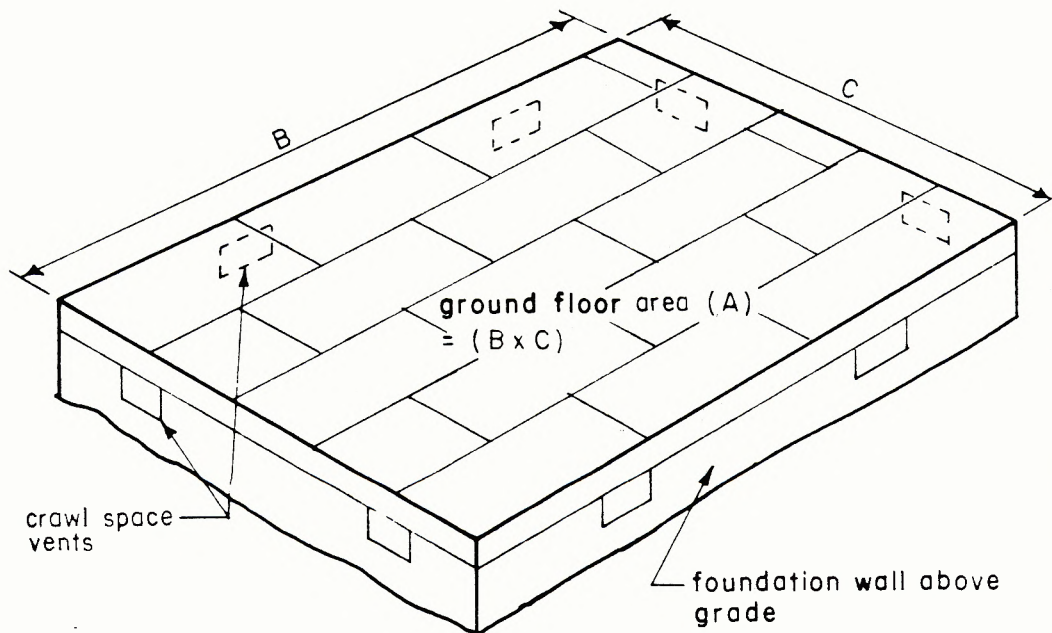
SECTION 9.18

SECTION 9.18 & 9.18.4.1 CRAWL SPACE-CLEARANCE UNDER JOISTS & BEAMS



9.18.3.2 UNOBSTRUCTED VENT AREA: The clear, open area of a vent which permits air to pass through.

9.18.3.2 VENTS FOR CRAWL SPACES



area of
crawl space vents = $\frac{A}{500}$
(unobstructed)

eg. IF C = 20'
& B = 30'

Then floor area = C x B or 20' x 30' = 600 sq. ft.
unobstructed vent area required is $\frac{600}{500} = 1.2$ sq. ft. total

Assuming vent areas 0.15 sq. ft. each, therefore
require $1.2 / 0.15 = 8$ vents.

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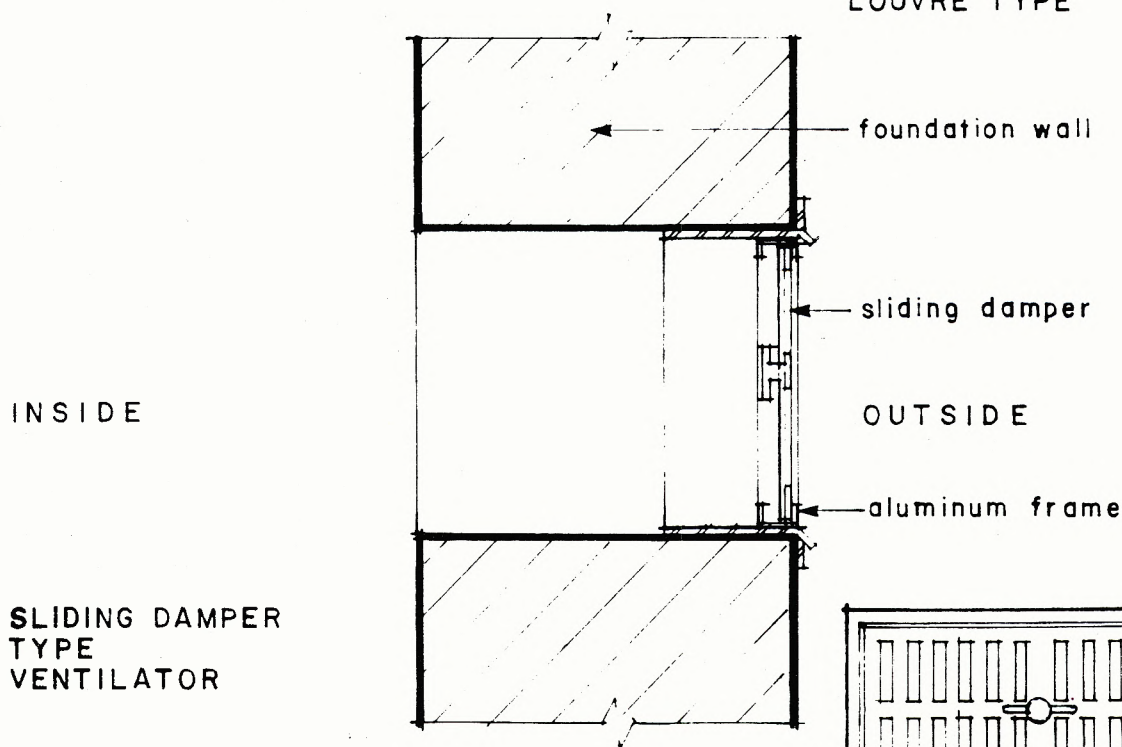
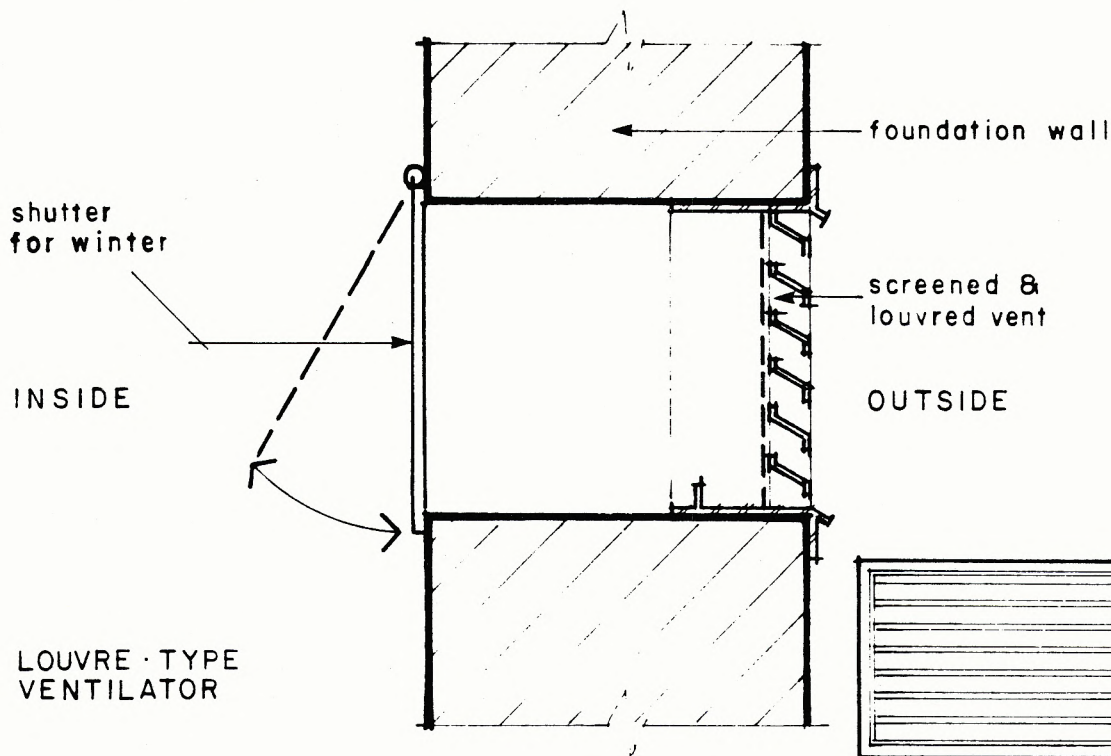
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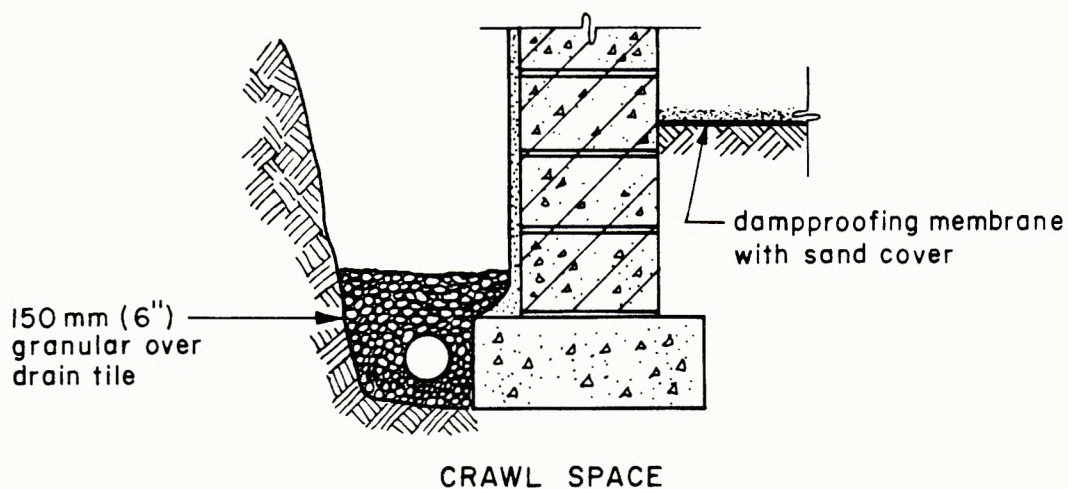
9.18

9.18.3.3 CRAWL SPACE VENTS



9.18.4.1 CRAWL SPACE CLEARANCE: See Section 9.18.

9.18.6.1 GROUND COVER



9.18.7.1 SURFACE FLAME SPREAD RATING: See 9.10.17.1

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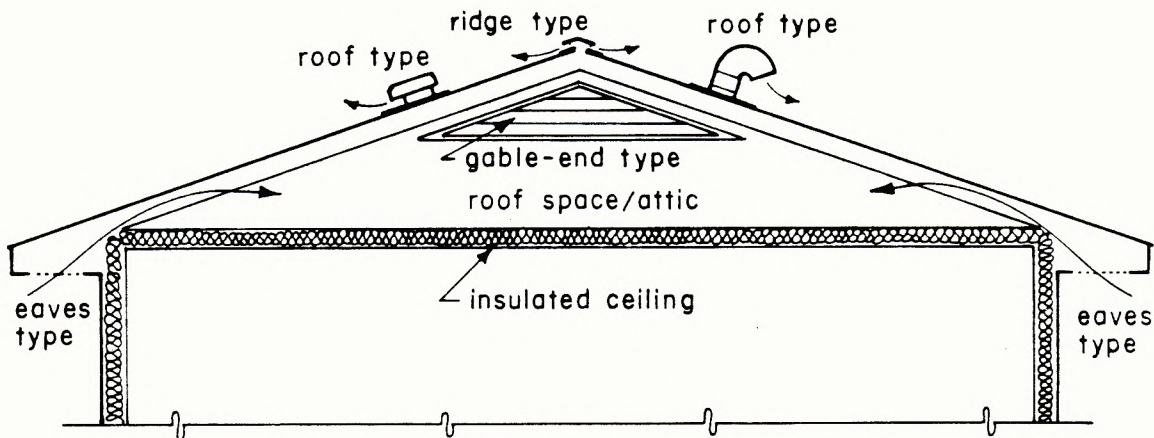
roof spaces

SECTION 9.19

9.19.1.1

UNOBSTRUCTED VENT AREA: The clear, open area of a vent which permits air to pass through.

9.19.1.1 VENTILATING ROOF SPACE / ATTIC



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**above-grade
masonry**

SECTION 9.20

9.20.2.6

SATURATION COEFFICIENT: This is the ratio between the amount of water absorbed after 24 hours in cold water and the total water absorbed after an additional 5 hours of boiling. It should be below 0.88. It is a measure of the durability of the brick in its resistance to freeze-thaw cycles. The theory is that bricks below this ratio have additional spaces between the particles to absorb freezing without damage.

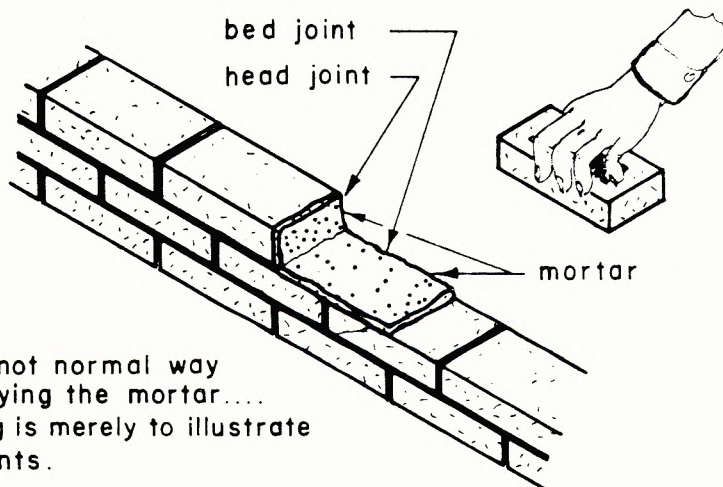
9.20.3.1

CEMENTITIOUS: Describing material such as concrete, mortar, grout and plaster made up of sand or other aggregates with a binding agent of cement which, when mixed with water, forms a paste that hardens into a stone-like building material.

9.20.3.2

DELETERIOUS MATERIALS: Materials like oil, soap or organic dirt that would prevent the cement from setting properly.

9.20.4.2 FULL HEAD AND BED JOINTS



Note: This is not normal way of applying the mortar.... drawing is merely to illustrate full joints.

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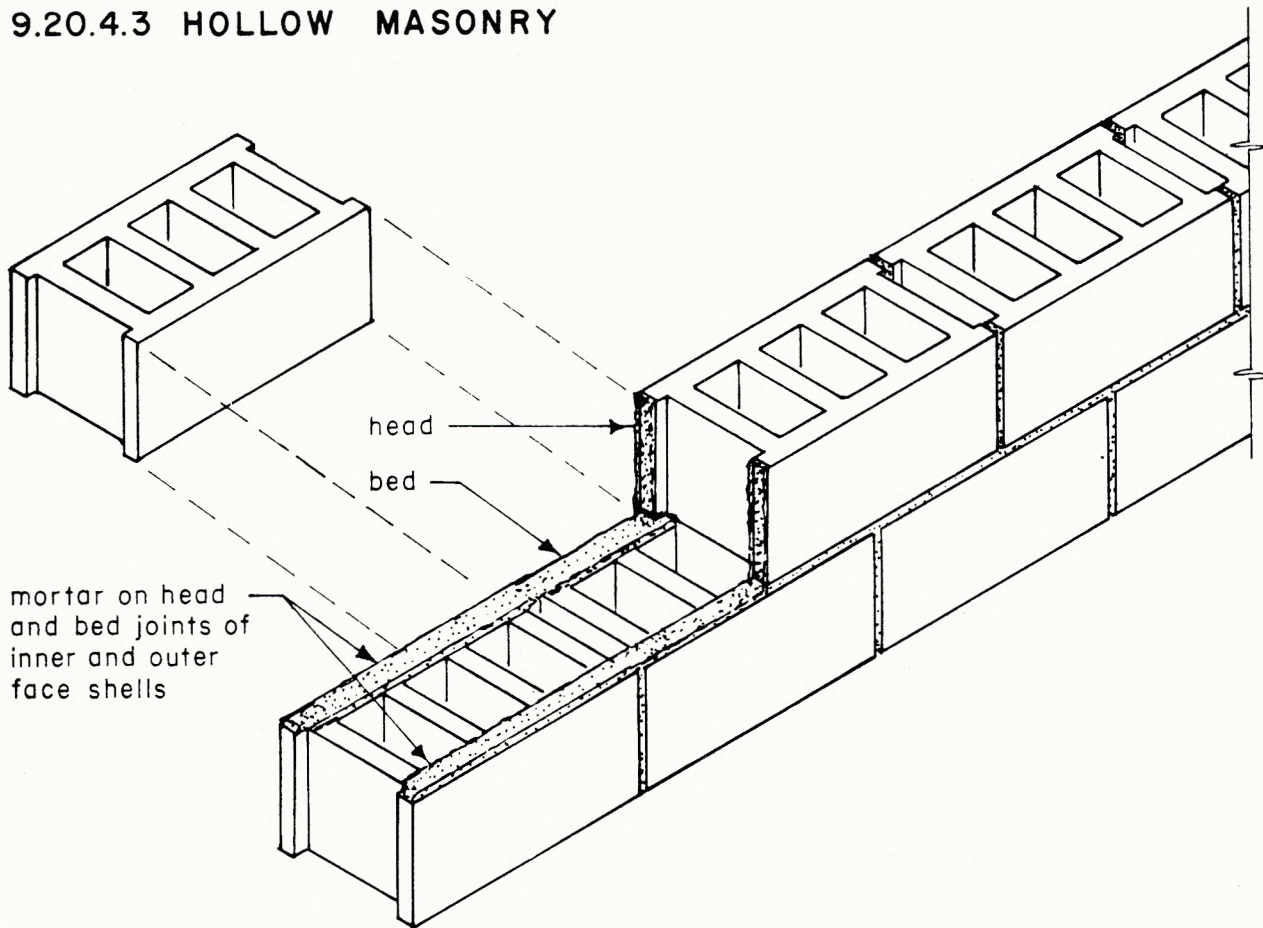
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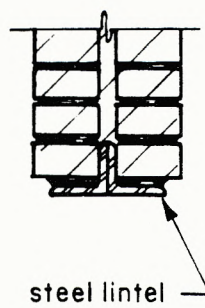
Section:

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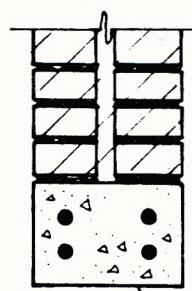
9.20.4.3 HOLLOW MASONRY



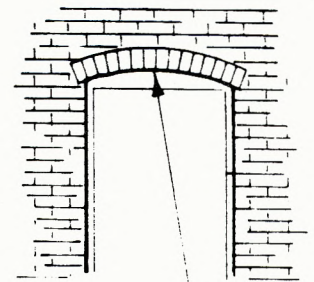
9.20.5.1 SUPPORTING MASONRY AT OPENINGS



steel lintel

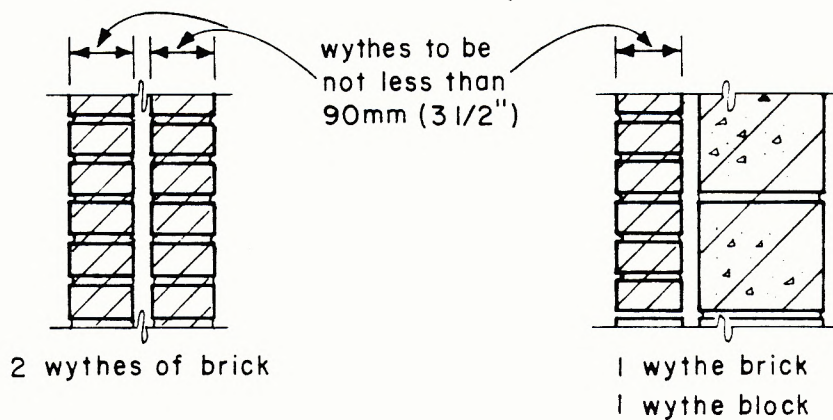


concrete lintel



brick arch lintel

9.20.6.1 **WYTHE:** A continuous vertical section of a masonry wall having a thickness of one masonry unit.



Note: Ties are not shown but are required.

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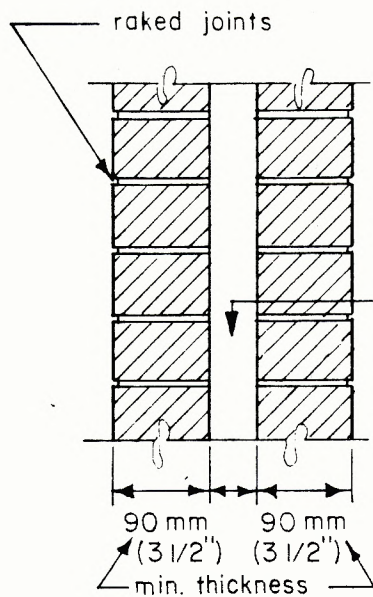
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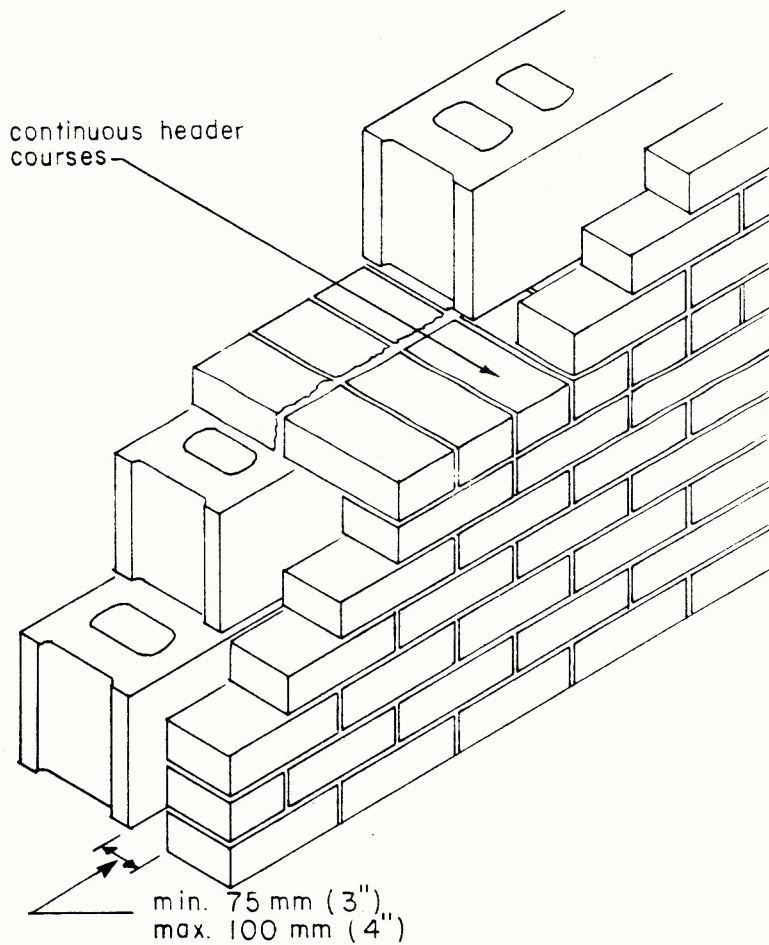
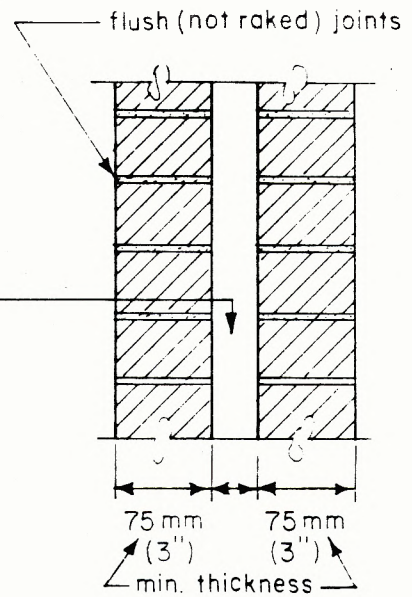
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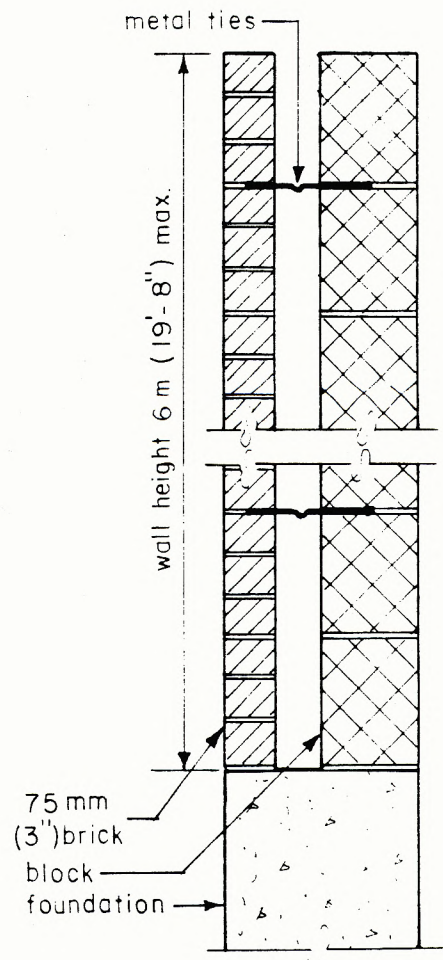
9.20.6.2 CAVITY WALLS



cavity
 min. 50 mm (2")
 &
 max. 75 mm (3")

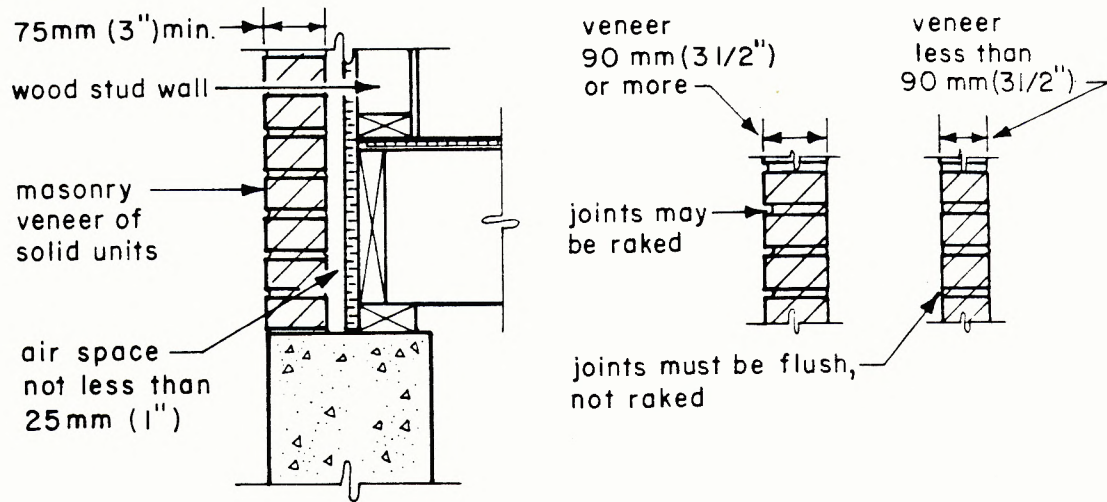


BRICK BONDED WITH MASONRY



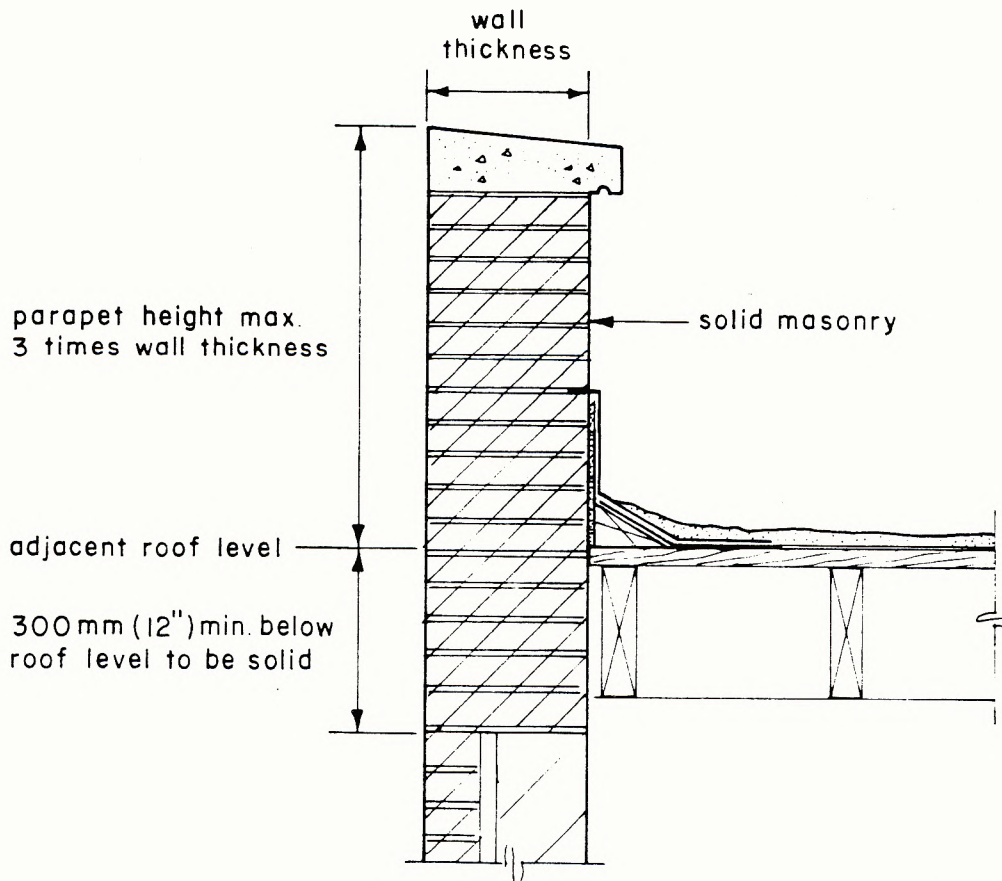
TIED WITH METAL TIES

9.20.6.5 MASONRY VENEER



Note: Ties for veneer are not shown.

9.20.6.7 PARAPET WALL HEIGHTS



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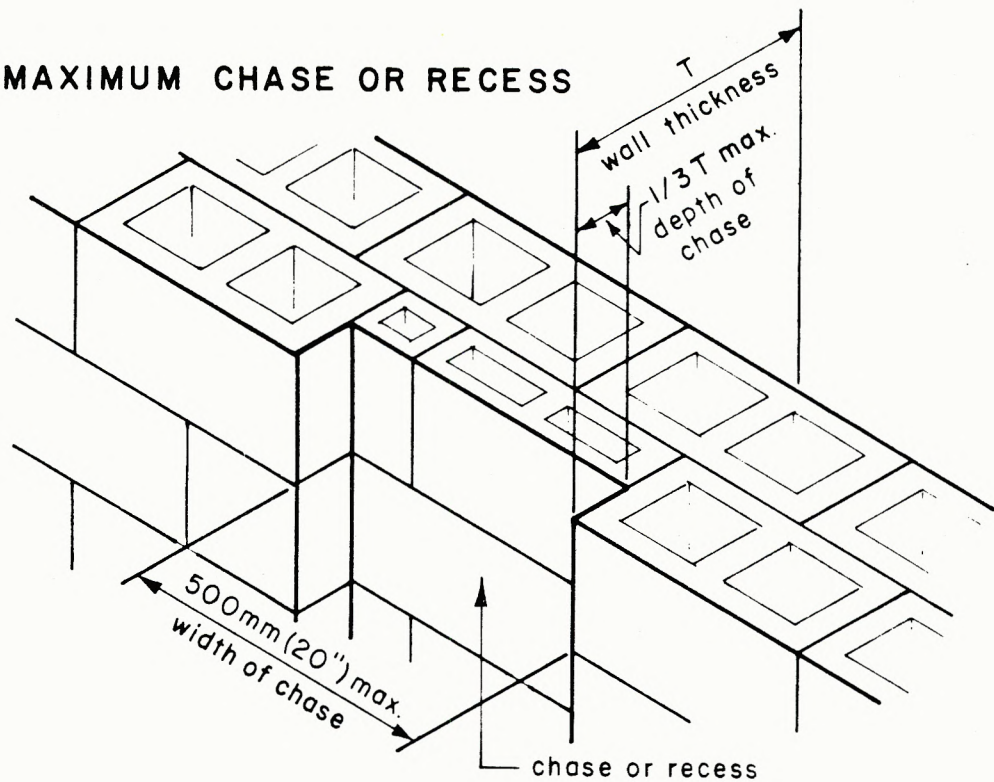
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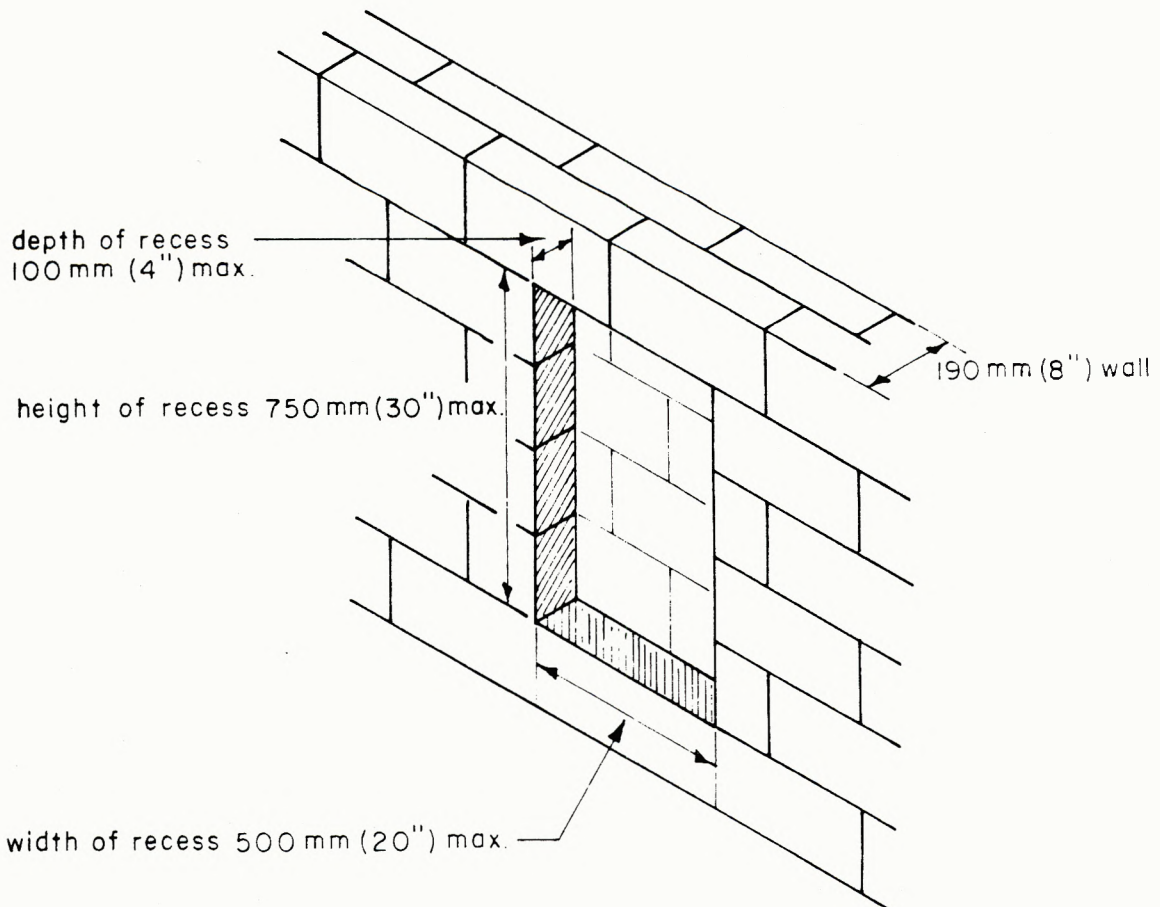
9.20

9.20.7.1 MAXIMUM CHASE OR RECESS

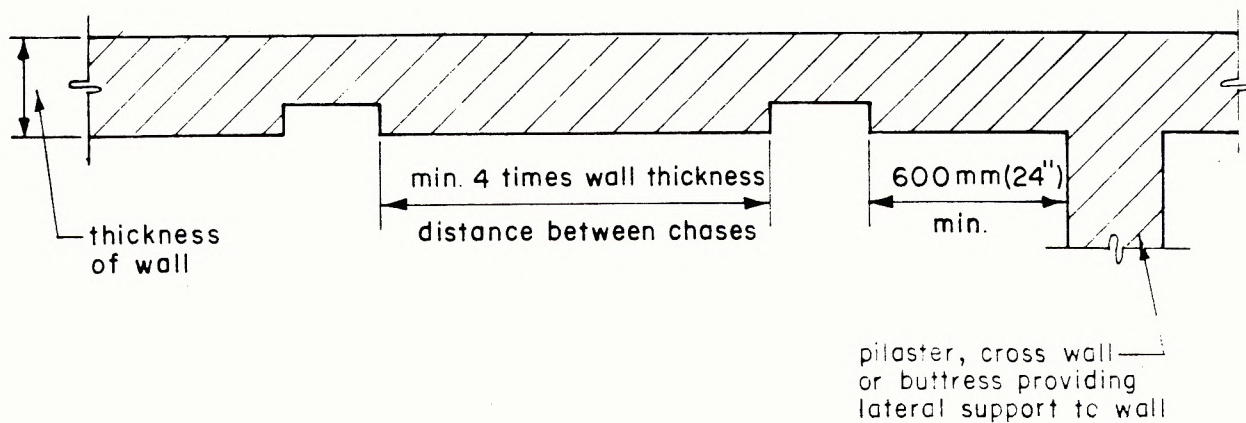


Note: Bonding or tying of block wythes not shown here.

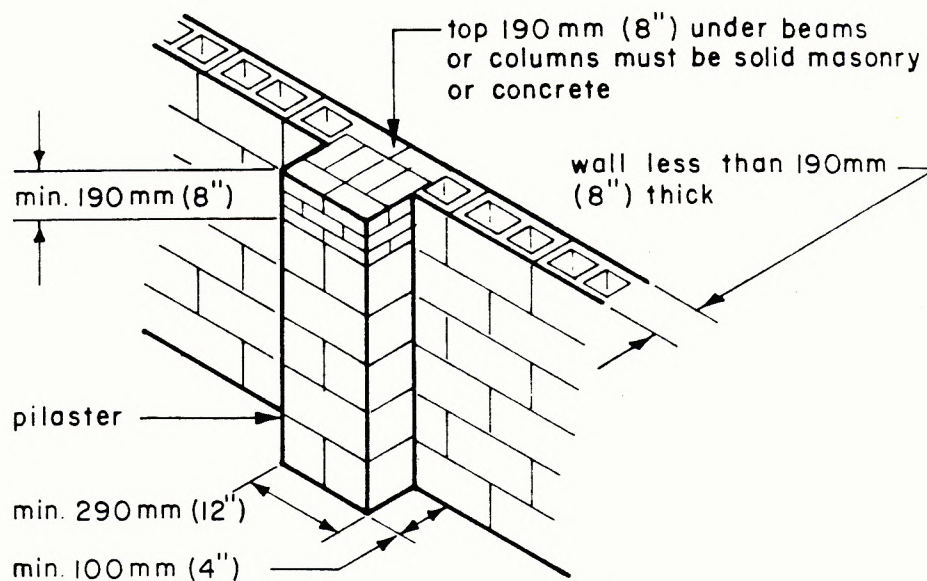
9.20.7.3 RECESSES IN 190 mm (8") WALLS



9.20.7.4 CHASES AND RECESSES IN MASONRY

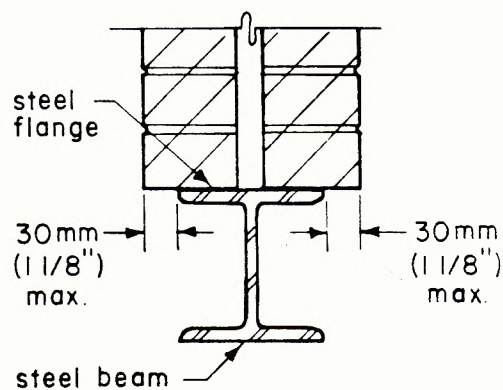
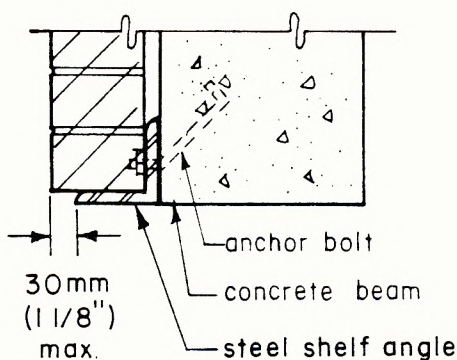


9.20.8.4 PILASTER



A column or pier forming an integral part of a wall and partially projecting from the wall face. Masonry in pilaster must be bonded or tied to the masonry in the wall.

9.20.8.5 DISTANCE FROM WALL FACE TO EDGE OF SUPPORT



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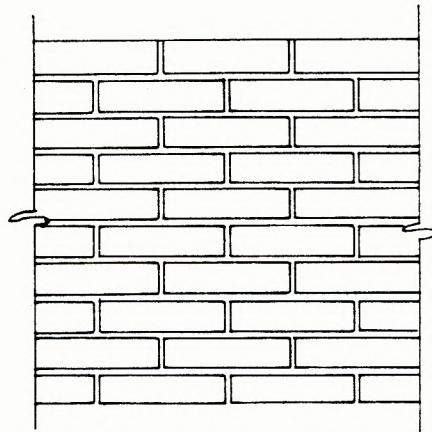
Date:

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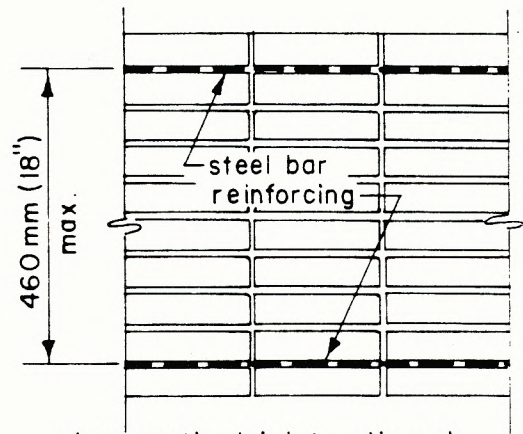
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9.20.9.1 VERTICAL JOINTS



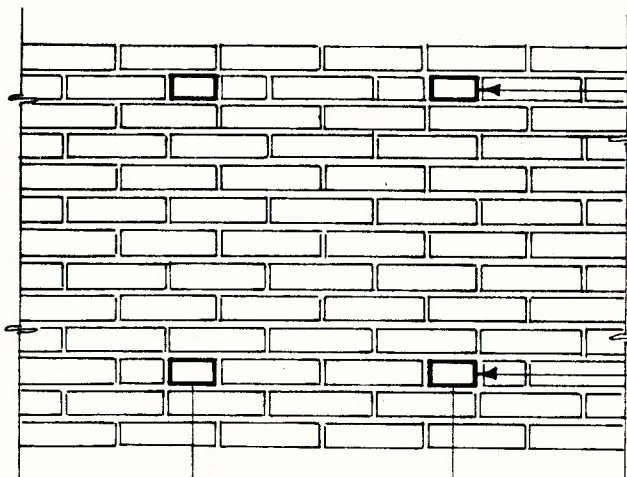
vertical joints offset

Note: for wythes see 9.20.6.1



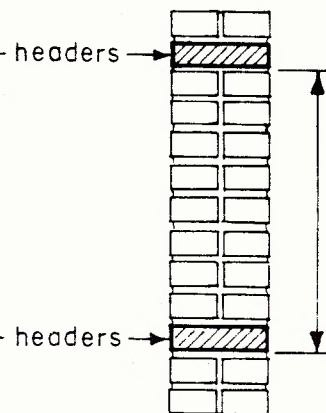
when vertical joints aligned, horizontal steel reinforcement is required

9.20.9.2 & 9.20.9.3 BONDING WITH MASONRY UNITS



not more than
600 mm (24") o.c. for brick, 900 mm (35") for block

ELEVATION

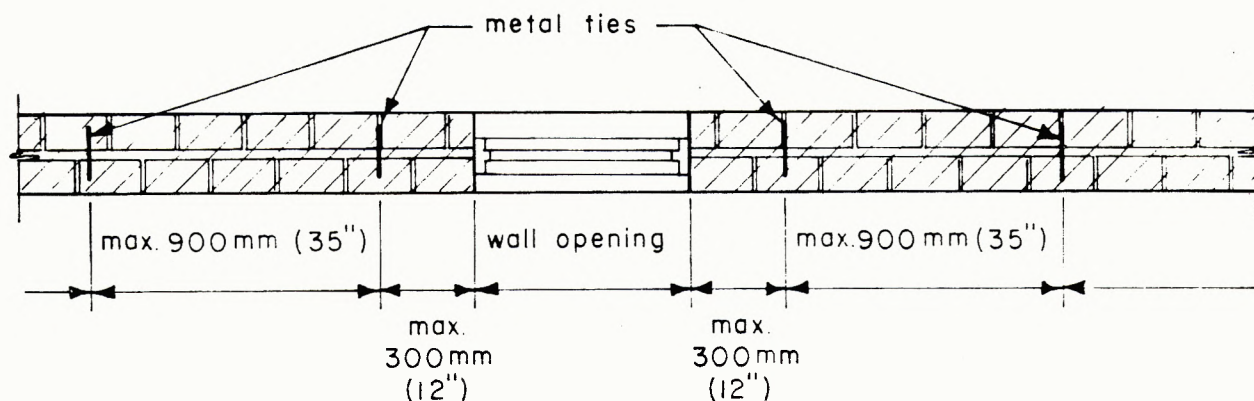


not more than
600mm (24")
for brick, 900mm
(35") for block

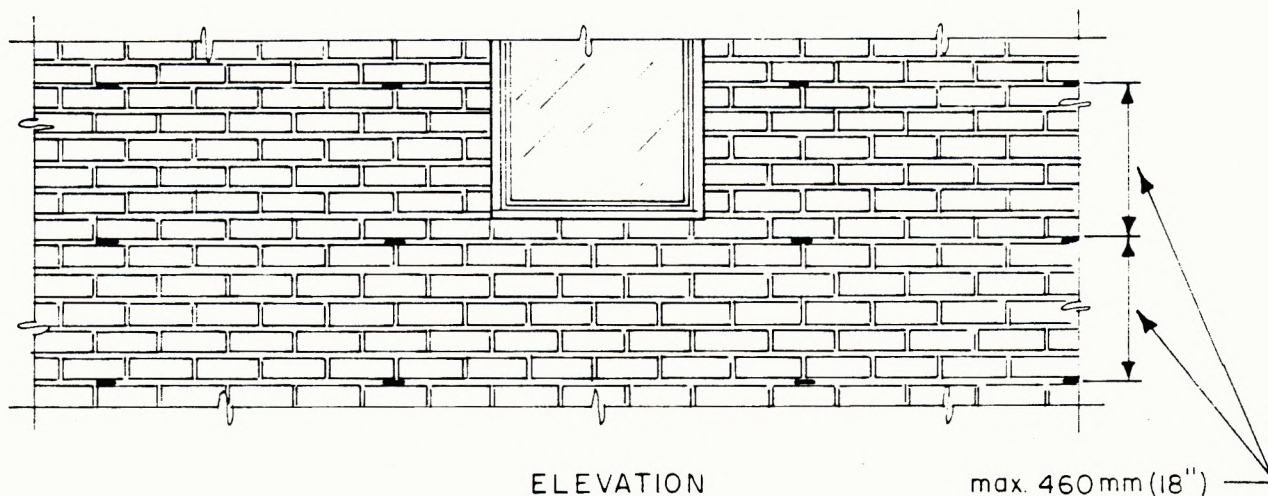
SECTION THROUGH
HEADERS

Area of bonding units to be not less than 4% of wall face. In practice, with brick, this is usually done with alternate headers and stretchers in every 6th course, which comes to about 6% and makes the horizontal spacing about 300mm(12").

9.20.9.4 & 9.20.9.7 METAL TIE SPACING



PLAN



ELEVATION

Vertical spacing to be not more than 460mm (18") apart generally.

9.20.9.5

CORROSION-RESISTANT: Material resisting rusting; normally, galvanized steel or aluminum, copper, bronze, brass, etc.

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9.20.9.7

9.20.9.8

TIES FOR CAVITY WALLS

METAL TIE SPACING: See 9.20.9.4.

METAL TIES: See also drawing 9.20.9.5.

9.20.9.5, 9.20.9.6, & 9.20.9.8

METAL TIES

50 mm (2") less than wall
thickness, i.e. 150 mm
(6") for 200 mm (8") wall

diameter approximately 5mm
(0.2") which gives a cross-
sectional area of 19.6 mm²
(0.03 sq. in.)

TIES FOR SOLID WALLS

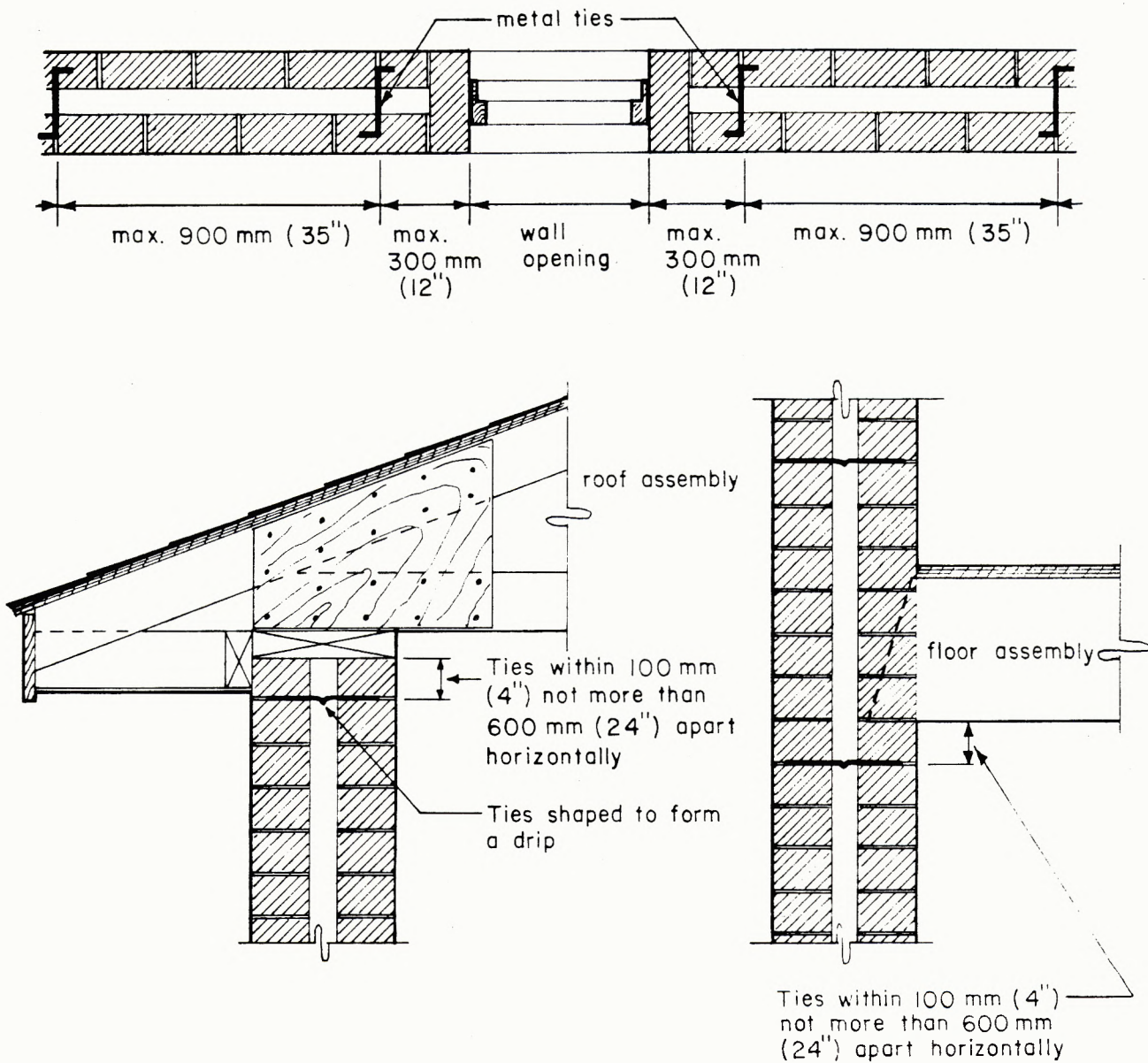
Diagram illustrating the construction of a cavity wall. The wall consists of two masonry wythes separated by a cavity. The cavity width is specified as 50 mm (2") less than the wall thickness. For example, for a 250 mm (10") wall, the cavity width would be 200 mm (8").

-drip near center

diam. approx.
5 mm (0.2")

25 mm (1") max

9.20.9.8 METAL TIES IN CAVITY WALLS



INTERPRETATION : PART 9 NATIONAL BUILDING CODE OF CANADA 1980

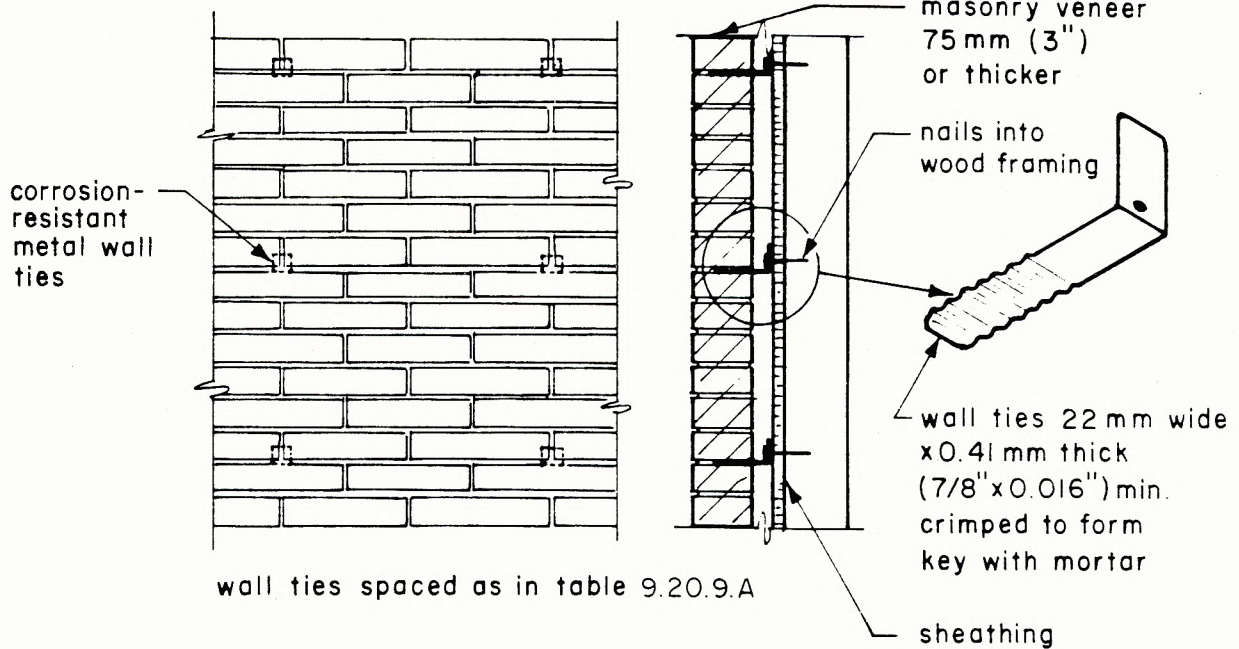
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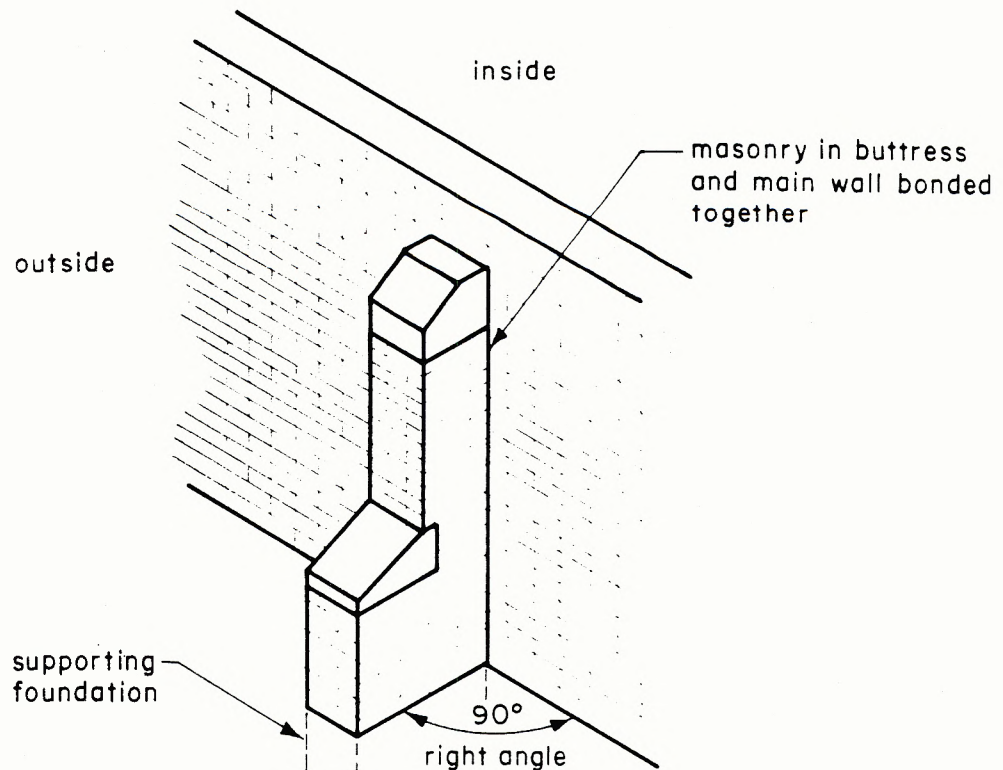
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9.20.9.9 TYING MASONRY VENEER



9.20.10.1 BUTTRESS

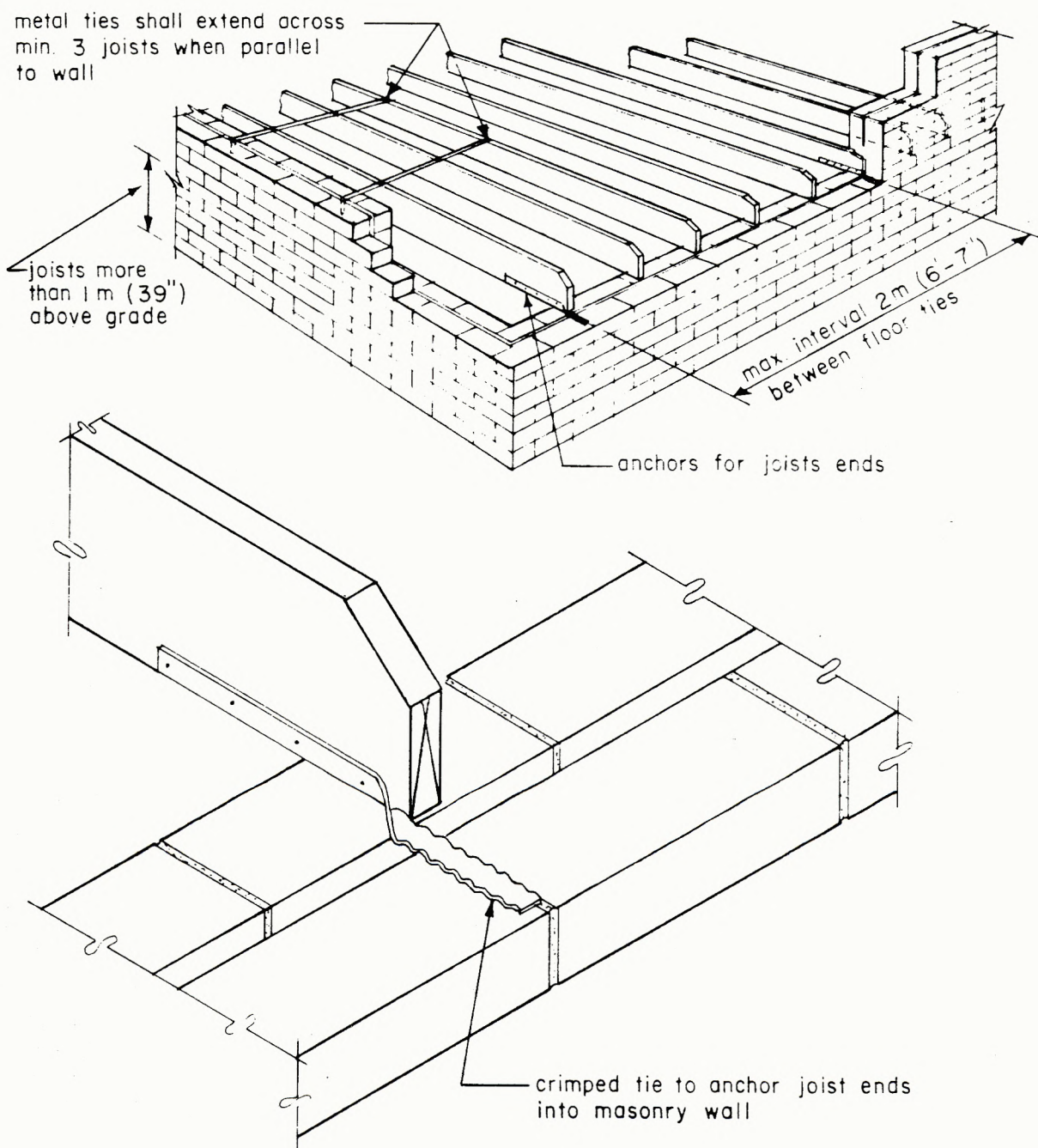


A short wall or pier supporting and bracing a main wall

9.20.11.1

DEVELOP FULL STRENGTH: Fastenings should be as strong as the tie. Straps of this size (40 mm x 4.76 mm (1½" x 3/16")) would require about 5 bolts 6 mm (1/4") diameter or 3 bolts 9 mm (3/8") diameter, or about 375 mm (15") embedment in concrete.

9.20.11.1 WALL ANCHORAGE



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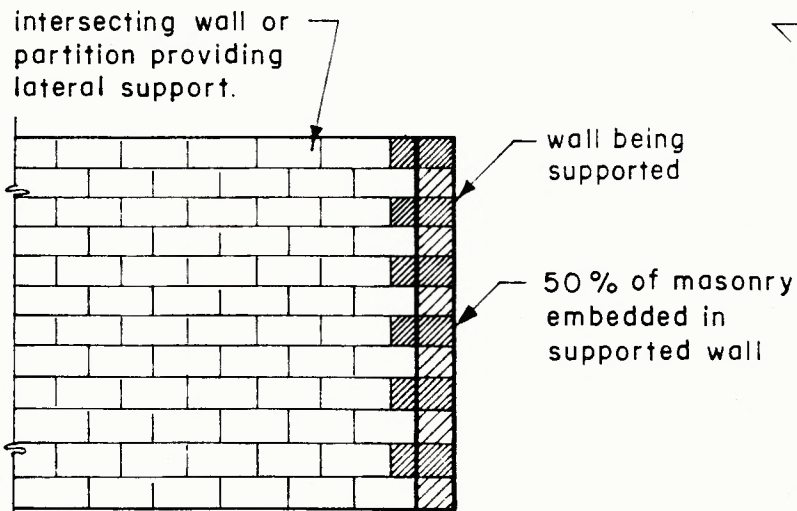
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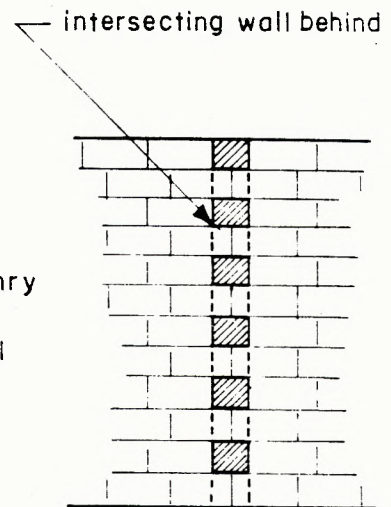
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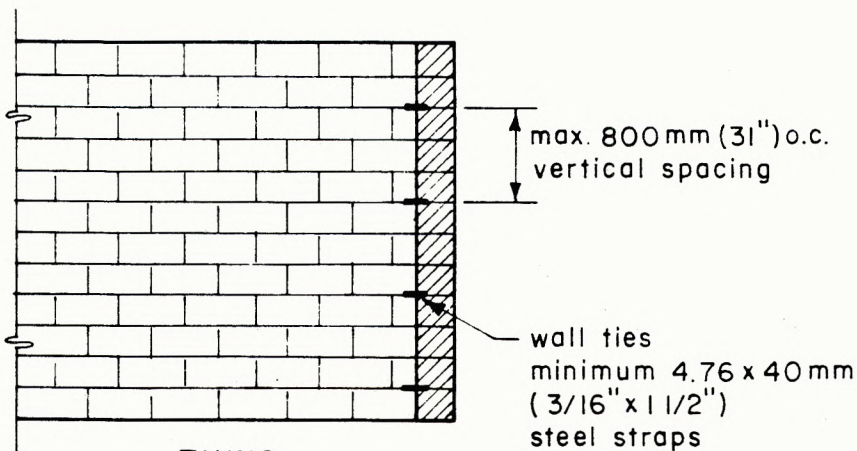
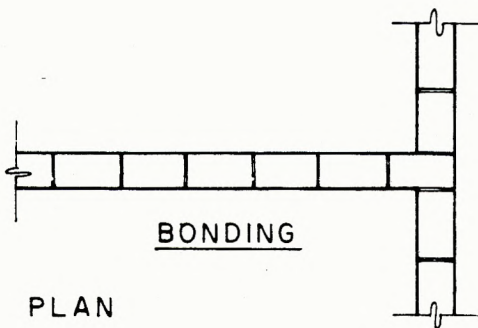
9.20.11.2 LATERAL SUPPORT TO MASONRY WALLS



SIDE ELEVATION

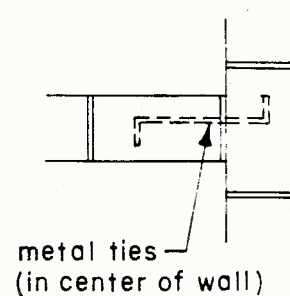


FRONT ELEVATION OF SUPPORTED WALL



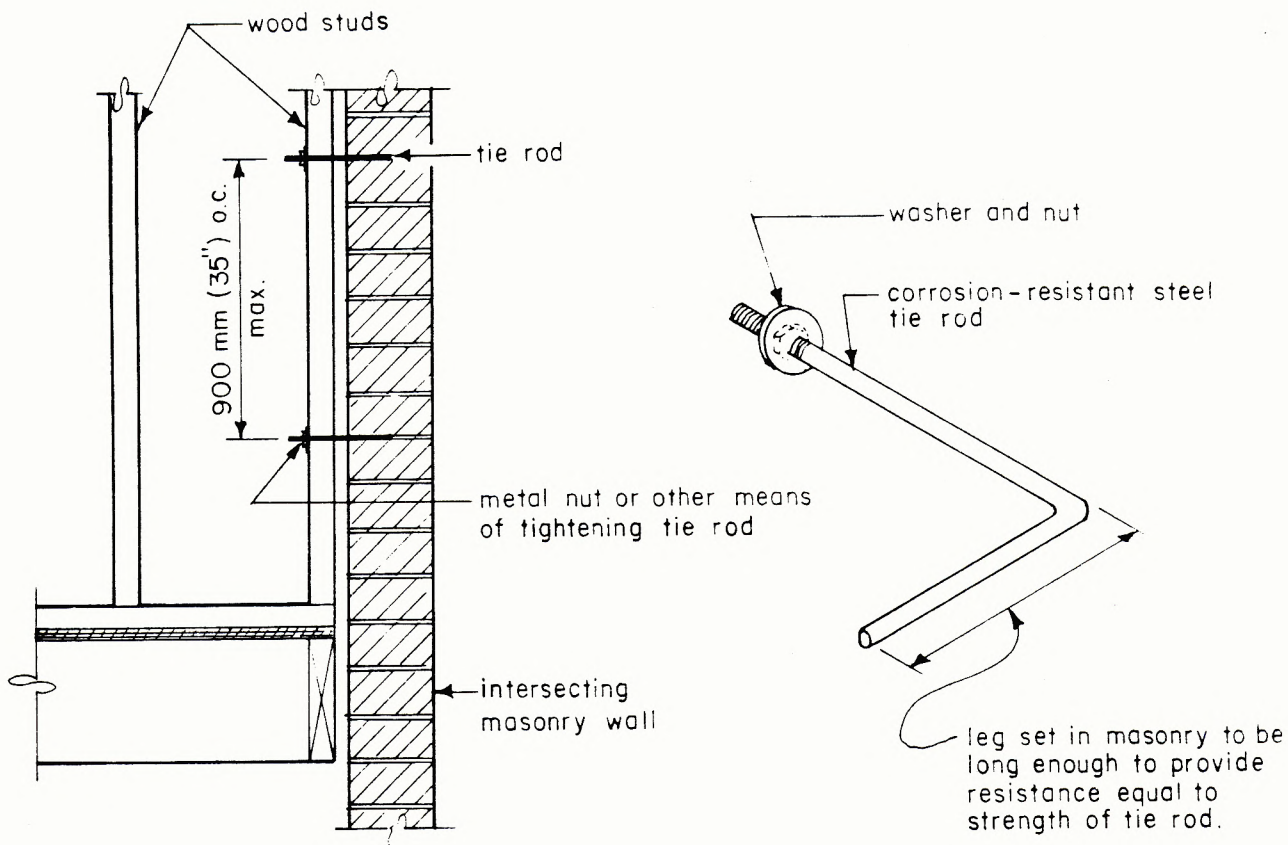
TYING

ELEVATION



PLAN

9.20.11.3 FRAME WALL ANCHORAGE TO MASONRY WALL



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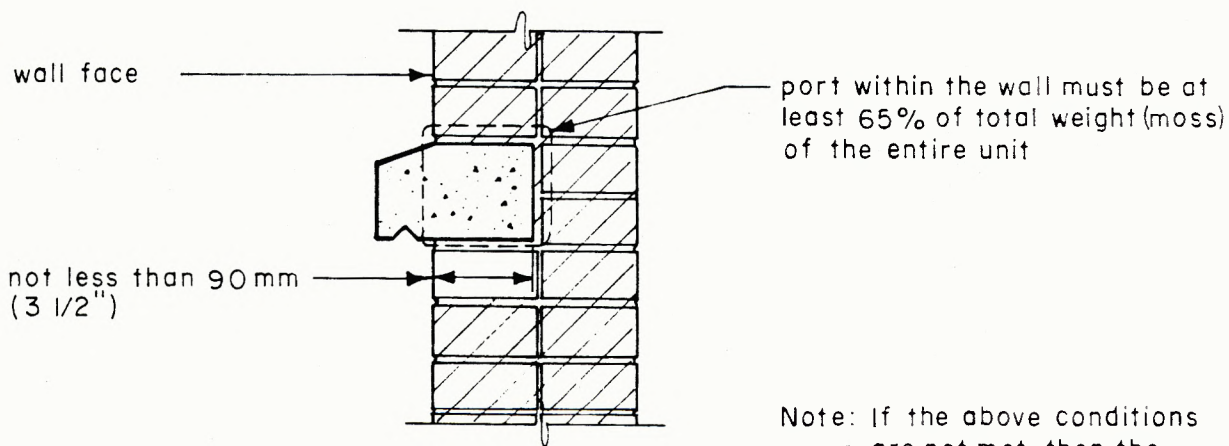
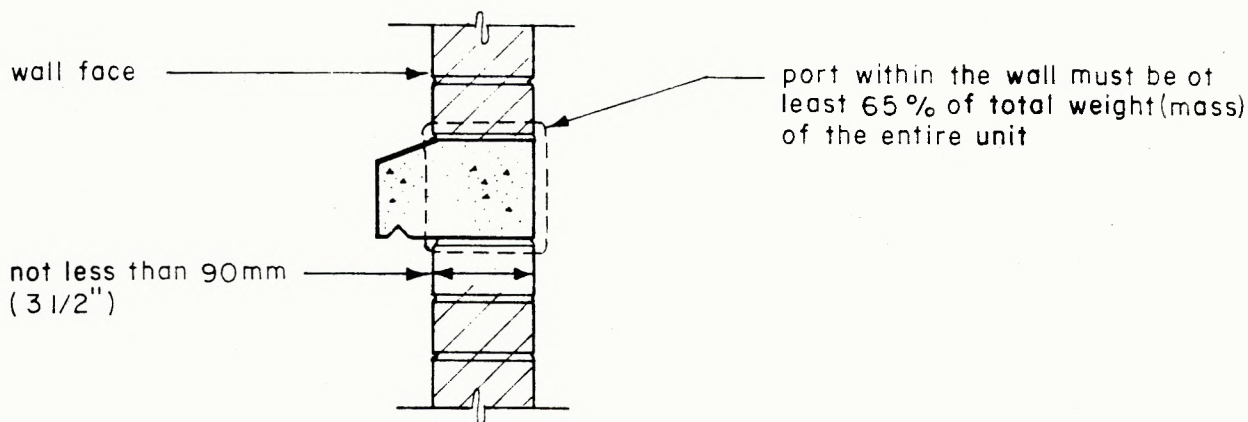
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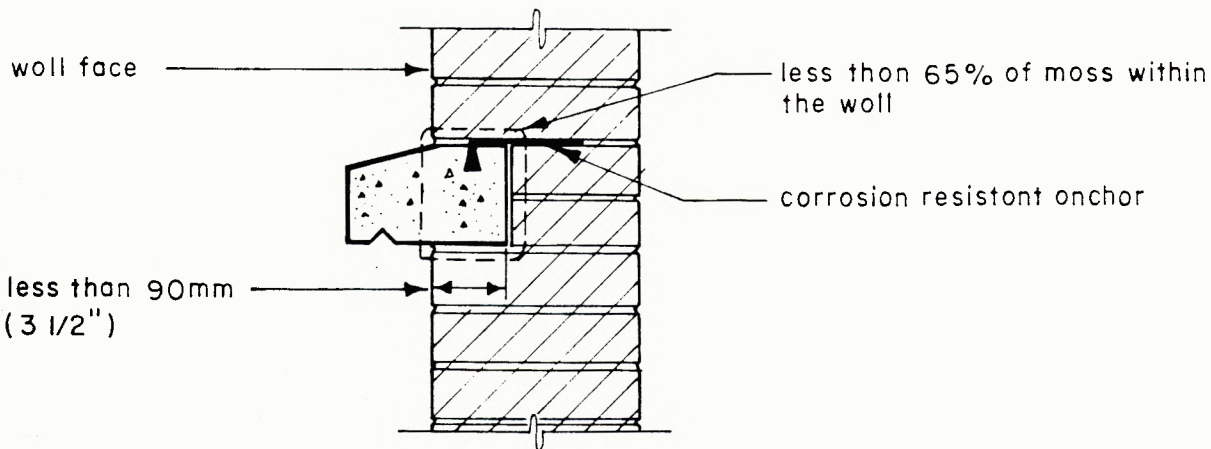
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9.20.11.5 MASONRY CORNICES, SILLS, ETC.



Note: If the above conditions are not met, then the projecting piece must be anchored back to prevent it from falling off



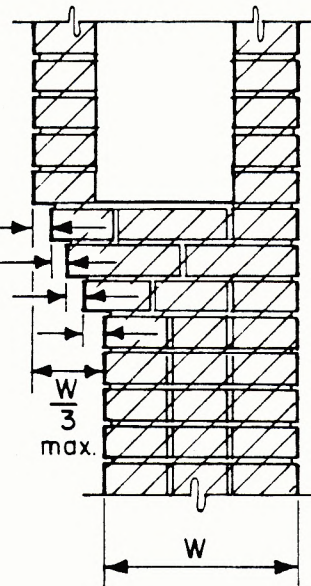
9.20.12.1

CORBELLING: Horizontal projections in a wall of masonry formed by one or more courses of masonry units and projecting over the course below.

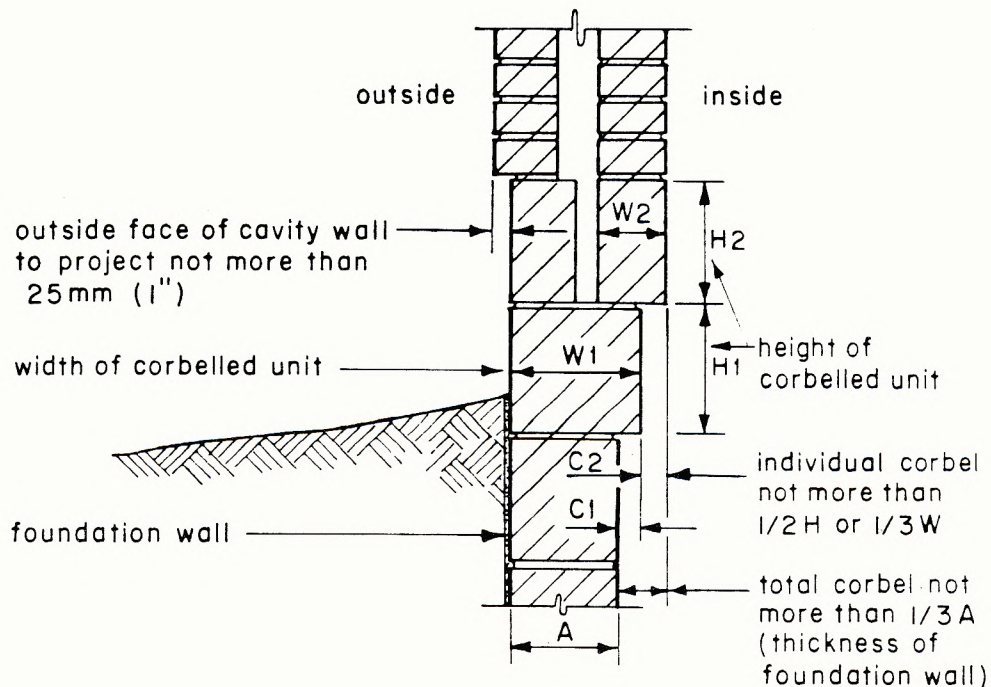
9.20.12.1 CORBELLING

corbel (projection) of each unit not more than 25 mm (1")
total projection not more than $\frac{1}{3}$ wall thickness W below

Note: Ties are not shown



9.20.12.2 PROJECTION FOR CAVITY WALLS



Note: Corbelling is done to obtain a thicker wall above a thinner one below, i.e. to avoid need to thicken wall below.

Corbel C1 relates to $H1$ & $W1$, corbel C2 relates to $H2$ & $W2$.

Ties not shown but required.

This type of construction is permitted, but not recommended, e.g. foundation wall should be same thickness as wall above.

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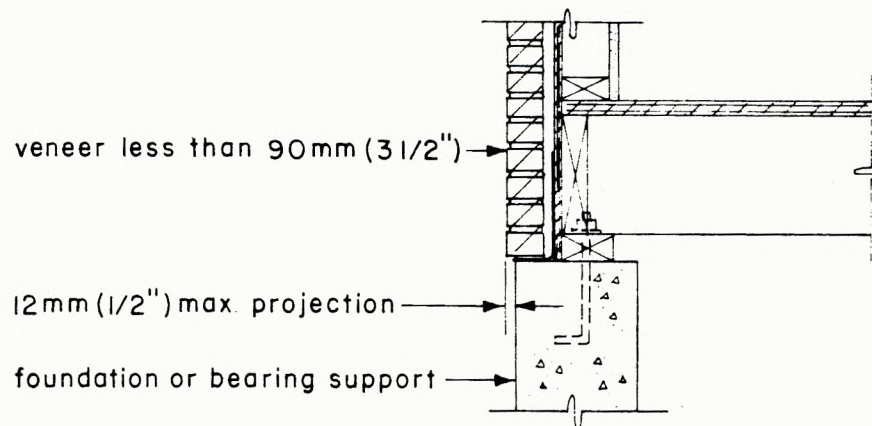
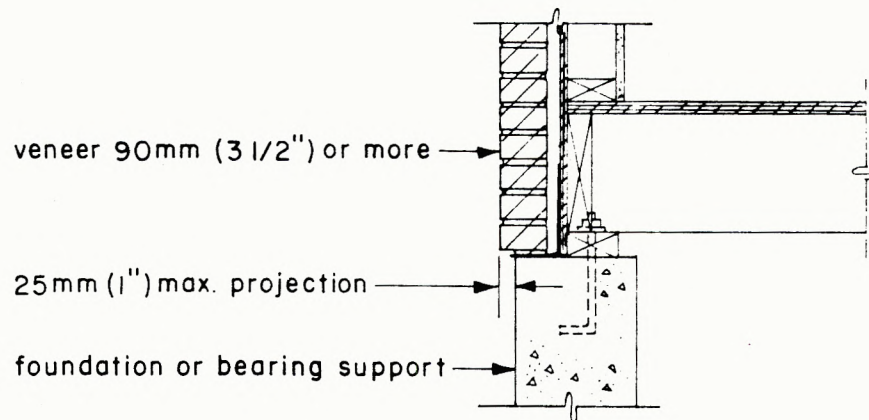
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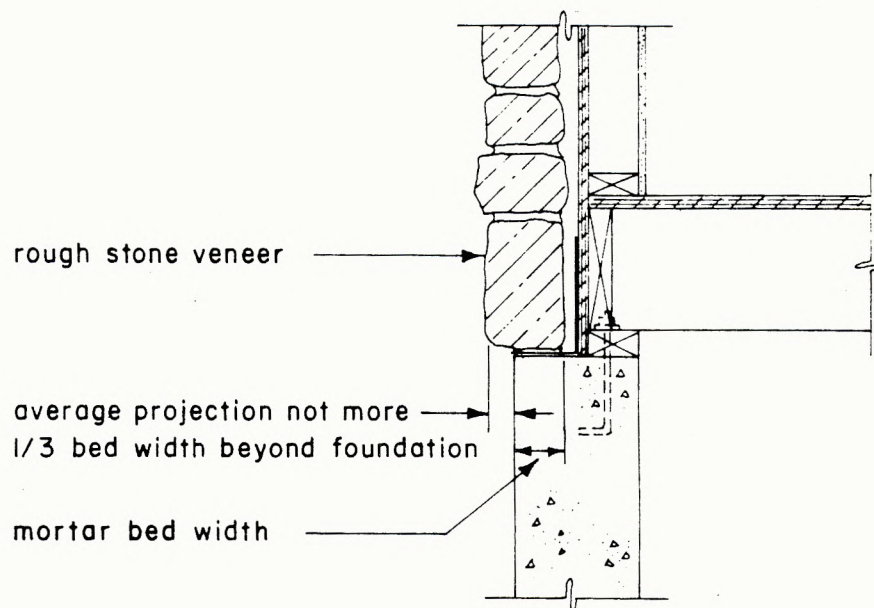
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9.20.12.3 (a) PROJECTION OF MASONRY VENEER



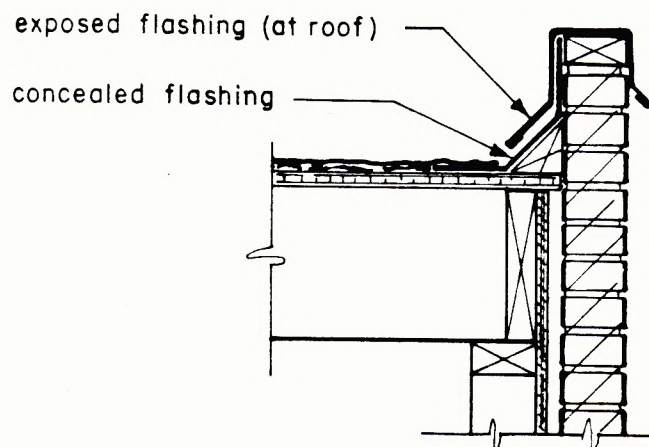
9.20.12.3 (b) PROJECTIONS IN ROUGH STONE VENEER



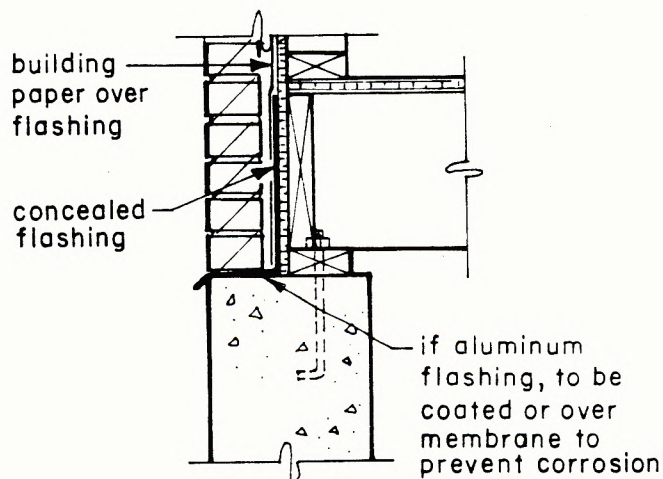
9.20.13.1

EFFECTIVELY COATED ALUMINUM: The separation of aluminum from masonry is usually done with asphalt paint (CGSB 1-GP-108), waterproof building paper or polyethylene. This is done to prevent the harmful effects of cement, etc. on the aluminum.

9.20.13.1 EXPOSED FLASHING



9.20.13.2 CONCEALED FLASHING



Note: See also 9.20.13.4, 9.20.13.5, 9.20.13.6, & 9.20.13.7

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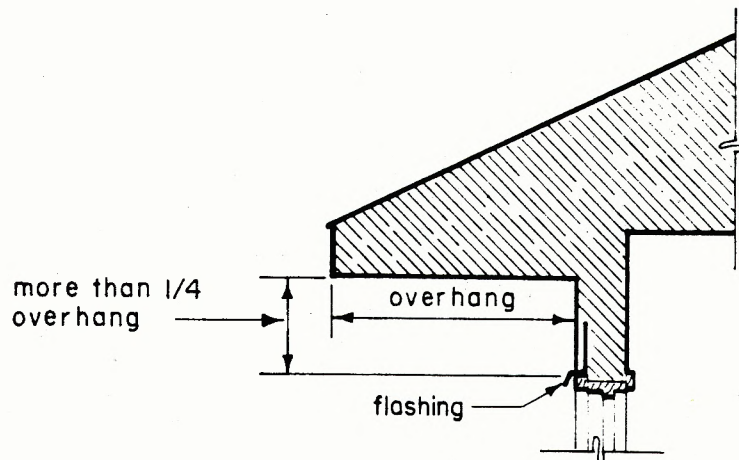
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9.20.13.3

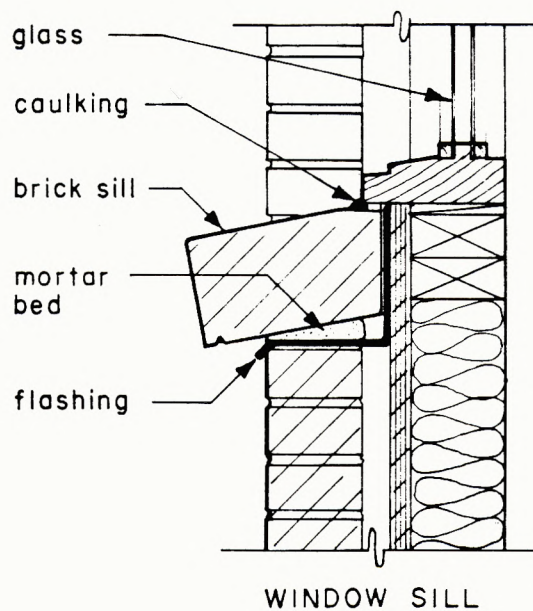
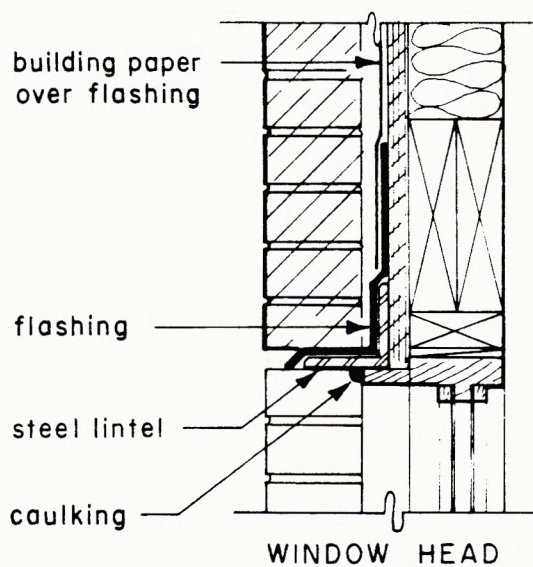
COMPATIBLE FASTENINGS FOR FLASHINGS: Use aluminum clips and nails with aluminum flashings; galvanized clips and nails with galvanized flashings. Any corrosion-resistant type may be used with pre-painted and plastic flashings. Stainless steel clips and nails may also be used with all types of flashings. Copper flashings require clips and nails of copper, or stainless steel, but not aluminum or galvanized steel.

GALVANIC ACTION: This is the type of corrosive interaction which takes place between two different metals when wet, that is when the above recommendations are not followed. One of the metals will deteriorate.

9.20.13.4 FLASHING OVER WALL OPENINGS



9.20.13.4 & 9.20.13.5 FLASHING AT WINDOW SILLS & HEADS



Note: Brick ties required but not shown.

Brick sills are not recommended.

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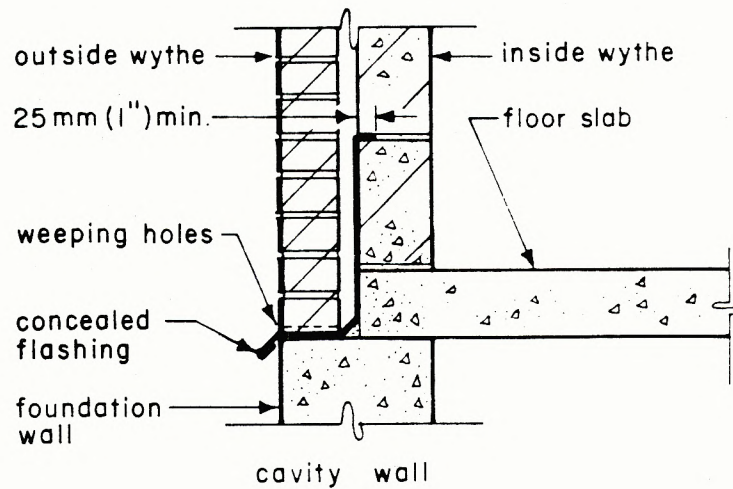
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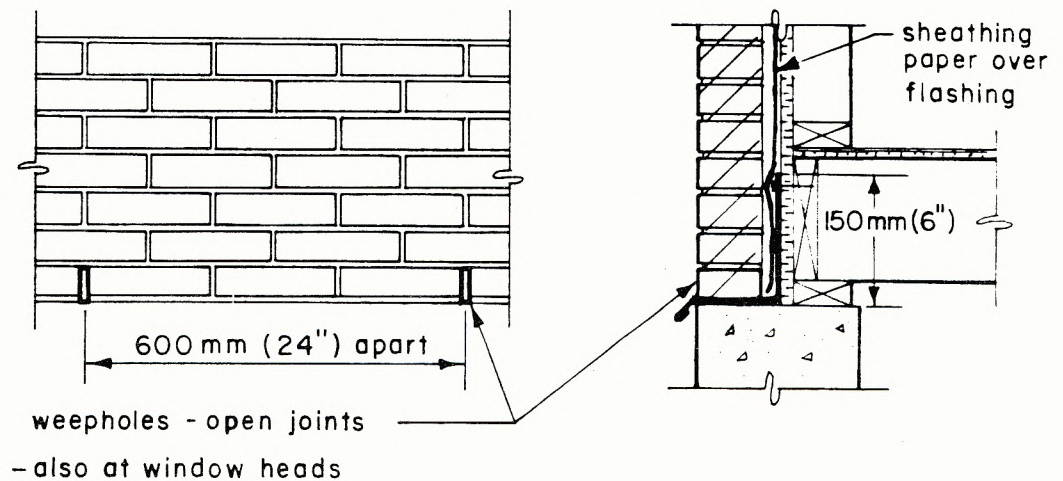
Section:

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9.20.13.6 FLASHING AT BASE OF CAVITY WALLS



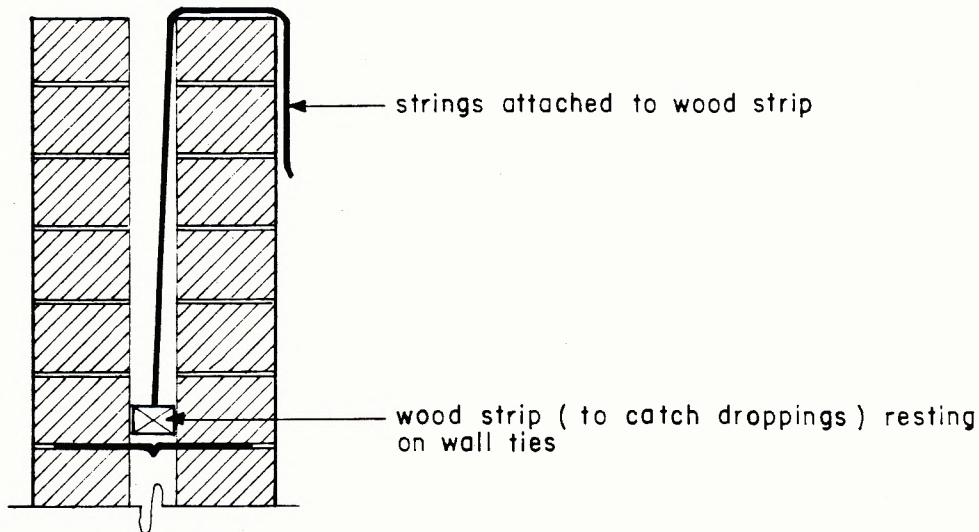
9.20.13.7 FLASHING AND WEEP-HOLES (MASONRY VENEER)



9.20.15.1 PARGED: See 9.13.3.1.

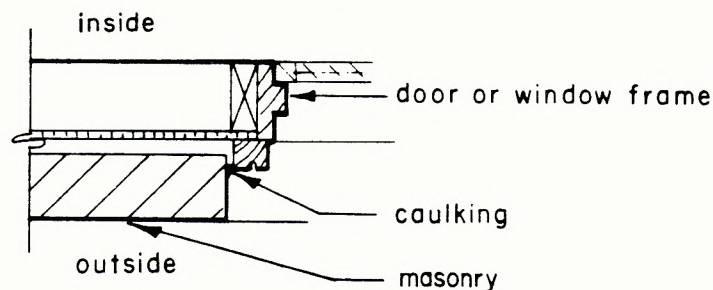
BREATHER-TYPE PAPER: See 9.20.16.1.

9.20.15.2 PREVENTING MORTAR DROPPINGS IN CAVITY WALLS



1. Prepare wood strip just a bit narrower than width of cavity.
2. Rest wood strip on row of ties in cavity to catch mortar dropping while constructing next section of wall above.
3. Pull out wood strip with strings when wall complete up to next row of ties.
4. Lay next row of ties & replace wood strip over ties, repeating above steps.

9.20.15.3 CAULKING AT DOOR AND WINDOW FRAMES



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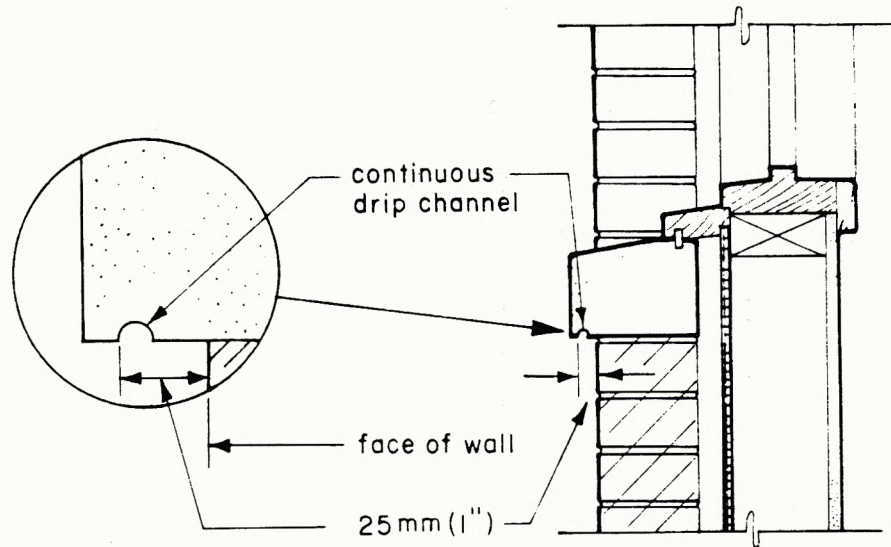
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9.20.15.4 DRIP AT WINDOWS WITHOUT FLASHING



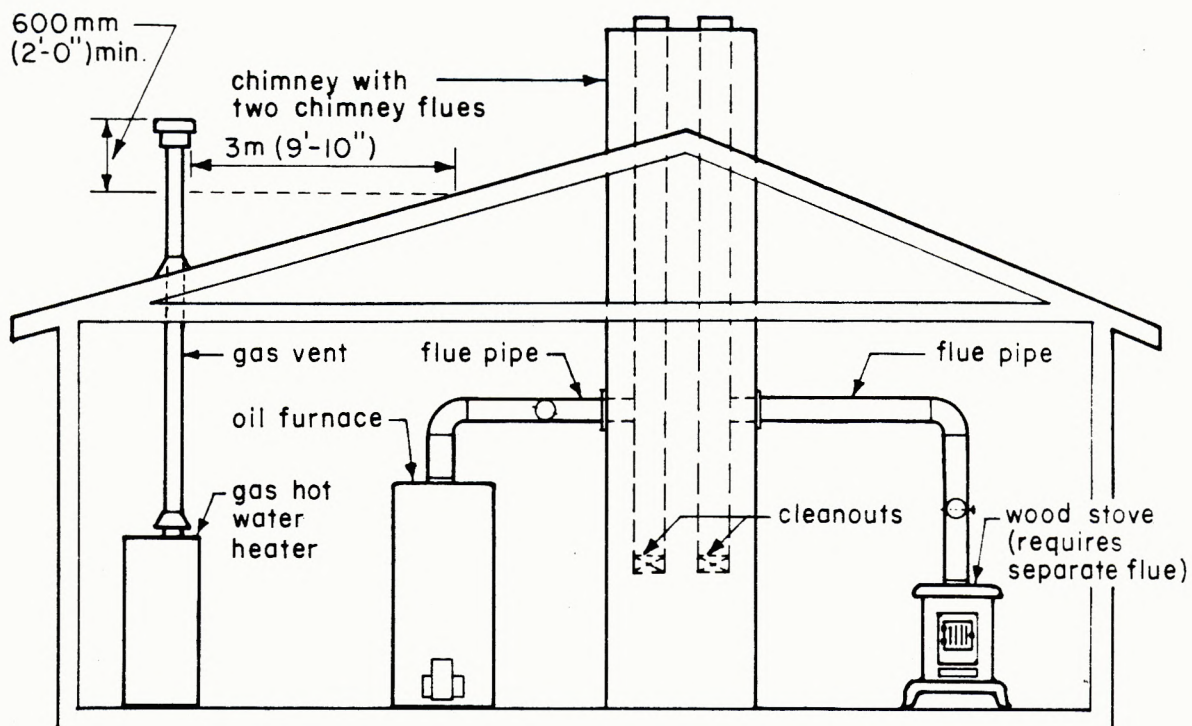
9.20.16.1

BREATHER-TYPE WATER REPELLENCY: The surface treatment stops the passage of water from the outside (except water under pressure, that is submerged, or the equivalent) but permits the escape of moisture from the interior in the form of vapour, so that moisture inside the wall can get out, in other words, the wall can "breathe".

chimneys & flues

SECTION 9.21

9.21.1.7 CHIMNEYS, FLUE PIPES & GAS VENTS



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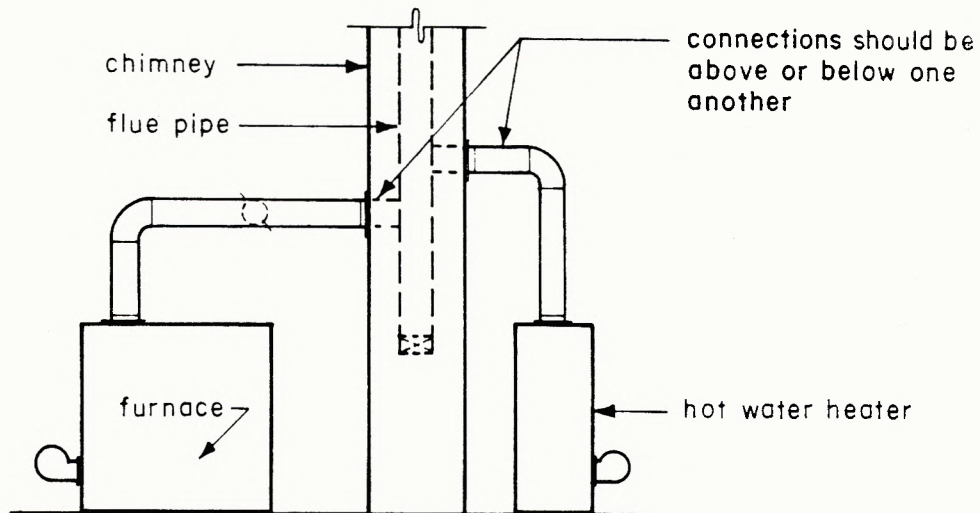
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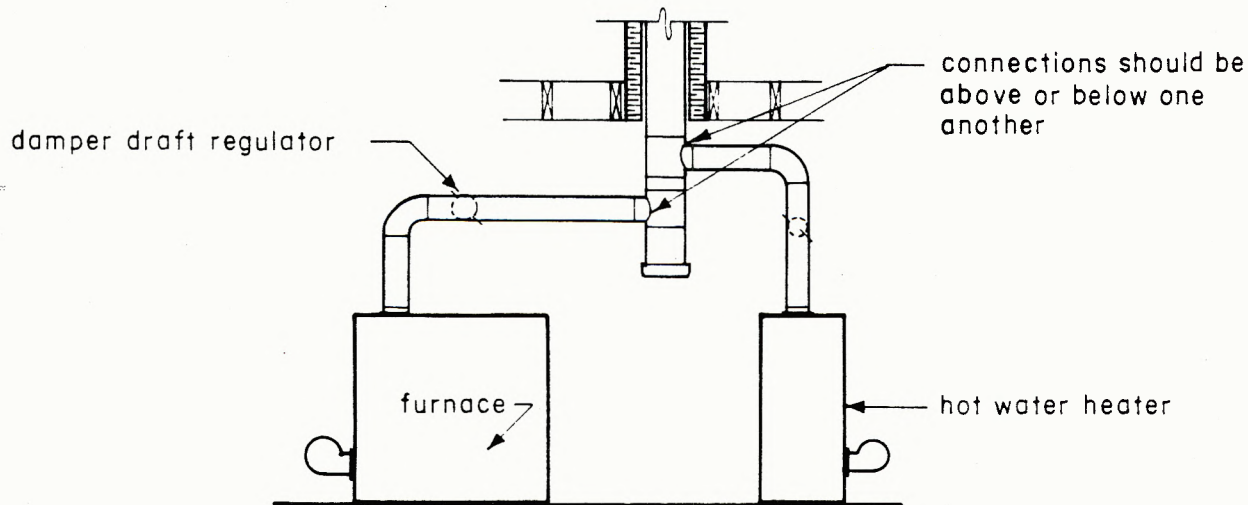
Section:

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9.21.2.2 CHIMNEY CONNECTIONS AT DIFFERENT LEVELS

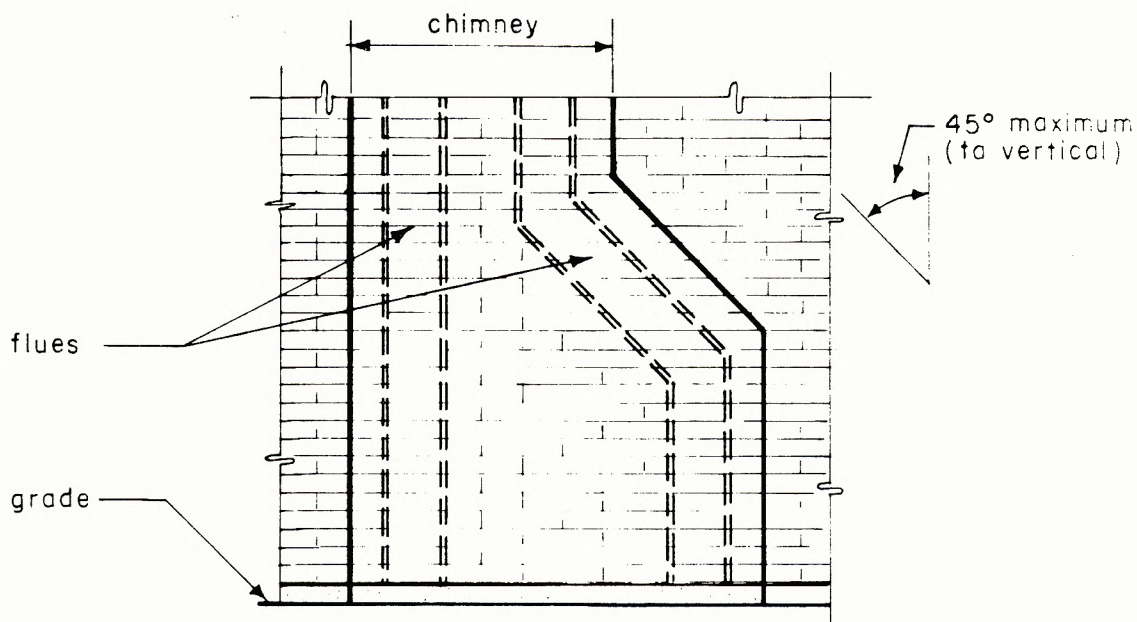


MASONRY CHIMNEY



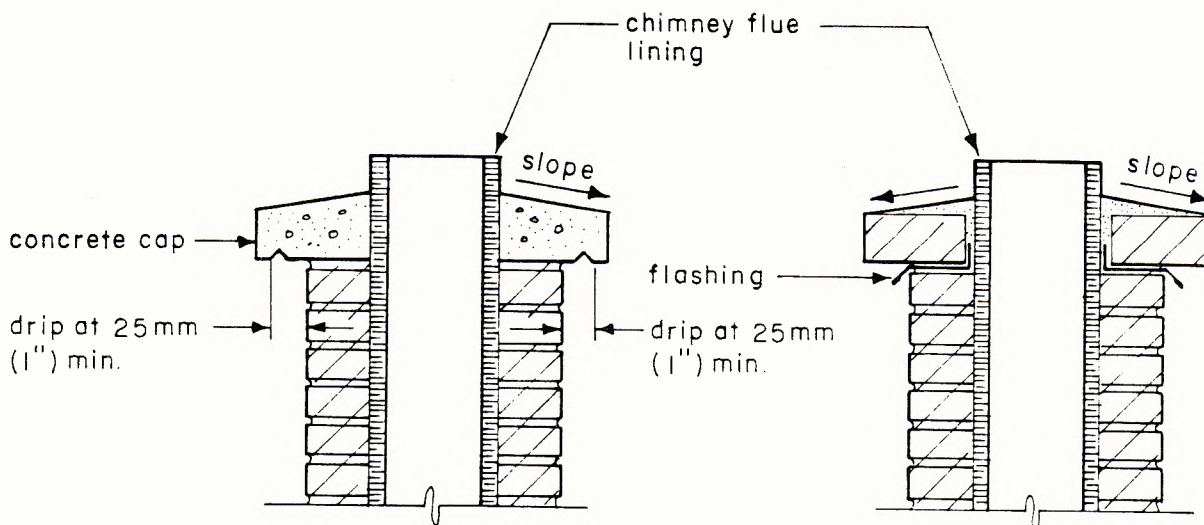
PREFABRICATED METAL CHIMNEY

9.21.2.3 FLUE INCLINE



EXTERIOR ELEVATION

9.21.4.5 CHIMNEY CAPS



CAST CONCRETE

JOINTED MASONRY

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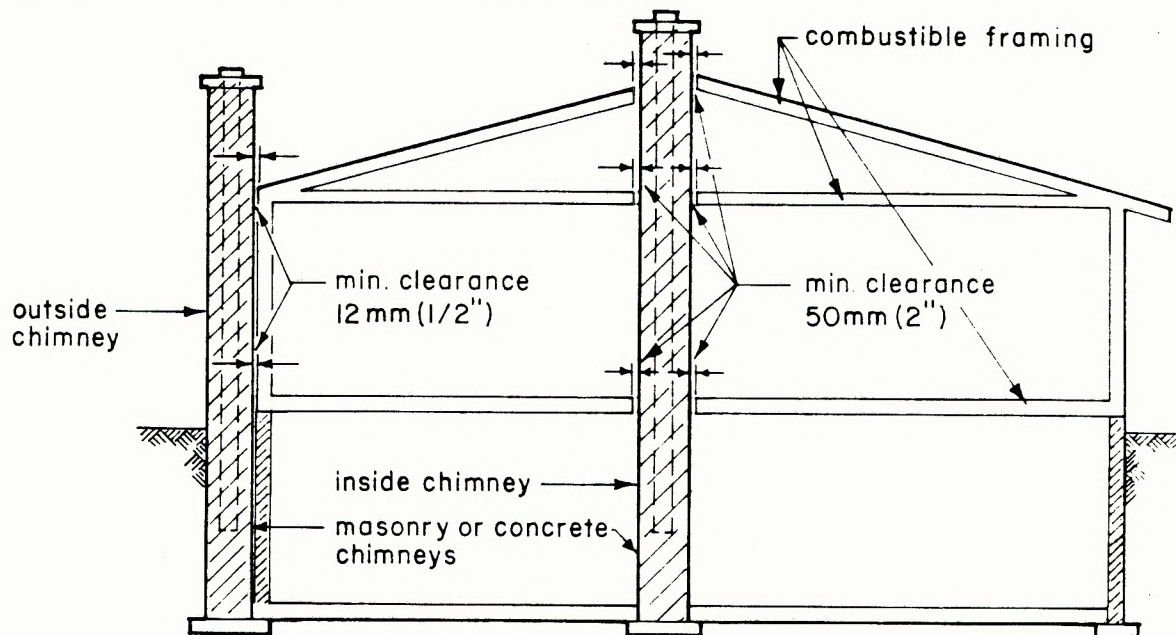
9.21

9.21.5.1

SOLID-FUEL-BURNING: Solid fuel means wood, coal, peat, etc.

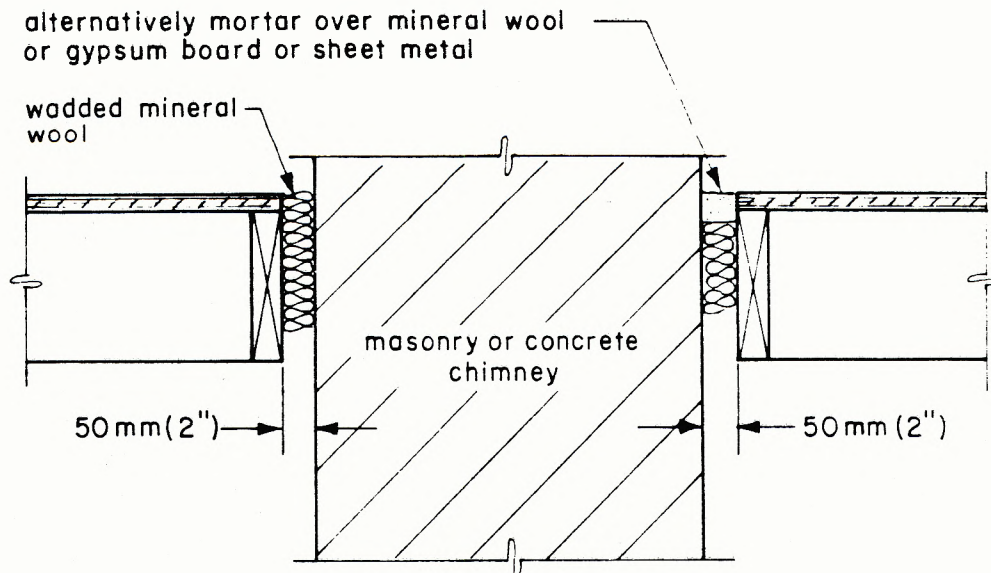
9.21.6.1

CHIMNEY CLEARANCE

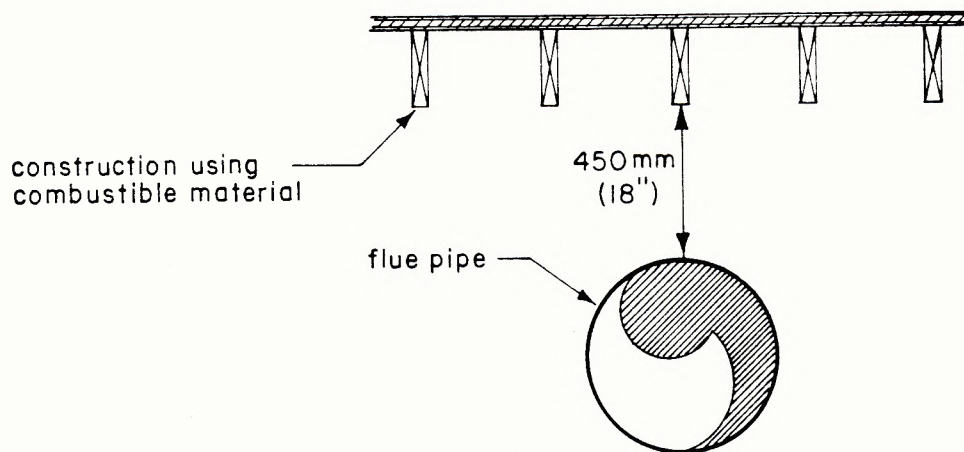


9.21.6.3

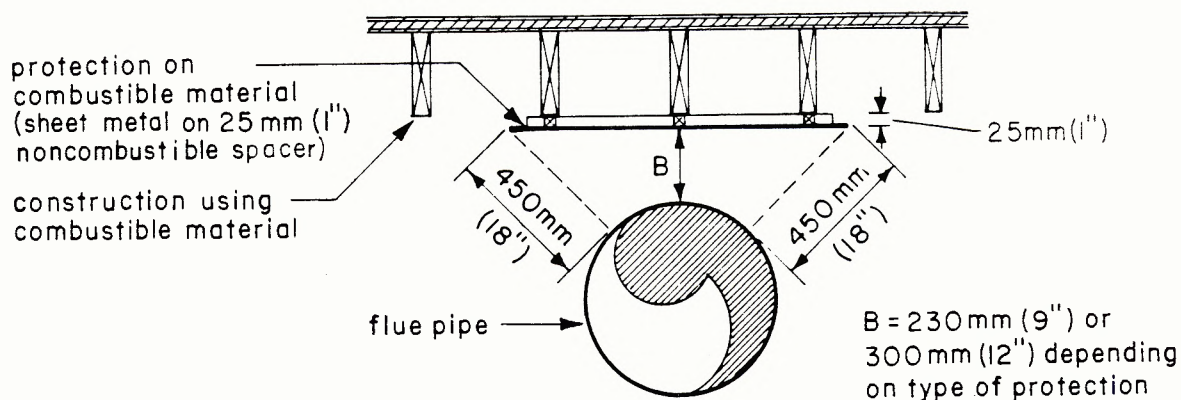
SEALING CLEARANCE SPACE



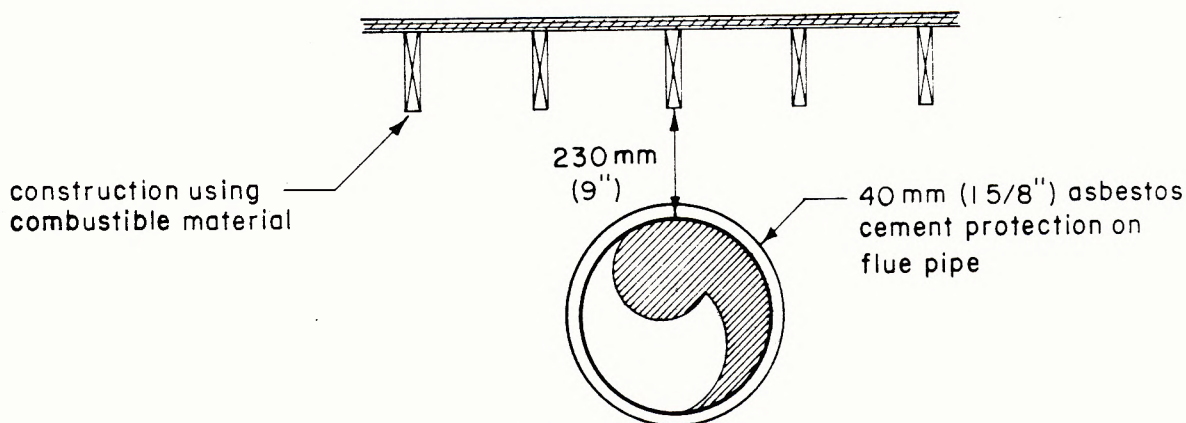
9.21.6.5 & TABLE 9.21.6.A MINIMUM CLEARANCES FOR FLUE PIPES



WITHOUT PROTECTION



WALL OR CEILING PROTECTION



FLUE PIPE PROTECTION

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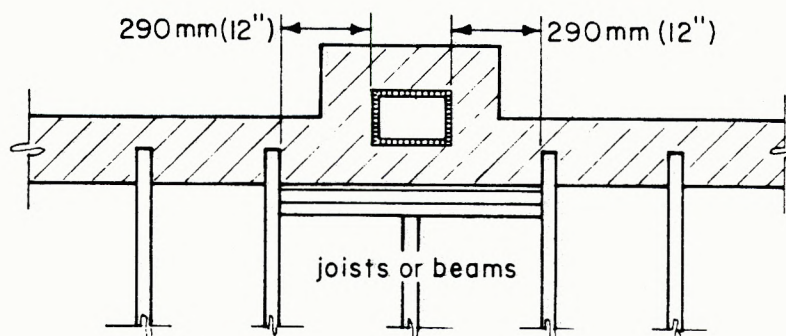
Date:

1.2.84

Section:

9.21

9.21.6.6 JOISTS OR BEAMS RESTING ON CHIMNEY MASONRY

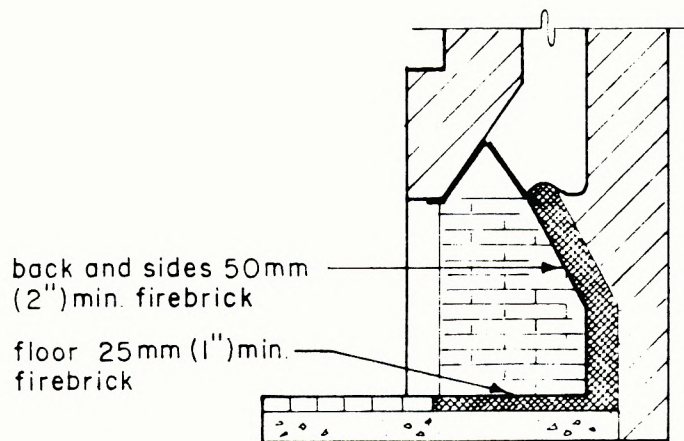


PLAN

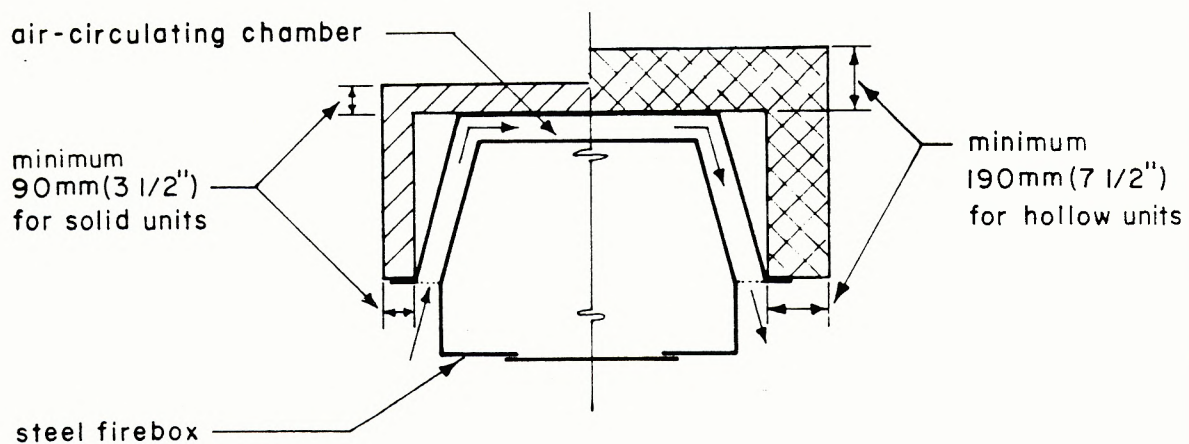
fireplaces

SECTION 9.22

9.22.2.1 FIREBRICK LINING FOR FIREPLACES



9.22.3.2 STEEL LINER & AIR-CIRCULATING CHAMBER



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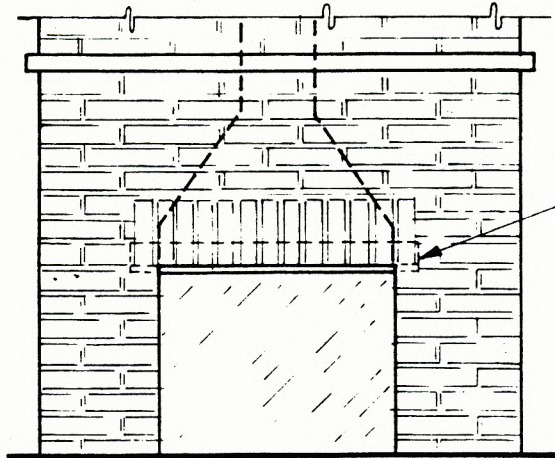
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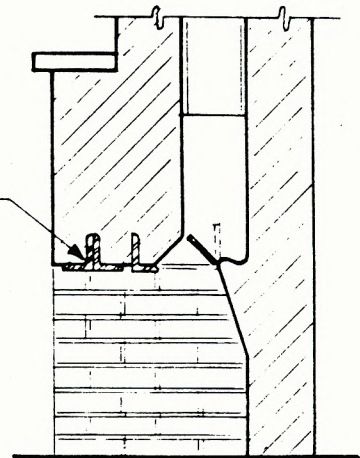
Section:

9.22

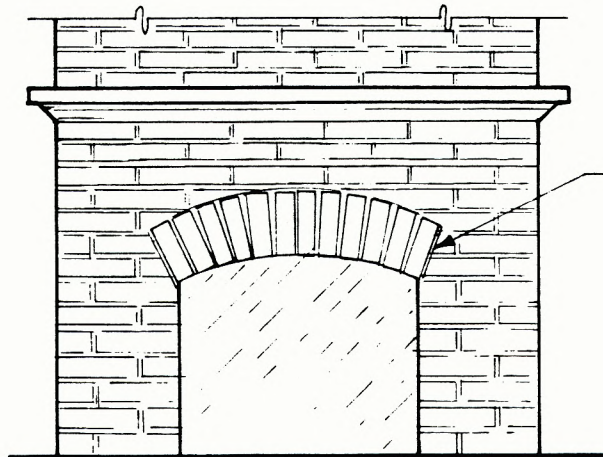
9.22.4.1 FIREPLACE OPENING SUPPORTS



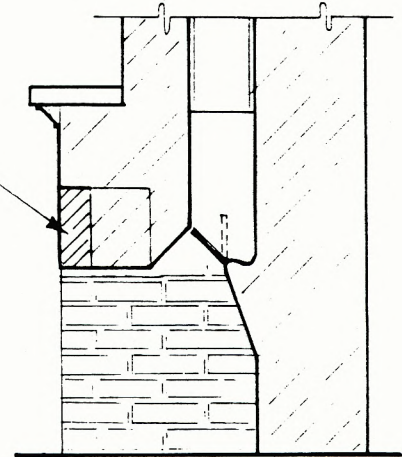
ELEVATION



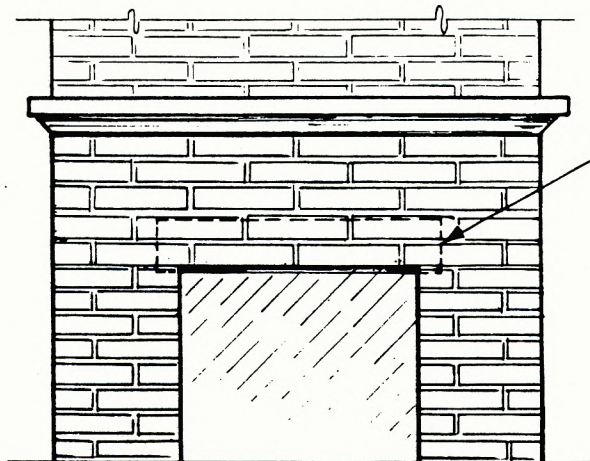
SECTION



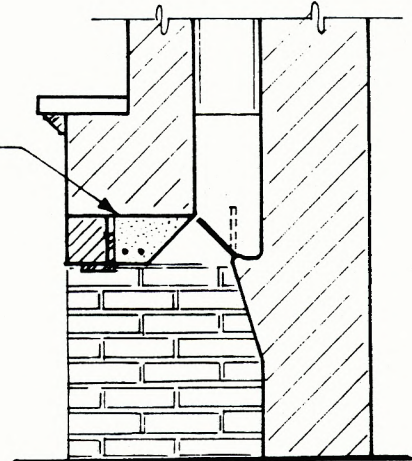
ELEVATION



SECTION

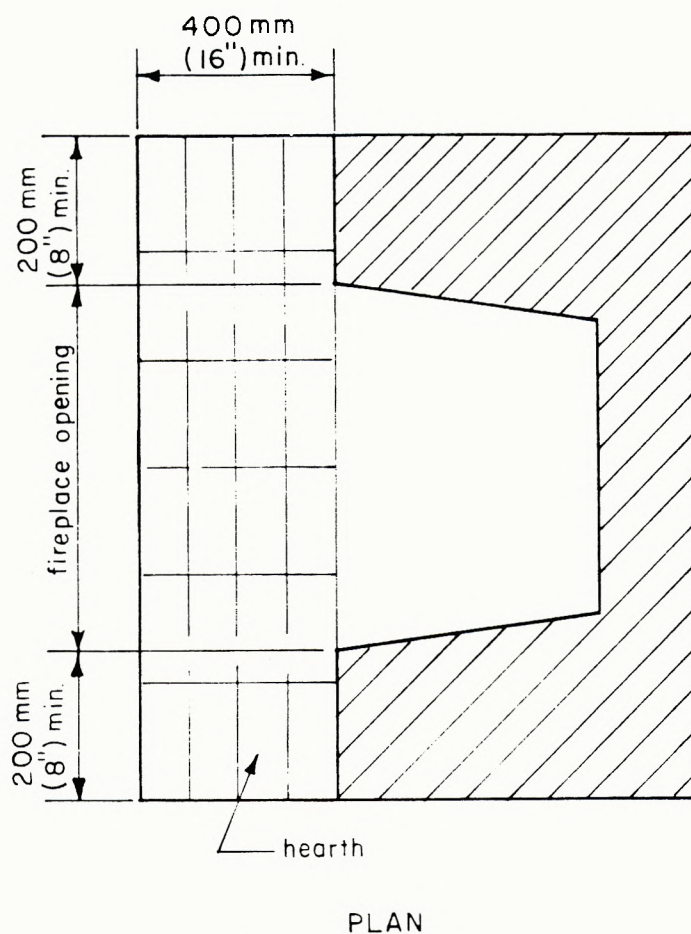


ELEVATION



SECTION

9.22.5.1 FIREPLACE HEARTH SIZES



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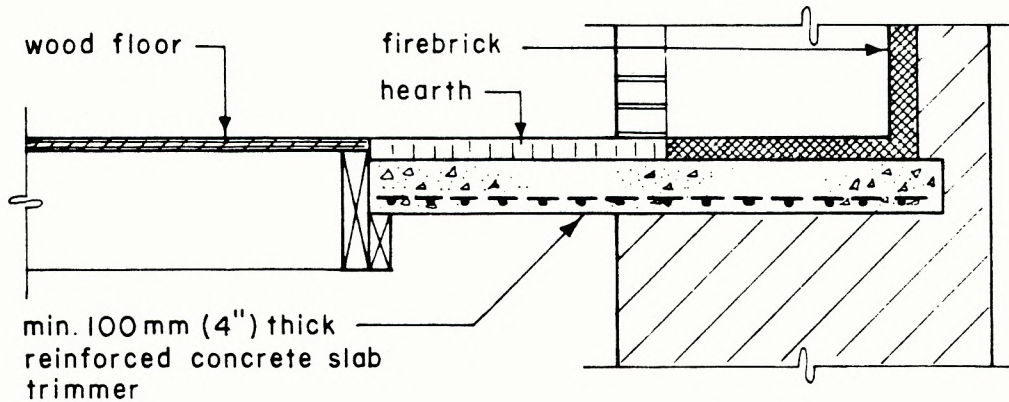
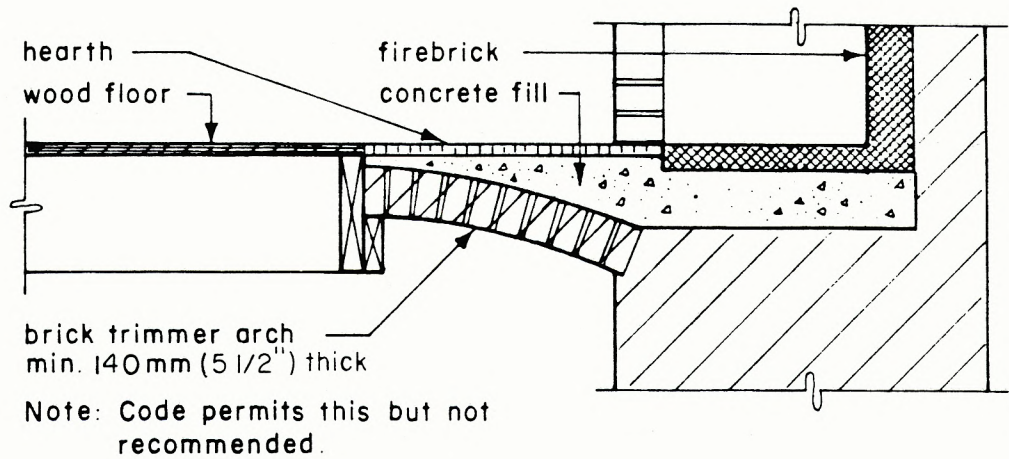
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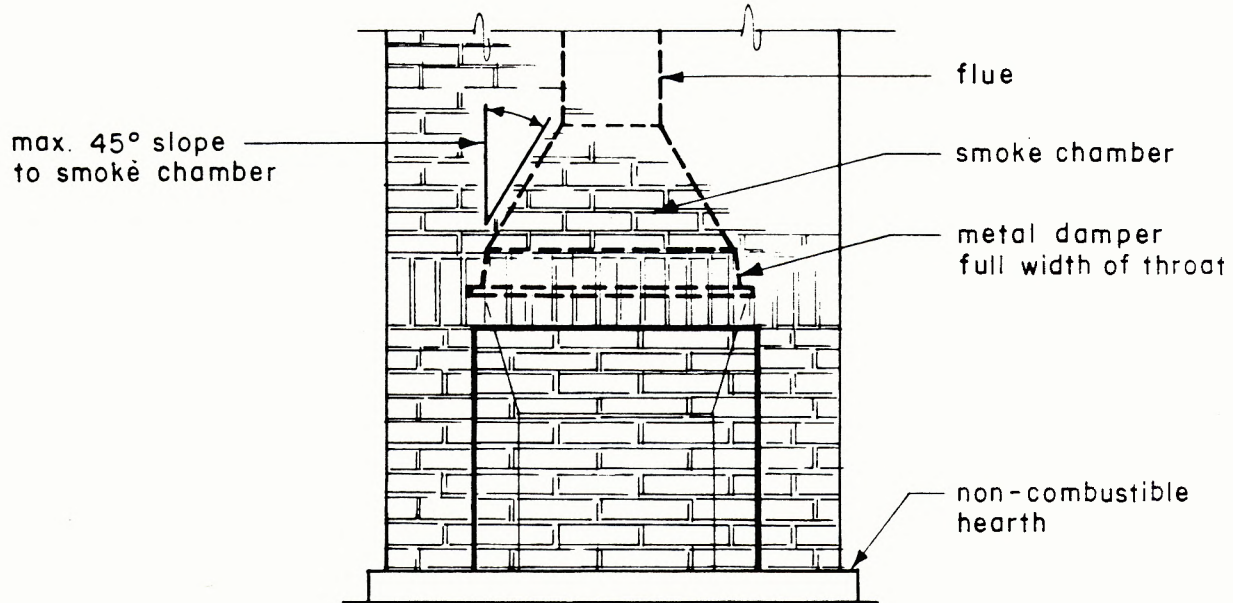
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9.22

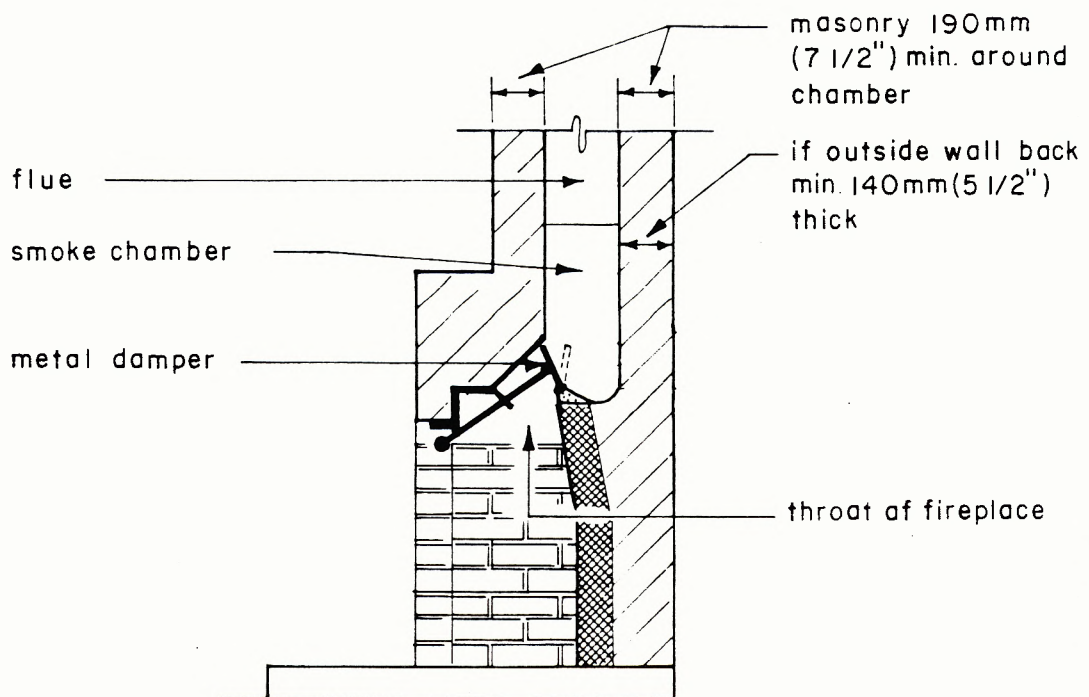
9.22.5.2 HEARTH SUPPORT



9.22.6.1, 9.22.7.1, 9.22.7.2 SMOKE CHAMBER, DAMPER, FIREPLACE THROAT



ELEVATION



SECTION

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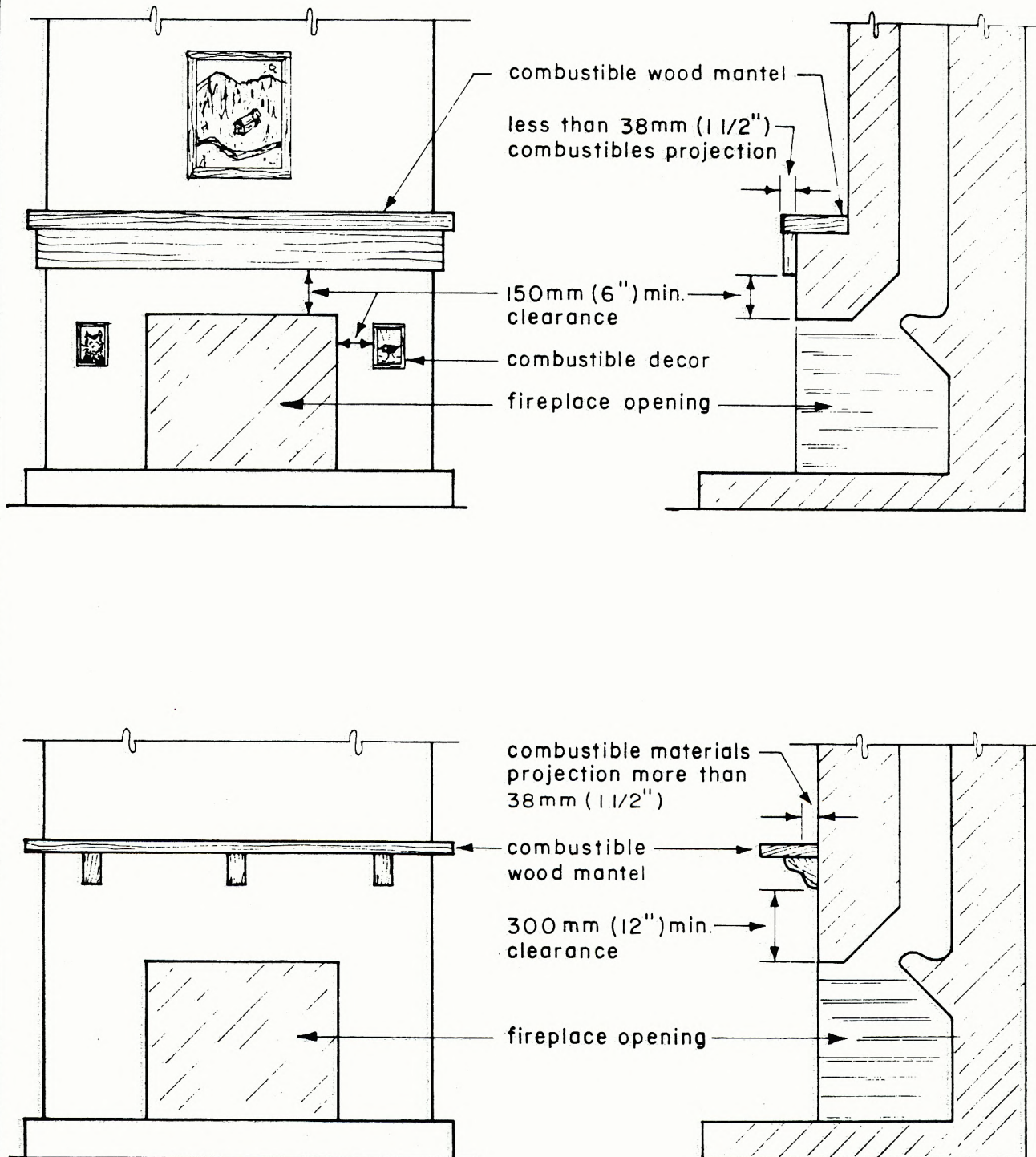
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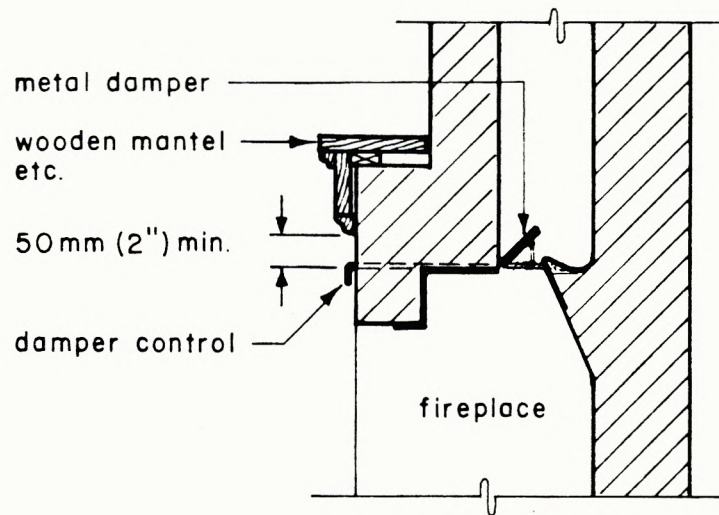
Section:

9.22

9.22.9.1 CLEARANCE OF COMBUSTIBLE MATERIALS



9.22.9.2 CLEARANCE FROM WOODWORK, ETC.



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Section:

9.22

**wood-frame
construction**

SECTION 9.23

9.23.3.2 MINIMUM NAIL LENGTHS AND SPACING

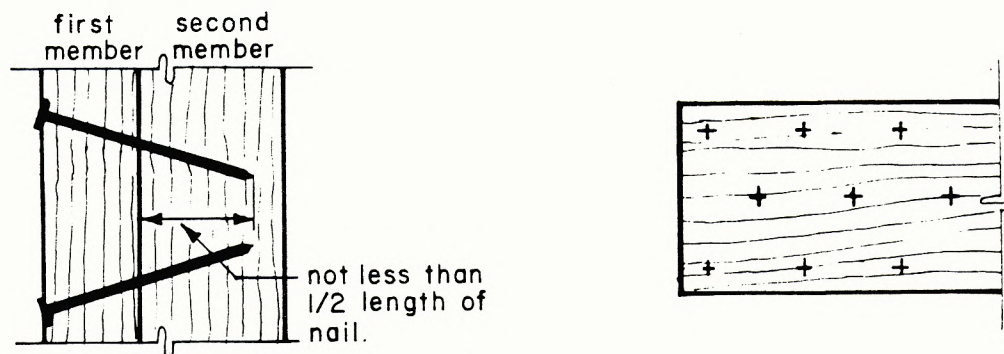
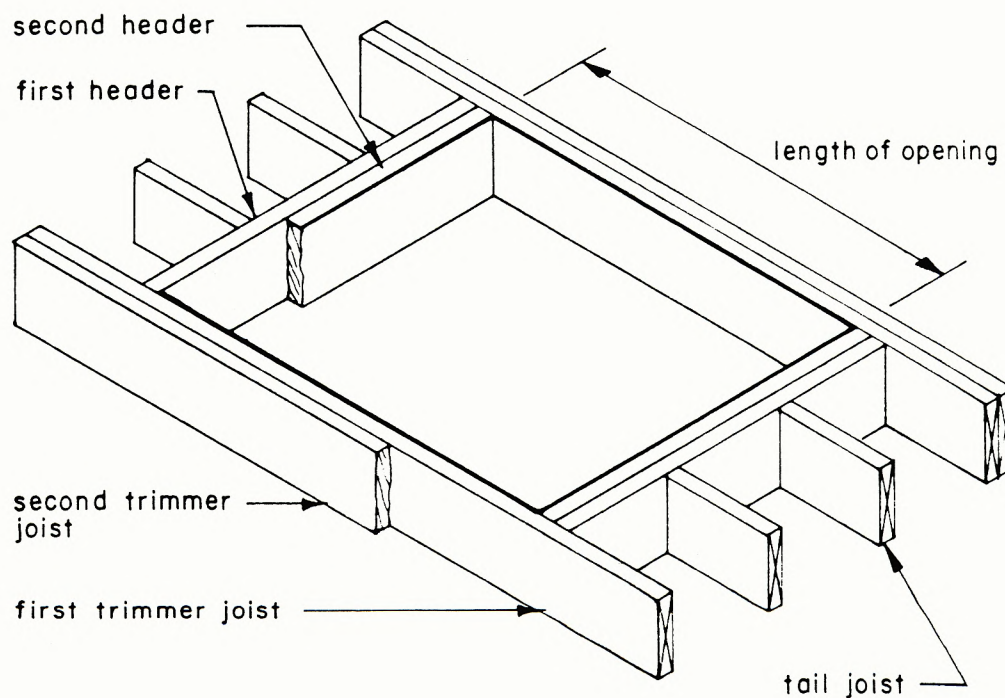


TABLE 9.23.3.A TAIL JOISTS & HEADER JOISTS
SIZE, SPACING OF NAILS AS IN TABLE



Note: Second header and trimmer joists not always required.

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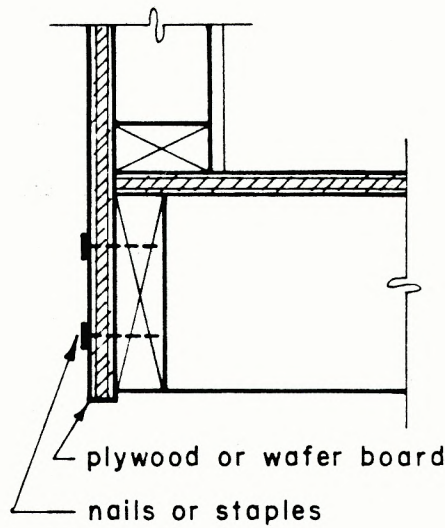
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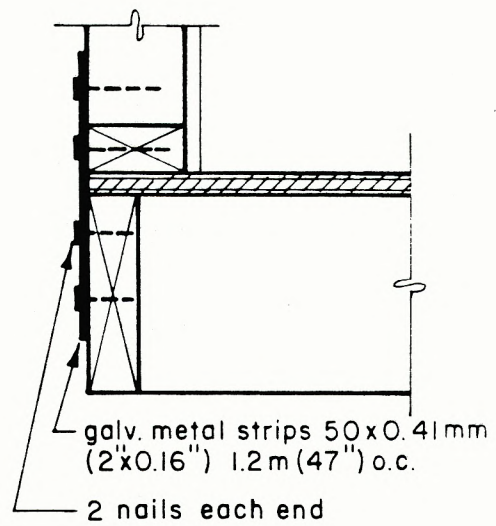
Section:

9.23

9.23.3.4 ANCHORING WALL TO FLOOR FRAMING



USING SHEATHING



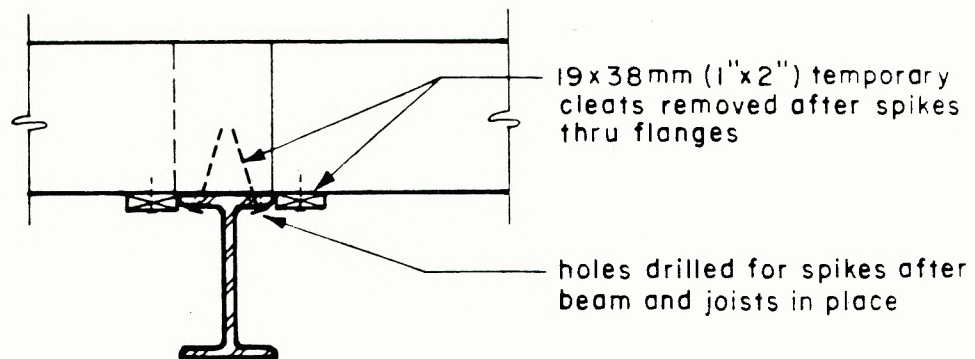
USING METAL STRIPS

Note: This normally applies to factory-built housing.

9.23.4.2

LATERALLY SUPPORTED: The beam is laterally supported, that is, braced against lateral (sideways) movement, if it carries wood joists at not more than 600 mm (24") on centre with nailers on either side. Other methods are also acceptable.

9.23.4.2 LATERAL SUPPORT FOR STEEL BEAMS

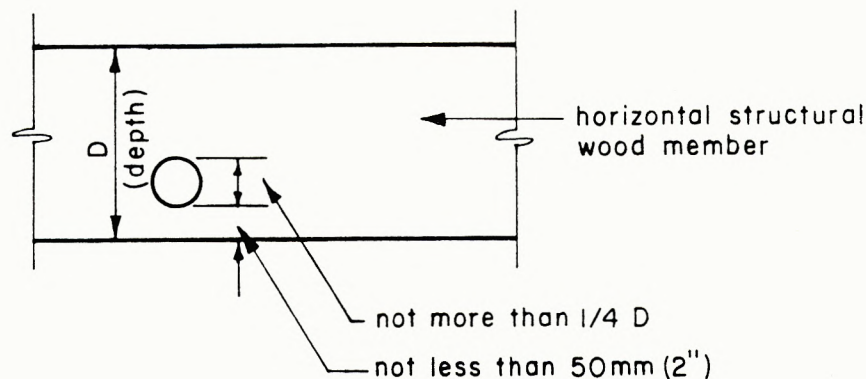


Note: Lateral support prevents beam from twisting due to the load carried. This is not a code requirement, but one suggestion to support beam flange.

9.23.5.1

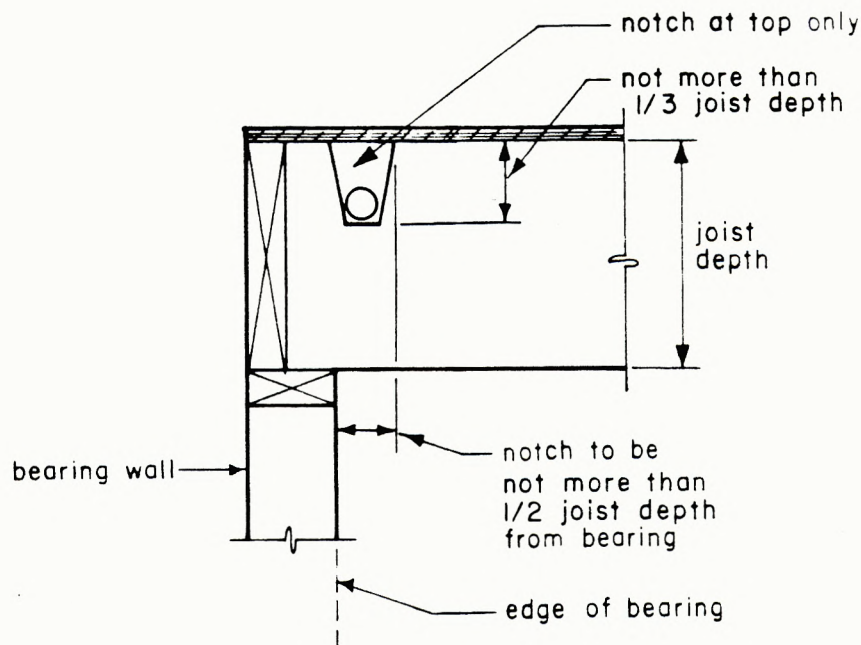
HOLES IN FRAMING MEMBERS: Maximum bending stresses occur at the top and bottom edges of the members, so by keeping the hole in from the edge the strength is not significantly reduced. However, shear stresses do occur in the middle portion, although they are not as high, so the size of the hole is limited to $1/4$ of the depth.

9.23.5.1 HOLES IN FRAMING MEMBERS



NOTE: This is to avoid weakening the structural member too much. Within the limits shown, the member can be considered able to carry the full intended load

9.23.5.2 NOTCHING JOISTS



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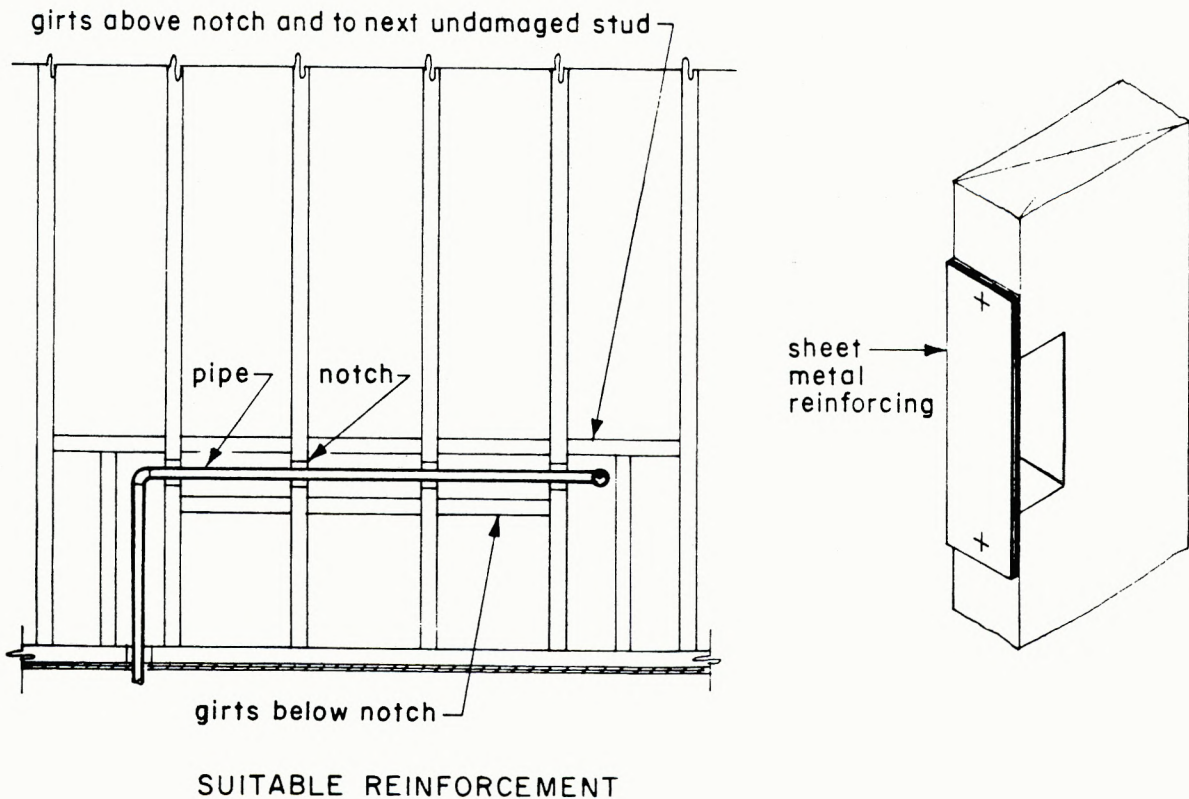
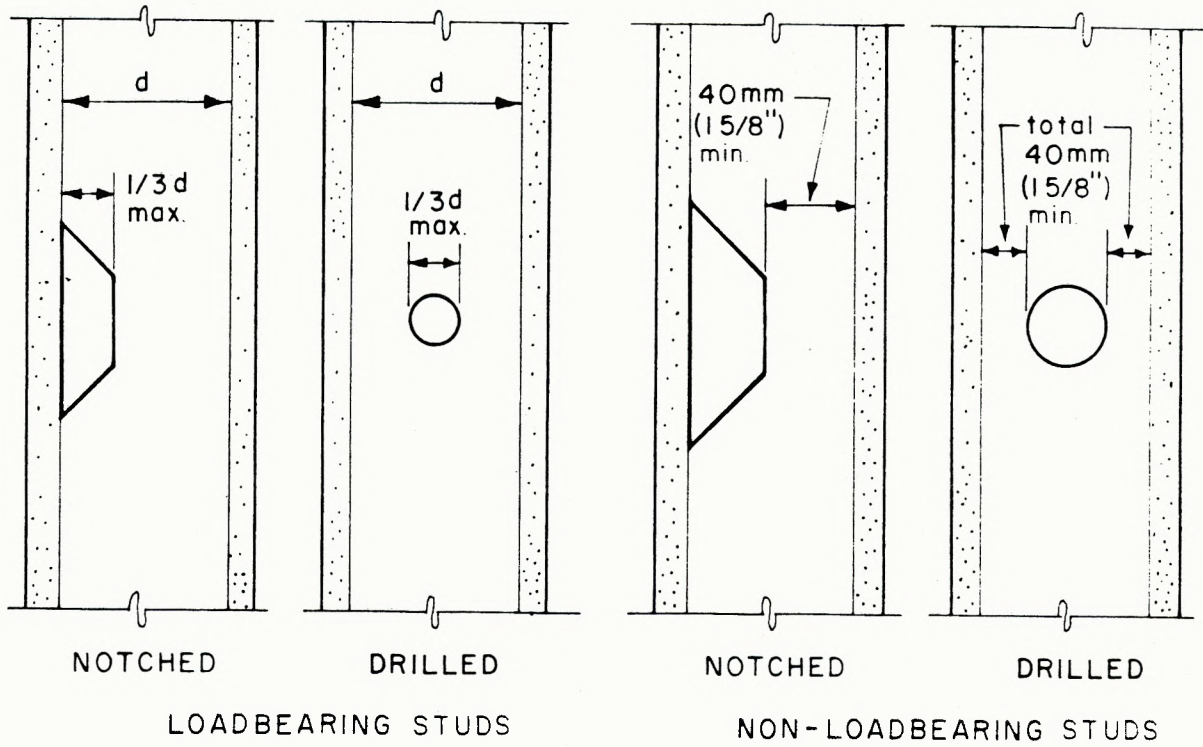
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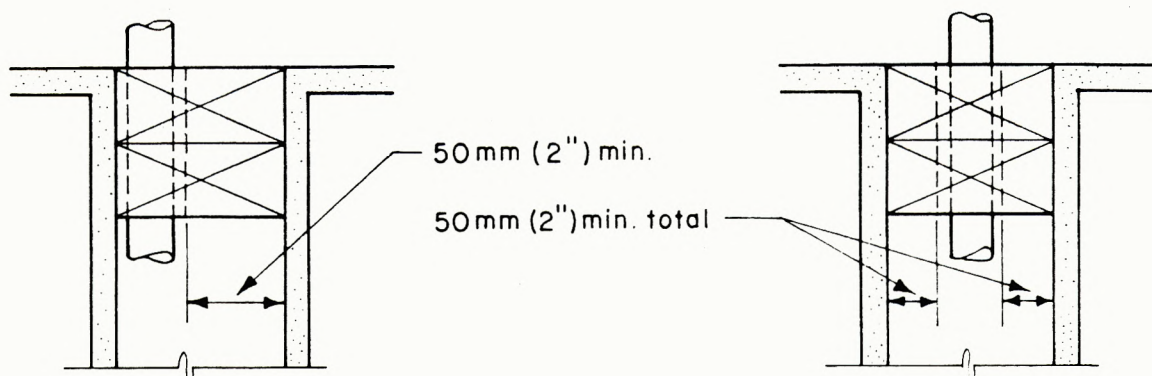
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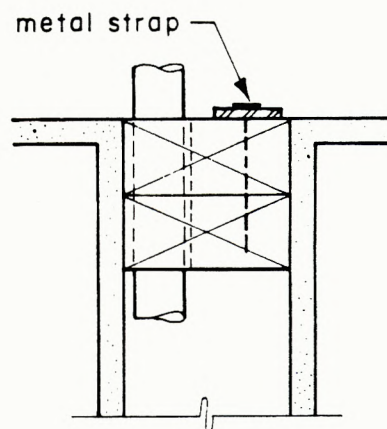
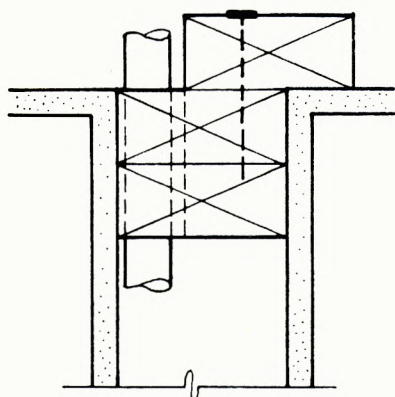
9.23.5.3 NOTCHING & DRILLING STUDS



9.23.5.4 NOTCHING & DRILLING TOP PLATES

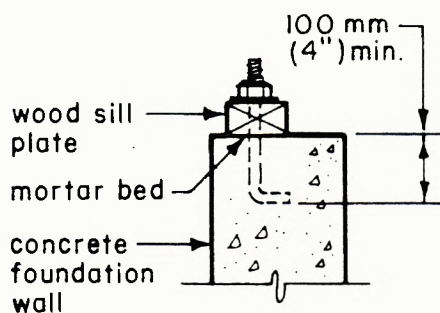


IF UNREINFORCED



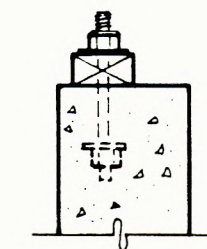
SUITABLE REINFORCEMENT

9.23.6.2 ANCHOR BOLTS



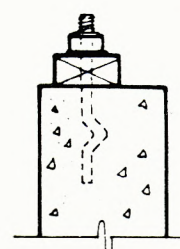
Bolt may be: Hooked

or



Bolt with washer

or



Bent

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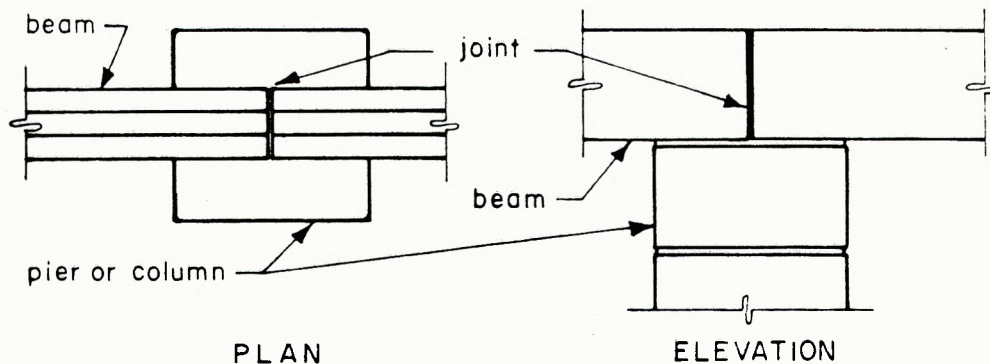
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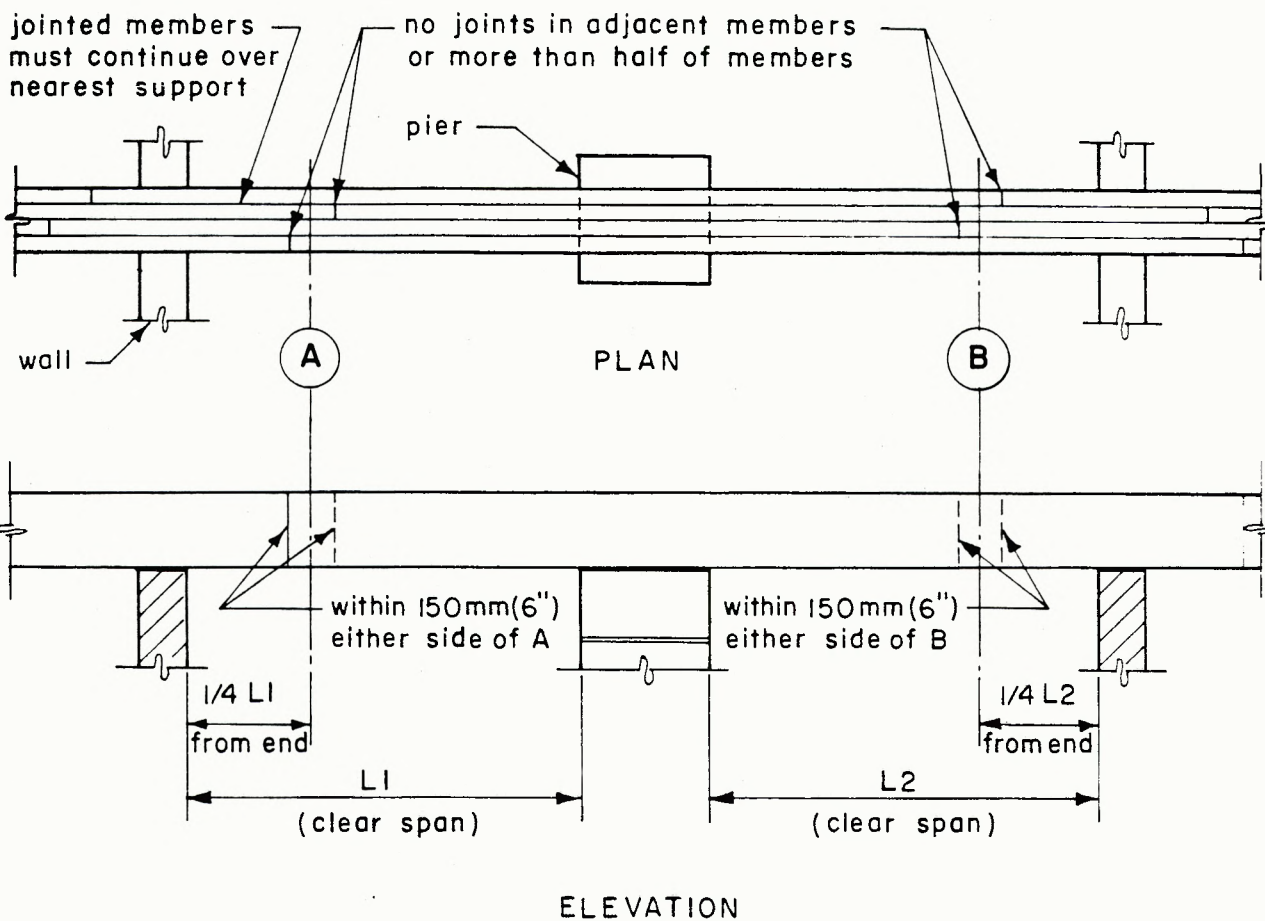
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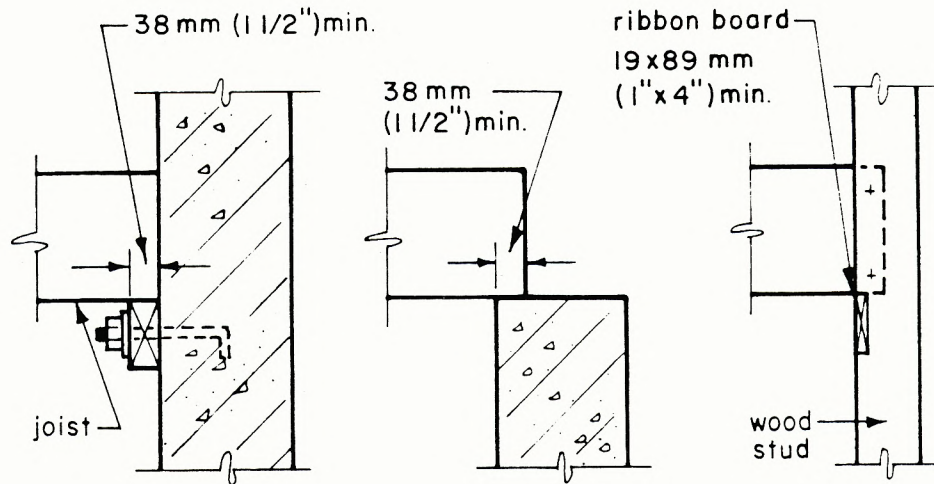
9.23.8.4 JOINTS OVER SUPPORTS (DISCONTINUOUS BEAMS)



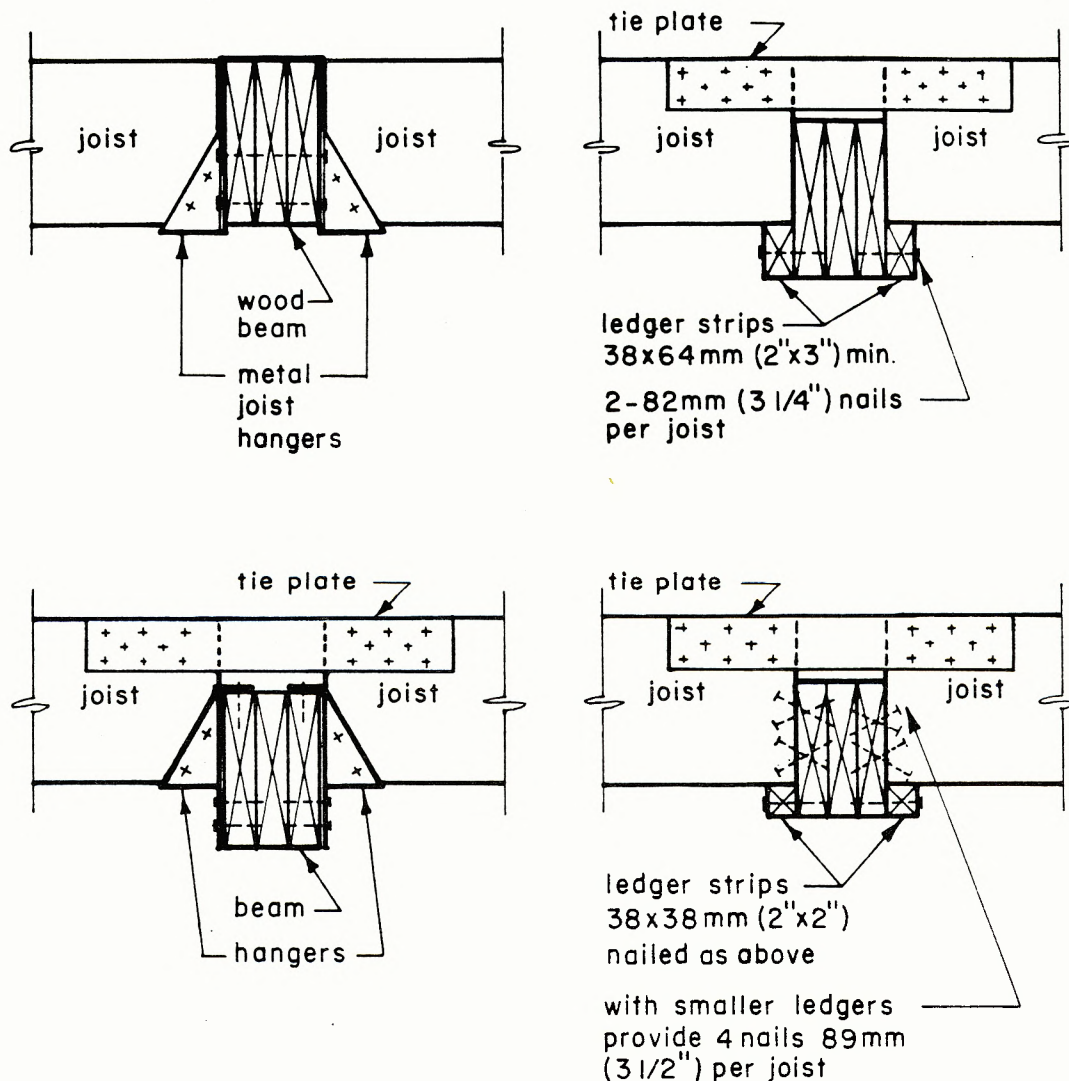
9.23.8.4 & 9.23.8.5 JOINTS IN CONTINUOUS BEAM MEMBERS



9.23.9.1 MINIMUM JOIST BEARING



9.23.9.3 HANGING JOISTS ON WOOD BEAMS



Note: Tie plates are not mandatory, but are recommended.

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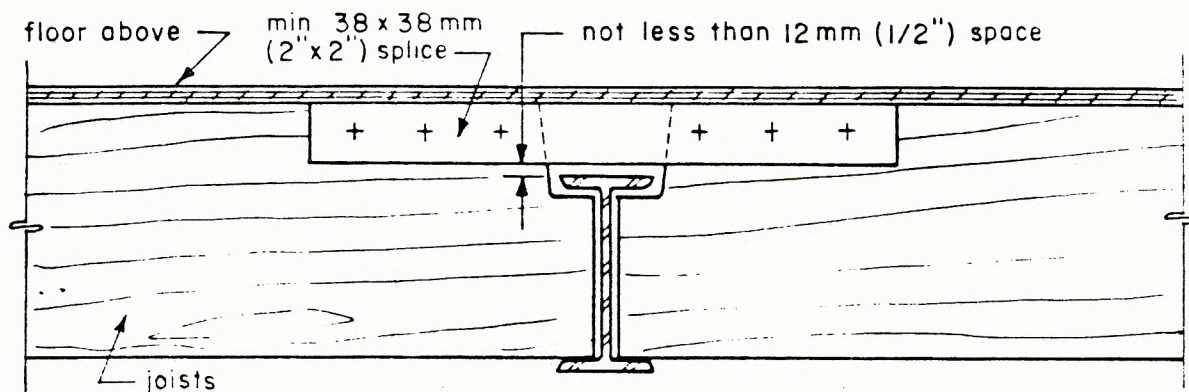
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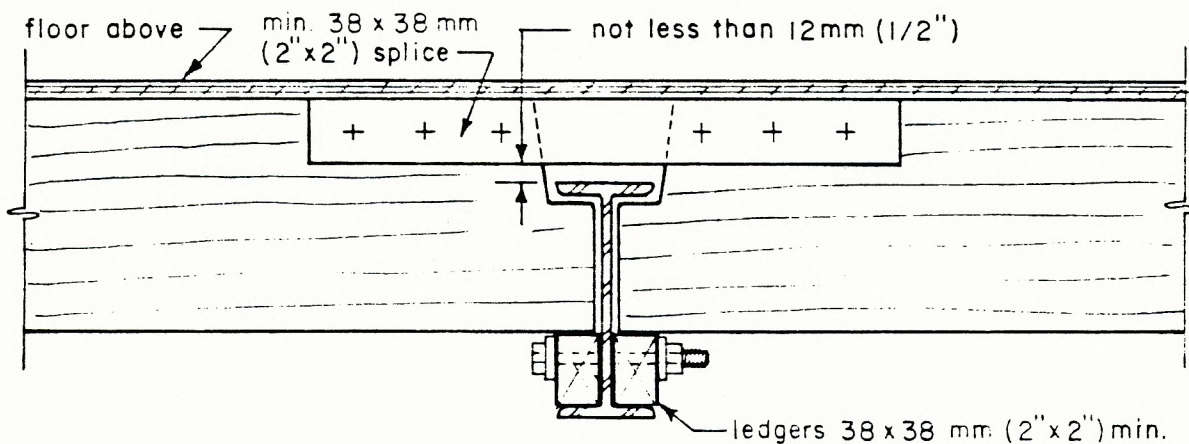
Section:

9.23

9.23.9.4 JOISTS FRAMED INTO STEEL BEAMS



JOISTS RESTING ON BOTTOM FLANGE



JOISTS RESTING ON WOOD LEDGERS

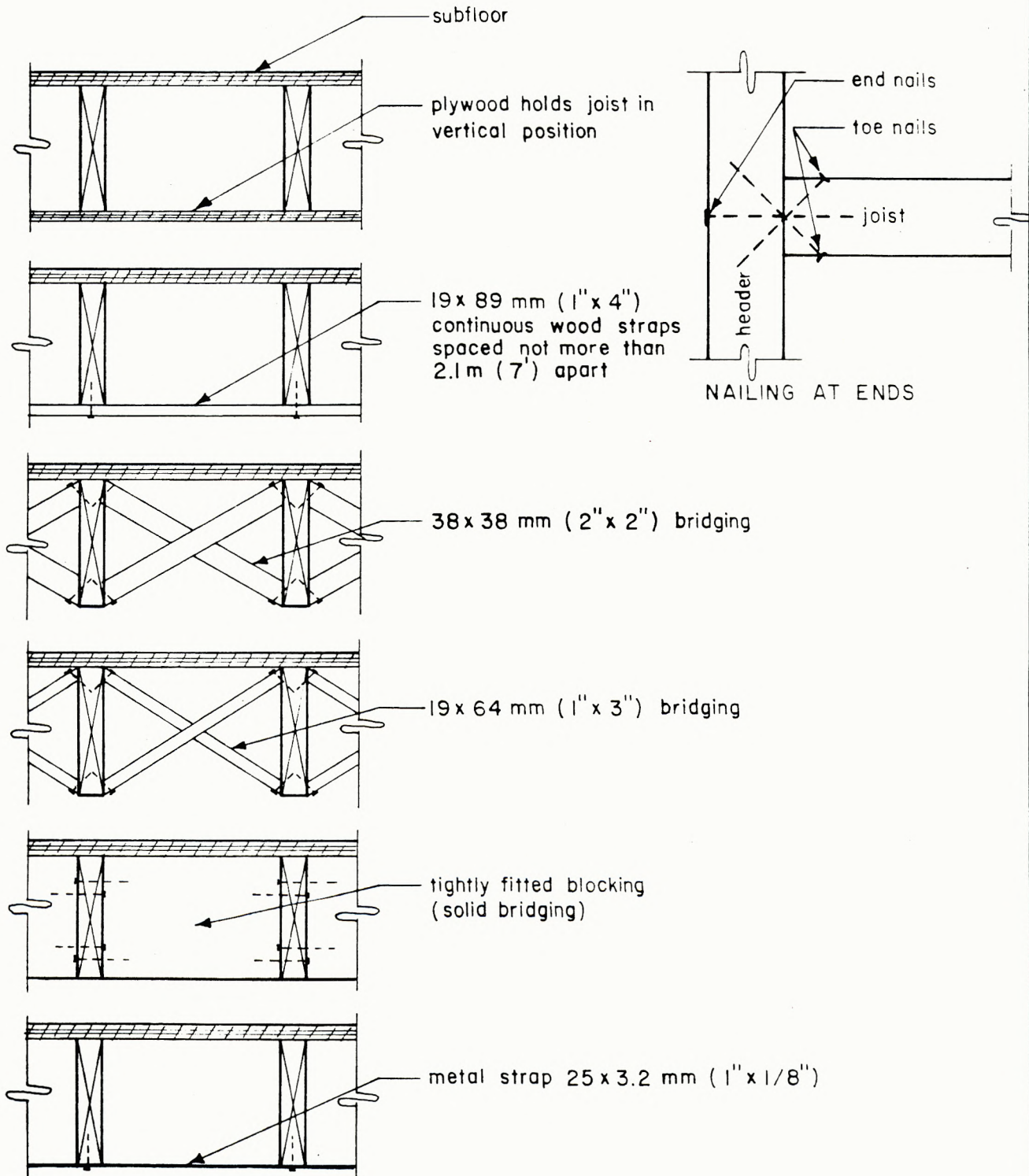
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9.23.9.5 RESTRAINING JOIST TWISTING



ALTERNATIVE MEANS TO PREVENT JOIST TWISTING.

Spacing not more than 2.1 m (7').

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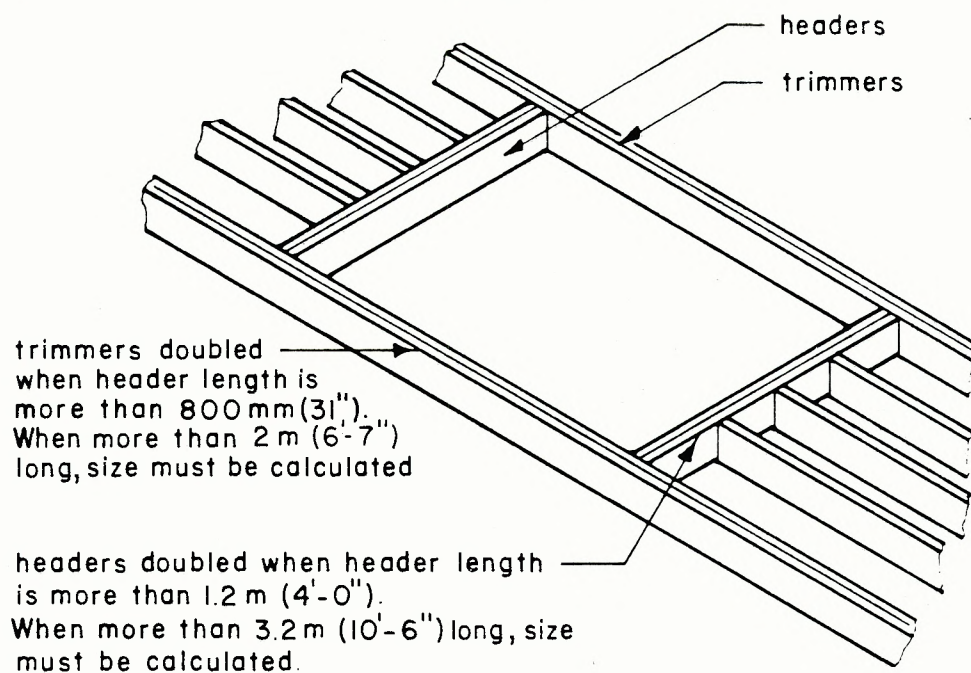
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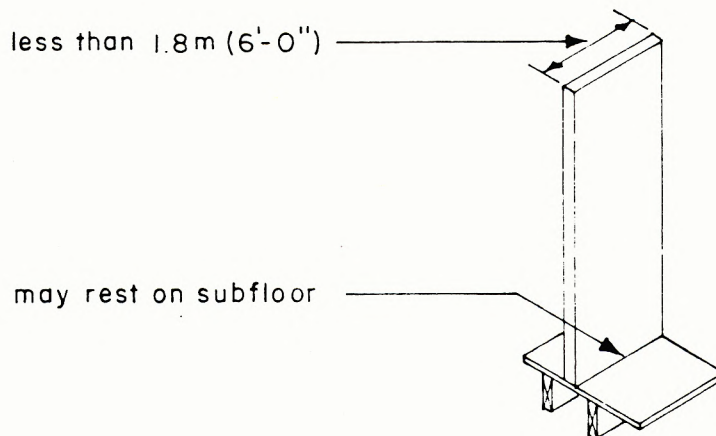
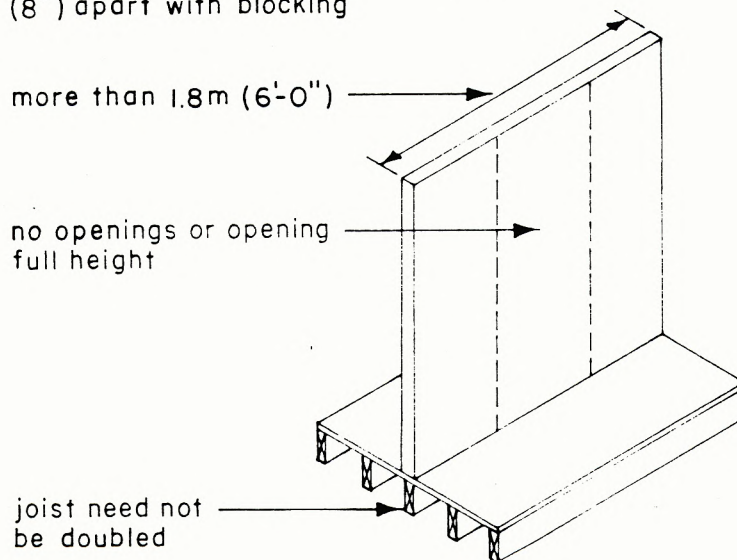
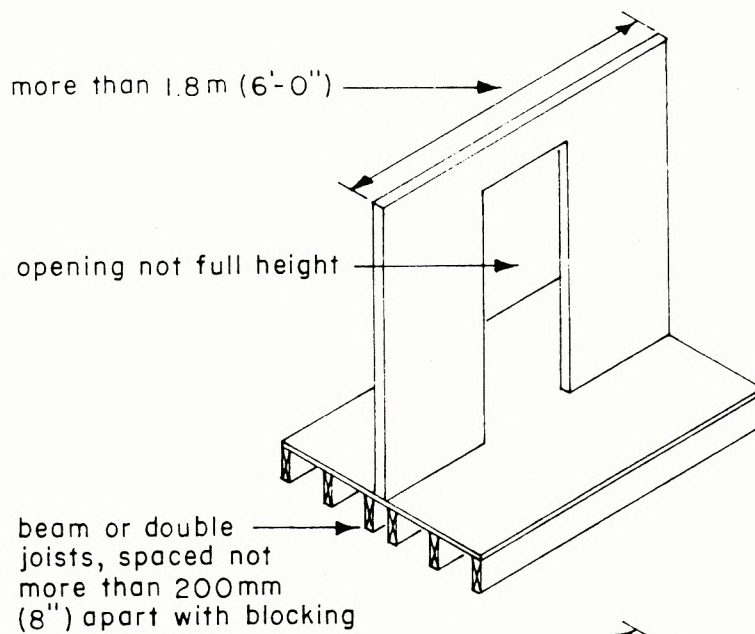
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9.23.9.6 & 9.23.9.7 HEADERS & TRIMMERS



9.23.9.9 SUPPORT FOR NON-LOADBEARING PARTITIONS



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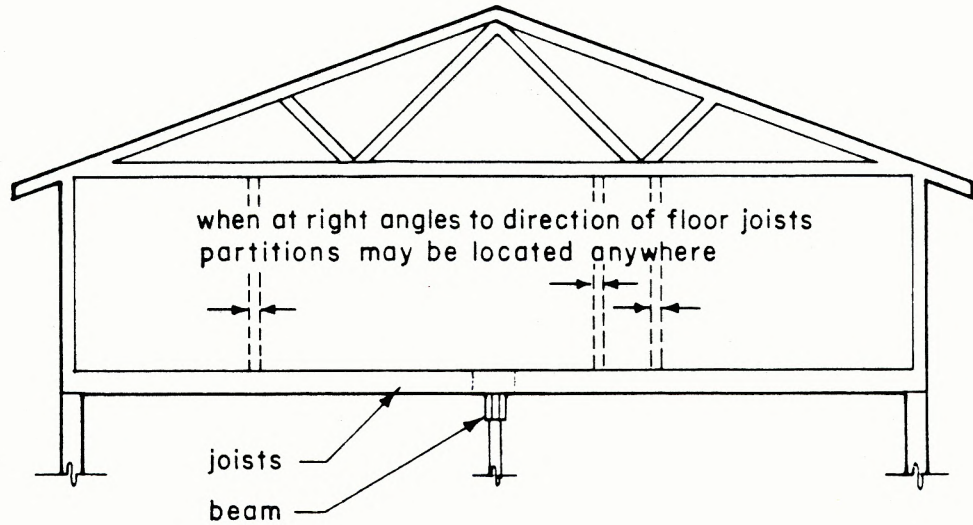
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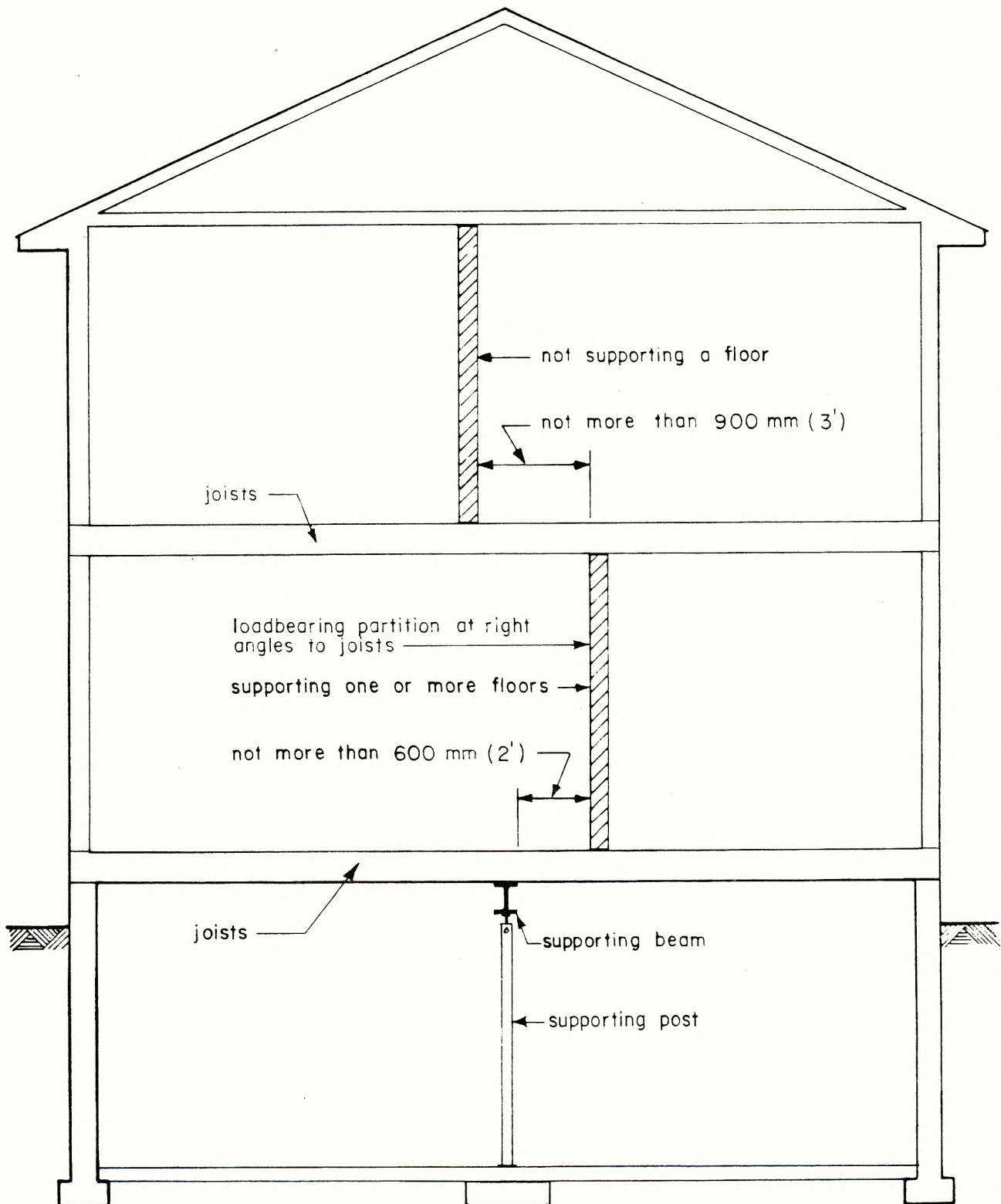
Section:

9.23

9.23.9.10 NON-LOADBEARING PARTITIONS AT RIGHT-ANGLES TO JOISTS



9.23.9.12 OFFSET OF BEARING PARTITIONS FROM SUPPORT BELOW



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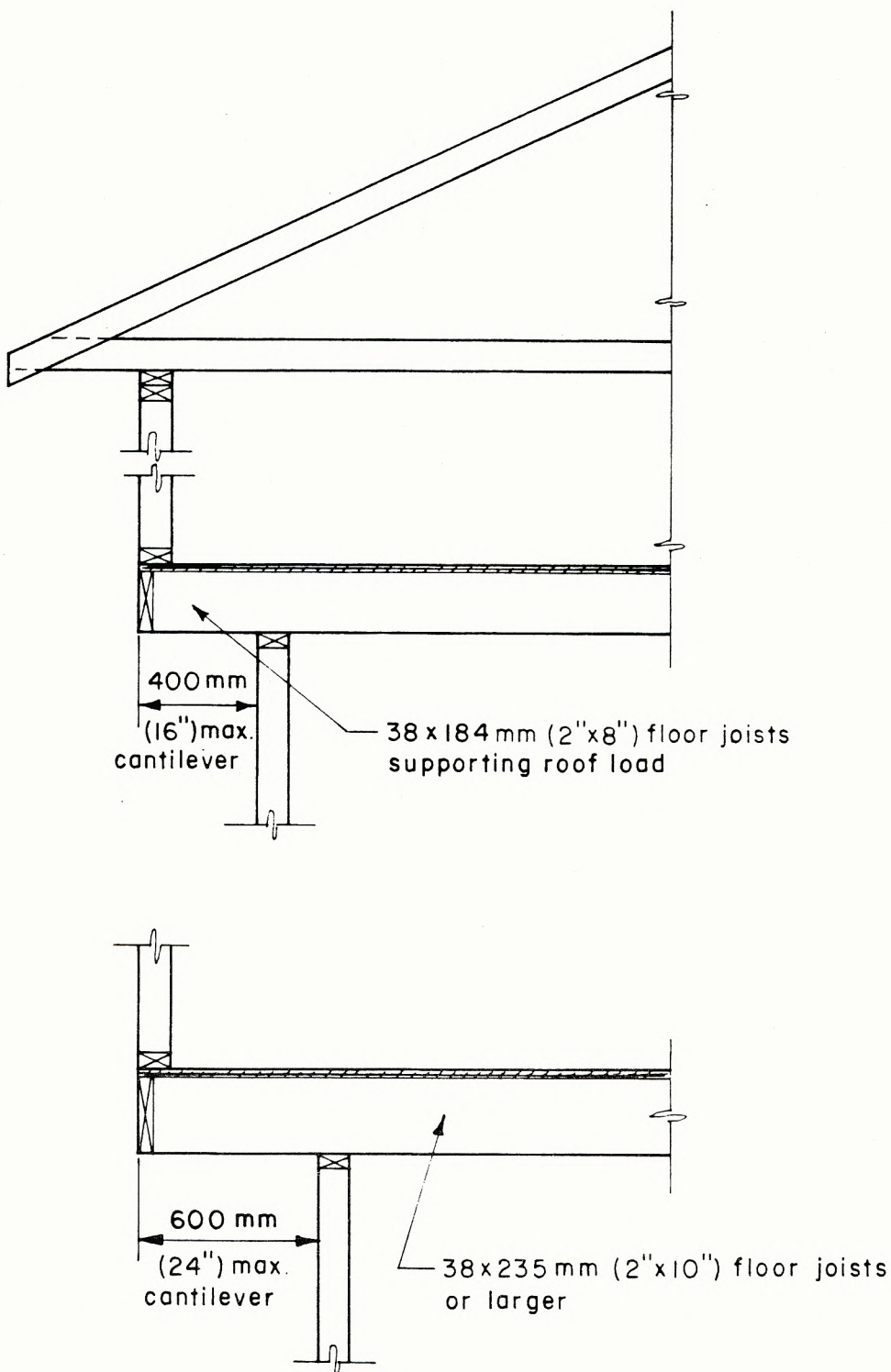
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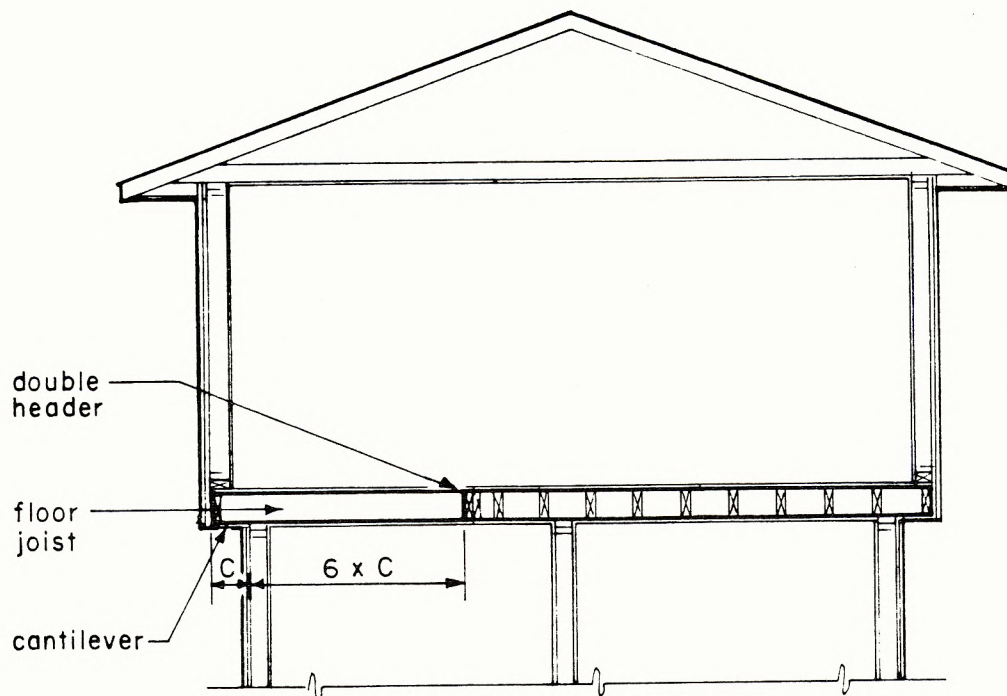
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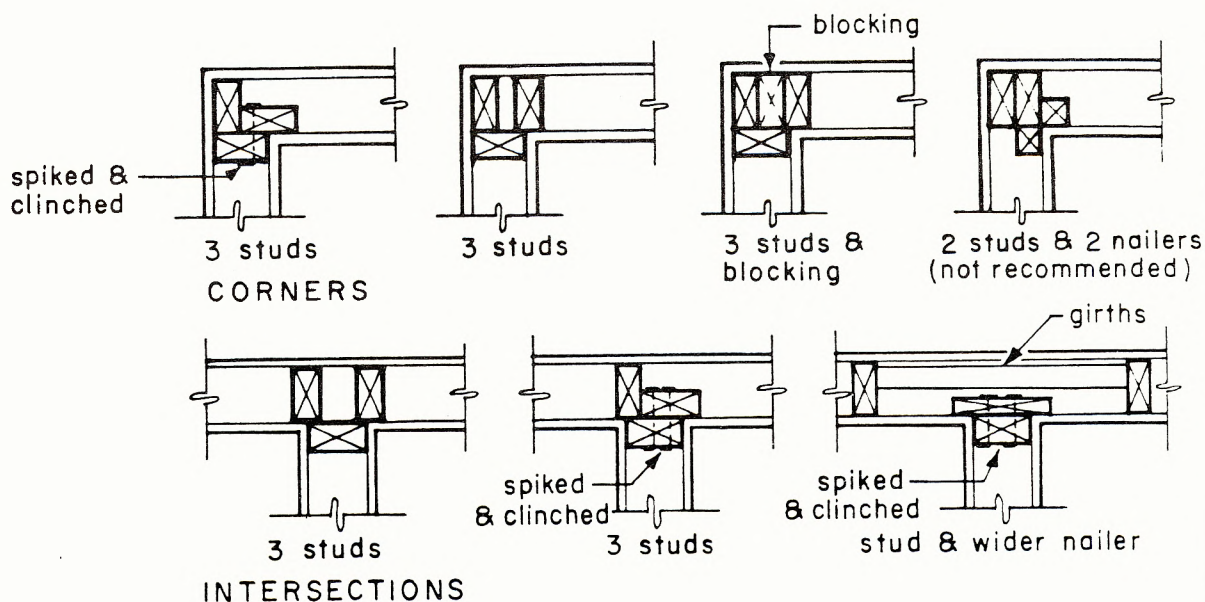
9.23.9.13 CANTILEVERED JOISTS SUPPORTING ROOF LOADS



9.23.9.14 CANTILEVERED JOISTS



9.23.10.4 CORNERS & INTERSECTIONS



Note: If these are exterior walls, all spaces should be filled with insulation.

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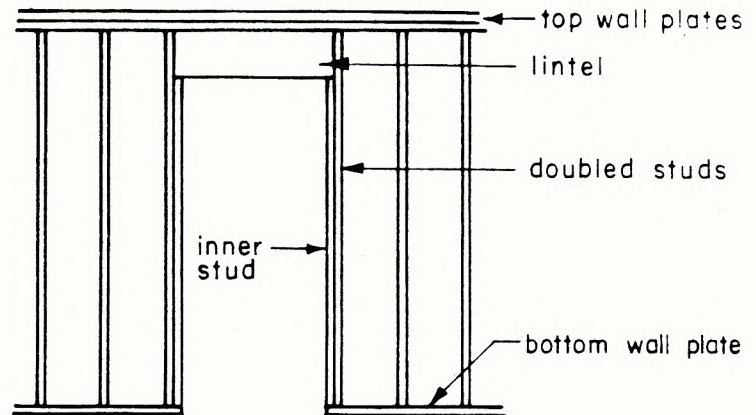
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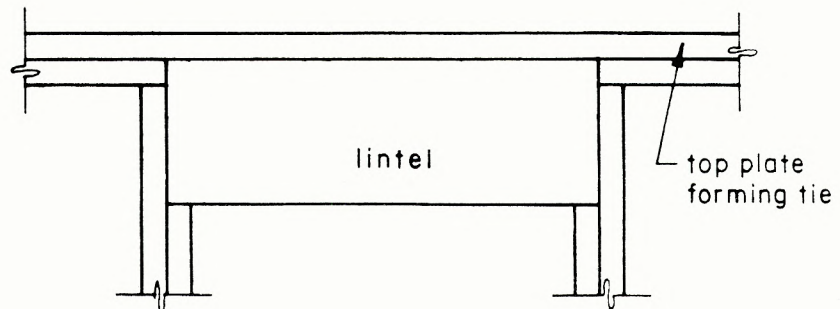
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9.23.10.5 STUDS AT OPENINGS

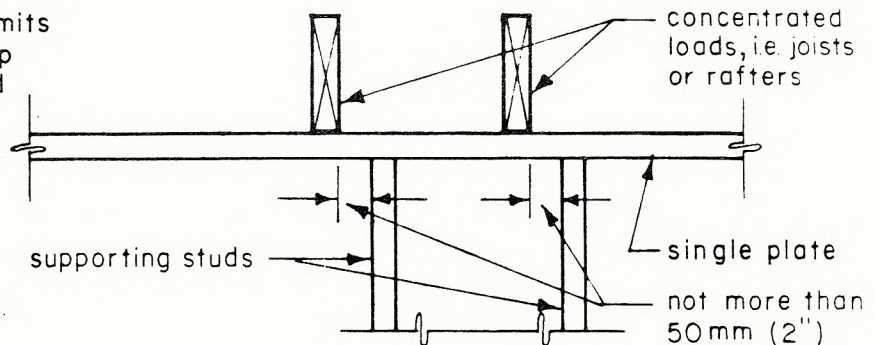


9.23.11.4 SINGLE TOP PLATE OVER LINTEL



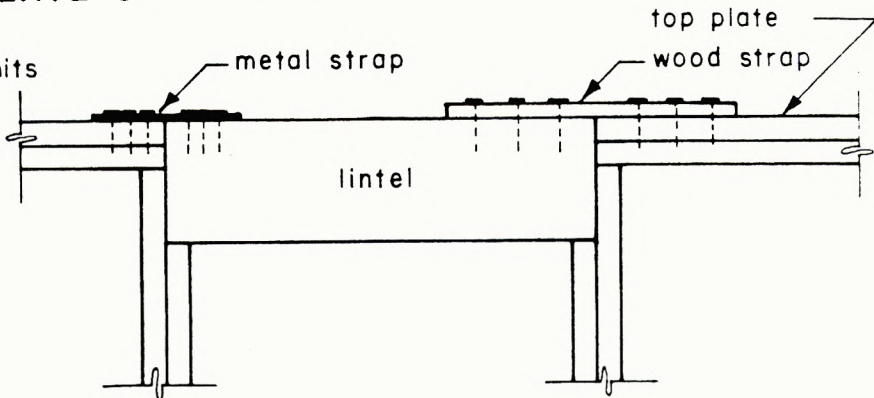
9.23.11.5 SINGLE TOP PLATE: LOAD NEAR STUD

Note: The code permits this, but a double top plate is recommended

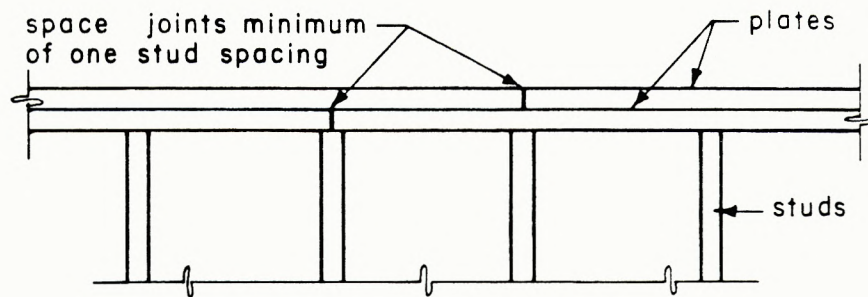


9.23.11.6 TOP PLATE OMITTED WHERE TIED

Note: The code permits this, but it is recommended that the top plate be continued across the lintel.



9.23.11.7 JOINTS IN TOP PLATES STAGGERED



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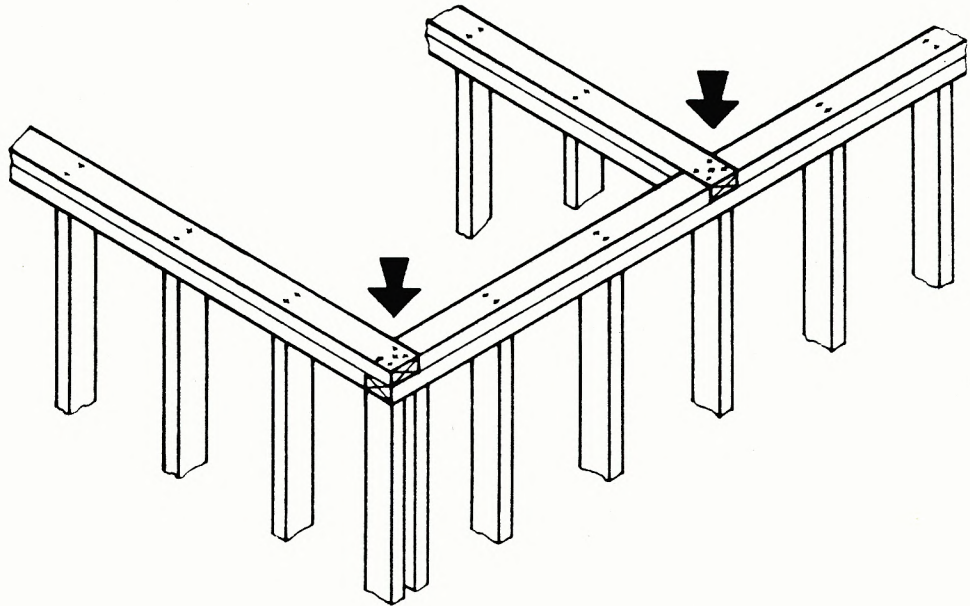
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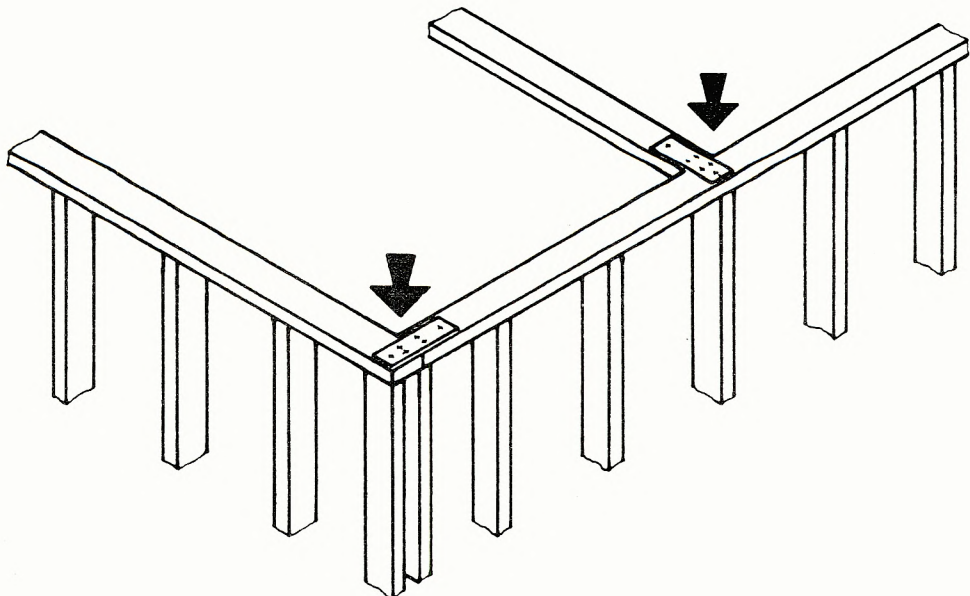
Section:

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9.23.11.8 TOP PLATES LAPPED OR TIED AT CORNERS AND INTERSECTIONS



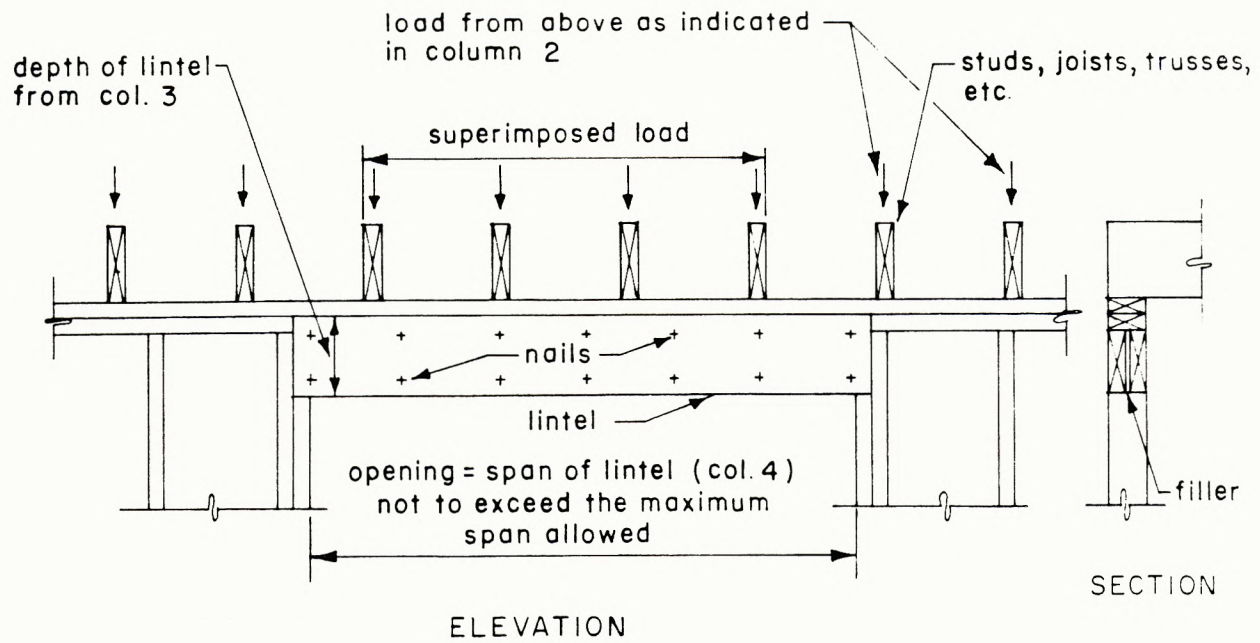
Double plates lapped at corners and intersections



Single plates tied with metal straps at corners and intersections

Note: Code permits this but double plate preferred

9.23.12.3 & TABLE 9.23.12.A NAILING AND SPANS OF WOOD LINTELS



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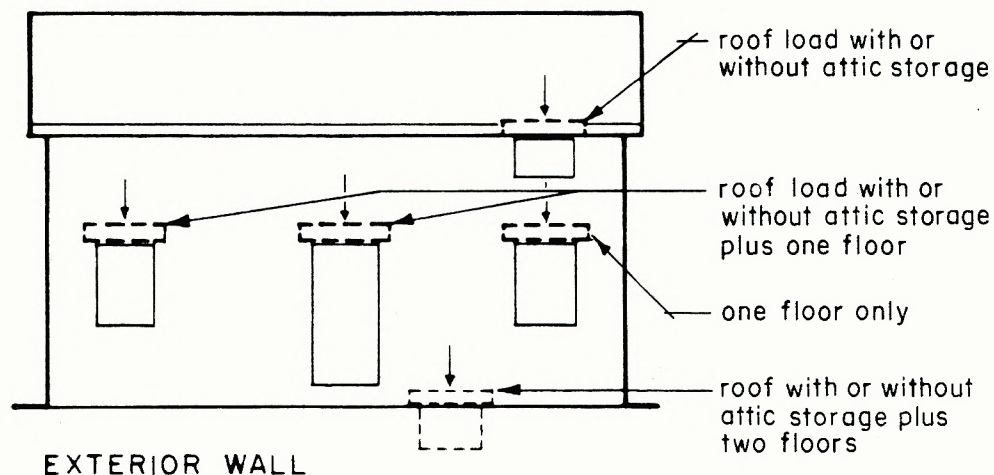
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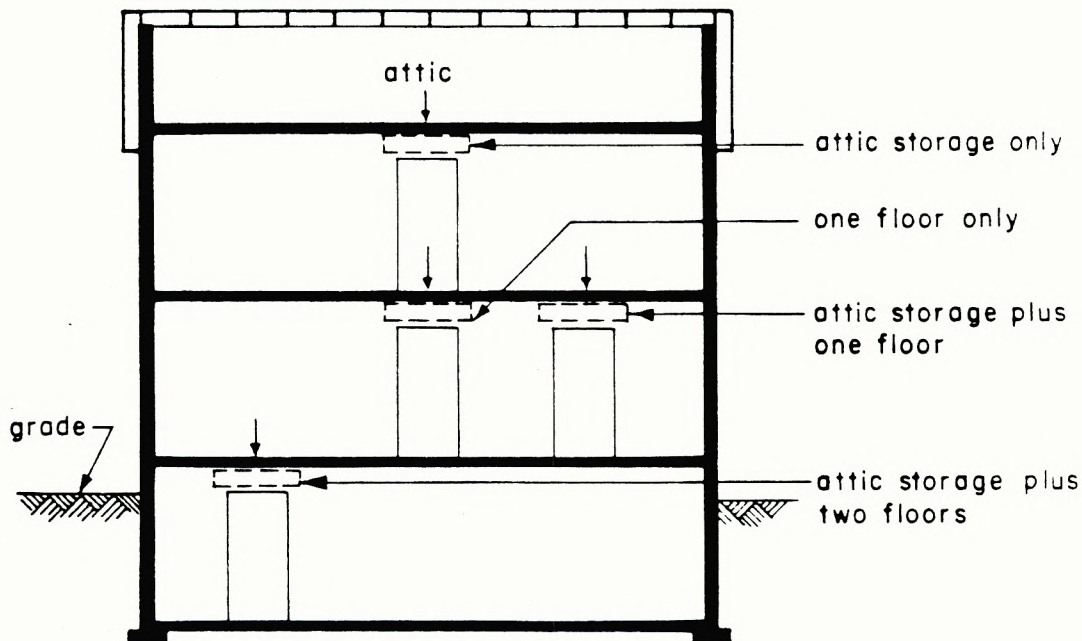
Section:

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9.23.12.4 & TABLE 9.23.12.A LOADS ON LINTELS

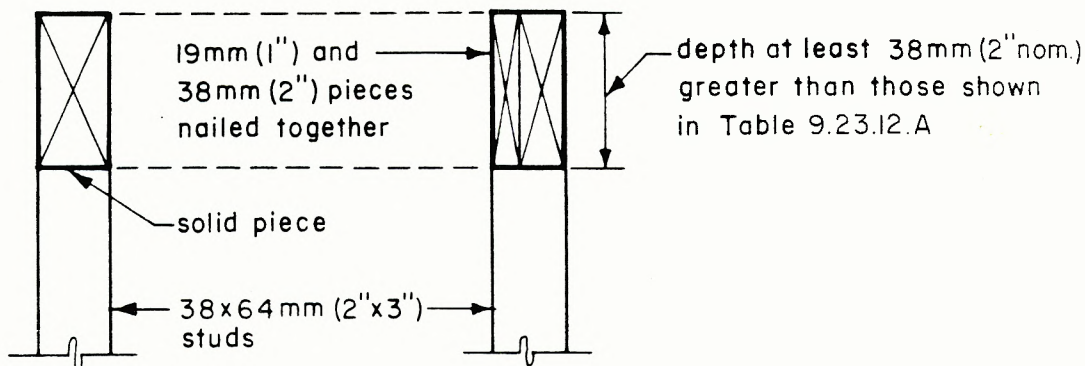


EXTERIOR WALL

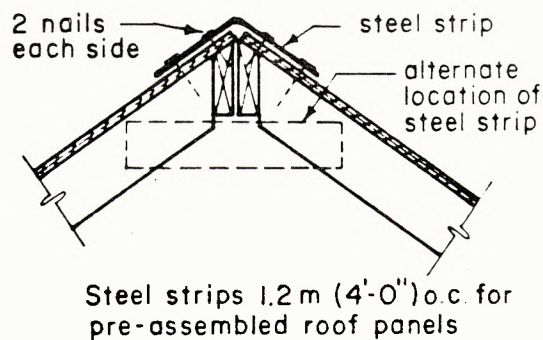
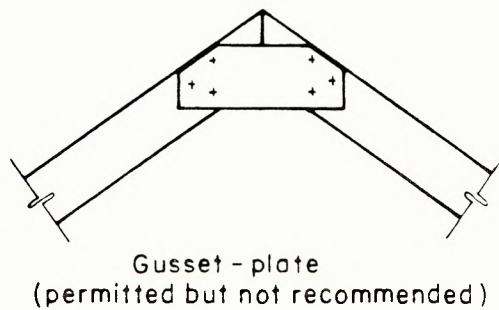
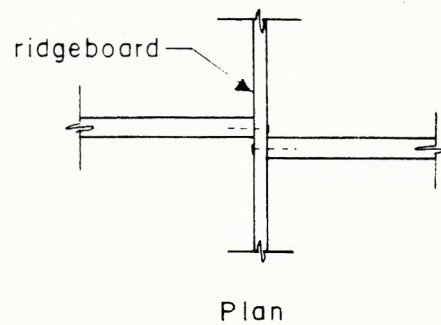
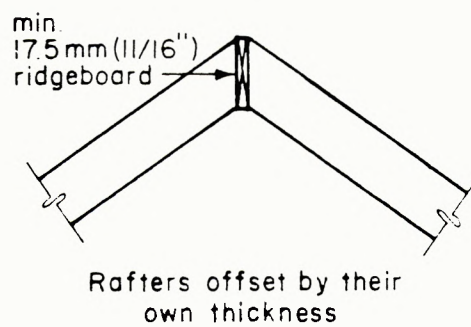
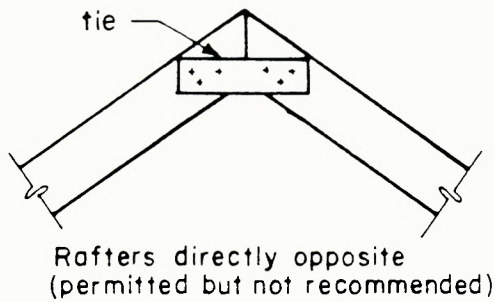


INTERIOR WALL

9.23.12.5 LINTELS IN 64 mm (3") LOADBEARING STUD WALLS



9.23.13.4 CONNECTIONS AT PEAK



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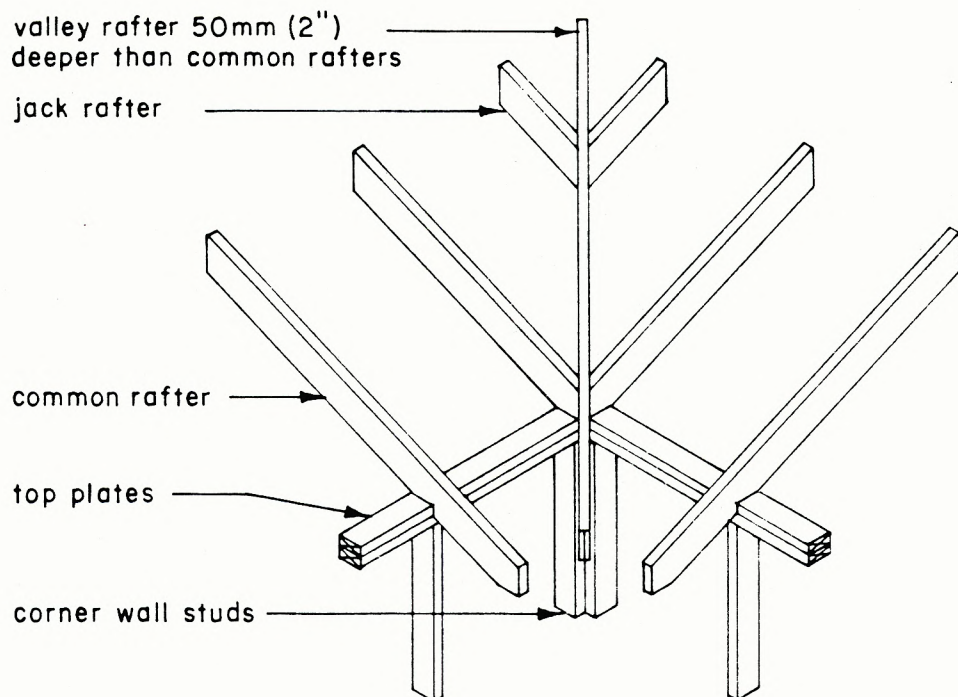
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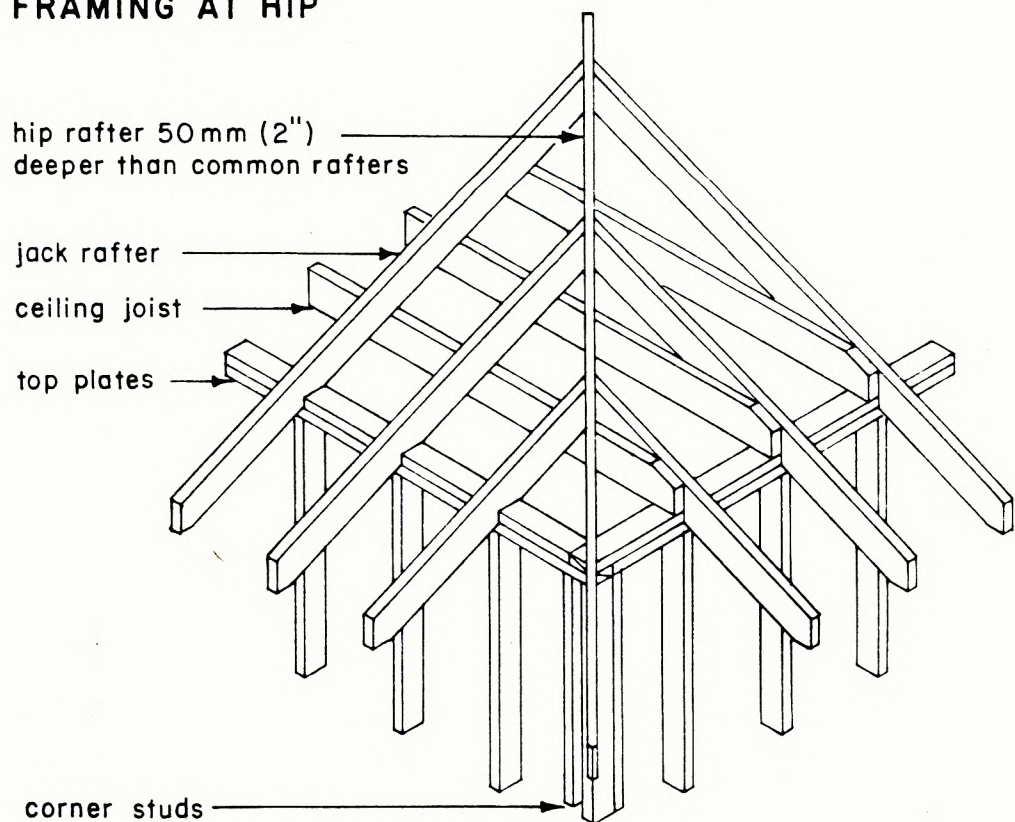
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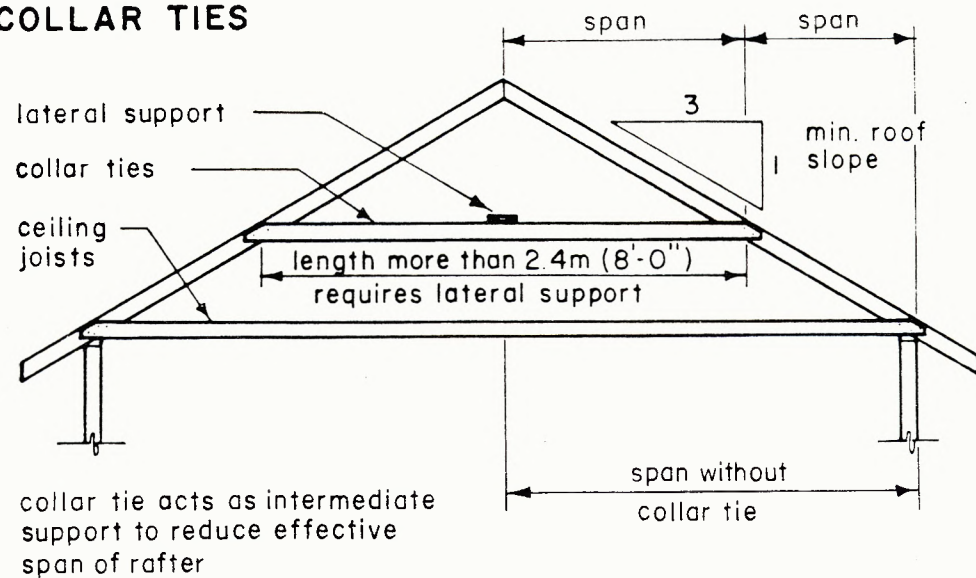
9.23.13.6 a) FRAMING AT A VALLEY



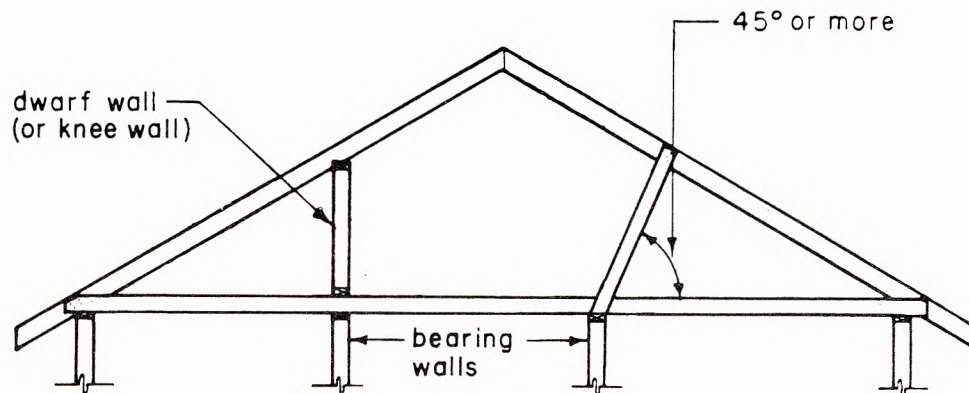
9.23.13.6 b) FRAMING AT HIP



9.23.13.7 COLLAR TIES



9.23.13.8 STRUTS & DWARF WALLS



Note: See 9.23.13.13 if bearing walls not provided.

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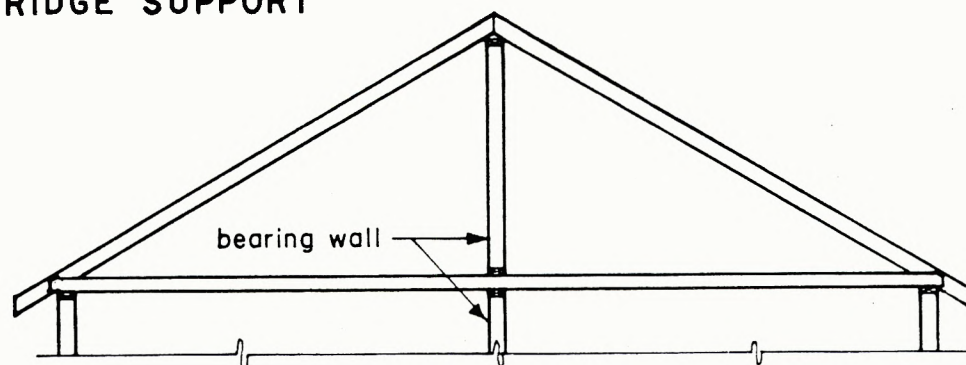
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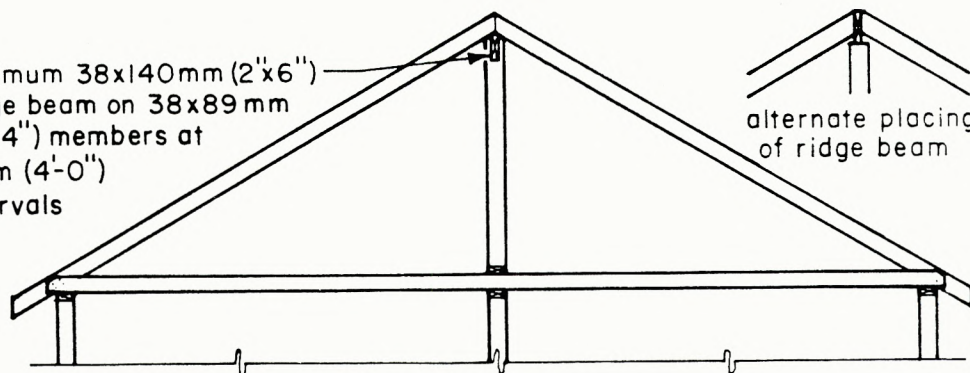
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9.23.13.10 RIDGE SUPPORT

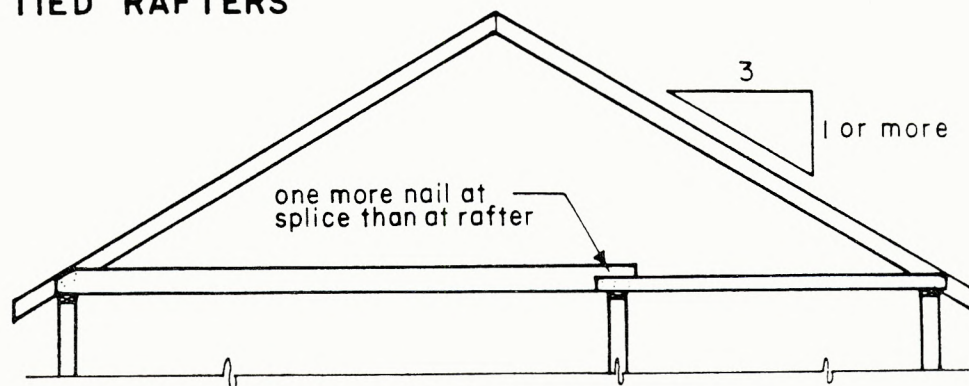


minimum 38x140mm (2"x6")
 ridge beam on 38x89 mm
 (2"x4") members at
 1.2 m (4'-0")
 intervals



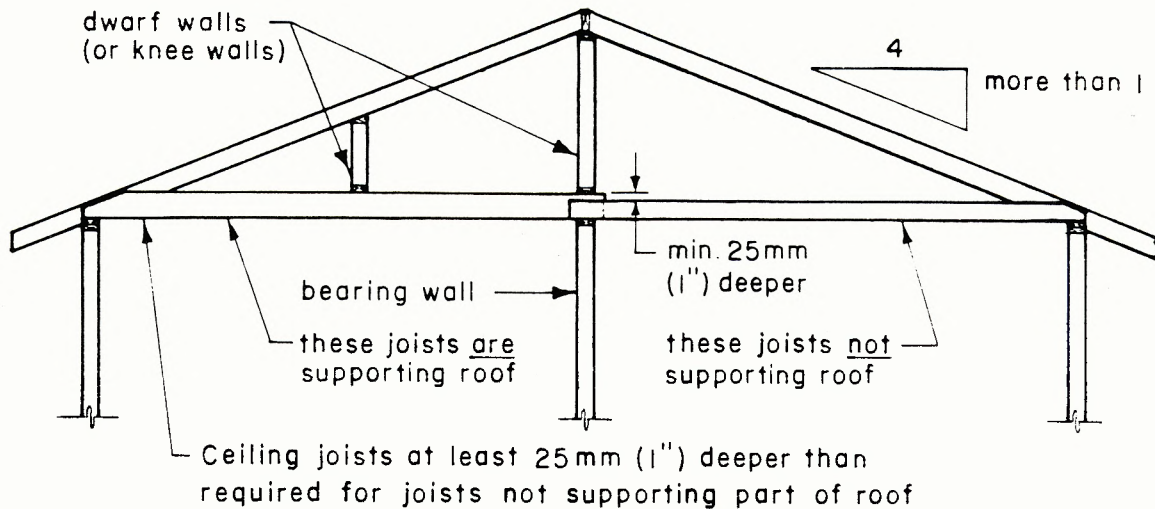
alternate placing
 of ridge beam

9.23.13.11 TIED RAFTERS

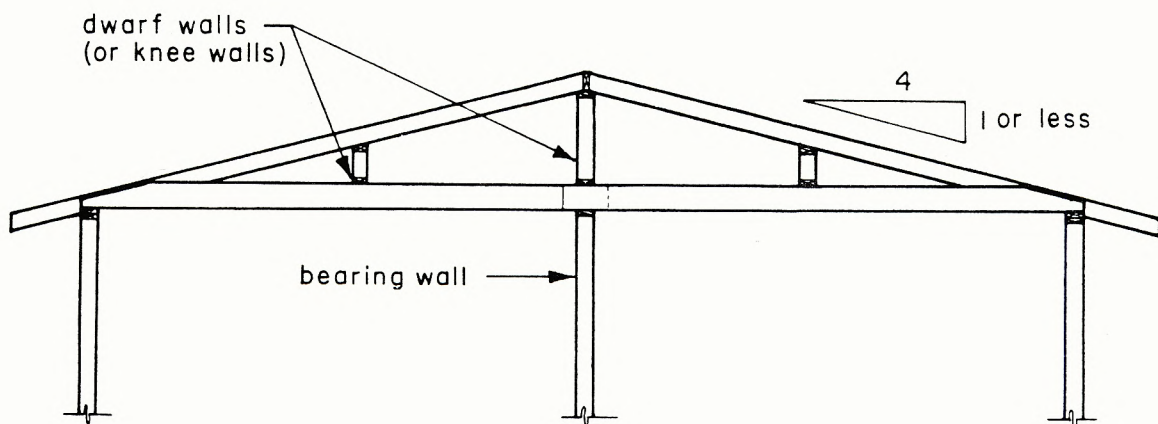


9.23.13.13 CEILING JOISTS SUPPORTING PART OF ROOF LOAD

Note: Roof loading is partly carried by ceiling joists because of the dwarf walls. These are not roof trusses.



SLOPES GREATER THAN 1:4



Ceiling joist size must be taken from span tables for roof joists

SLOPES 1:4 OR LESS

Note: This roof slope not recommended

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9.23.13.18

ROOF TRUSS TESTING: This describes a method for testing trusses to see if they are strong enough to take their design loads. Snow loads are usually 60% of the ground snow load for the area, (say about 2 KN/m^2 or 40 lbs./ft.^2) and the weight of the roof and ceiling itself is usually about $.5 \text{ KN/m}^2$ or 10 lbs./ft.^2 . It must not have a deflection greater than shown in the table after an hour, and must not collapse after supporting $2 \frac{2}{3}$ the roof load for 24 hours. The standard requires that the test be supervised by a registered professional engineer approved by the authority having jurisdiction.

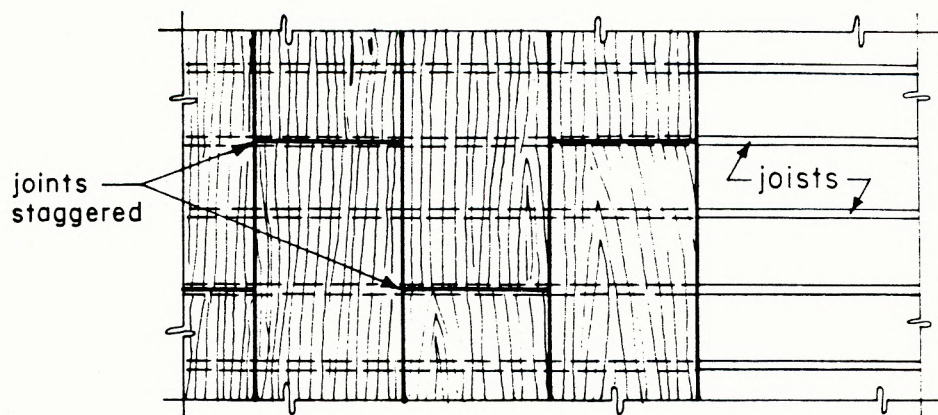
9.23.14.2

WAFERBOARD: Made from wafers of wood - flat particles over 30 mm ($1 \frac{1}{4}$ ") long - only, and is bound with completely waterproof thermo-setting glue.

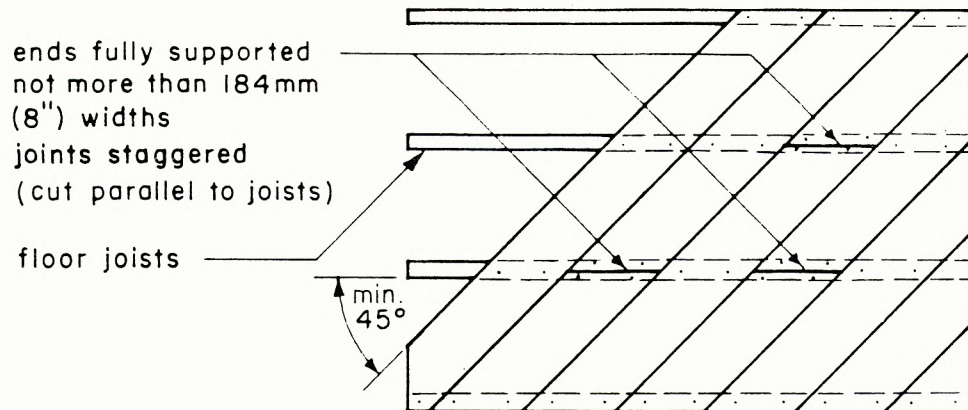
9.23.14.3

PARTICLEBOARD: Can be made up of any type of wood particle: chips, shavings, fibre, flakes, etc. - and is bound with glues that are not necessarily completely waterproof. Hence particleboard is not as strong as waferboard and is not intended for exterior use or wet areas.

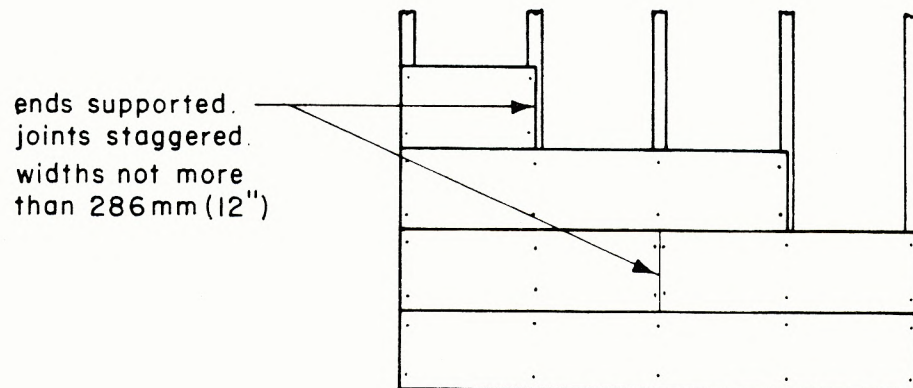
9.23.14.5 PLYWOOD SUBFLOORING, JOINTS STAGGERED



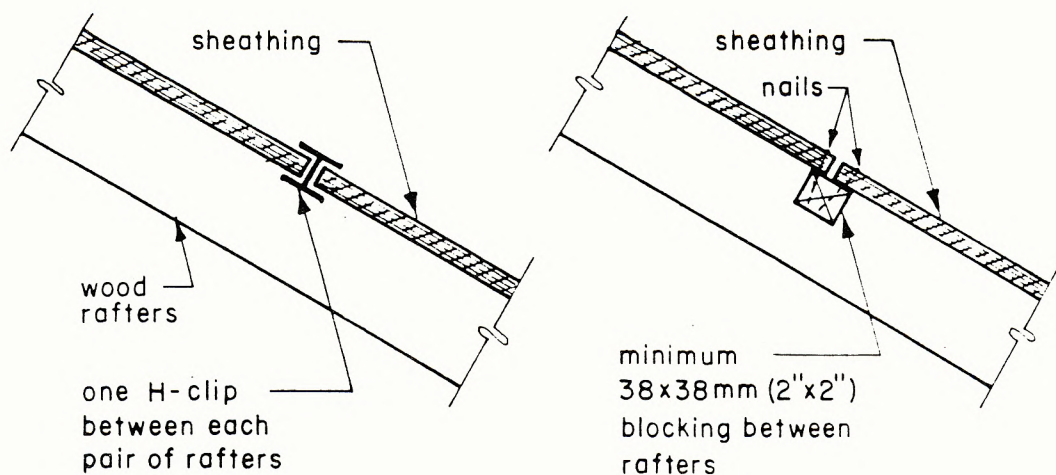
9.23.14.9 LUMBER SUBFLOORS



9.23.15.4 LUMBER ROOF SHEATHING



9.23.15.5 EDGE SUPPORT FOR ROOF SHEATHING (PANEL-TYPE)



To be provided where support is required for edges of panel-type (plywood or other permissible sheet material) sheathing.

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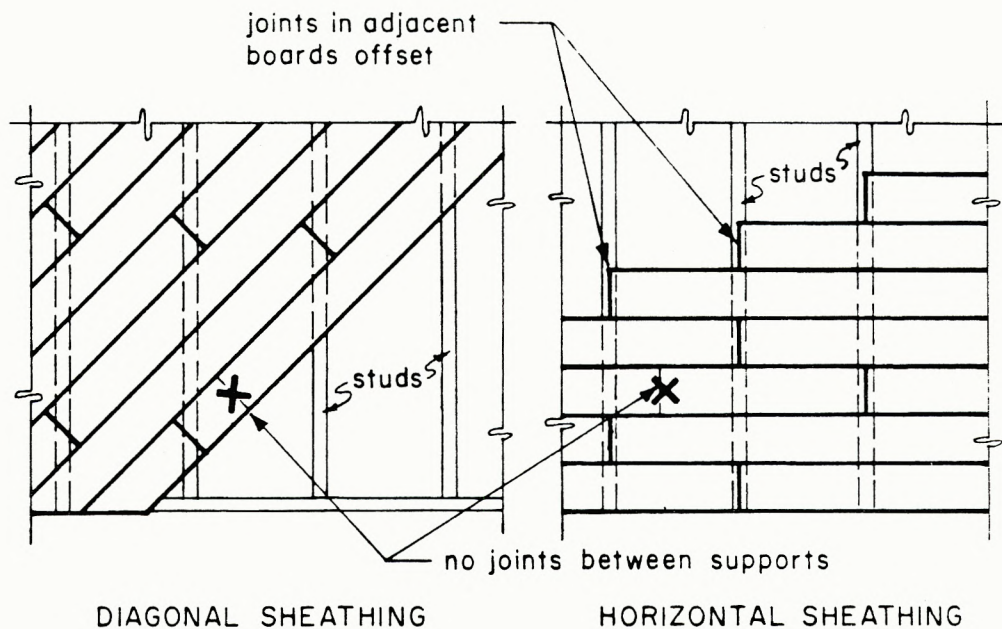
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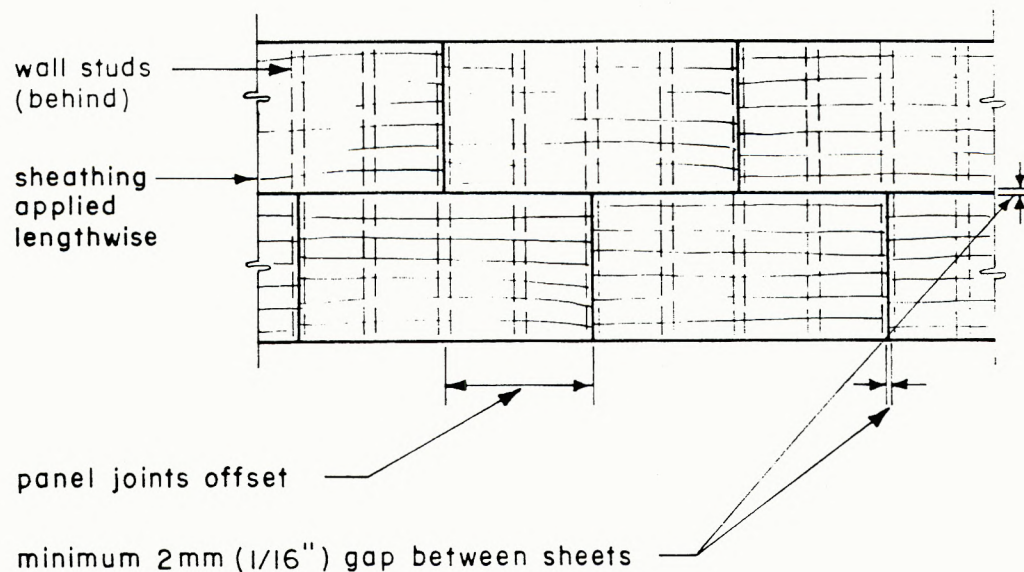
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9.23.16.4 LUMBER WALL SHEATHING-JOINTS SUPPORTED, STAGGERED



9.23.16.5 PANEL WALL SHEATHING & JOINTS STAGGERED



**post, beam &
plank construction**

SECTION 9.24

**sheet steel
stud wall framing**

SECTION 9.25

**thermal insulation &
vapour barriers**

SECTION 9.26

9.26.3.4

VAPOUR BARRIERS: Type 1 has about 3 times the resistance to the passage of vapour as Type 2. Type 1 includes most of the polyethylene and aluminum foil types, while Type 2 is mostly the waxed kraft-paper type. Where the outside cladding does not readily permit the passage of vapour, such as with plywood, it is necessary to use Type 1 to reduce entry of moisture into the wall. See also summary for standard CAN2-51.33-M79.

9.26.4.3

BATT-TYPE INSULATION: Batts are usually 300 mm (12"), 400 mm (16") or 600 mm (24") wide by 1200 mm (4') long, of various thicknesses. Insulation is kept in contact with the outside cladding, studs, etc. so no cold spots may develop where frost could form. On the inside the space keeps the studs warm to prevent thermal bridging. If the air space was on the outside, the studs would be colder and a frost-line might develop along each stud on the inside surface. Normally, today, the whole cavity is filled so this situation would not arise.

MEMBRANE: A surface layer or sheet material adhered to the face of the batt, as with a vapour barrier (see above).

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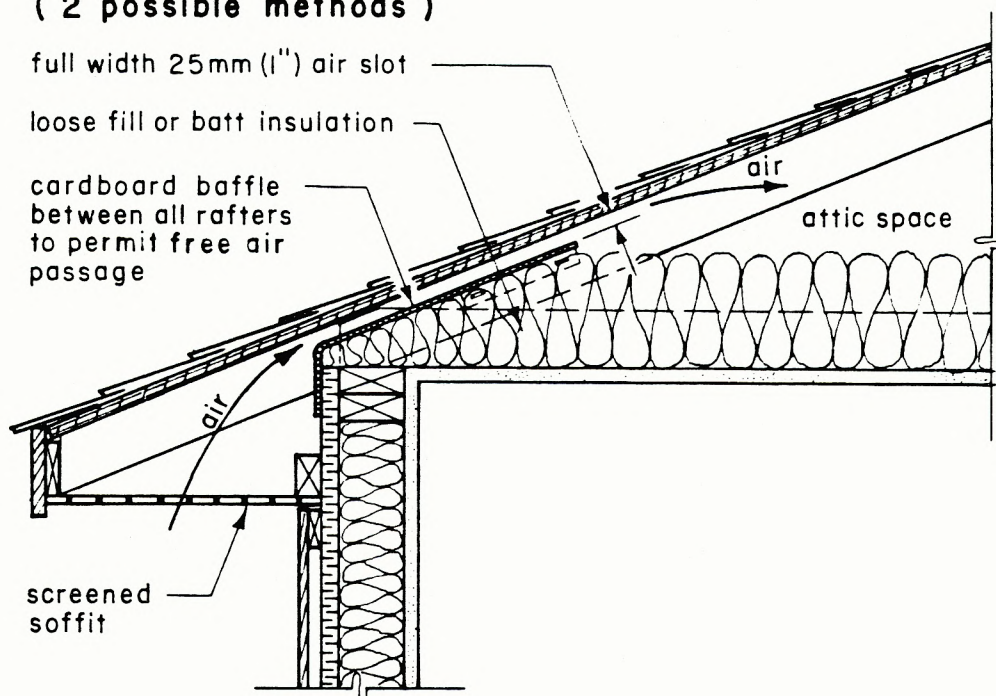
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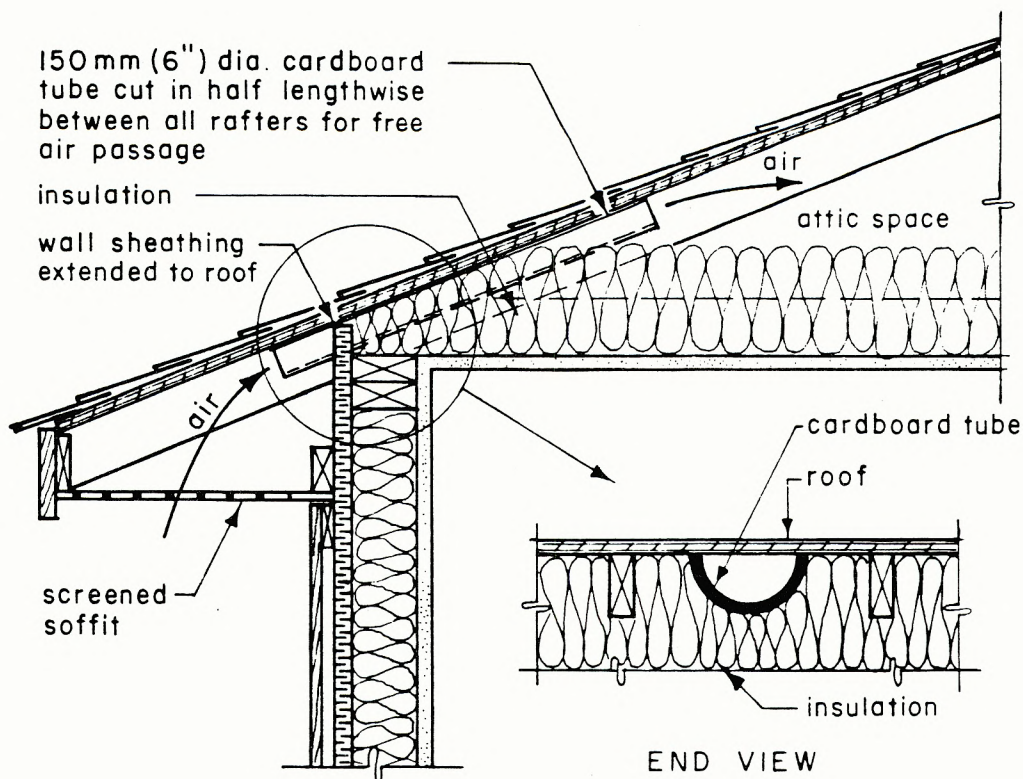
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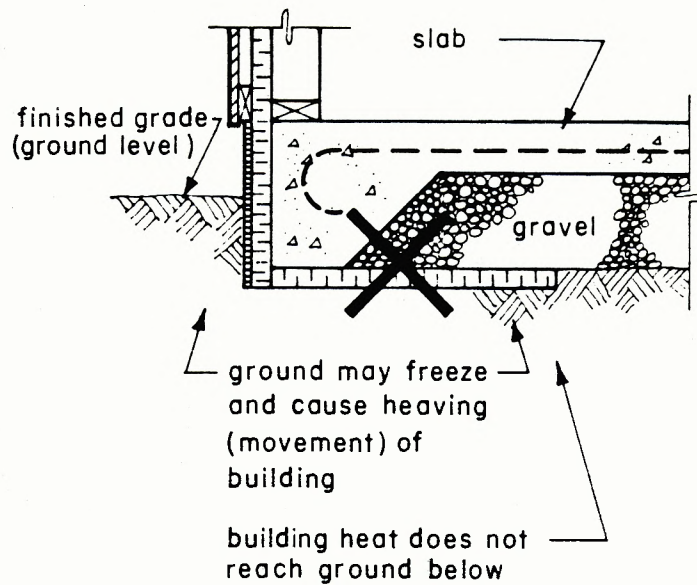
9.26.4.4 PROVIDING VENTILATION TO ATTIC SPACE (2 possible methods)



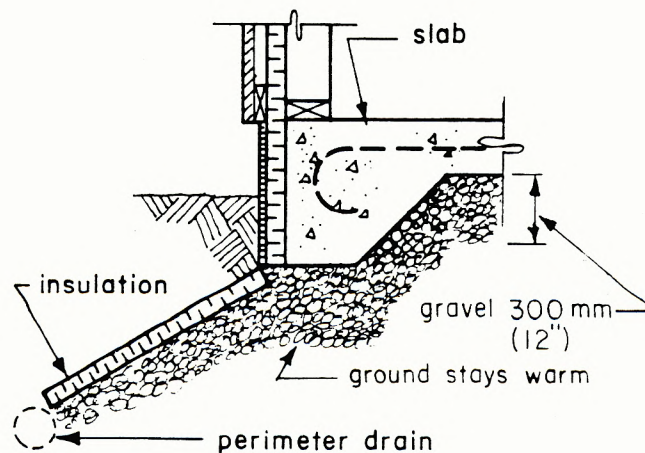
Note: Proper venting is necessary to reduce condensation in attic space, leading to rotting of wood and ice build-up in winter and to allow drying out in spring/summer if any moisture does collect.



9.26.4.6 INSULATING SLABS-ON-GRADE



DO NOT



DO

9.26.4.10

INSULATION IN FACTORY-BUILT BUILDINGS: Buildings made in a factory (prefabricated) shall have the insulation installed so that it will not come loose or fall out of place during shipment to the site or erection at the site.

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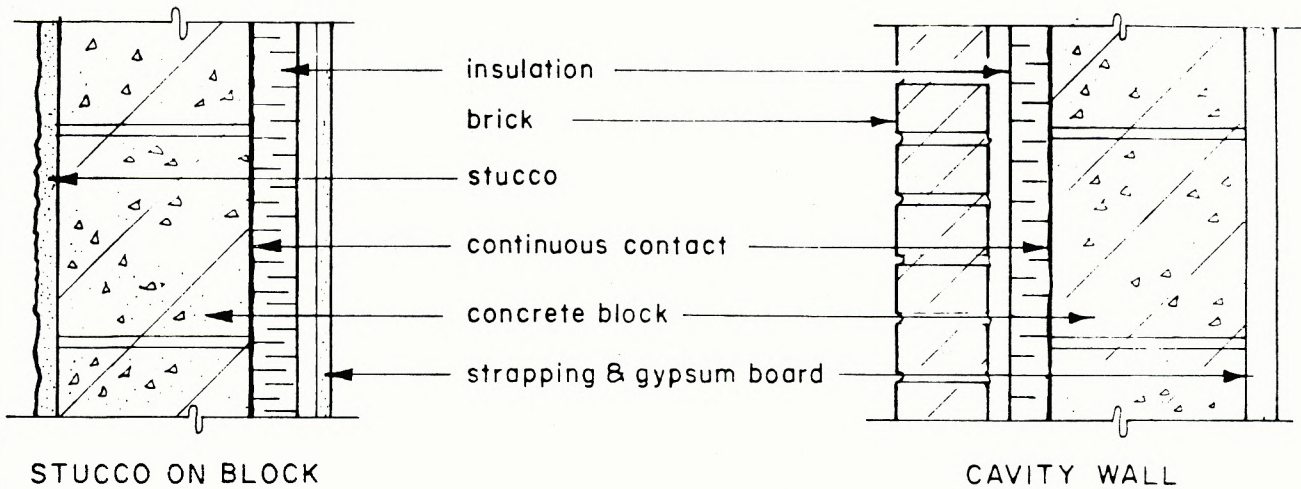
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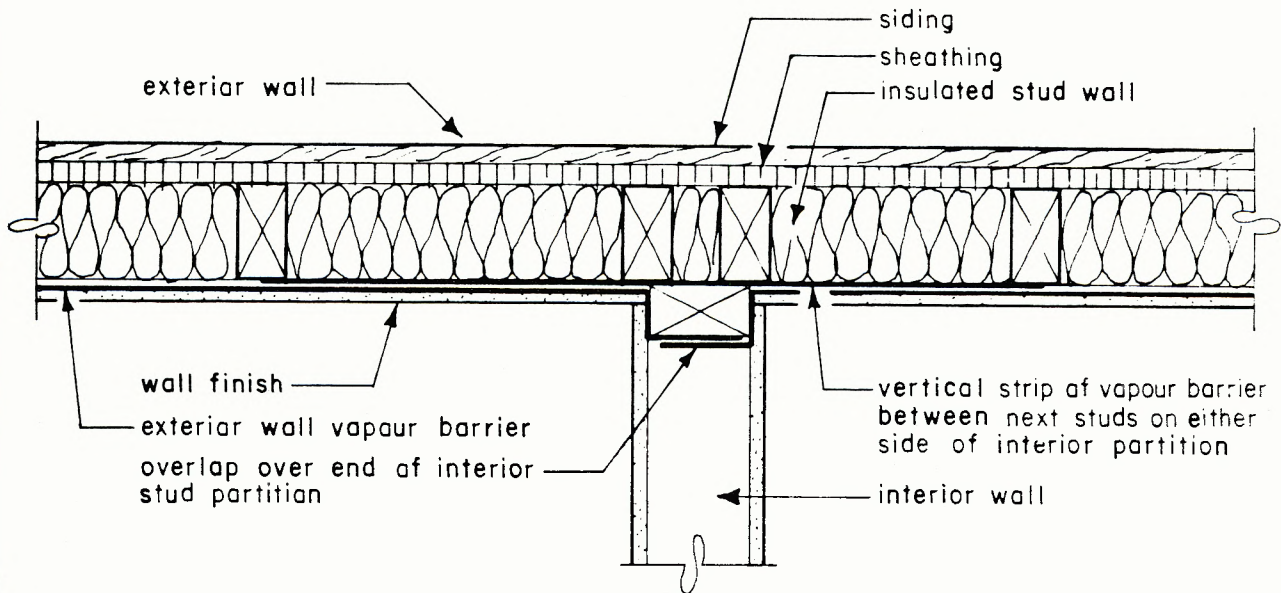
9.26

9.26.5.2 PLASTIC FOAM INSULATION ON MASONRY

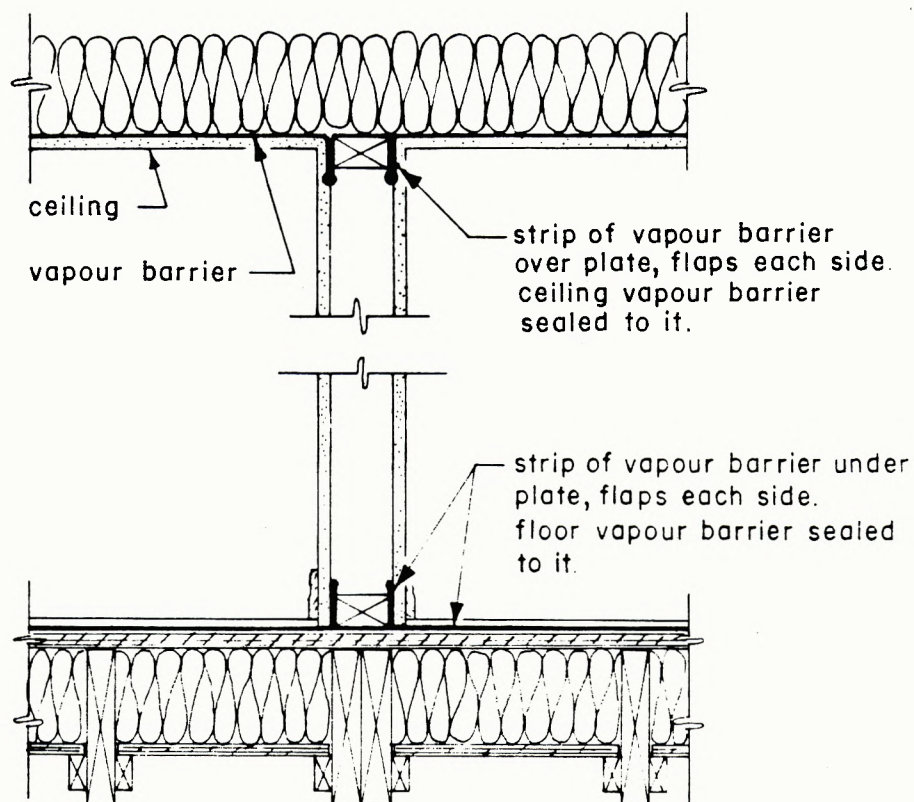


Note: Plastic foam insulation is "lightweight cellular" plastic type insulation

9.26.5.4 VAPOUR BARRIER AT INTERIOR / EXTERIOR WALL CONNECTION



9.26.5.5 VAPOUR BARRIER AT INTERIOR WALL, CEILING & FLOOR



Note: The code calls for the upper detail at ceilings. Where the floor is insulated and has a vapour barrier, the lower detail should also be applied.

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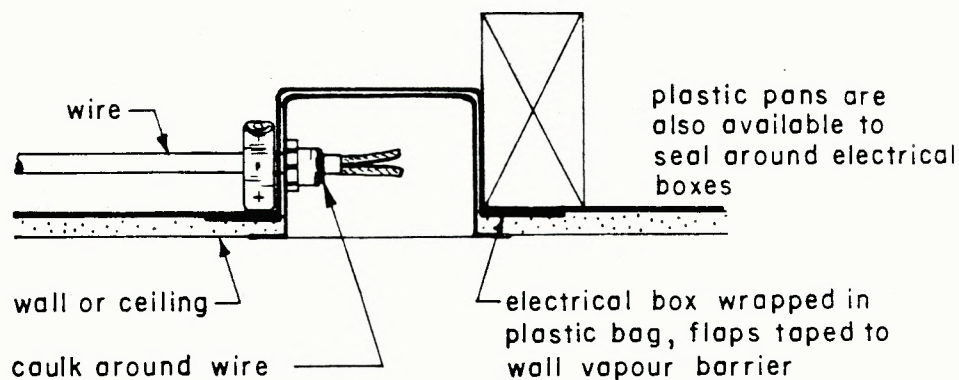
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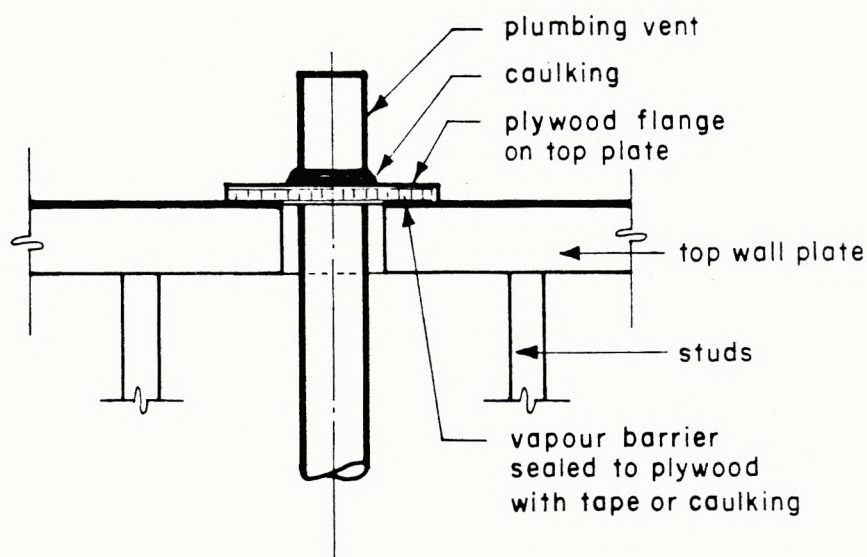
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9.26.5.14 a) VAPOUR BARRIER AT ELECTRICAL BOX



9.26.5.14 b) HOLES THROUGH VAPOUR BARRIER AT VENTS, ETC.

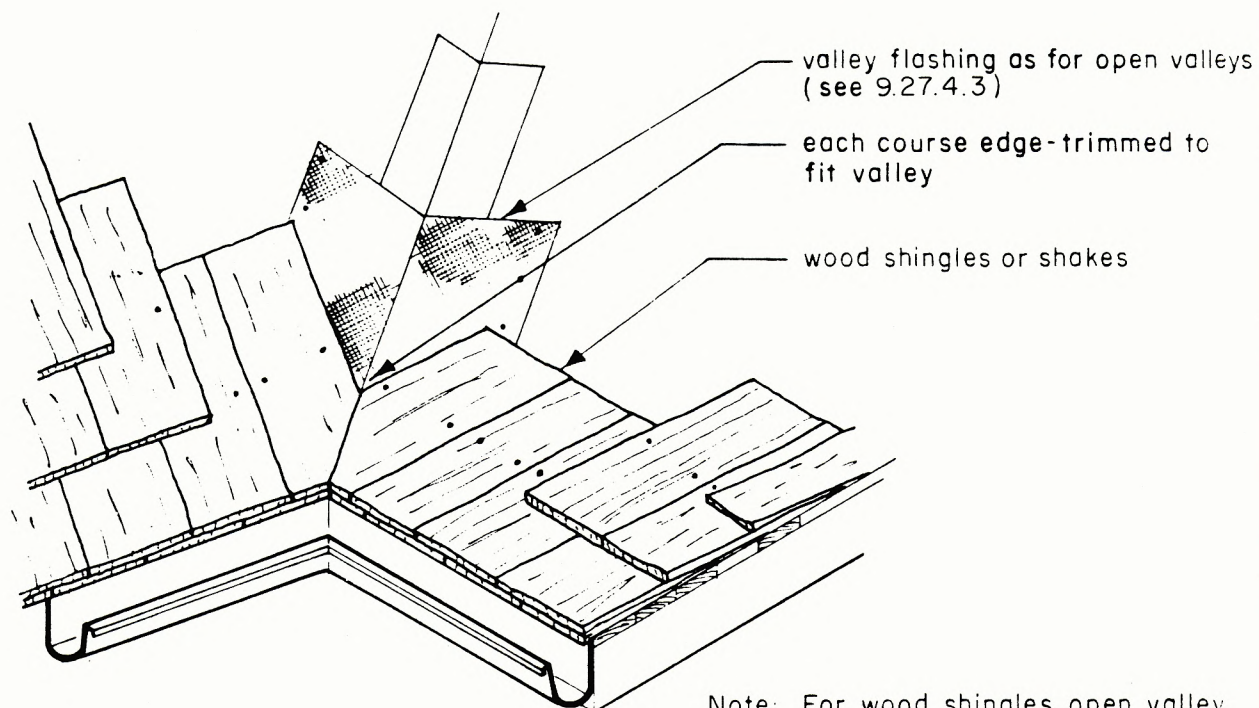


EXAMPLE OF SEALING VAPOUR BARRIER

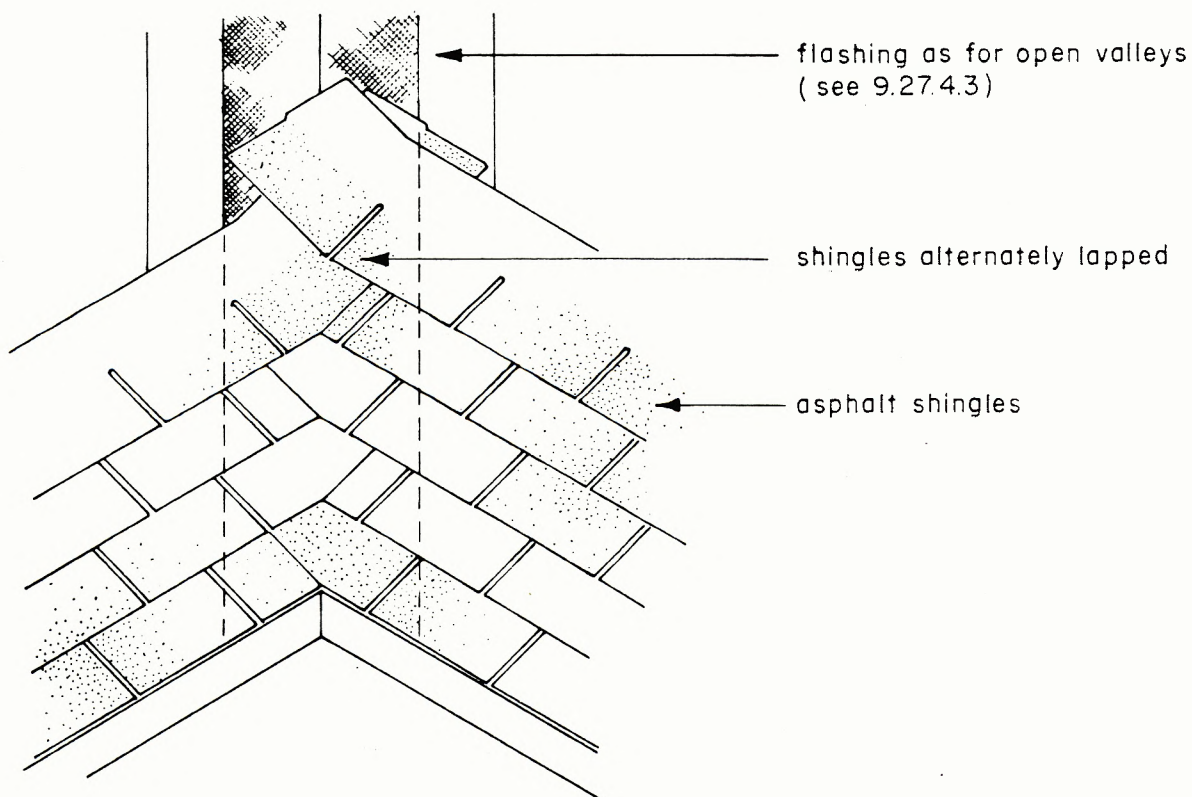
roofing

SECTION 9.27

9.27.4.2 CLOSED VALLEY FLASHING slopes 1:1.2 (10:12) or greater



Note: For wood shingles open valley preferred, see 9.27.4.3



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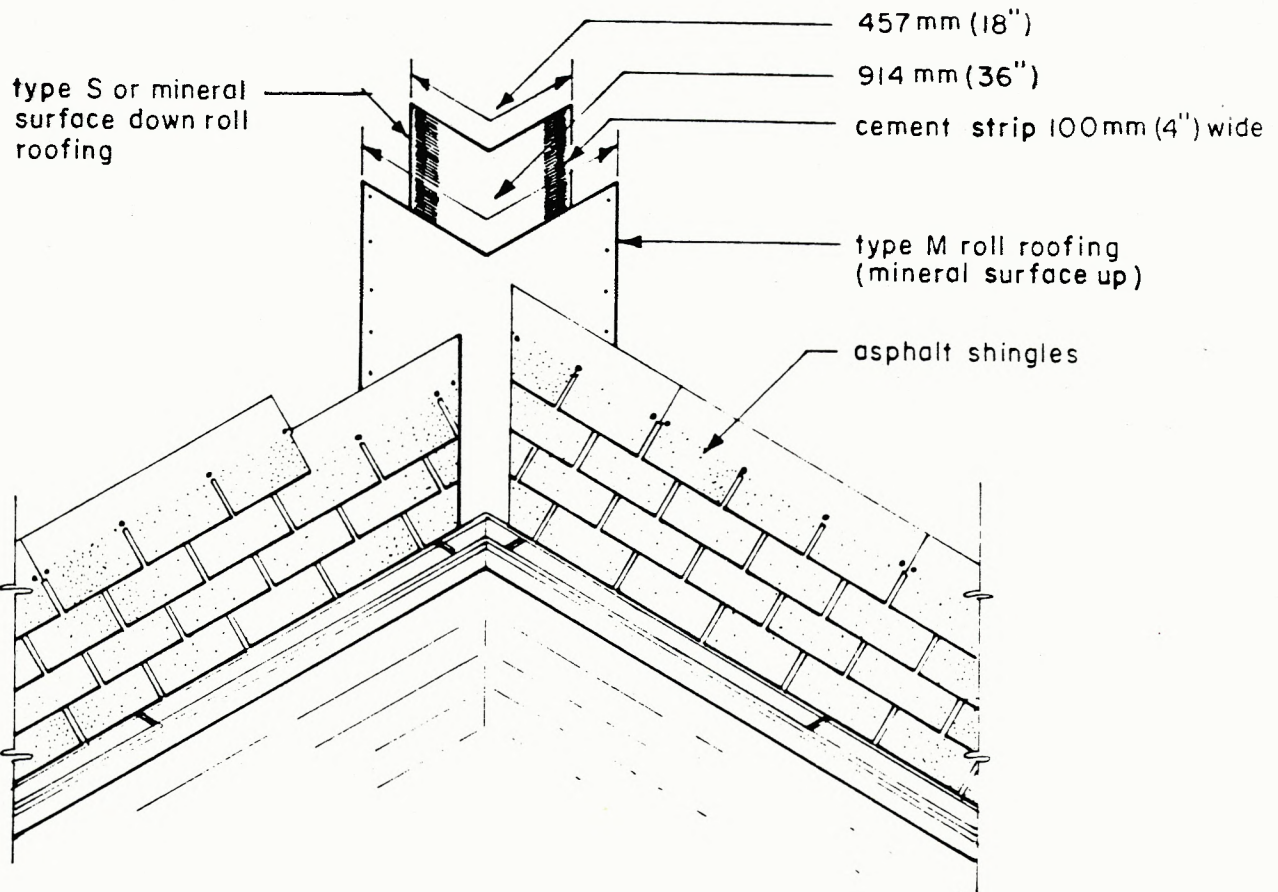
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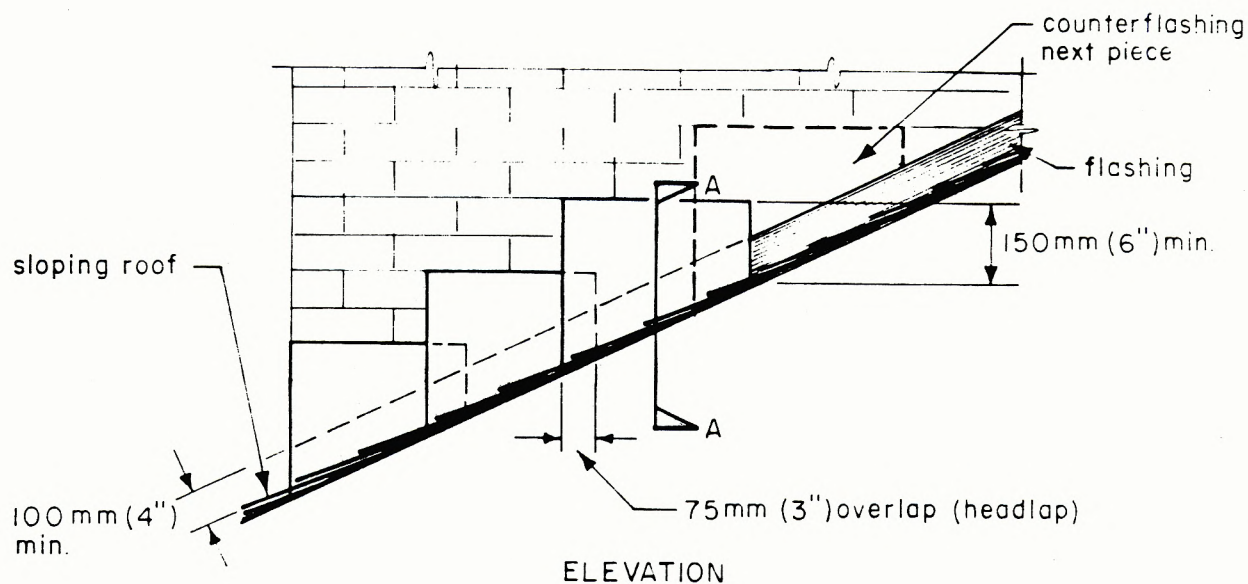
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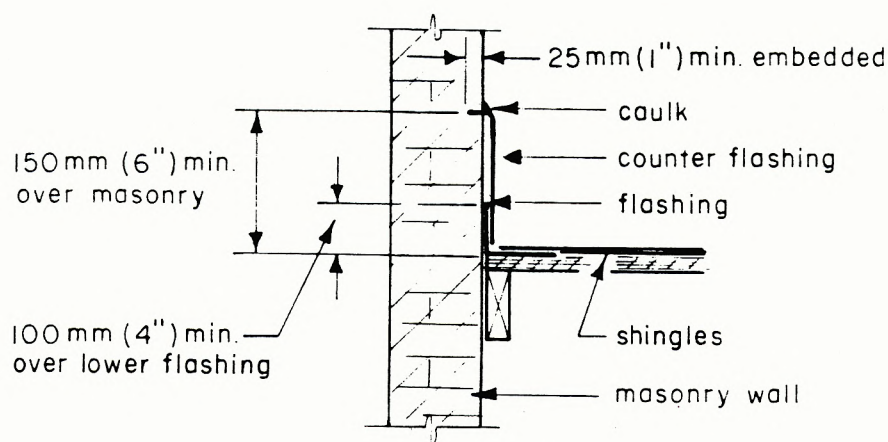
9.27.4.3 OPEN VALLEY FLASHING



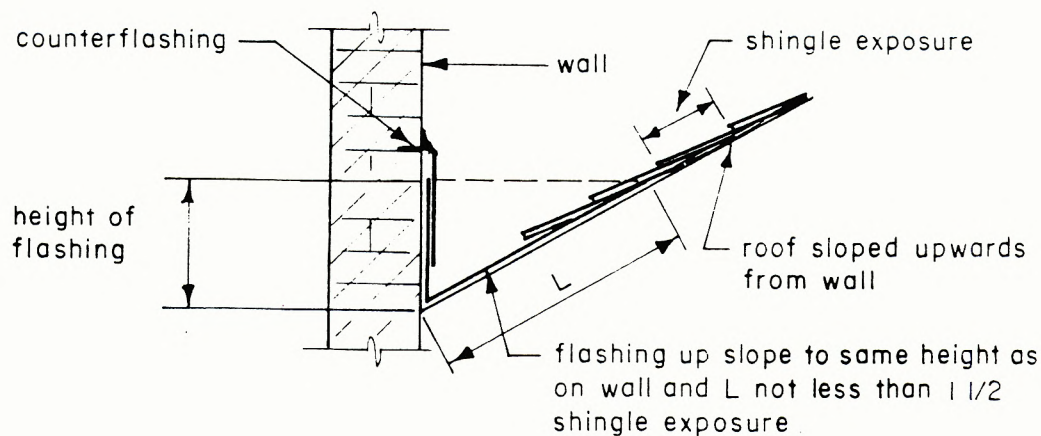
9.27.4.4 FLASHING SHINGLE ROOF AGAINST MASONRY



ELEVATION



SECTION A - A



SECTION B - B
(See 9.27.4.9)

INTERPRETATION:

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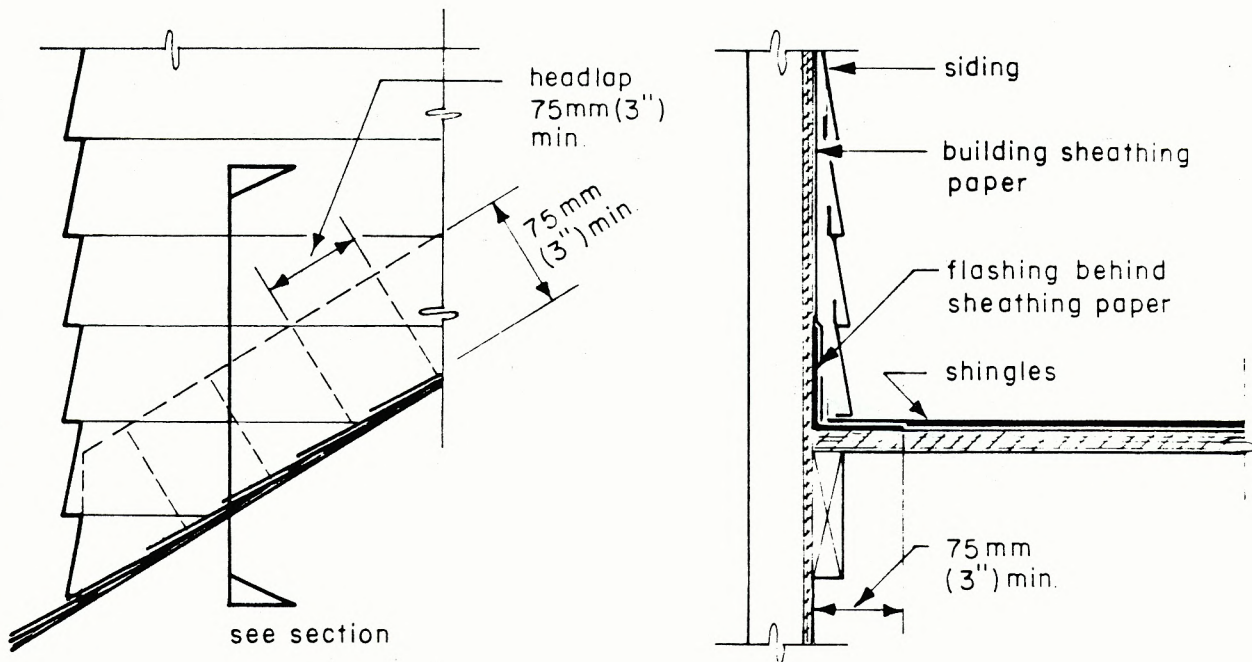
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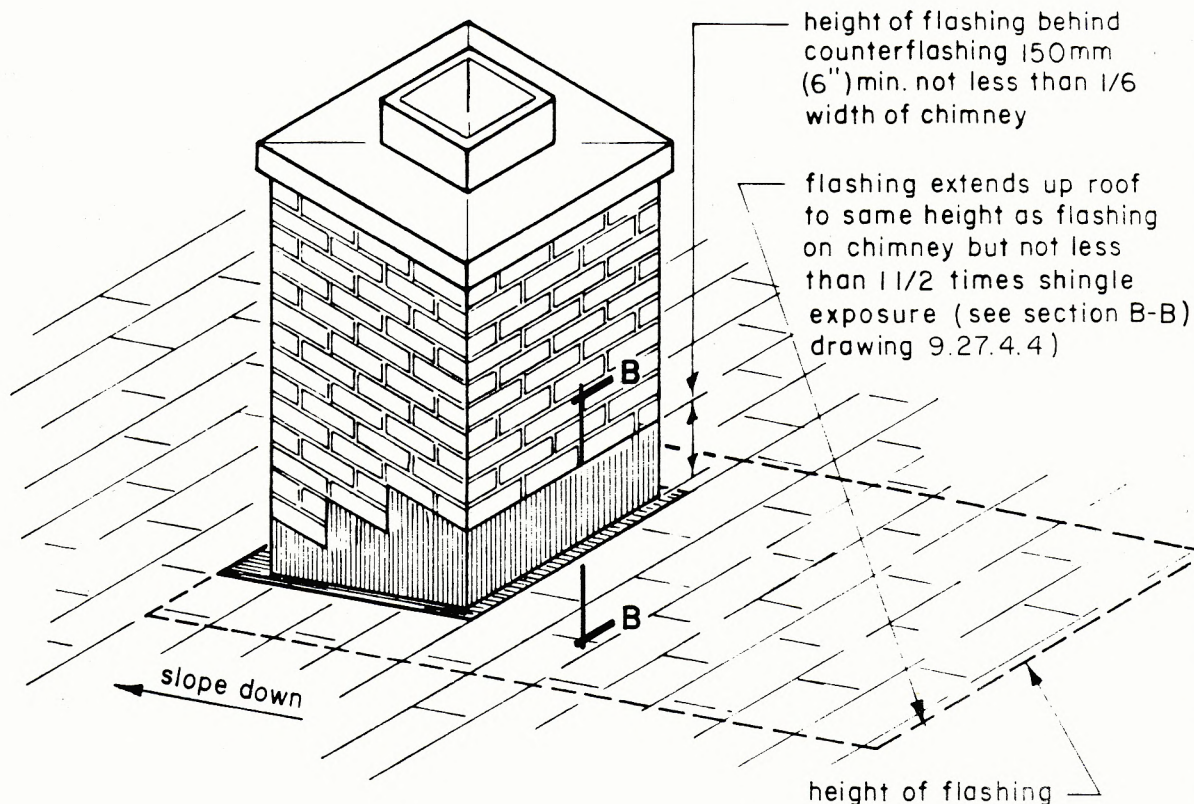
9.27.4.5 FLASHING AT NON-MASONRY WALLS



Flashing shown as "shingle - flashing",
installed one piece per shingle.

Note: This drawing indicates siding not affected by moisture. For condition with
siding affected by moisture see 9.28.2.3

9.27.4.9 CHIMNEY FLASHING WITHOUT SADDLE



Note: Counterflashing not shown

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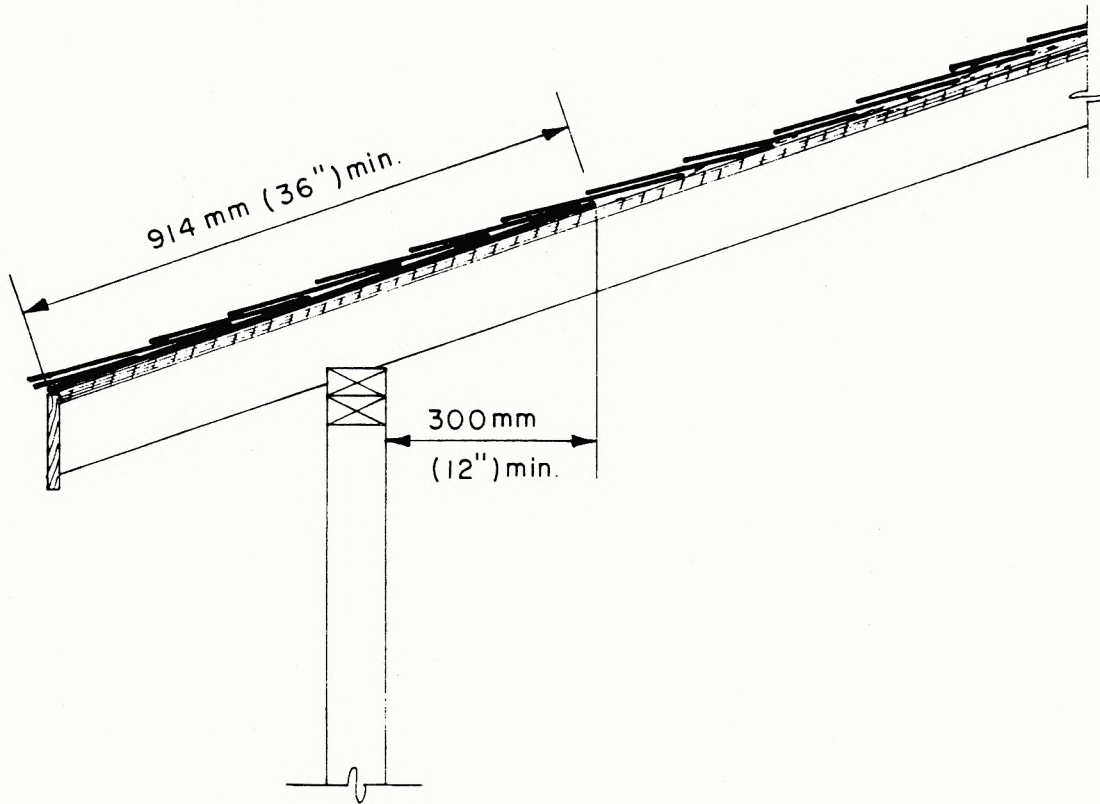
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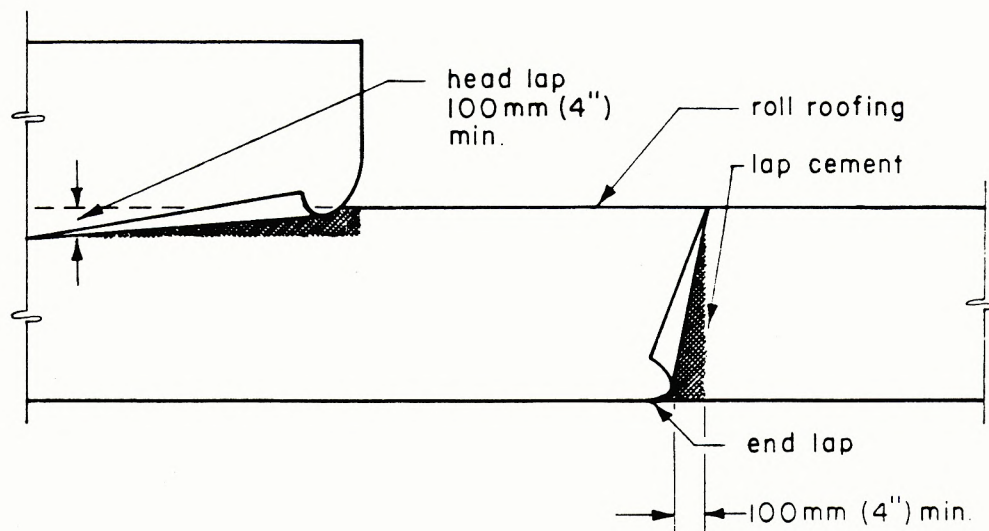
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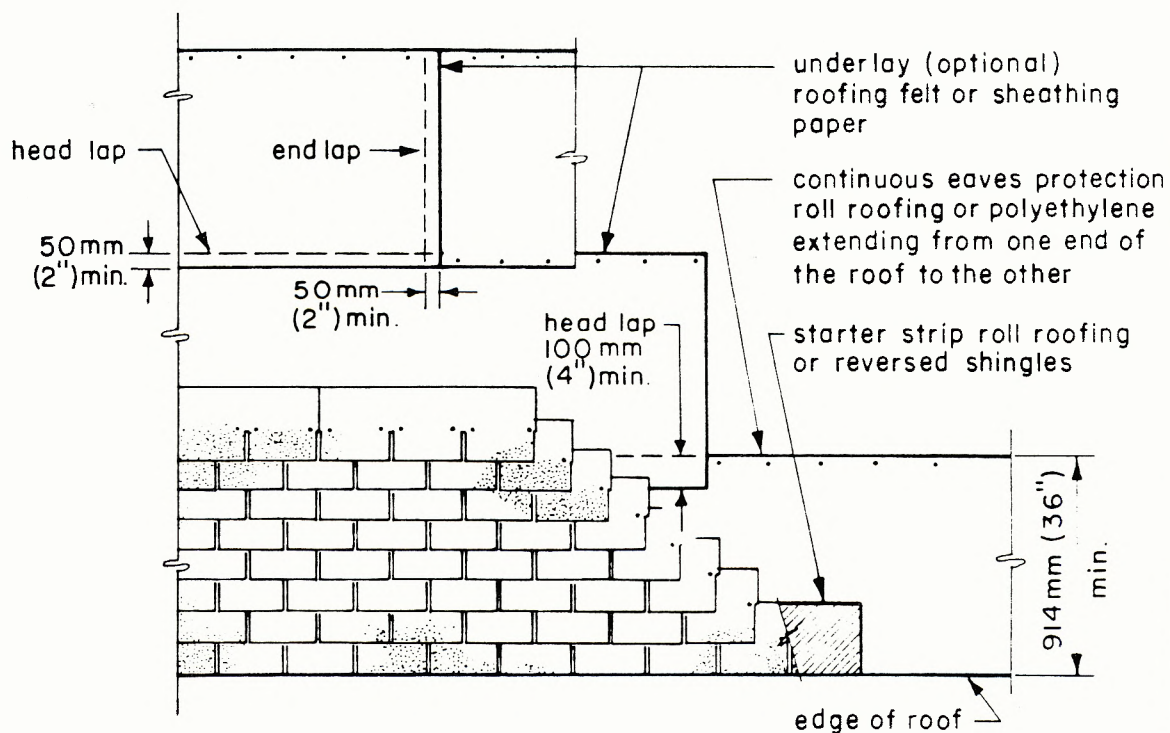
9.27.5.1 EAVE PROTECTION



9.27.5.2 HEAD AND END LAPS – ROLL ROOFING



9.27.5.2 & 9.27.6.2 EAVE PROTECTION & UNDERLAY BENEATH SHINGLES



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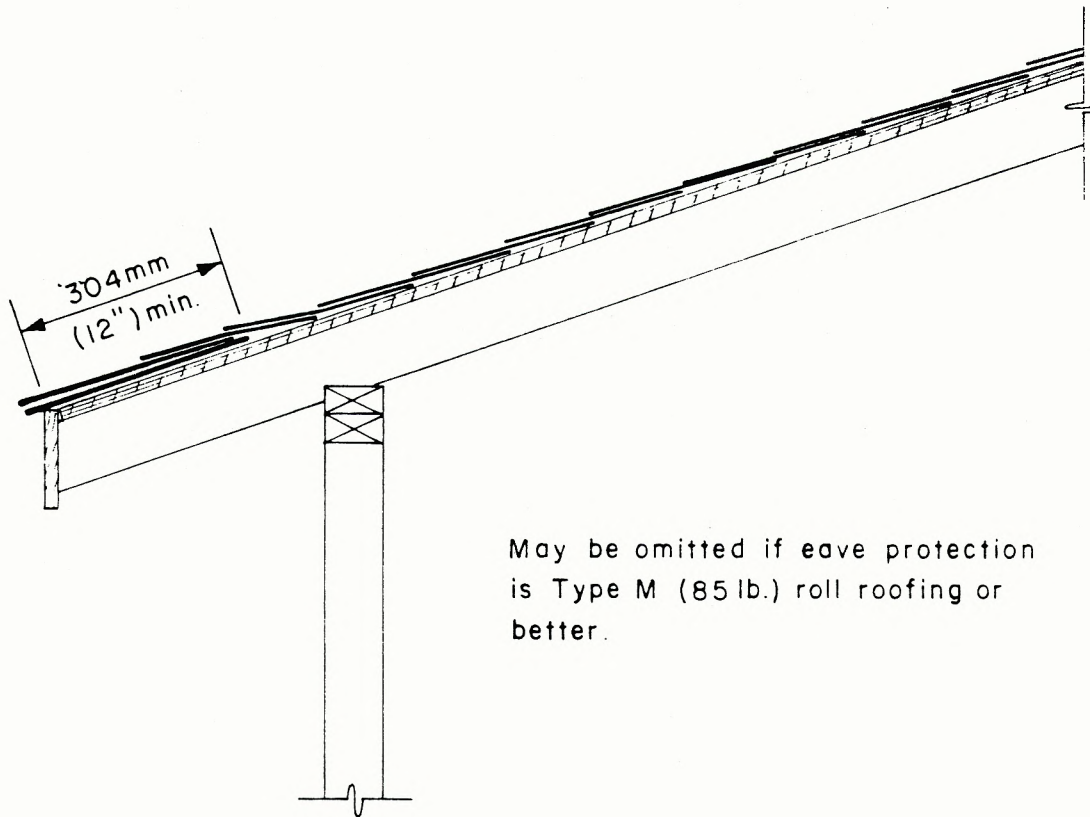
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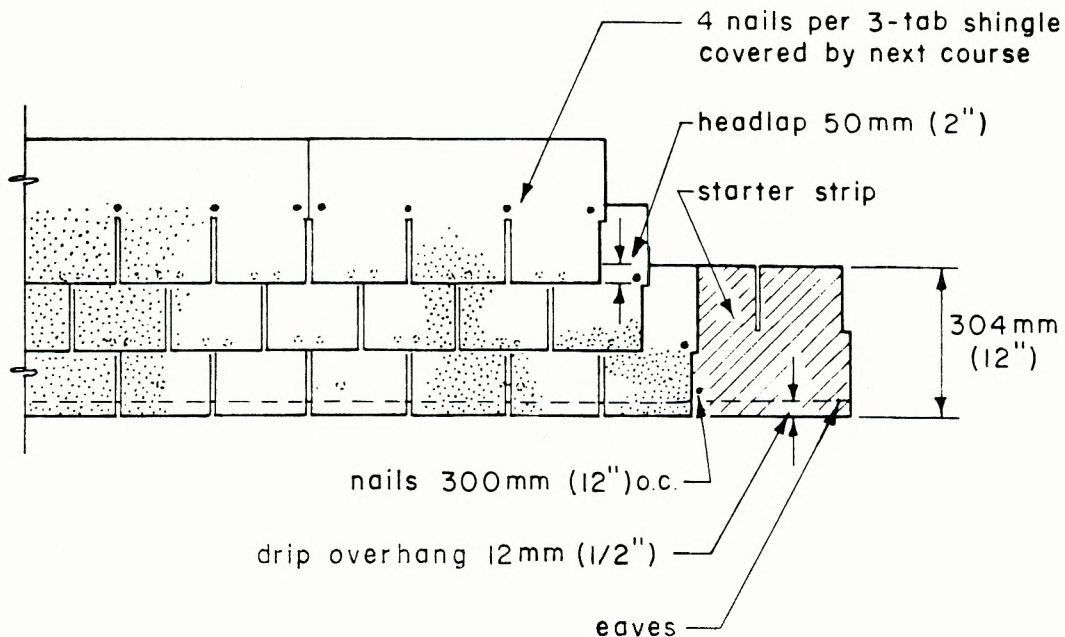
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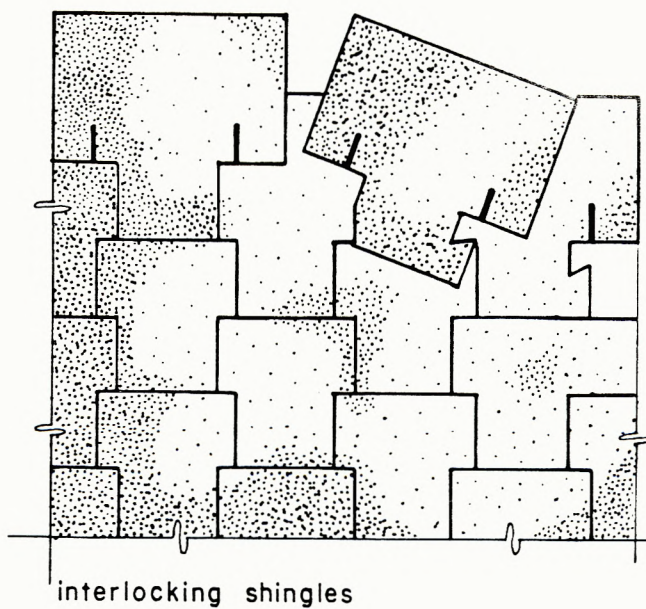
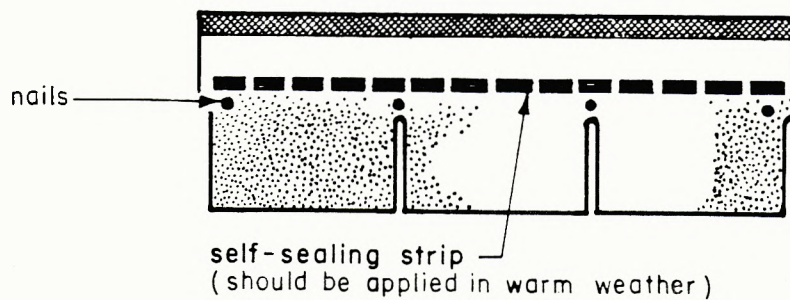
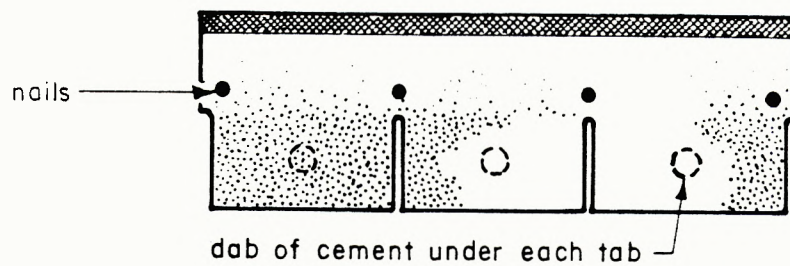
9.27.7.2 STARTER STRIP AT EAVES



9.27.7.2, 9.27.7.3 & 9.27.7.4 SHINGLE APPLICATION



9.27.7.6 SECURING SHINGLE TABS



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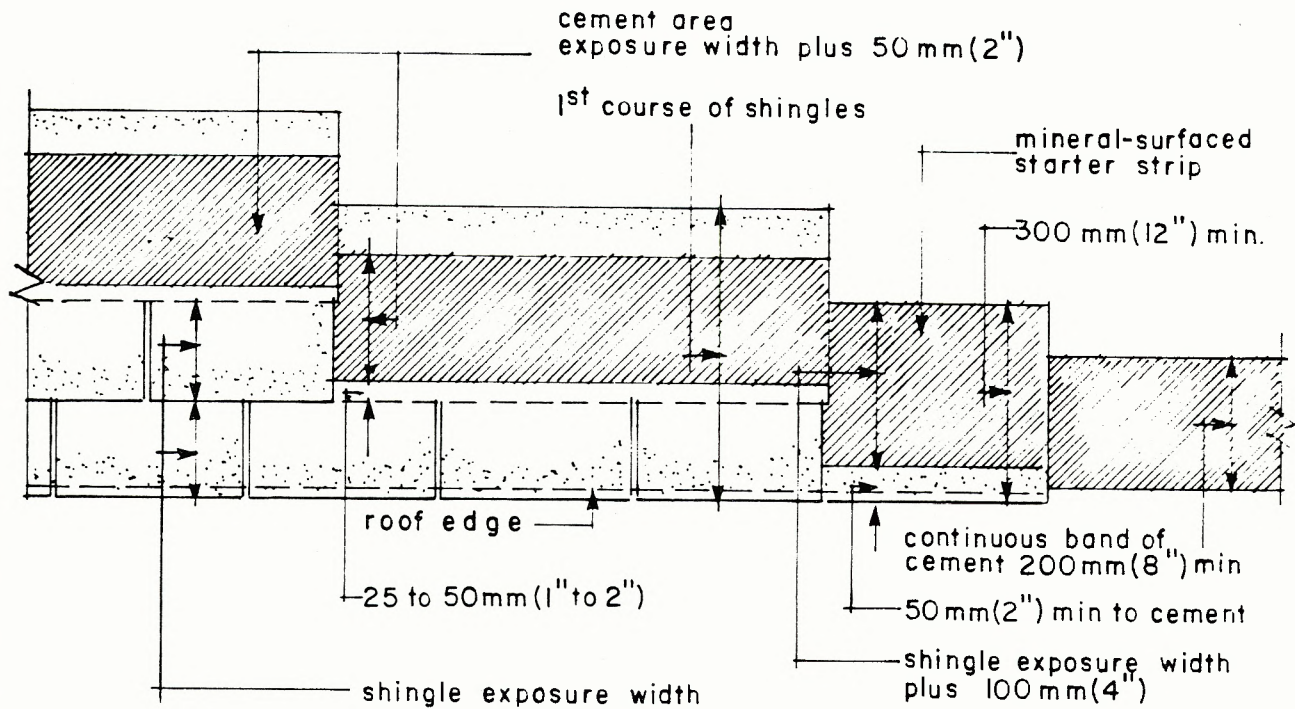
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9.27.8.4 & 9.27.8.5 LOW SLOPE SHINGLE APPLICATION



FOR SLOPES UNDER 1:3

9.27.9.1 & 9.27.9.5

WOOD SHINGLES ON CONTINUOUS OR
SPACED DECKING

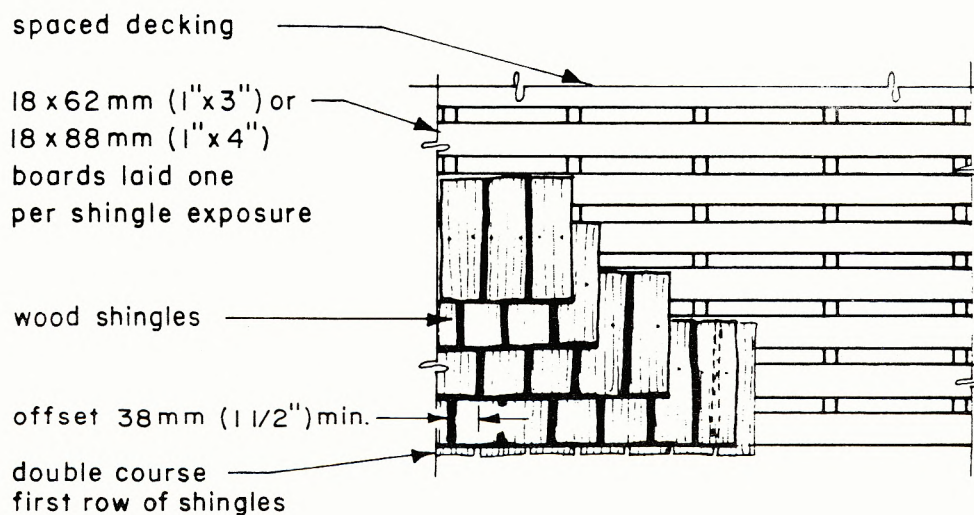
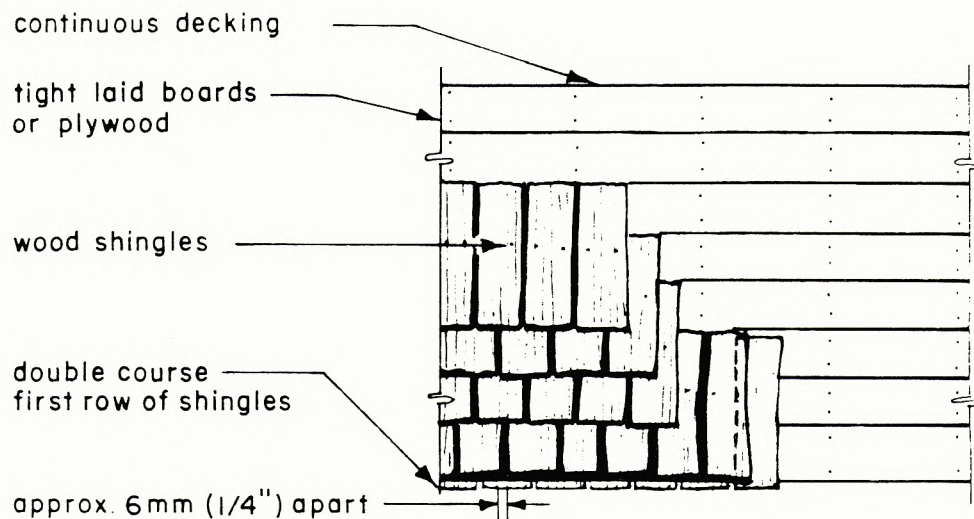


TABLE
9.27.9.A

WOOD SHINGLE GRADES: No. 1 is 100% heartwood, 100% clear and 100% edge grain. No. 2 requires 2/3 of the length of each shingle to be clear, and permits some sapwood and flat grain. See CSA 0118.1-M1980, "Western Red Cedar Shingles, Handsplit Western Red Shakes and Machine-Grooved Shakes". A summary of this standard is included later in this publication.

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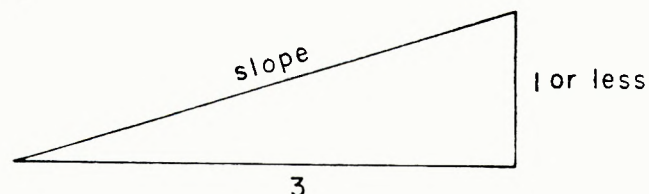
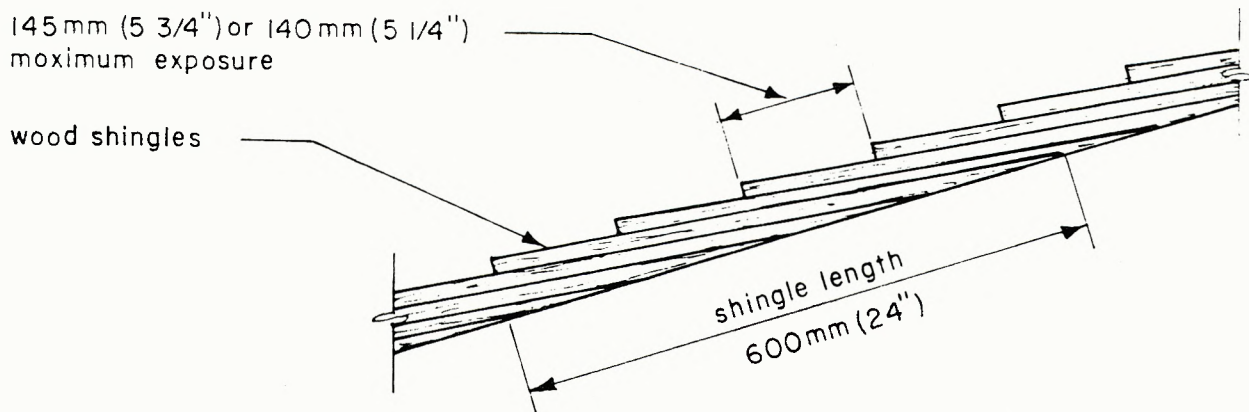
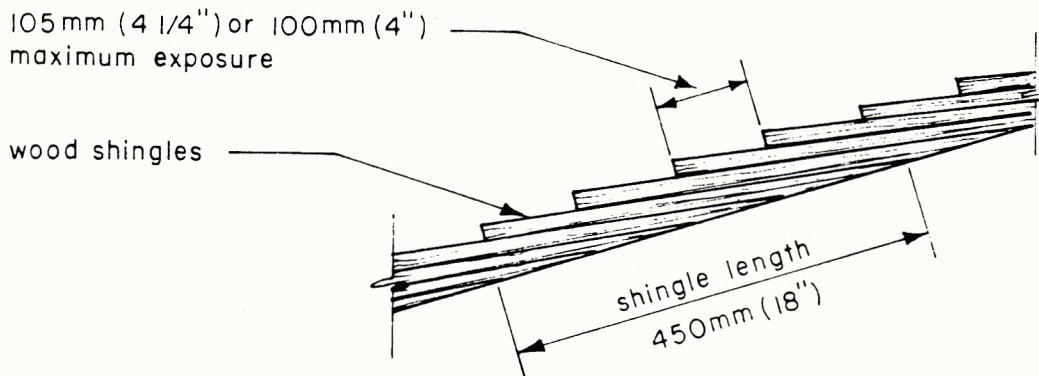
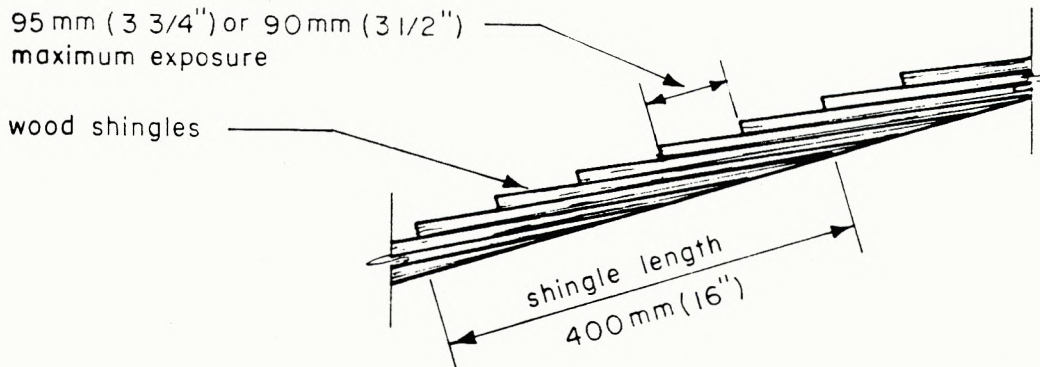
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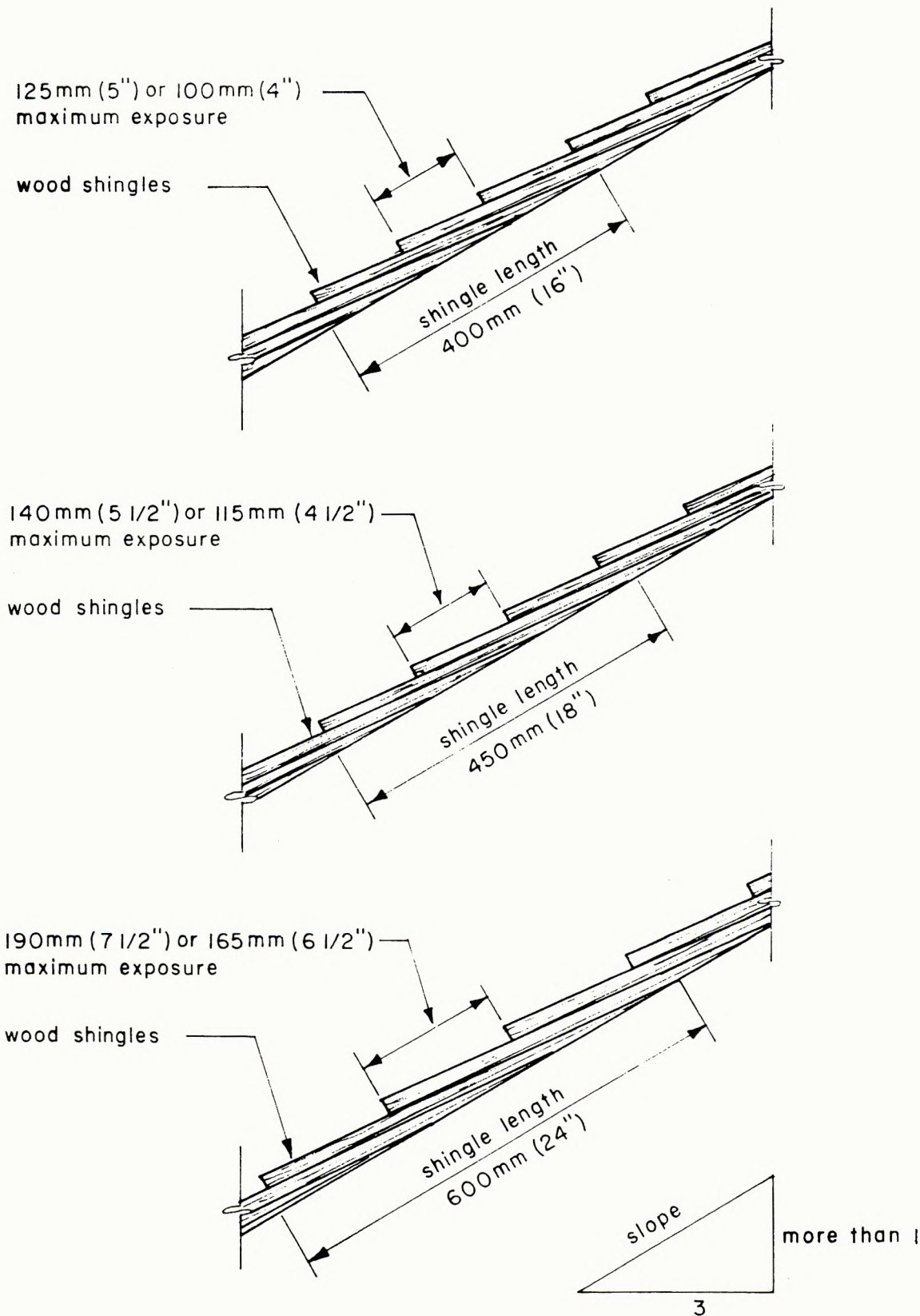
9.27

TABLE 9.27.9.A i) WOOD ROOF SHINGLE EXPOSURE SLOPES
 1:3 OR LESS



Note: Shingle exposure according to shingle grade as in table.

TABLE 9.27.9.A, ii) WOOD ROOF SHINGLE EXPOSURE SLOPES OVER 1:3



Note: Shingle exposure according to shingle grade as in table.

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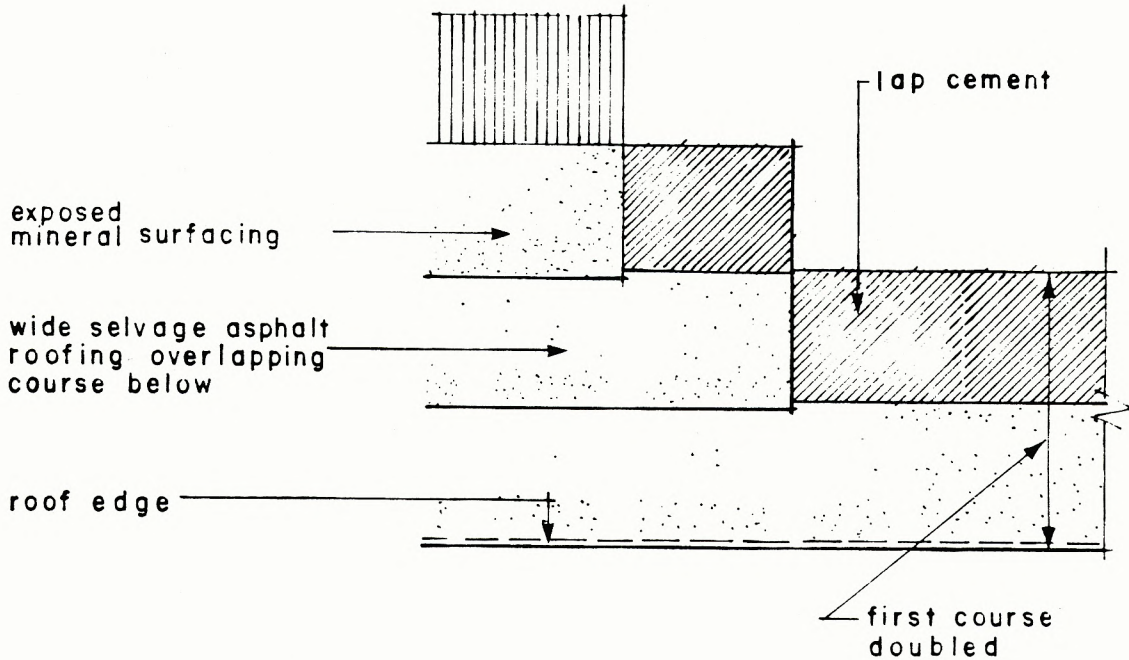
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9.27

9.27.12.1 DOUBLE COVERAGE



Note: wide selvage roofing is a continuous roll of asphalt impregnated paper with mineral surfacing similar to asphalt shingles.

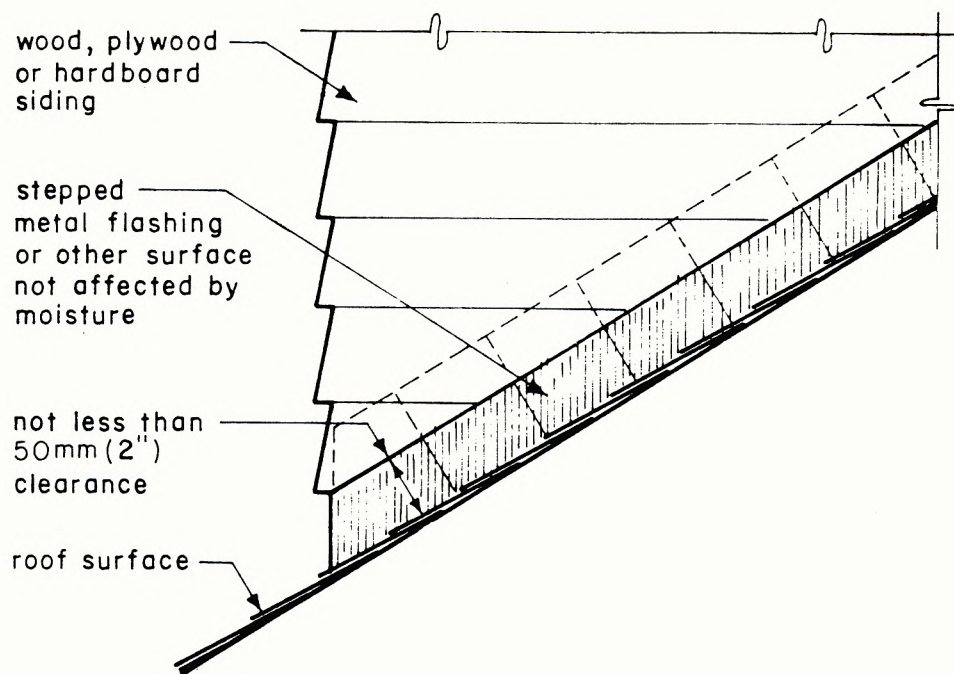
9.27.13.1 SHEET METAL THICKNESSES:

- Galvanized steel = 0.33 mm = 0.013" = 28 guage (US)
- Copper = 0.35 mm = 0.014" = 4oz./sq.ft.

siding

SECTION 9.28

9.28.2.3 CLEARANCE FROM SIDING TO ROOF



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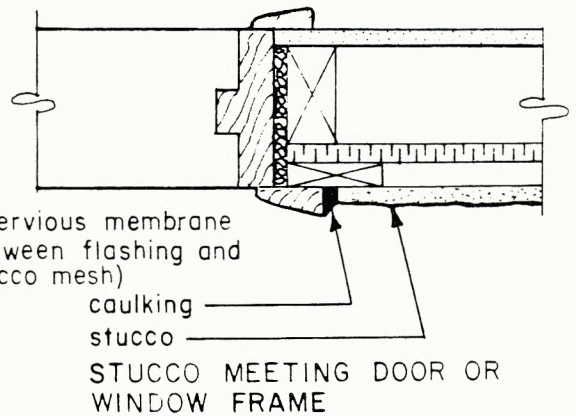
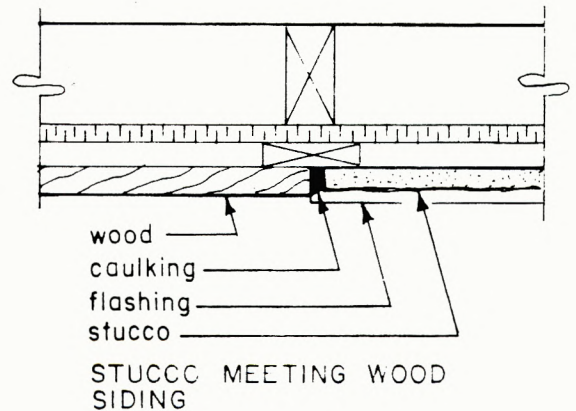
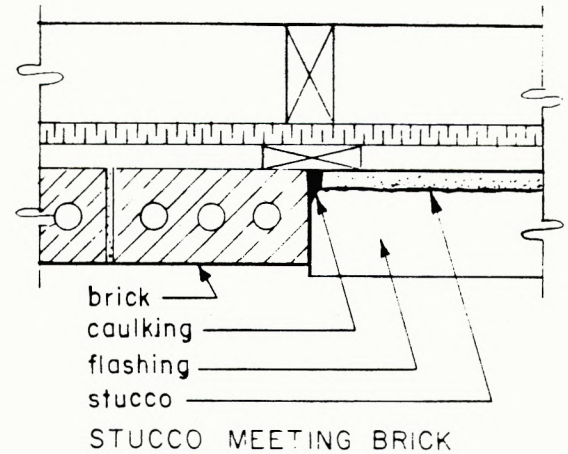
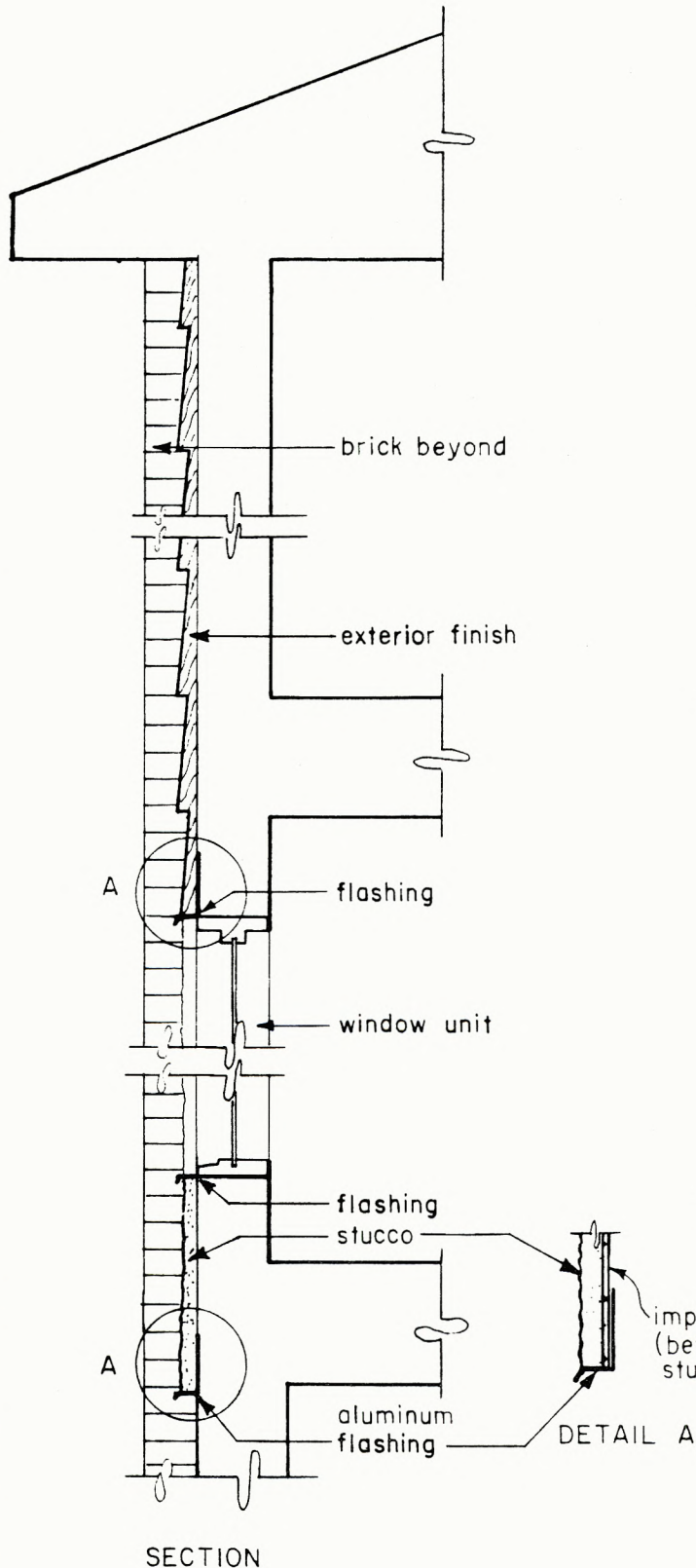
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1.2.84

Section:

9.28

9.28.3.2, 9.28.3.3, 9.28.4.2 & 9.29.1.5 FLASHING & CAULKING WITH STUCCO, ETC.

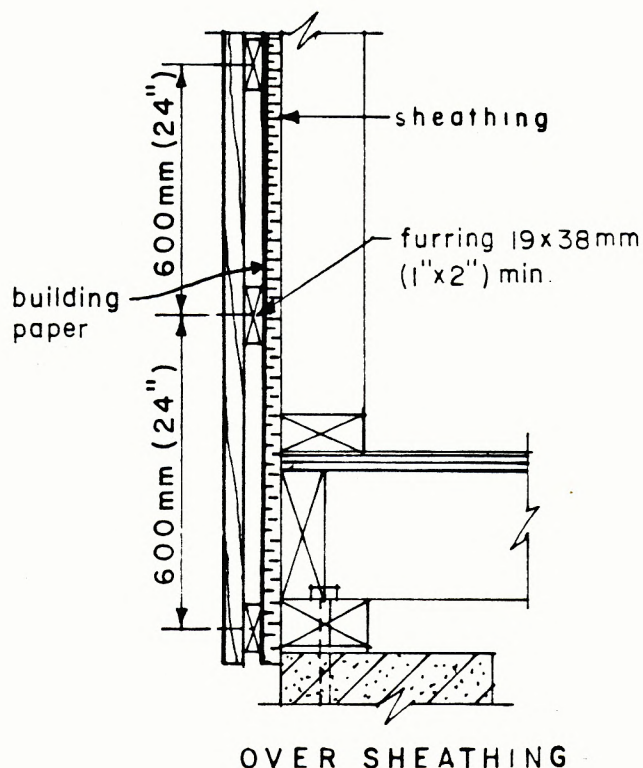


PLANS

9.28.5.2 **BLOCKING:** Discontinuous pieces of wood forming a base for nailing of panel or board material.

9.28.5.3 **FURRING (or STRAPPING):** Spaced continuous strips of wood applied to framing or a wall or other surface to make an even surface and provide nailing for panel or board material.

9.28.5.3 FURRING (or STRAPPING)



9.28.5.10 **CORROSION-RESISTANT MATERIAL:** Fastenings, nails or staples for siding are usually galvanized, occasionally aluminum or stainless steel, sometimes enamelled. (See also 9.20.9.5).

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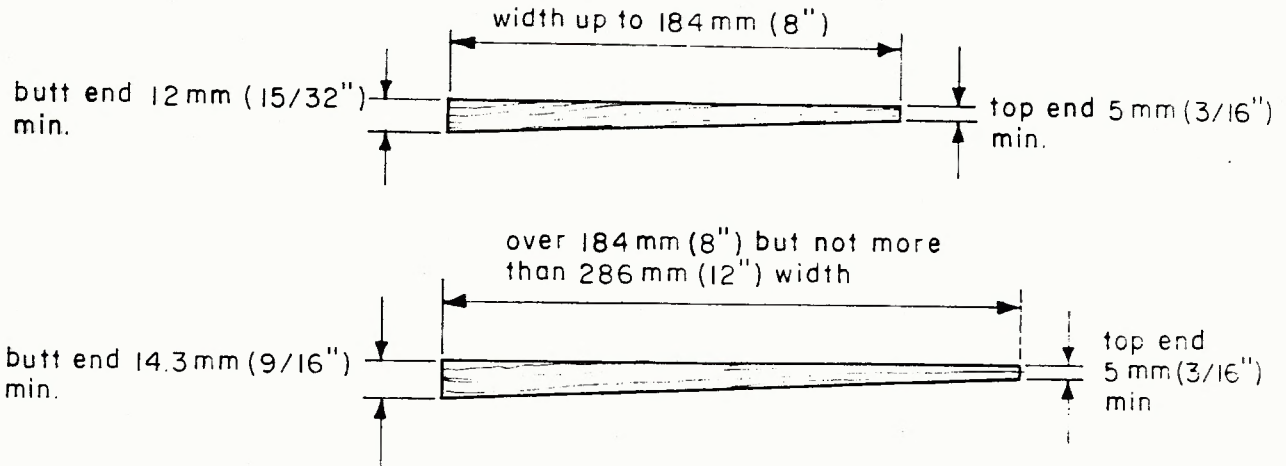
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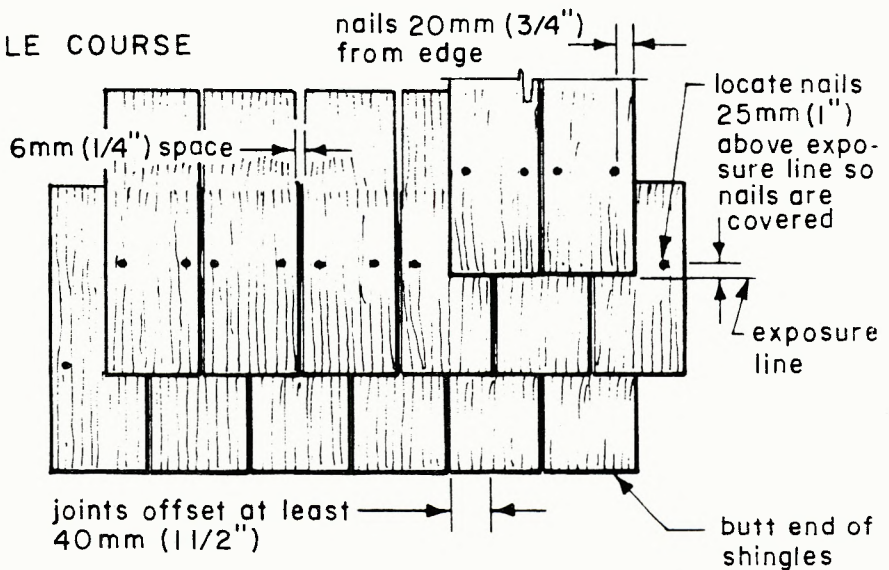
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9.28.6.3 BEVEL SIDING

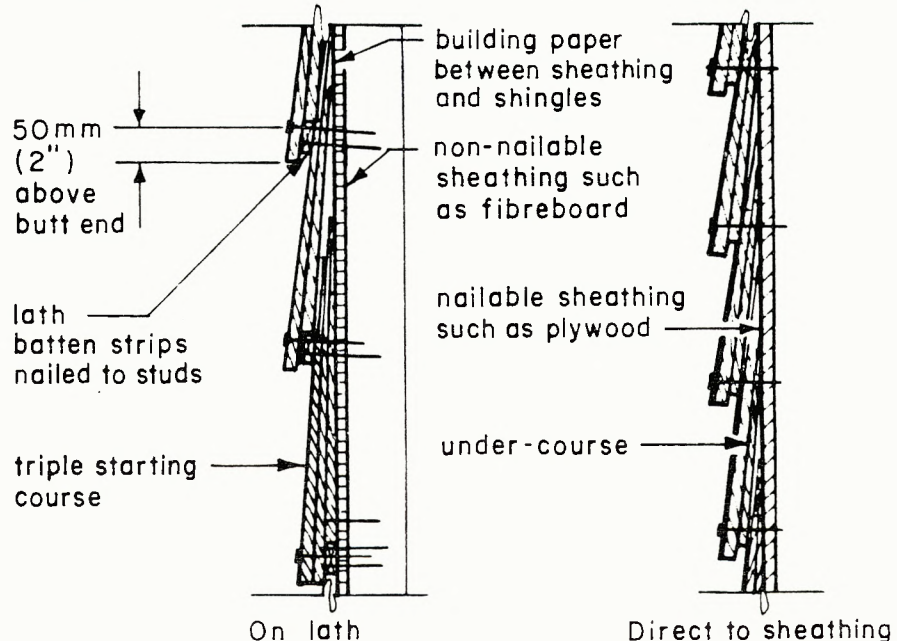


9.28.7.3, 9.28.7.4, & 9.28.7.5 WOOD SHINGLE NAILING

a) SINGLE COURSE

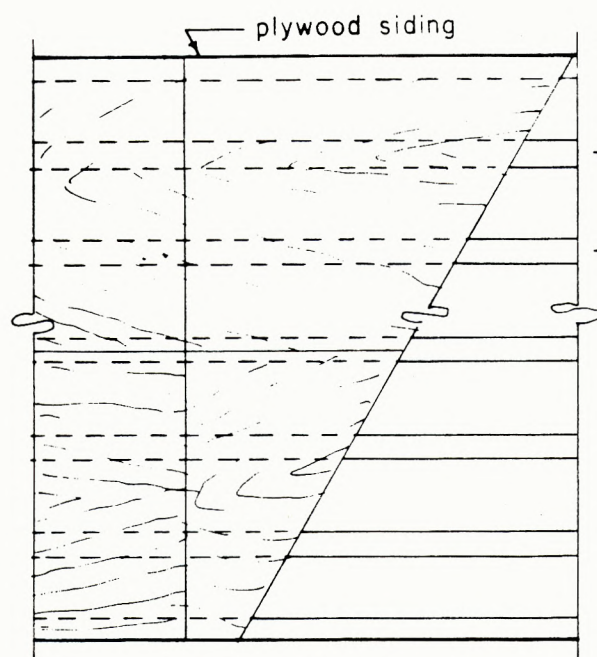


b) DOUBLE - COURSING

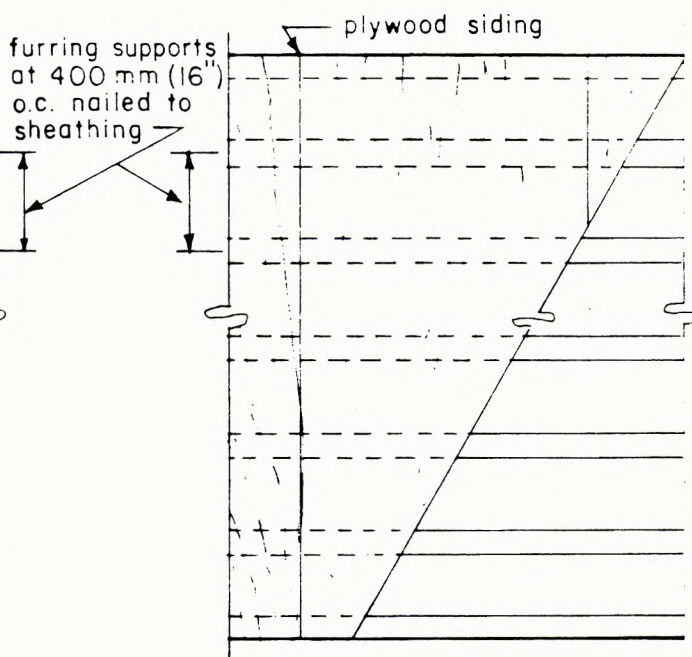


9.28.9.2 PLYWOOD SIDING ON FURRING STRIPS

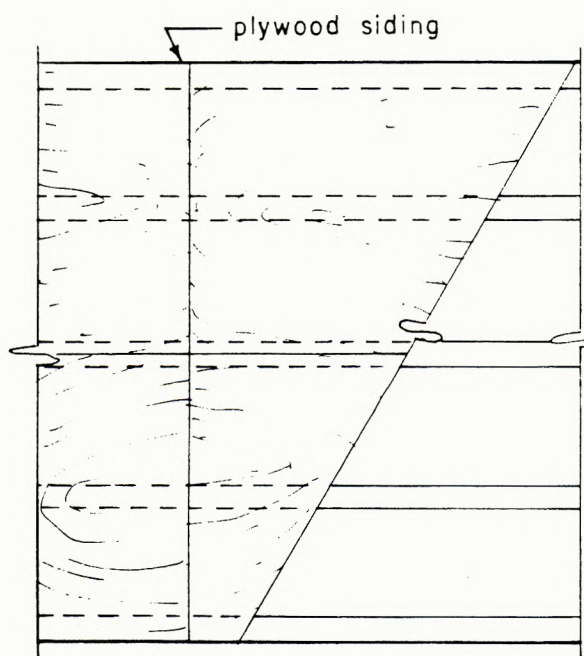
Thickness of plywood and spacing of furring strips per Table 9.28.9.A



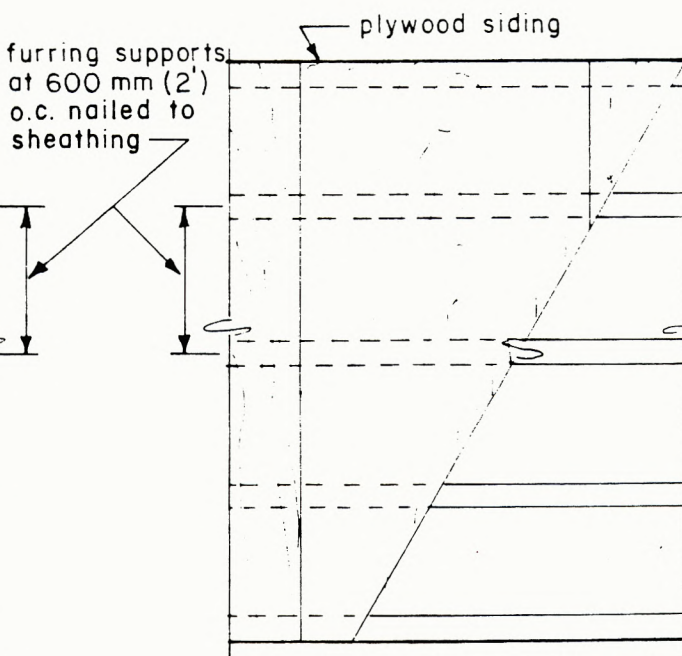
When face grain parallel to furring supports, thickness of plywood siding 8 mm (3/8") min.



When face grain at right angles to furring supports, thickness of plywood 6 mm (1/4") min.



When face grain parallel to furring supports, thickness of plywood siding 11 mm (1/2")



When face grain at right angles to furring supports, thickness of plywood siding 8 mm (3/8") min

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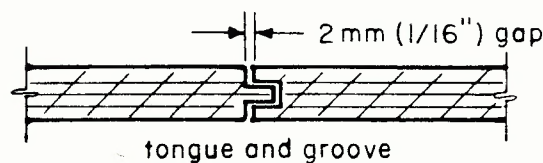
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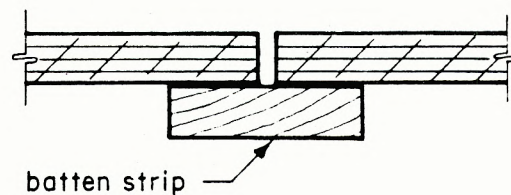
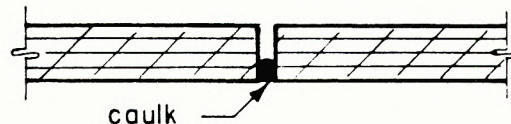
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9.28.9.4

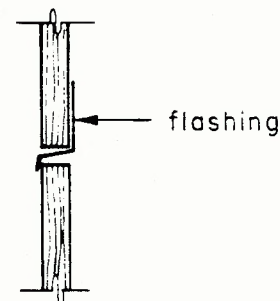
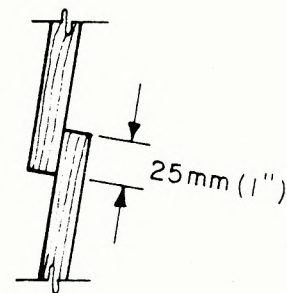
PLYWOOD JOINTS



VERTICAL MATCHED JOINTS



VERTICAL UNMATCHED JOINTS



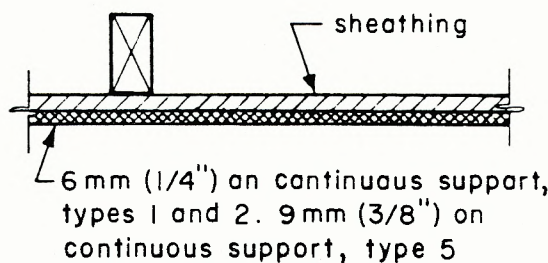
HORIZONTAL JOINTS

9.28.10.2

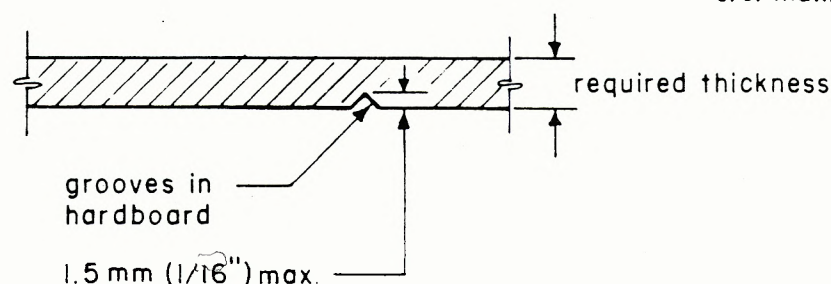
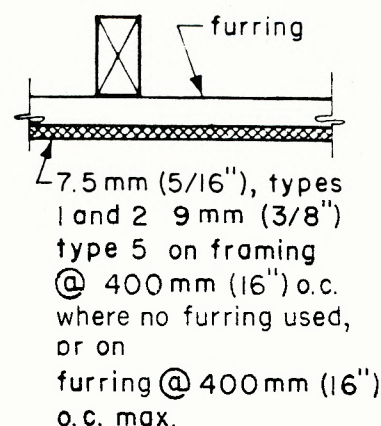
HARDBOARD TYPES: For hardboard, Type 1 is Standard; Type 2 is tempered; Type 5 is medium density, about 2/3 the density of the others. (See also summary for standard CGSB 11-GP-3).

9.28.10.2

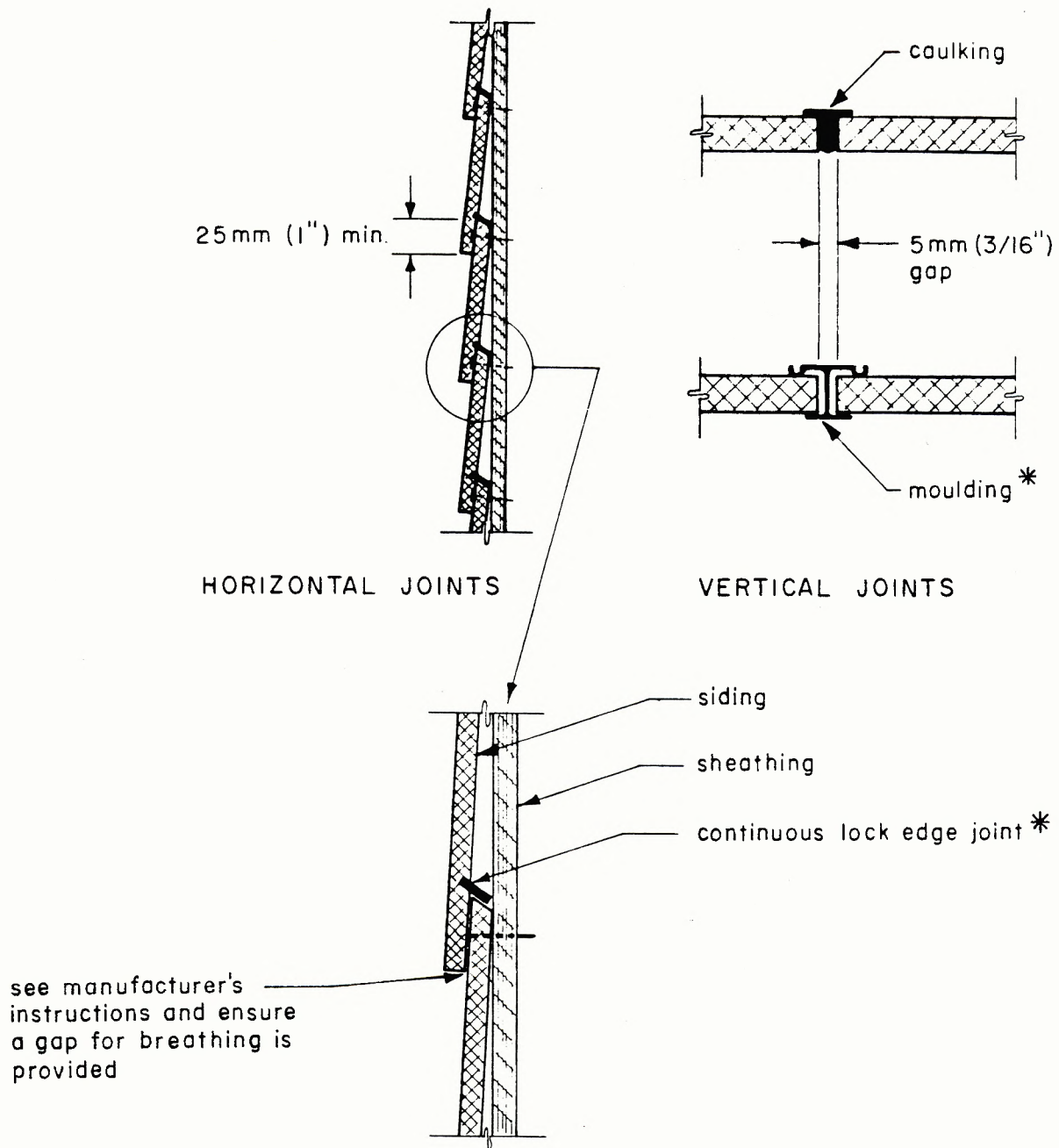
HARDBOARD THICKNESS



Note: see next page for explanation of types 1, 2 & 5



9.28.10.4 HARDBOARD SIDING JOINTS



* Note: propriety product shown; not required by N.B.C.

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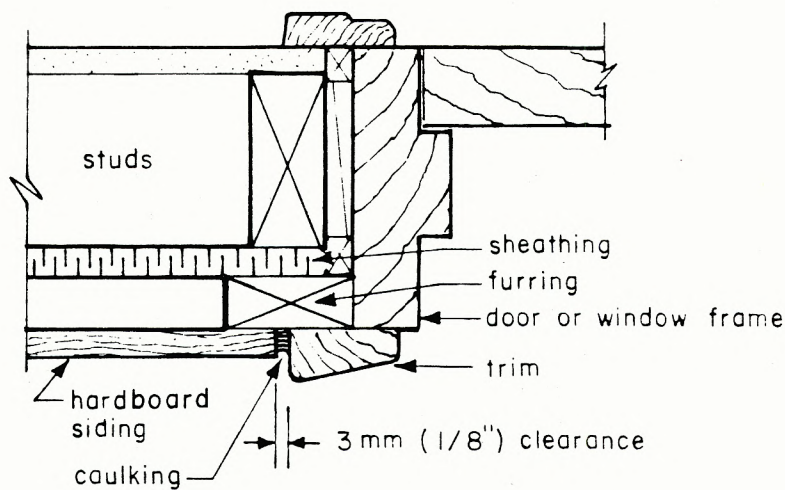
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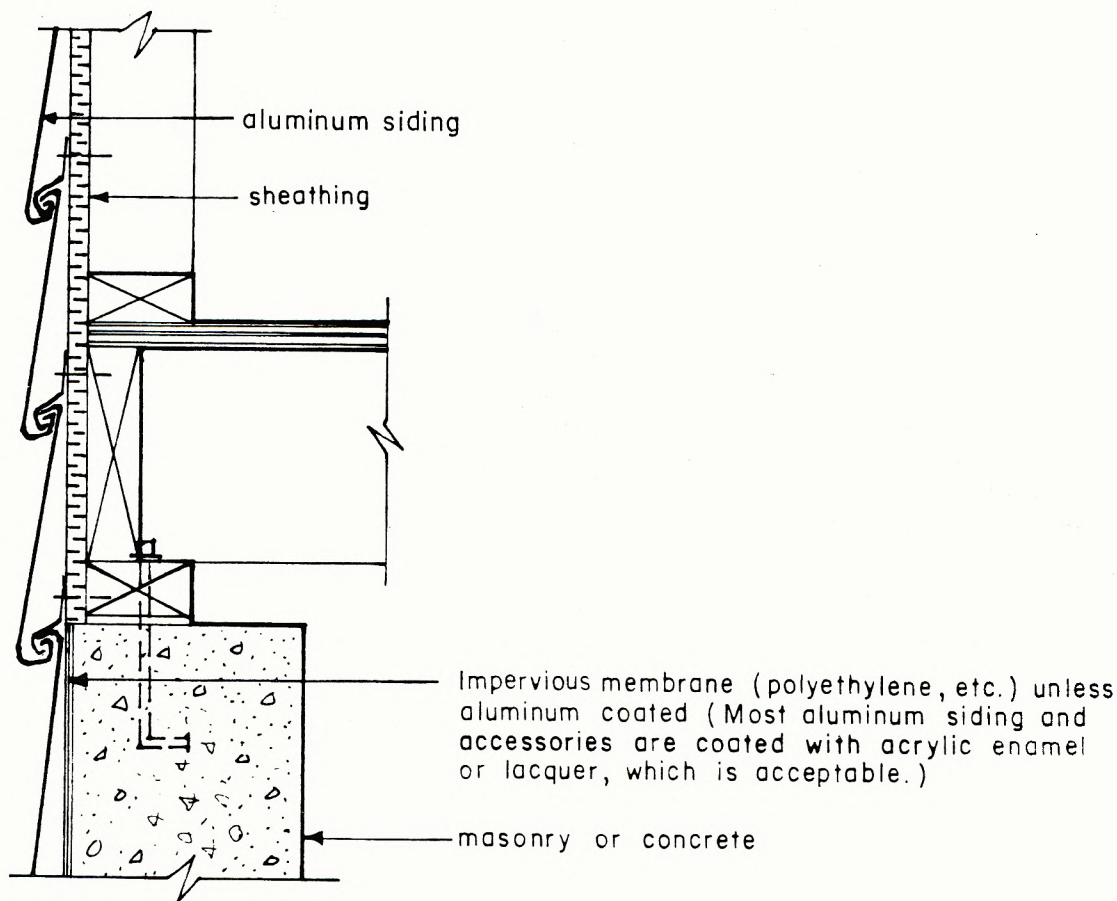
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9.28.10.5 CLEARANCE BETWEEN HARDBOARD SIDING AND FRAMES



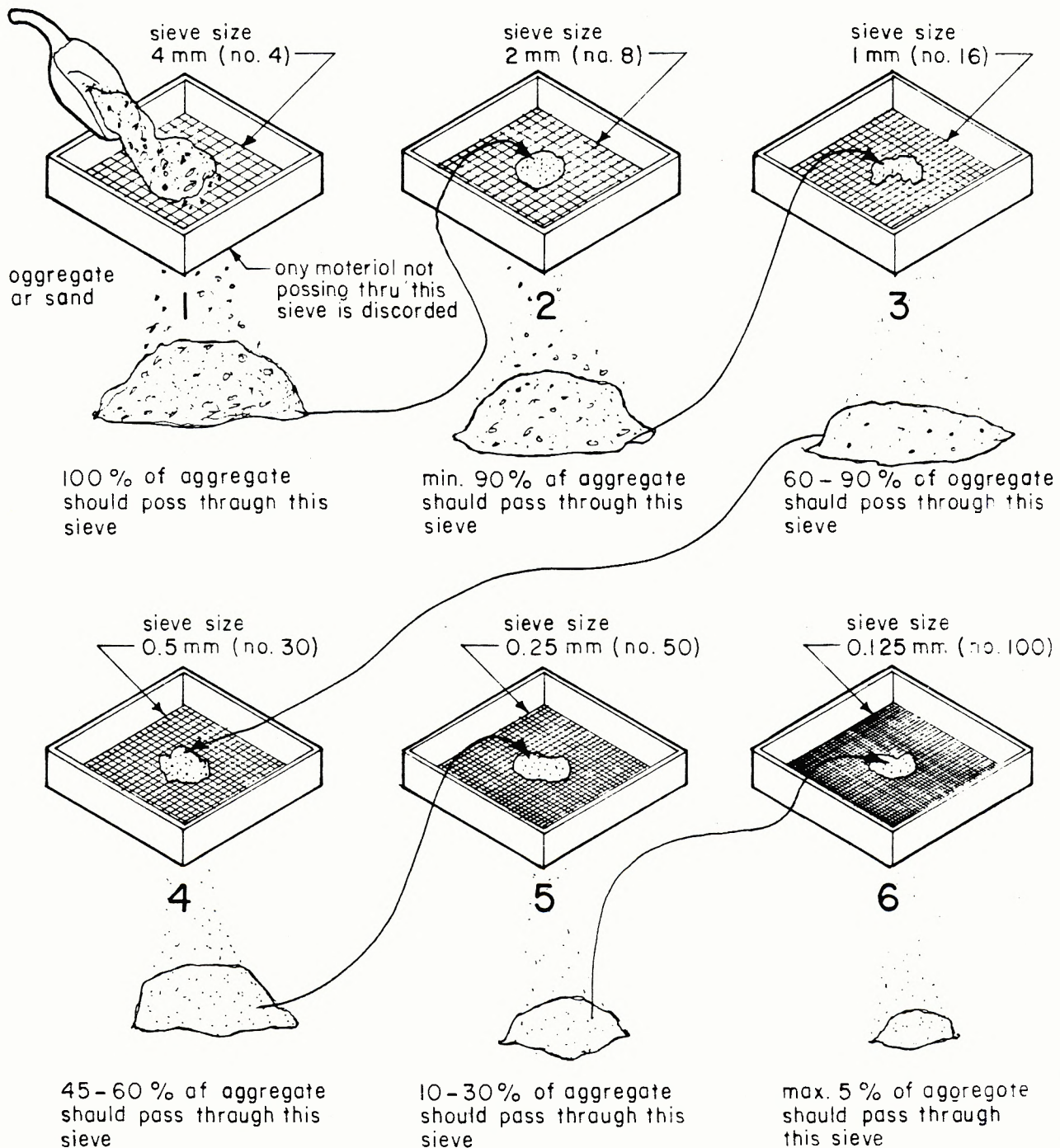
9.28.12.5 SEPARATING ALUMINUM FROM CONCRETE OR MASONRY



stucco

SECTION 9.29

TABLE 9.29.2.A AGGREGATE GRADING PROCESS FOR STUCCO



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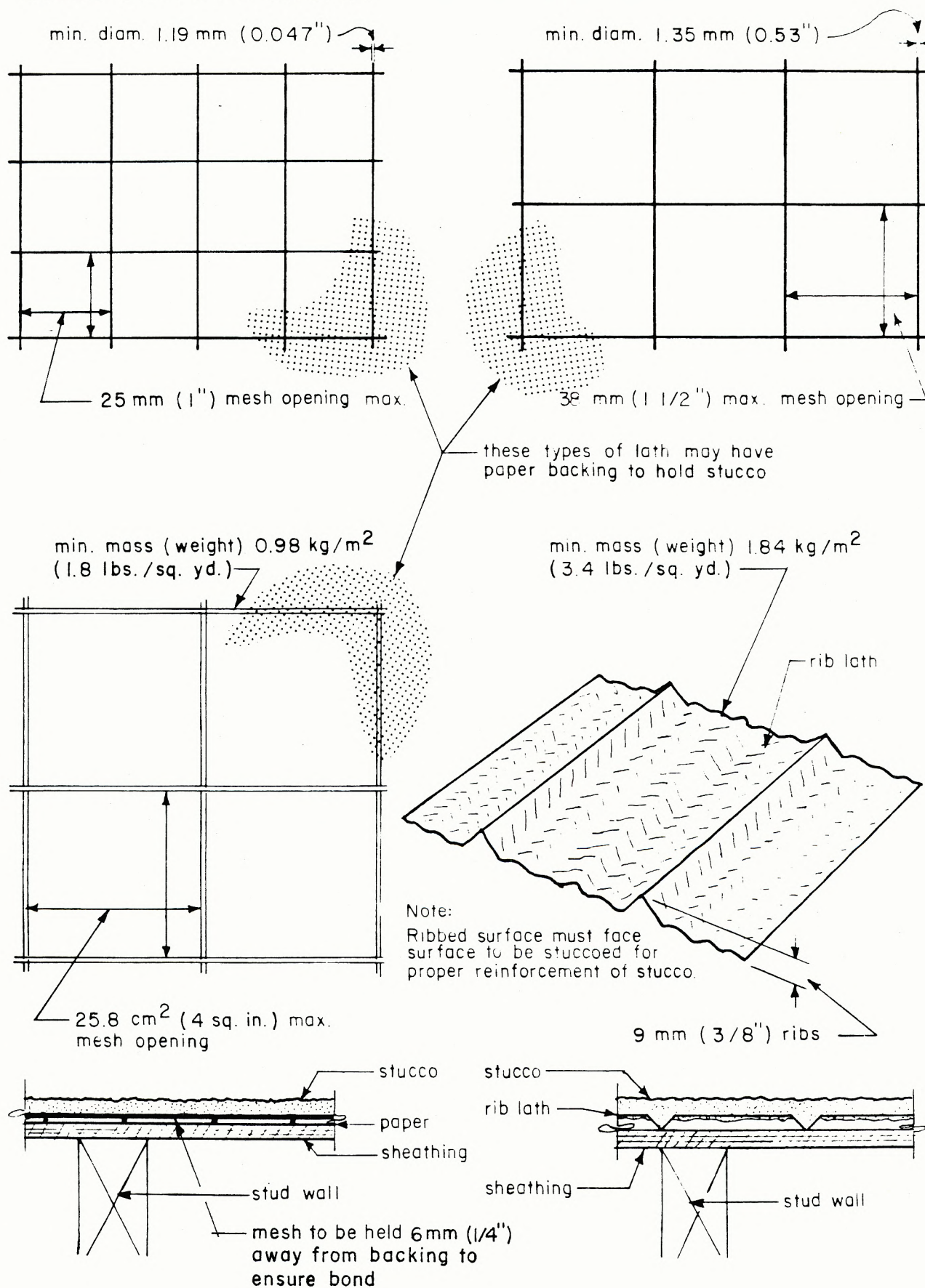
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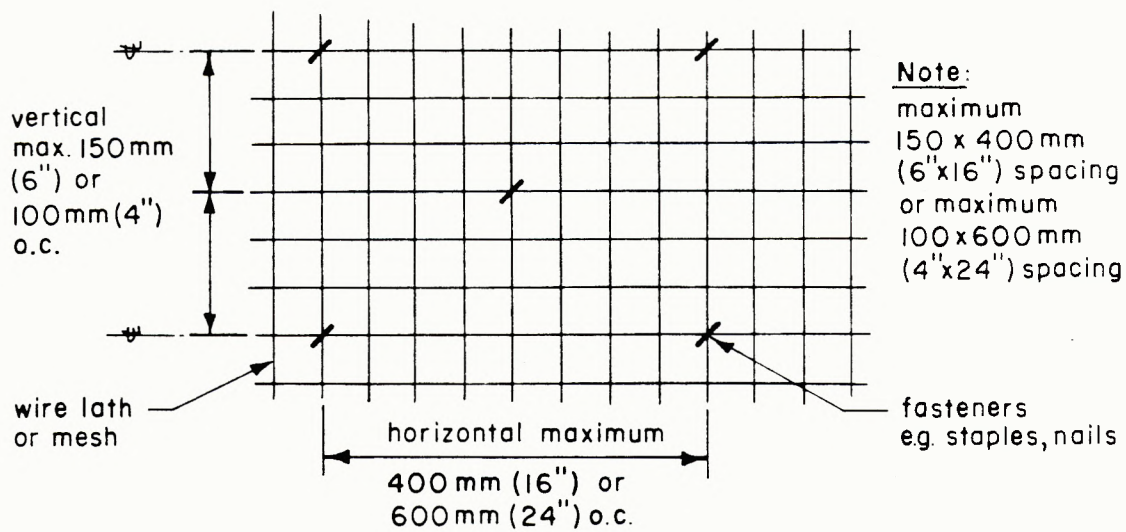
9.29

TABLE 9.29.4.A & 9.29.4.4

METAL STUCCO LATH



9.29.4.7 NAILING FOR STUCCO MESH (REINFORCEMENT)



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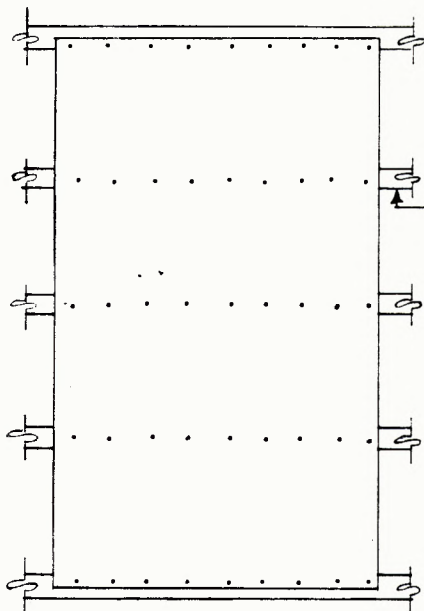
**interior wall &
ceiling finishes**

SECTION 9.30

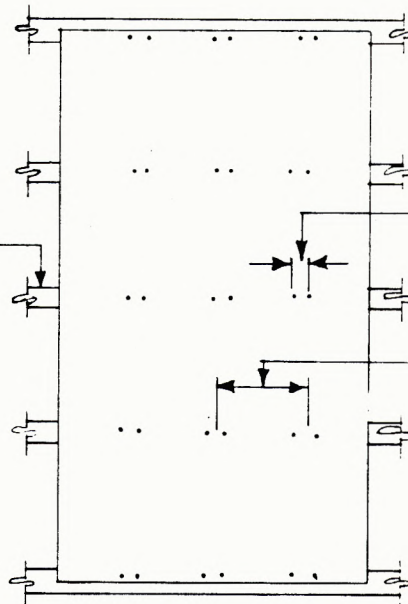
9.30.2.2

LAMINATED THERMOSETTING DECORATIVE SHEETS: Formica, Arborite, etc.

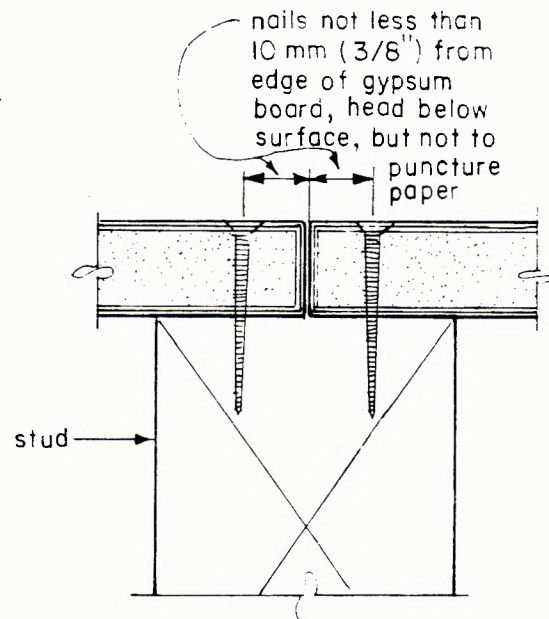
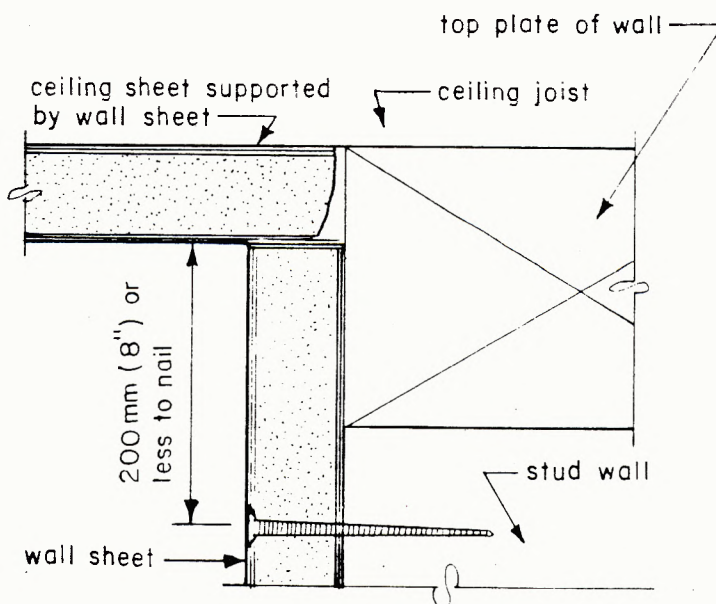
9.30.8.5 NAILING FOR GYPSUM BOARD (SINGLE LAYER)



SINGLE NAILING
max. 180 mm (7") o.c. for ceilings
max. 200 mm (8") o.c. for walls



DOUBLE NAILING (PAIRS)
2 at 300 mm (12") o.c. for
walls or ceilings



Screws at 300 mm (12") o.c. are acceptable for walls or ceilings.

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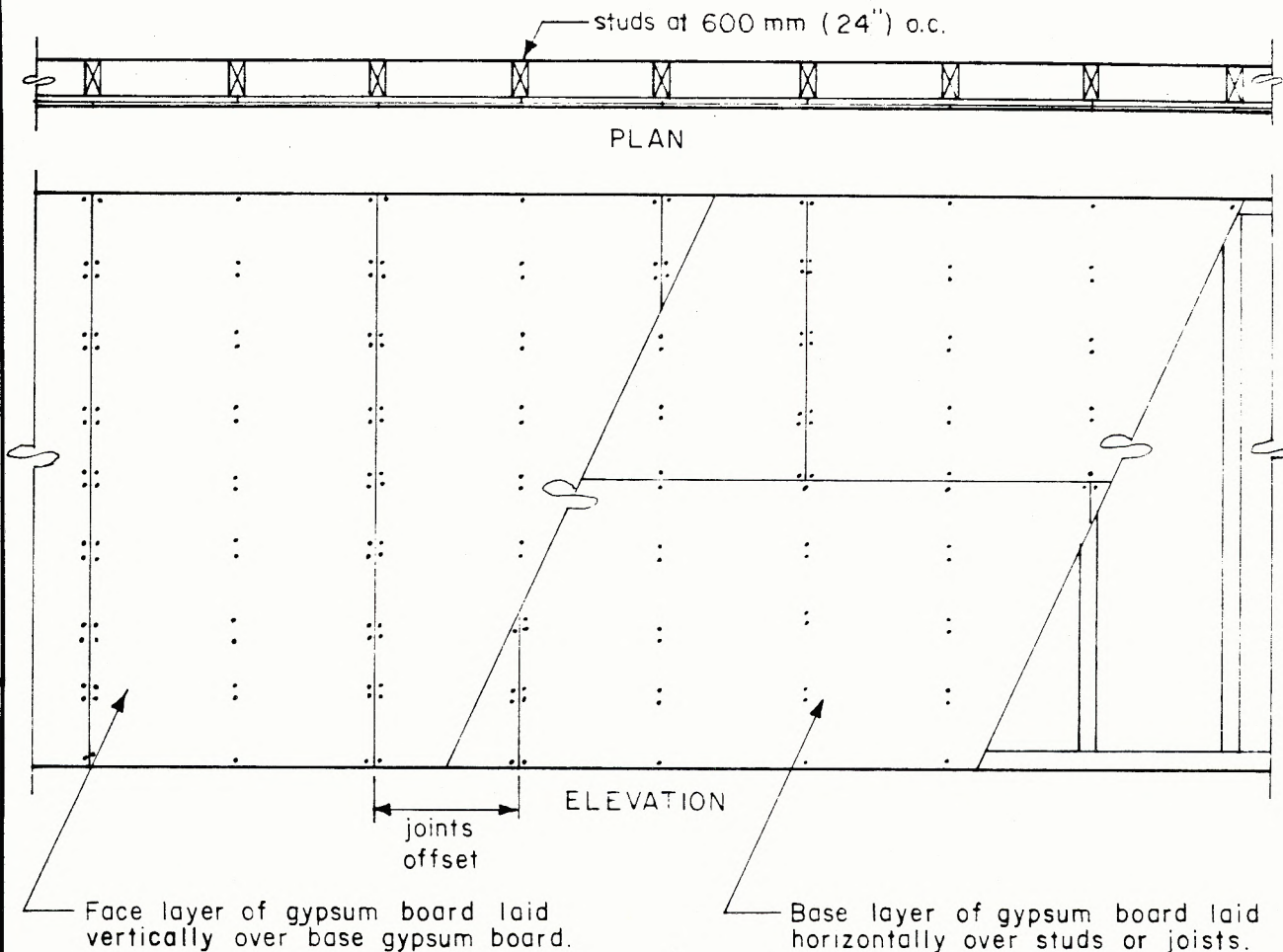
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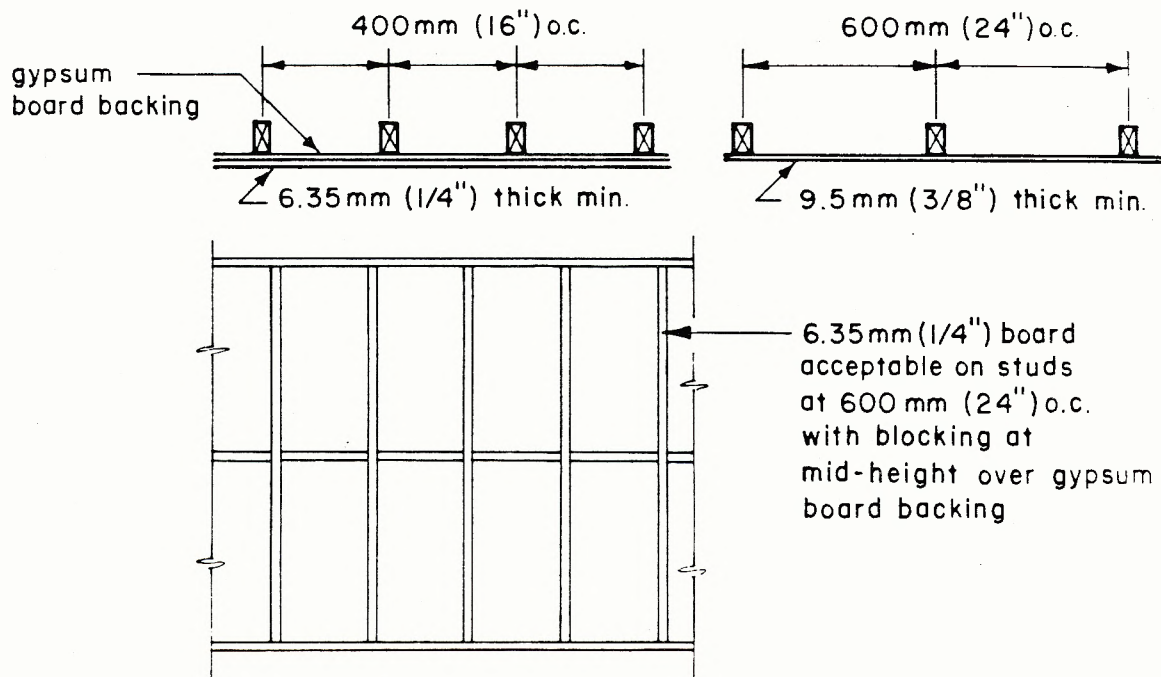
Section:

9.30

9.30.8.6 DOUBLE LAYER GYPSUM BOARD



9.30.12.2 THICKNESS OF PARTICLEBOARD OR WAFERBOARD



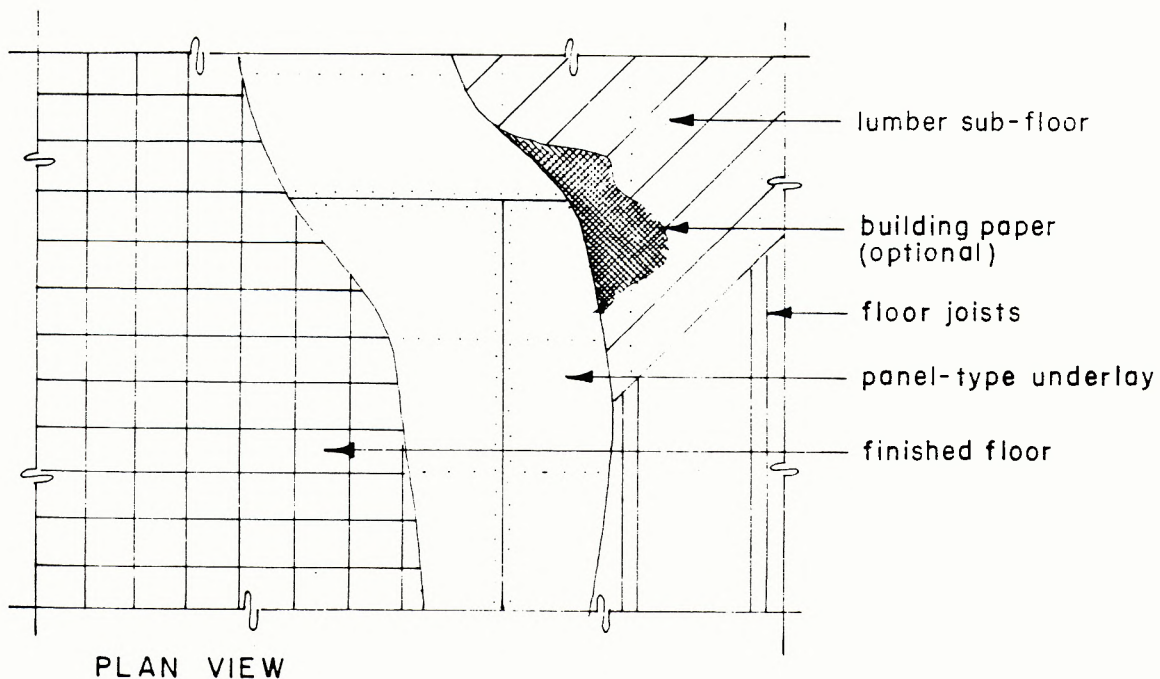
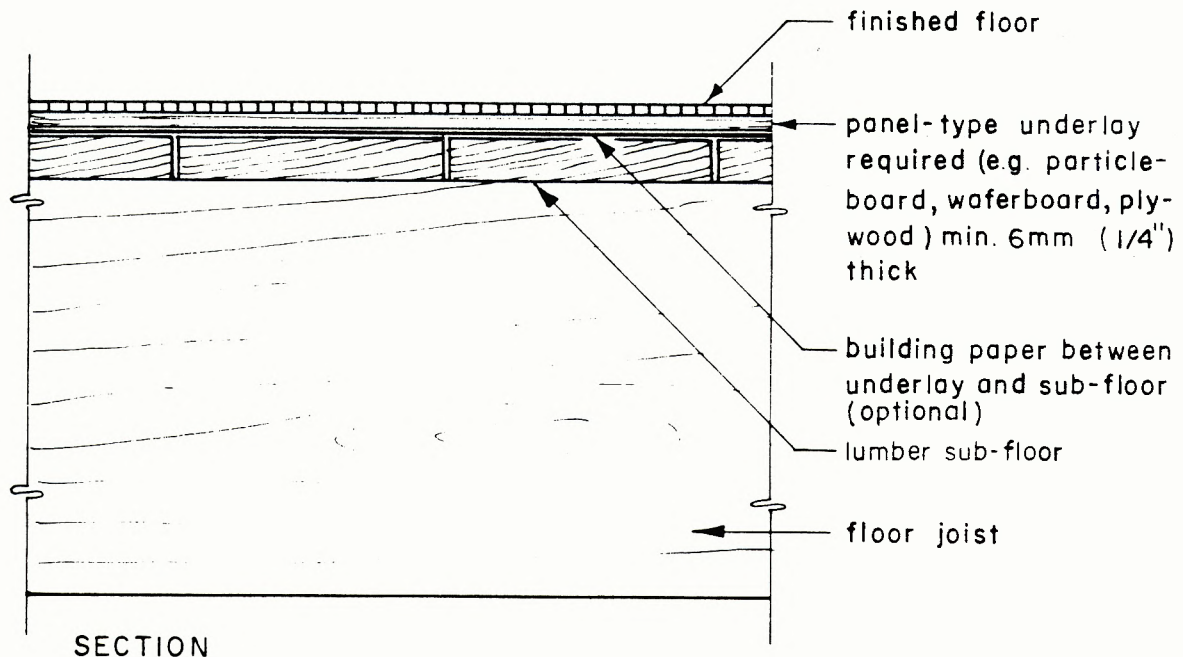
flooring

SECTION 9.31

9.31.2.1

FELTED SYNTHETIC FIBRE: Non-woven matted material like "indoor-outdoor" carpet.

9.31.2.1 PANEL-TYPE UNDERLAY ON SUB-FLOORING



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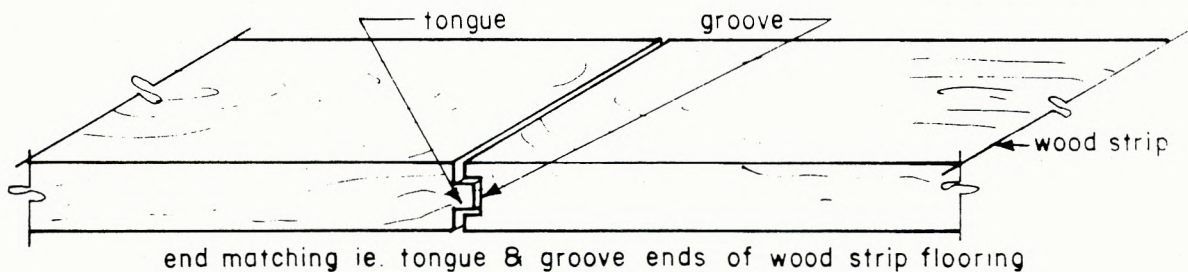
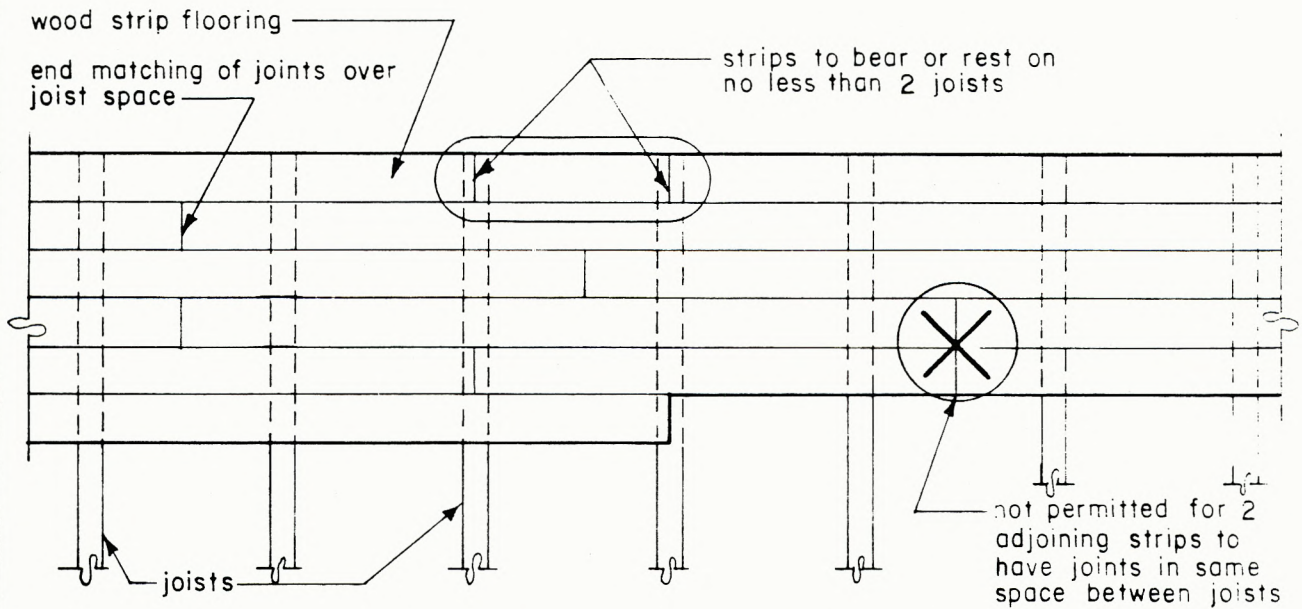
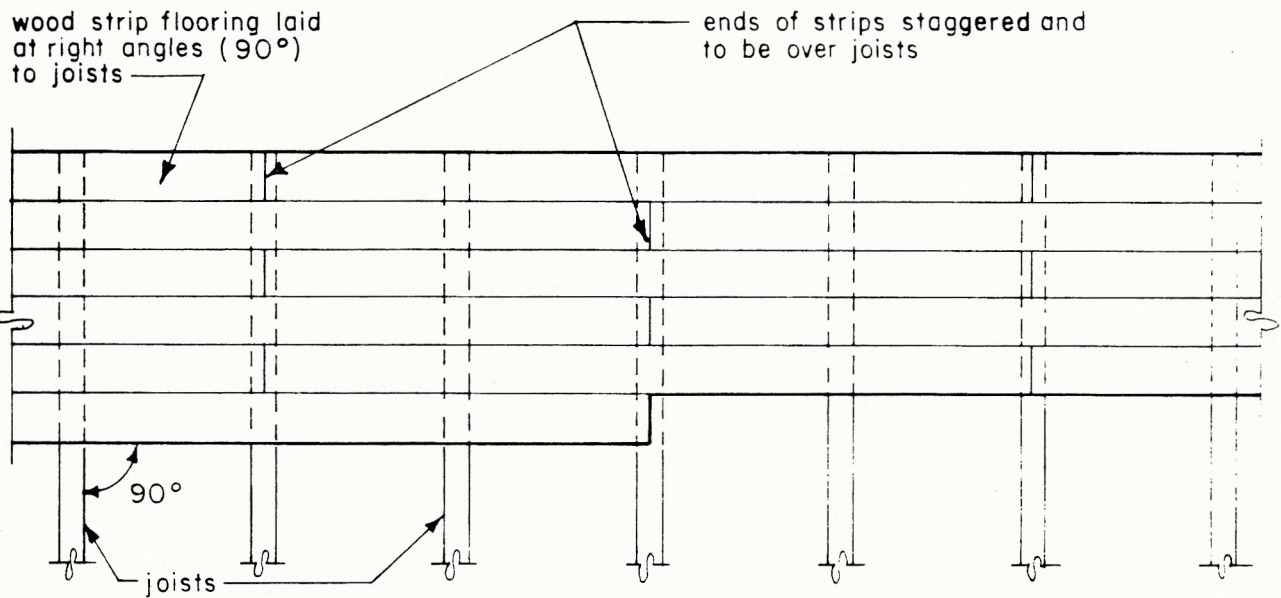
Date:

1.2.84

Section:

9.31

9.31.3.3 WOOD STRIP FLOORING WITHOUT SUBFLOOR



END MATCHED STRIP FLOORING

plumbing facilities

SECTION 9.32

ventilation

SECTION 9.33

9.33.3.1

UNOBSTRUCTED VENTILATION AREA: The clear, open area of a vent which permits air to pass through.

INTERPRETATION :
PART 9
NATIONAL BUILDING CODE OF CANADA 1980

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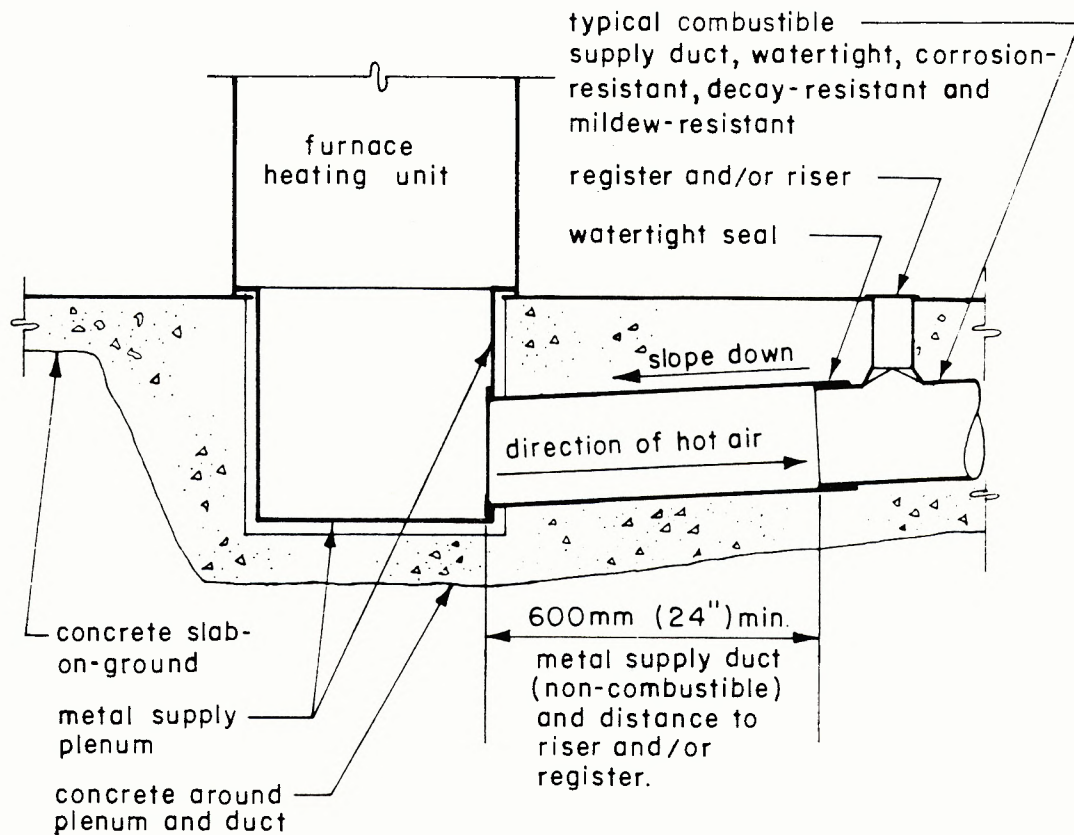
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9.33

**heating &
air-conditioning**

SECTION 9.34

9.34.3.1 HEATING SUPPLY DUCTS : SLABS-ON-GROUND



Note: As a result of tests performed in accordance with the requirements contained in the Standard ULC-S110, air ducts are classified as follows:

Class I air ducts have a flame spread rating of not over 25 without evidence of continued progressive combustion and a smoke developed rating of not over 50.

INTERPRETATION :

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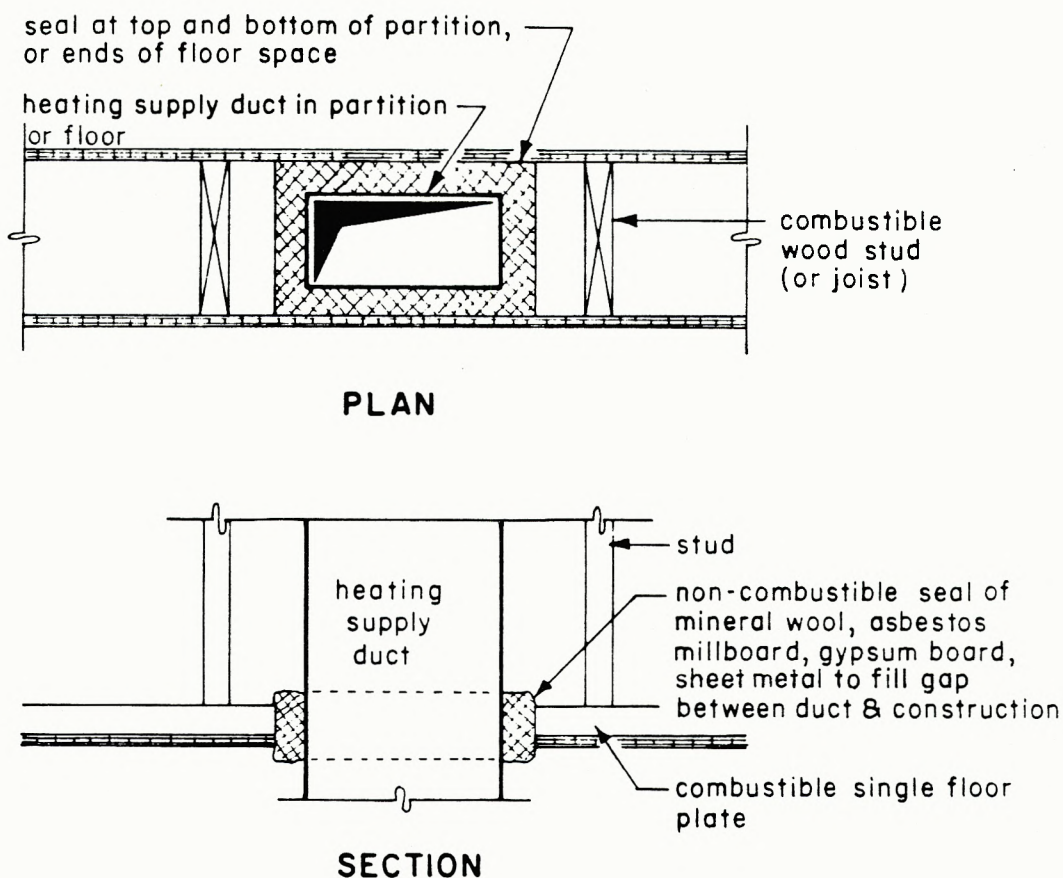
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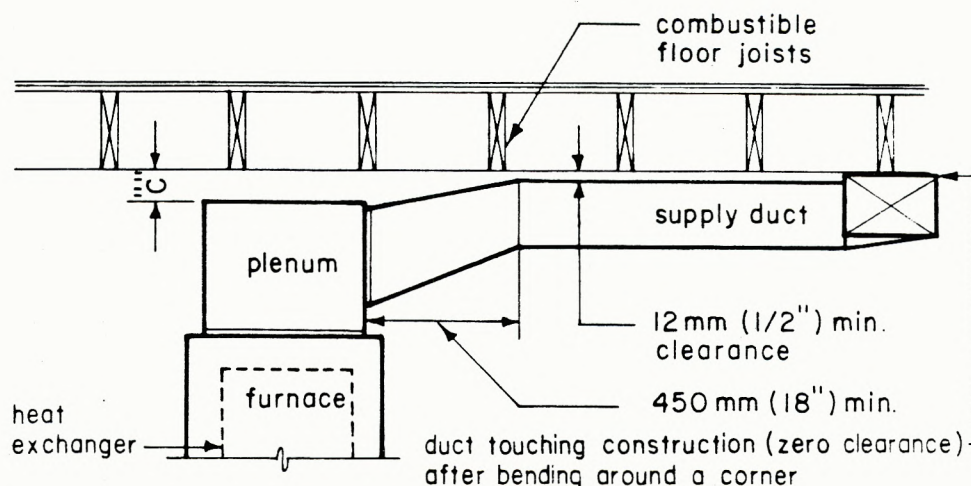
9.34

9.34.3.3 DUCTS IN WALLS, PARTITIONS & FLOORS



9.34.3.7 DUCT CLEARANCE -"A"

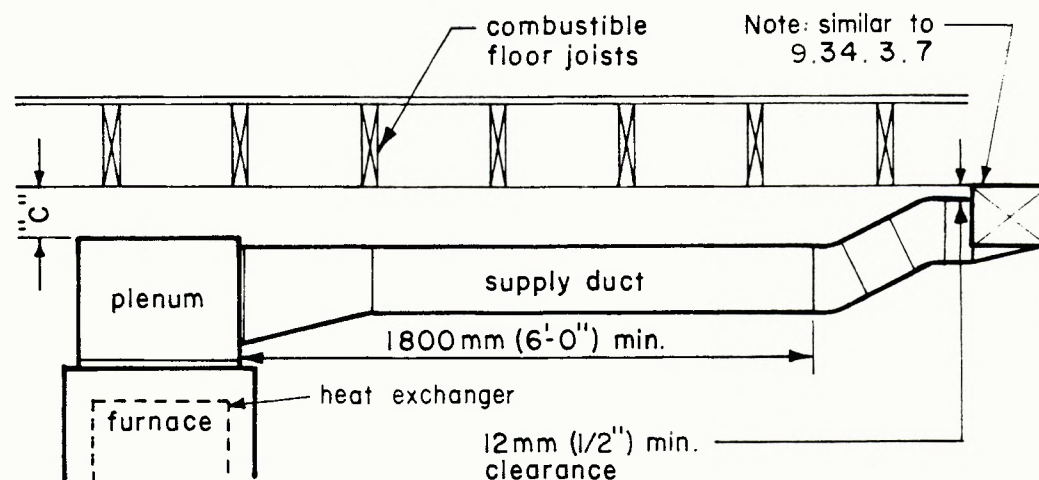
CRITICAL MINIMUM CLEARANCES FROM THE WARM AIR PLENUM AND THE DUCTS OF AN OIL OR GAS-FIRED FURNACE.



Applicable to forced-air furnaces where permissible clearance "C" above plenum is 75 mm (3") or less.

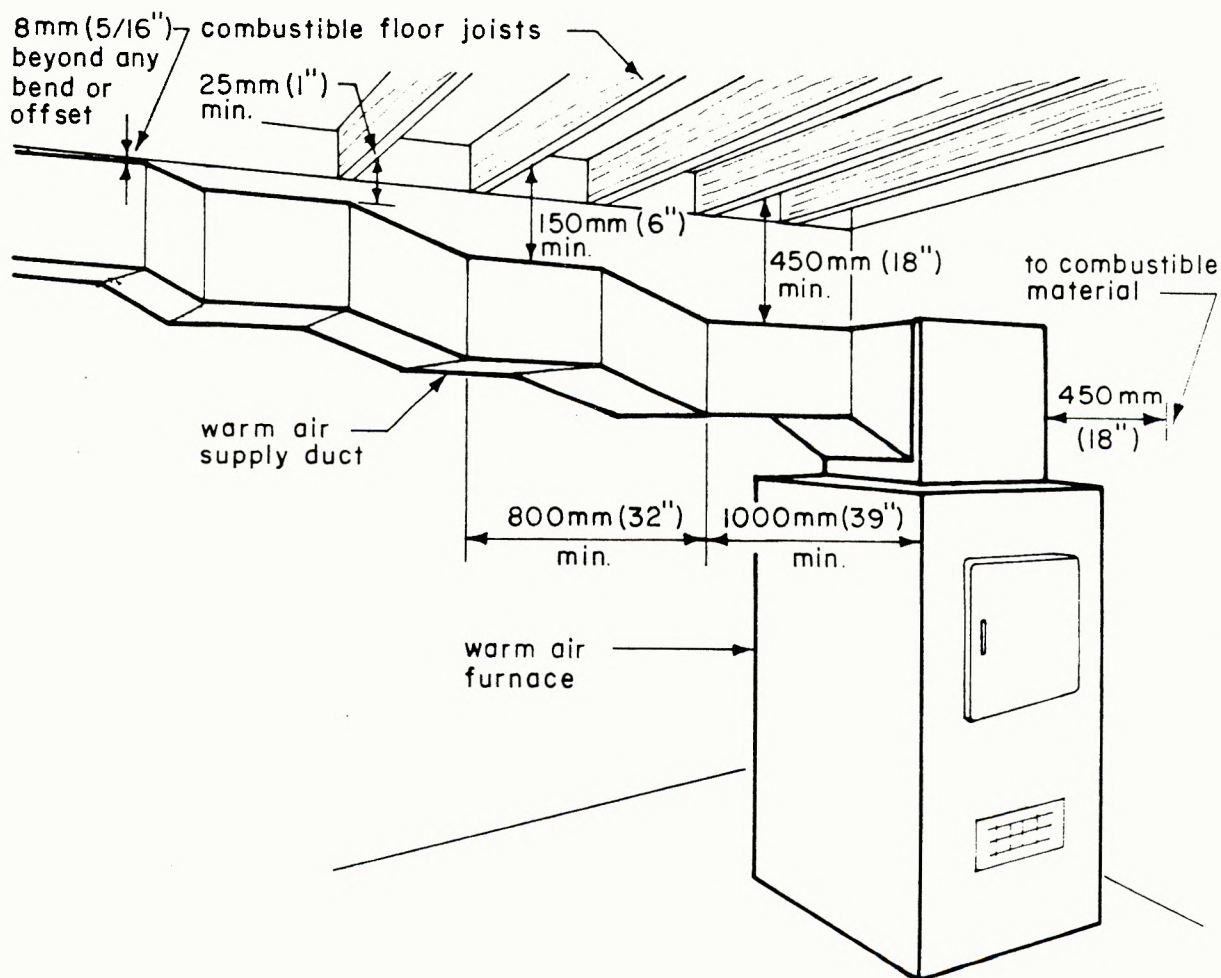
9.34.3.8 DUCT CLEARANCE - "B"

CRITICAL MINIMUM CLEARANCES FROM THE WARM AIR PLENUM AND THE DUCTS OF AN OIL OR GAS-FIRED FURNACE.



Applicable to forced-air furnaces where permissible clearance "C" above plenum is more than 75mm(3") but not more than 150mm(6")

9.34.3.9 DUCT & PLENUM CLEARANCES - "C"



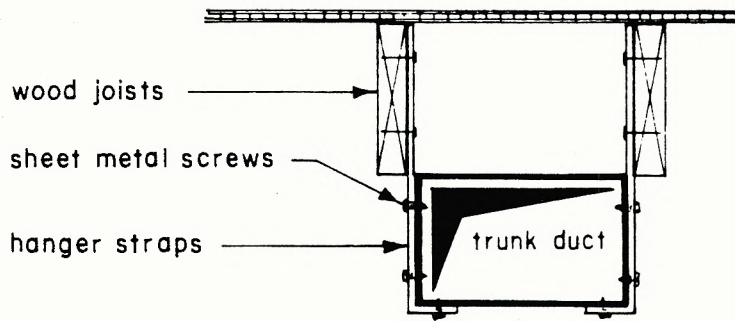
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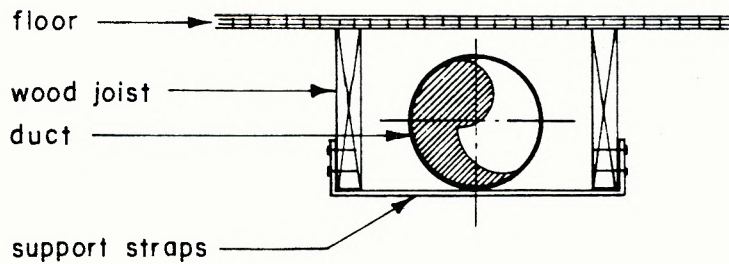
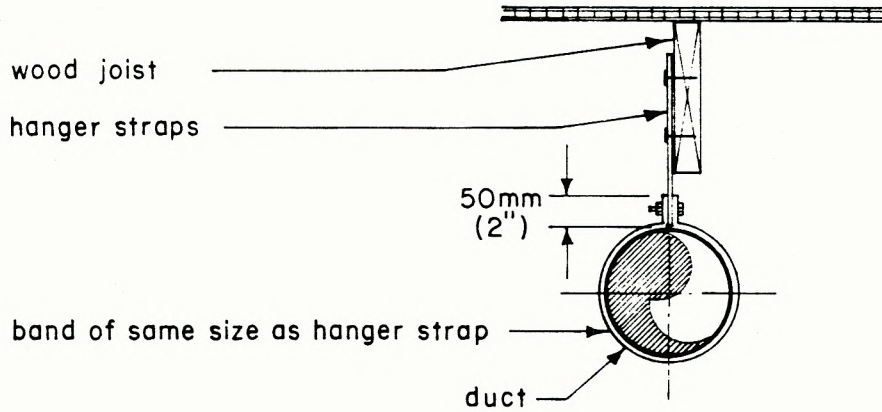
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9.34.3.14 DUCT HANGERS

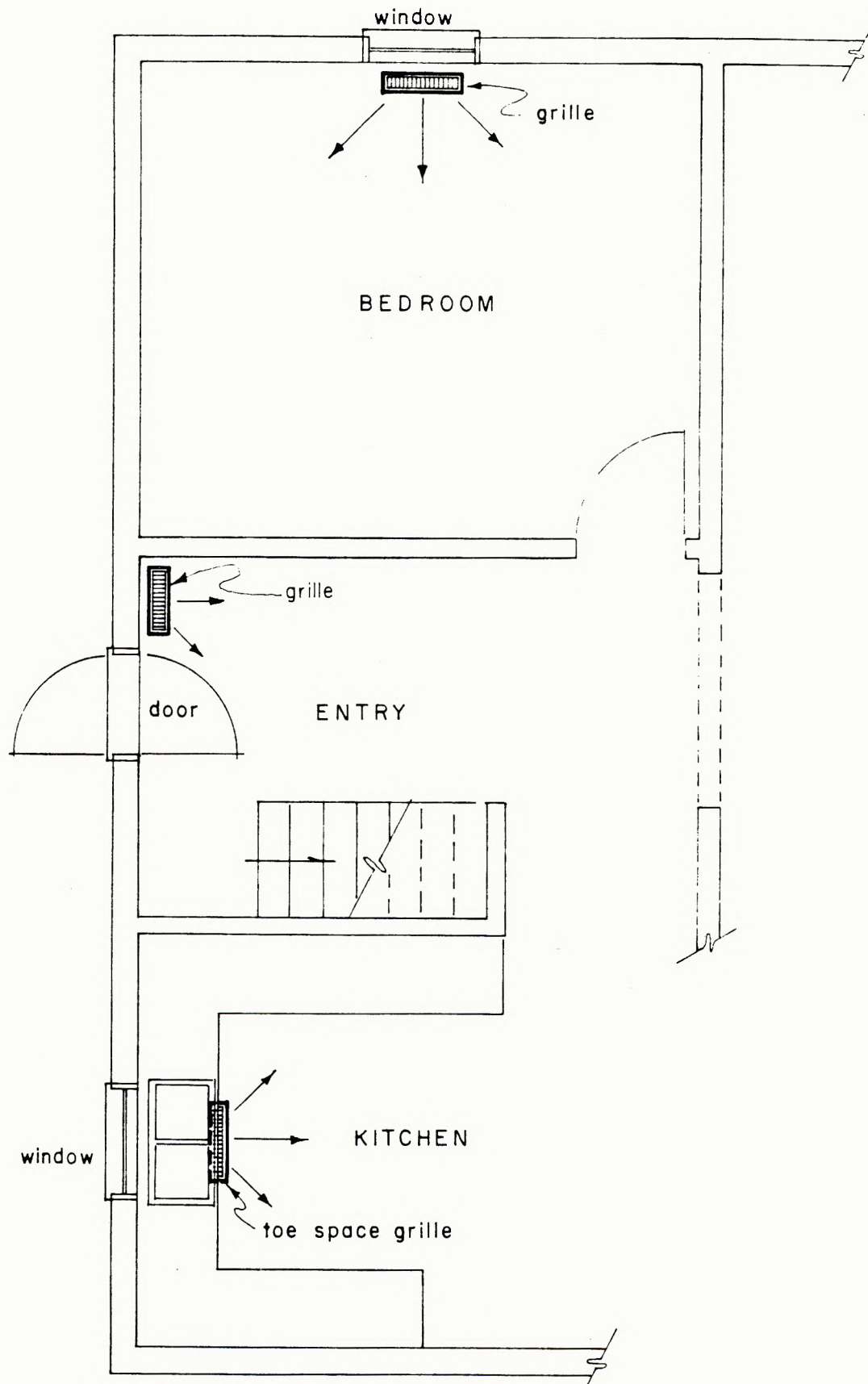


HANGERS FOR HORIZONTAL RECTANGULAR DUCTS



HANGERS FOR HORIZONTAL ROUND DUCTS

9.34.4.1 LOCATION OF WARM-AIR OUTLETS



Note: These are suggested locations of outlets. Variations meeting the code are permitted.

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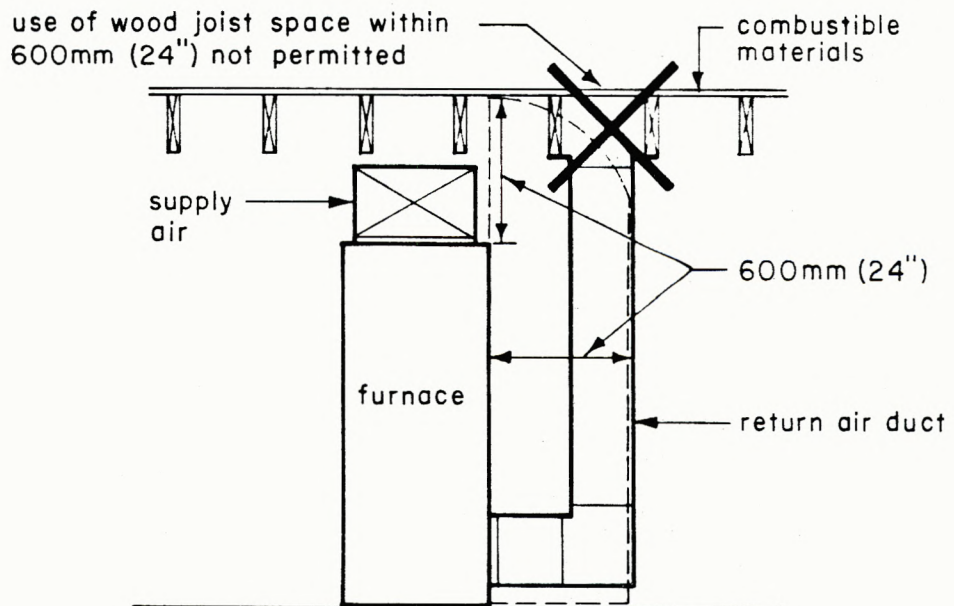
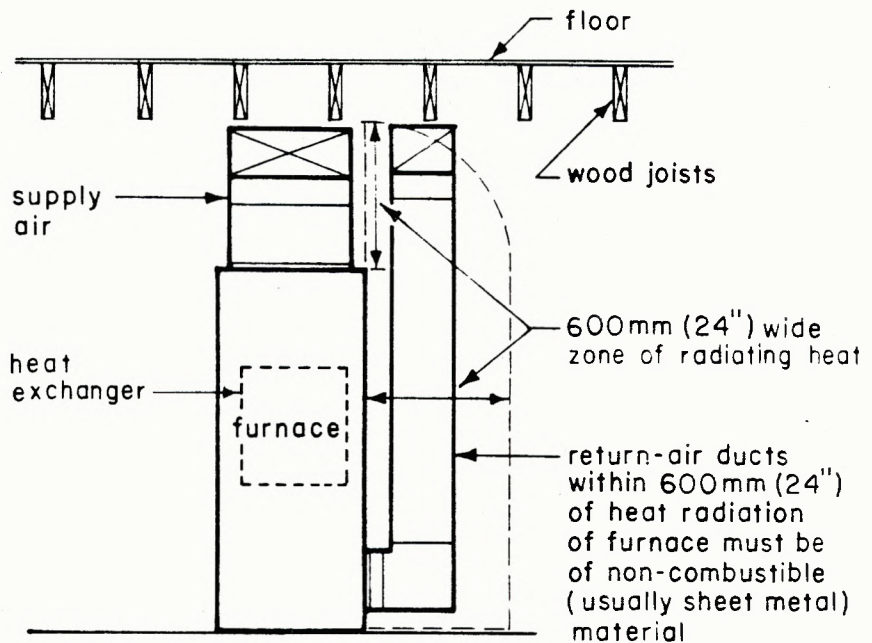
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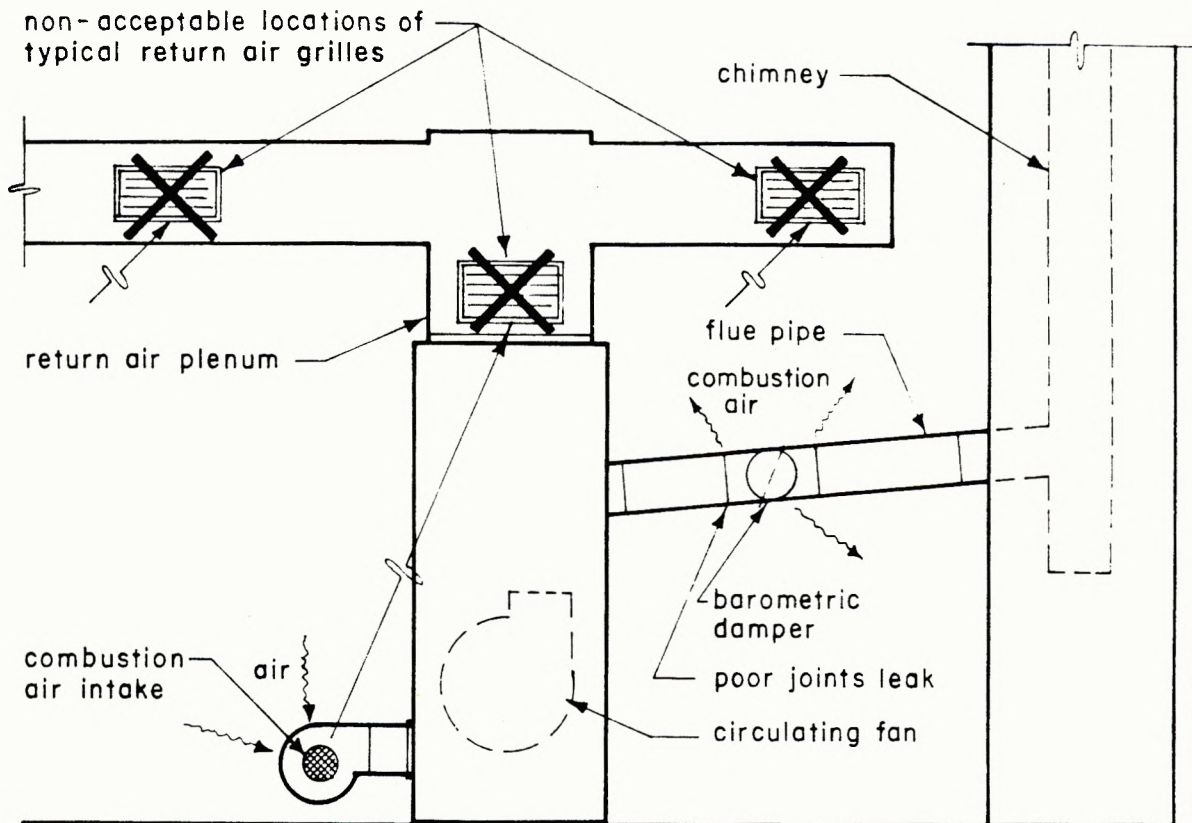
9.34.6.2 RETURN AIR DUCTS



RETURN AIR DUCT MUST BE NON-COMBUSTIBLE (SHEET METAL) WITHIN 600 mm (24") OF FURNACE CASING

Note: for explanation of "flame-spread rating" see 9.10.17.1

9.34.6.7 NEGATIVE PRESSURE / COMBUSTION PRODUCTS



RETURN AIR INLETS (GRILLES) MUST NOT BE SO LOCATED THAT FURNACE CIRCULATING FAN CAN DRAW AGAINST COMBUSTION AIR INTAKE OR FROM AREA OF FLUE PIPE.

INTERPRETATION :

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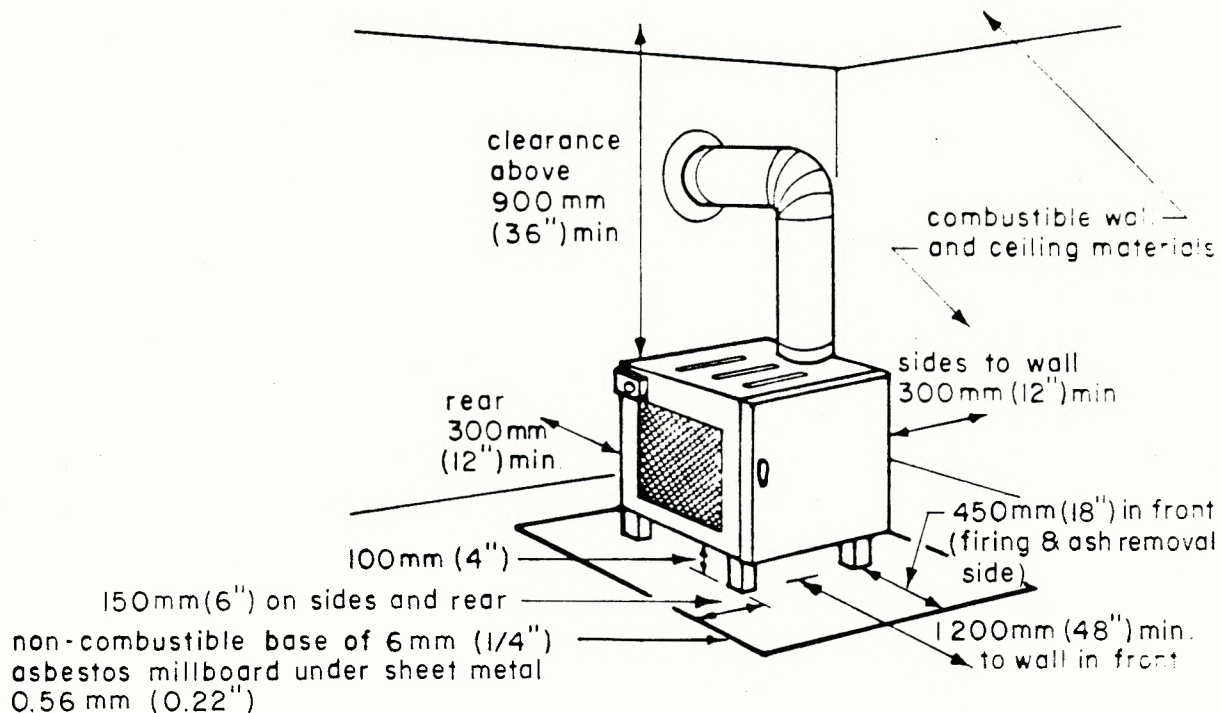
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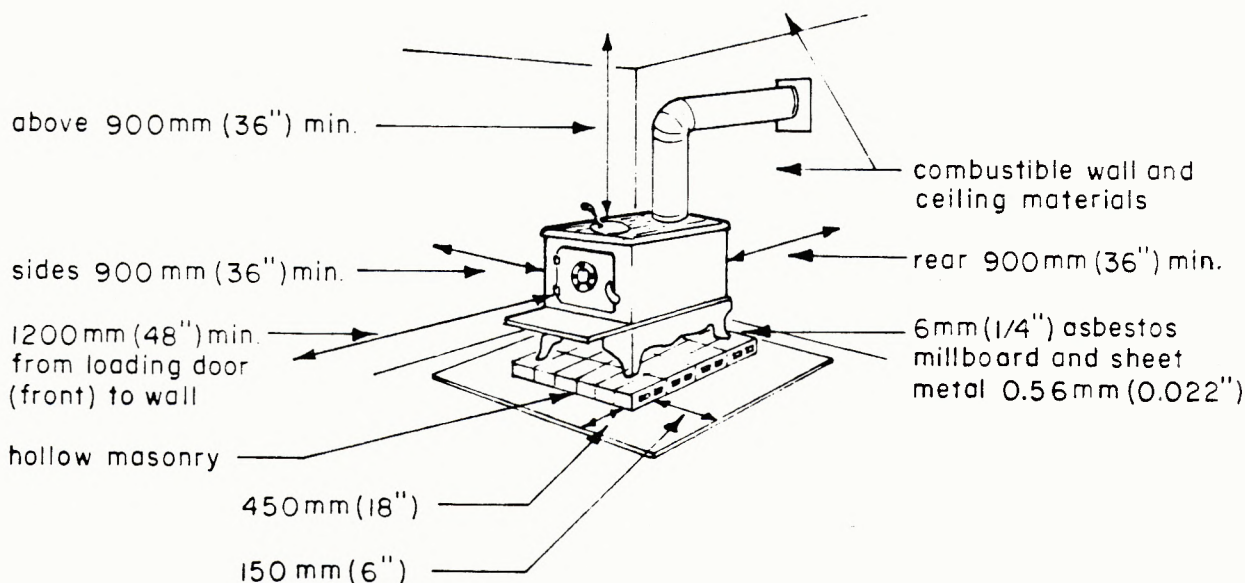
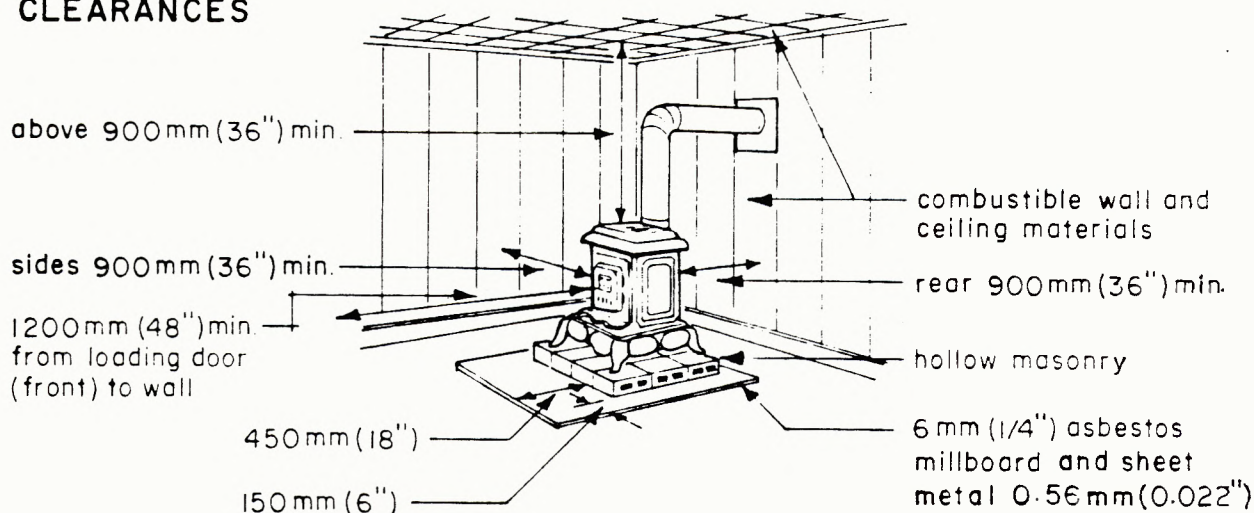
9.34.9.1 & SOLID FUEL: Wood, coal, peat, etc.
9.34.9.2

**9.34.9.2, TABLE 9.34.9.A (3rd PARA. DOWN) & 9.34.9.4
SPACE HEATER OR STOVE CLEARANCES**



NON-COMBUSTIBLE BASE UNDER A CIRCULATING SPACE HEATER WITH FREE-STANDING LEGS OF 100 mm (4") OR MORE

9.34.9.2, TABLE 9.34.9.A (4th PARA.DOWN) & 9.34.9.4 SPACE HEATER CLEARANCES



AIR MUST BE ABLE TO MOVE THROUGH OPENINGS OF HOLLOW MASONRY

9.34.9.4

FLOOR UNDER STOVES, ETC.: See 9.34.9.2, previous page.

INTERPRETATION :

PART 9

NATIONAL BUILDING CODE OF CANADA 1980

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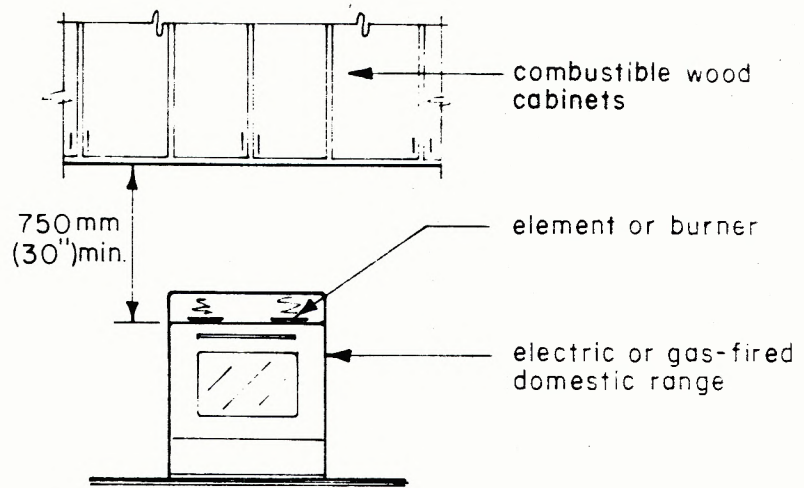
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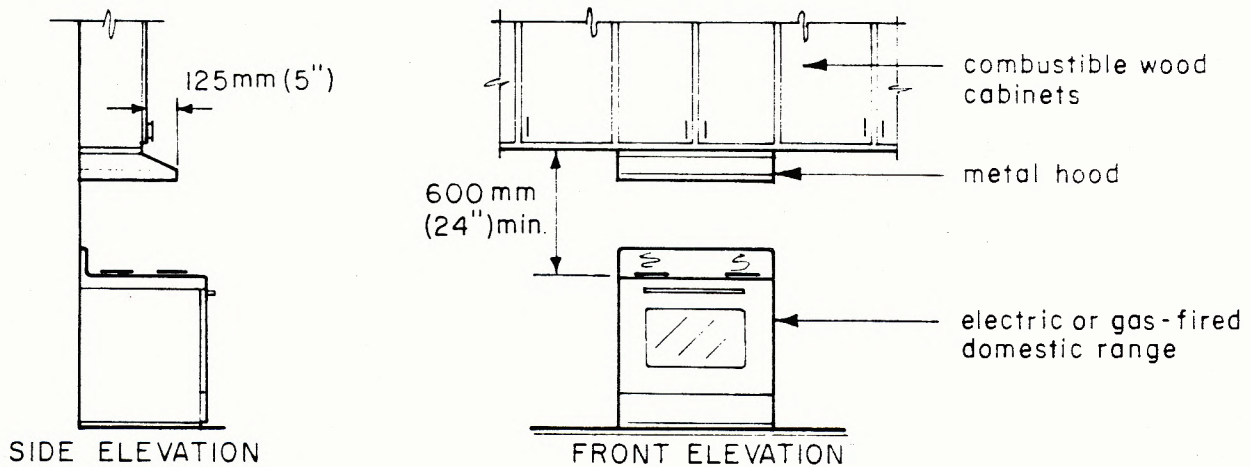
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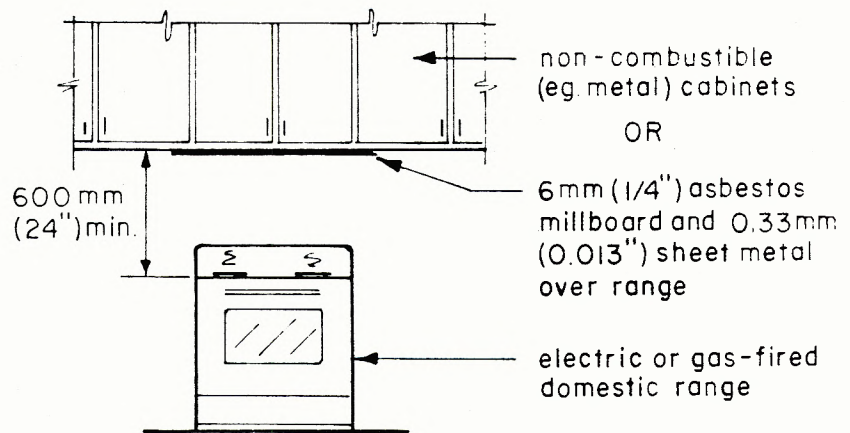
9.34.10.1 CLEARANCE ABOVE COOKING STOVE



9.34.10.2 a) CLEARANCE WITH HOOD



9.34.10.2 b) OTHER PROTECTION



electrical facilities

SECTION 9.35

9.35.1.1

SERVICE CAPACITY (COMMERCIAL SUPPLY): Where not amended by provincial or municipal legislation the capacity of the service is determined from Rule 8-200 of the Canadian Electrical Code, Part 1, for single family dwellings and row housing; and from Rule 8-202 for apartments and similar multi-family dwellings.

For example, from Rule 8-200, for a dwelling having a floor area less than 80 m² (850 sq. ft.) based on the outside dimensions and exclusive of basement, the minimum service capacity is the greater of the calculated load as provided for in this Rule, or 60A.

For a dwelling of 80 m² (850 sq. ft.) or more, it shall be the greater of the calculated value or 100A.

Generally, single family dwellings 80 m² (850 sq. ft.) or larger with full electric heat require a minimum service capacity of 200A. Existing dwellings with supplementary electric heat may be permitted a service capacity of 100A with supplementary electric heat in the order of 8-10 KW. Otherwise the service may be permitted at between 100A and 200A depending on the area and calculated load.

9.35.1.1

ALUMINUM WIRING: Although permitted by the Canadian Electrical Code, aluminum wiring is not recommended because of the special care required to make connections at switches, receptacles, lighting fixtures and the requirement that these devices be of a special type compatible with aluminum wiring. Homeowners will on occasion replace these devices as need be. The potential problem of improper terminations will be minimized if aluminum wiring is not used.

9.35.3.3

SPLIT RECEPTABLES: Rule 26-702 of the Canadian Electrical Code calls for split receptacles in kitchens in dwelling units. These consist of duplex receptacles having terminals adapted for connection to a grounded 3 wire supply, e.g. 120/240V. The split receptacle connection allows each half of the duplex receptacle to operate up to 15 amps so that for example, appliances such as an electric kettle, or electric iron, etc., may be connected to either half of the receptacle without affecting each other (each appliance draws in the order of 10 to 12 amps). The receptacle is protected by a two-pole 15 amp breaker, one pole for each half with a common trip (or two single pole breakers with their toggles tied together). An overload or short circuit on one half of the receptacle causes both poles of the breaker to trip. This is a mandatory safety feature to prevent shock hazard when repairing or replacing the receptacle. (See also drawing 9.35.3.3).

INTERPRETATION :

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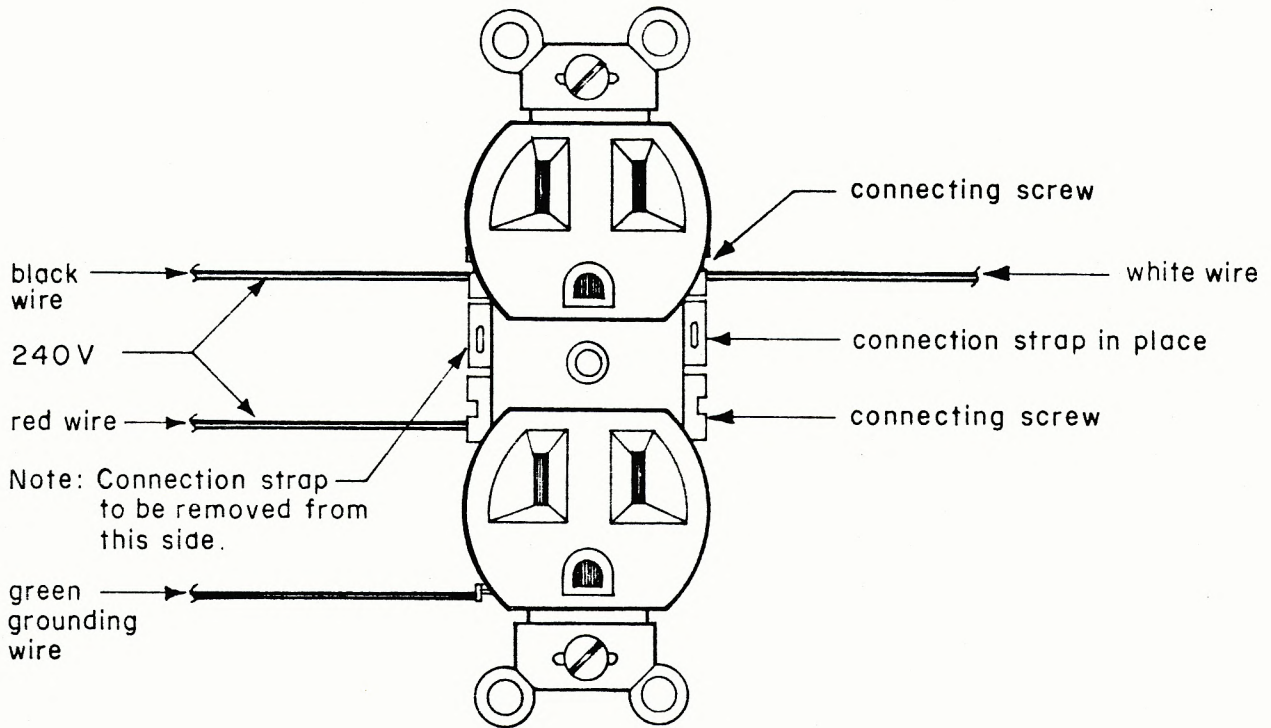
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9.35 3.3 STANDARD 15 AMP 125 VOLT DUPLEX RECEPTACLE CONNECTED AS A "SPLIT RECEPTACLE"



TYPICAL ARRANGEMENT

Note:

Split receptacle is fed at 240V allowing 2 separate loads of up to 15amp 120 volt to be utilized (one from bottom half and one from top half of receptacle).

CAUTION: Wiring should only be installed by qualified electrician.

9.35.3.6

SPECIAL PURPOSE OUTLET: A single receptacle with a rating greater than the standard 15 amp, 125V, 2-wire duplex receptacle used throughout the dwelling, intended for a specific heavy duty appliance.

The receptacle intended for an electric range is rated at 50 amps, 125/250V, four wire with a C.S.A. designation of 14-50R.

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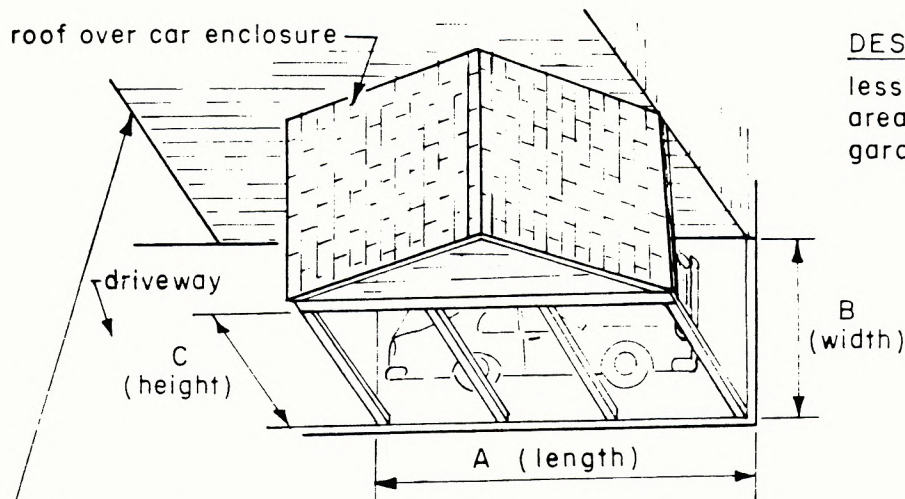
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9.35

garages & carports

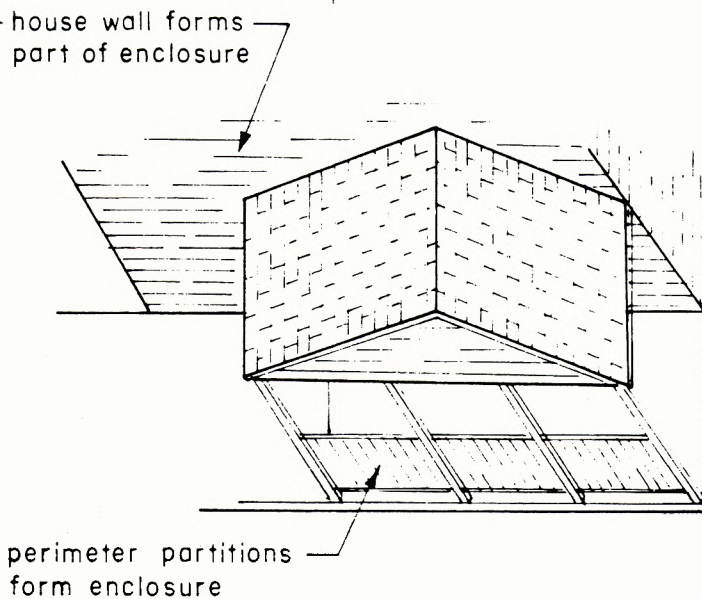
SECTION 9.36

9.36.2.1 CARPORT & GARAGE ENCLOSURE



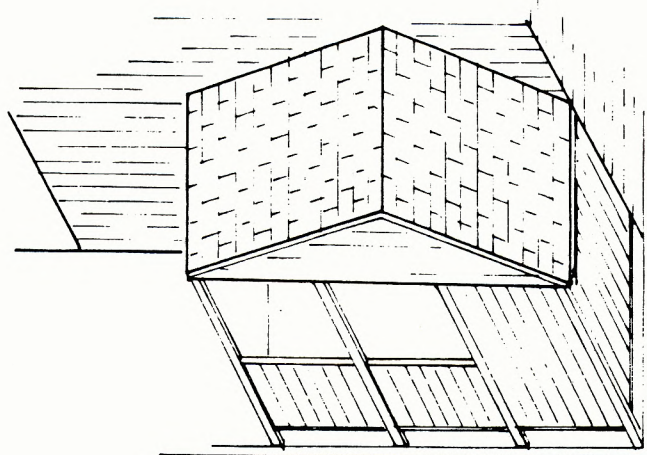
DESIGN 1

less than 60 % of perimeter area is enclosed - not a garage



DESIGN 2

less than 60 % of perimeter area is enclosed - not a garage



DESIGN 3

more than 60 % of perimeter area is enclosed - considered a garage

NOTE:

Perimeter area = $2(A+B) \times C \text{ m}^2$
(sq. ft.)

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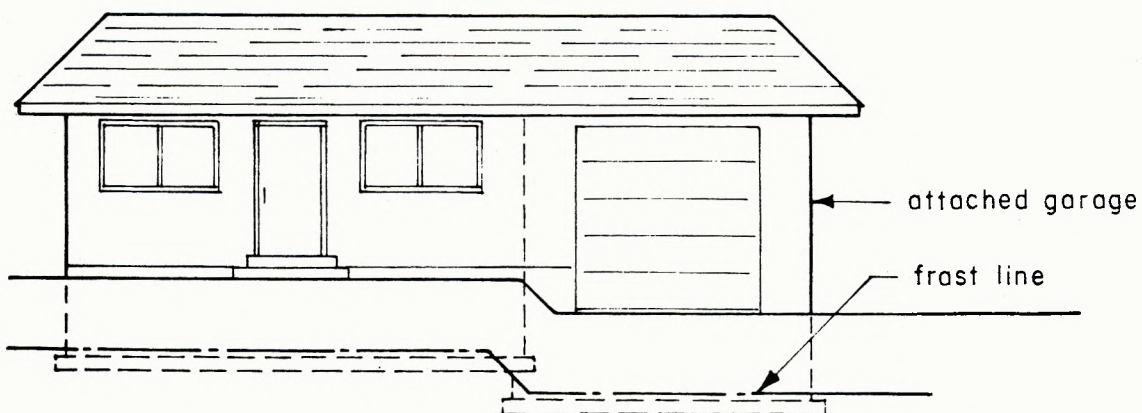
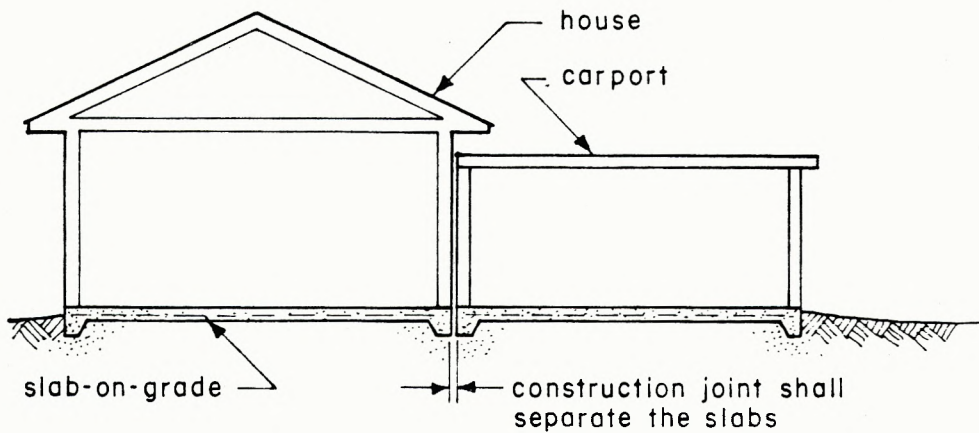
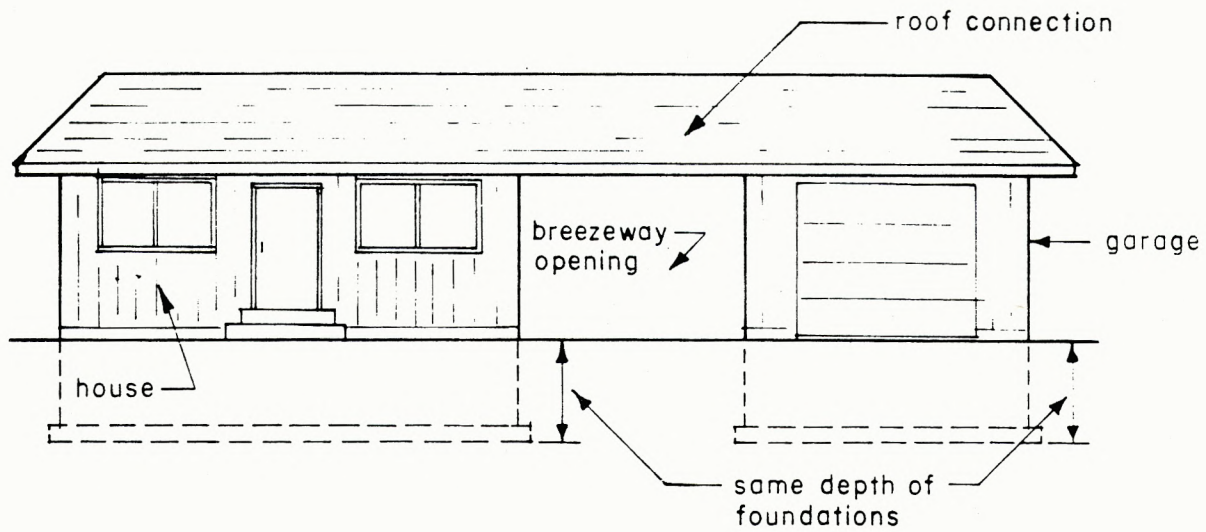
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9.36

9.36.3.2 FOUNDATION DEPTHS FOR GARAGES AND CARPORTS FOR CLAY-TYPE SOILS



**SUMMARIES
OF
STANDARDS**

SUMMARIES OF STANDARDS REFERRED TO IN PART 9 OF THE
NATIONAL BUILDING CODE OF CANADA
(PARTIAL COMPILATION)

TABLE OF CONTENTS

Introduction	i
Index of Standards	ii to ix
Summaries of Standards	1 to 73
Glossary of Technical Terms	74 to 79

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Summary

SUMMARIES OF STANDARDS REFERRED TO IN THE CODE

INTRODUCTION

The National Building Code contains numerous references to recognized Standards and also to some other codes, etc.

The following summaries have been prepared to assist those users of the Building Code who do not have ready access to these Standards and Codes.

Care has been taken in the preparation of the Summaries. However, because of their conciseness and because they do not exactly repeat the wording of the Standards and Codes, the published copies of the Standards and Codes, etc., should be referred to in all instances of dispute or legal process.

In some cases standards of different (earlier) dates are used in the National Building Code, than the ones which are summarized here. Where this occurs the earlier date is given in brackets under the main date. In such cases it should be noted that there may be significant differences between the two editions of the same item.

Summaries of some standards, etc., which occur in the Ontario Indian Housing Council code but which do not occur in the National Building Code have been included (since they were available) because of possible general interest in this material.

Copies of the Standards may be obtained by writing to the association which published the Standards, at the addresses listed in Section 1.4 of the National Building Code. Copies of the Electrical Safety Code of Ontario, the Canadian Plumbing Code and the Ontario Water Resources Act may be obtained by writing to the addresses listed in the Summaries for these documents.

INDEX OF SUMMARIES OF STANDARDS REFERRED TO IN PART 9
OF THE NATIONAL BUILDING CODE

STANDARD NUMBER	STANDARD TITLE	PAGE NO.	LOCATION IN BUILDING CODE
CANADIAN STANDARDS ASSOCIATION			
CAN3-A5-M77	Portland Cements	2	9.3.1.2., 9.20.3.1., 9.29.2.1.
CAN3-A8-M77	Masonry Cement	2	9.20.3.1.
CAN3-A23.1-M77	Concrete Materials and Methods of Concrete Construction	3	9.3.1.1., 9.3.1.2., 9.3.1.3.
CAN3-A23.2-M77	Methods of Test for Concrete	4	9.3.1.1., 9.3.1.7.
CAN3-A23.3-M77	Code for the Design of Concrete Structures for Buildings	4	Part 4
A82.1-M1977	Burned Clay Brick	4	9.20.2.1.
CAN3-A82.2-M78	Methods of Sampling and Testing Brick	5	9.20.2.6.
A82.3-M1978	Calcium Silicate (Sand-Lime) Building Brick	5	9.20.2.1.
A82.27-M1977	Gypsum Board Products	5	Table 9.11.2.A. Table 9.11.2.B. Table 9.23.16.A 9.30.4.1., 9.30.8.1.
A82.42-1950	Quicklime for Structural Purposes (Reaffirmed 1971)	6	9.20.3.1., 9.20.3.4., 9.307.1.
A82.43-1950	Hydrated Lime for Masonry Purposes (Reaffirmed 1971)	6	9.20.3.1.
A82.44-1950	Normal Finishing Hydrated Lime (Reaffirmed 1971)	6	9.29.2.3., 9.30.7.1.
A82.56-M1976	Aggregate for Masonry Mortar	6	9.20.3.1.
A93-1965	Vents for Buildings (Reaffirmed 1971)	6	9.19.1.1.
A101-M1977	Mineral Fibre Thermal Building Insulation	7	9.26.3.3.
A123.1-M1979 (1964)	Asphalt Shingles Surfaced with Mineral Granules	8	9.27.2.1.
A123.2-M1979	Asphalt Coated Roofing Sheets	9	*
A123.3-M1979	Asphalt or Tar Saturated Roofing Felt	9	*

* Not referenced in NBC, but in O.I.H.C. Code and may be of interest.

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STANDARD NUMBER	STANDARD TITLE	PAGE NO.	LOCATION IN BUILDING CODE
CANADIAN STANDARDS ASSOCIATION (Continued)			
A123.4-M1979	Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Water-proofing	10	*
A123.17-1963	Asphalt-Saturated Felted Glass-Fibre Mat for Use in Construction of Built-Up Roofs (Reaffirmed 1970)	11	9.27.2.1.
A126.1-1977	Vinyl Asbestos Floor Tile	11	*
A126.3-1972	Sheet Vinyl Flooring Products	12	*
A145-1959	Rubber Floor Tile	13	*
A146-1965	Linoleum Products	13	*
A165.1-M1977	Concrete Masonry Units	13	9.15.2.2., 9.20.2.1., 9.20.2.5.
A165.2-M1977	Concrete Brick Masonry Units	14	9.20.2.1.
A165.3-M1977	Prefaced Concrete Masonry Units	15	9.20.2.1.
A165.4-M1977	Autoclaved Cellular Units	15	9.20.2.1.
A247-M1978	Insulating Fibreboard	16	9.23.15.7., 9.26.3.3., Table 9.23.16.A 9.30.11.1.
CAN3-A266.1-M78	Air-Entraining Admixtures for Concrete	16	9.3.1.8.
CAN3-A266.2-M78	Chemical Admixtures for Concrete	16	9.3.1.8.
B51-1975	Code for the Construction and Inspection of Boilers and Pressure Vessels	17	9.34.2.3.
B111-1974	Wire Nails, Spikes and Staples	18	9.23.3.1., 9.27.2.2.
B127.2-M1977	Components for Use in Asbestos Cement Building Sewer Systems	18	*
B131.1-1969	Thickness Design of Cast-Iron Pipe	19	*
B131.5-1976	Cast-Iron Pipe Centrifugally Cast in Metal Molds, for Water or Other Liquids	19	*
B131.9-1978	Gray-Iron and Ductile-Iron Fittings, 3-inch through 48-inch for Water and Other Liquids	19	*
B137.1-1970	Polyethylene Pipe for Cold Water Services	20	*

* Not referenced in NBC, but in O.I.H.C. Code and may be of interest.

STANDARD NUMBER	STANDARD TITLE	PAGE NO.	LOCATION IN BUILDING CODE
CANADIAN STANDARDS ASSOCIATION (Continued)			
B137.3-M1981	Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications	20	*
B137.7-1976	Polybutylene Pipe for Cold Water Usage	21	*
B139-1976	Installation Code for Oil Burning Equipment	21	9.21.1.5., 9.21.5.2., 9.34.2.3., 9.34.3.6.
B181.2-1973	Poly (Vinyl Chloride) Drain, Waste and Vent Pipe and Pipe Fittings	21	*
B181.4-1976	Polyethylene (PE) Drain, Waste and Vent Pipe and Pipe Fittings	22	*
B182.1-M1977	Plastic Drain and Sewer Pipe and Pipe Fittings	23	9.14.3.1.
B182.11-1967	Recommended Practice for the Installation of Plastic Drain and Sewer Pipe and Pipe Fittings	24	*
B228.1-1968	Pipes, Ducts and Fittings for Residential Type Air Conditioning Systems	24	9.34.5.1.
C22.1-1978	Canadian Electrical Code, Part I: Safety Standards for Electrical Installations	24	9.34.2.3. 9.35.1.1
C309-1977	Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service	25	*
G40.21-M1978	Structural Quality Steels	25	9.23.4.2.
HC7.6-1968	Seamless Copper Water Tube, Drainage Tube (DWV), and Hydronic Heating Tube (Type 'H')	26	*
CAN3-086-M80 (1976)	Code for the Engineering Design of Wood	27	4.3.2.1.
0115-1967	Hardwood Plywood	27	9.28.9.1., 9.31.2.3.
0118.1-1980 (1960 - Reaffirmed 1965)	Western Red Cedar Shingles, Handsplit Western Red Cedar Shakes, and Machine-Grooved Shakes	28	9.27.2.1., 9.28.7.1.
0121-M1978	Douglas Fir Plywood	30	9.23.14.2., 9.23.15.1., Table 9.23.16.A 9.24.3.1., 9.28.9.1., 9.31.2.3.

* Not referenced in NBC, but in O.I.H.C. Code and may be of interest.

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<u>CANADIAN STANDARDS ASSOCIATION (Continued)</u>			
0132.1-M1977	Wood Windows	31	9.7.3.1.
0132.2-M1977	Wood Doors	31	9.6.4.1. 9.10.14.2.
0141-1970	Softwood Lumber	32	9.3.2.7.
0151-M1978	Canadian Softwood Plywood	34	9.23.14.2., 9.23.15.1., Table 9.23.16.A 9.24.3.1., 9.28.9.1., 9.31.2.3.
0153-M1980 (1976)	Poplar Plywood	34	9.23.14.2., 9.23.15.1., Table 9.23.16.A. 9.24.3.1., 9.28.9.1., 9.31.2.3.
0177-1977 (M1978)	Qualification Code for Manufacturers of Structural Glued-Laminated Timber	36	4.3.2.2.
CAN3-0188.1-M78	Interior Mat-Formed Wood Particleboard	36	9.23.14.3., 9.30.12.1. 9.31.2.3.
CAN3-0188.2-M78	Waferboard	37	9.23.14.2., 9.23.15.1., Table 9.23.16.A. 9.24.3.1., 9.28.11.1., 9.30.12.1.
S307-M1980 (1977)	Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings	37	9.23.13.18.
<u>CANADIAN GENERAL STANDARDS BOARD</u>			
10-GP-3M(1976)	Mortar, Refractory, Air Setting	38	9.21.3.3., 9.22.2.2.
11-GP-3M(1976)	Hardboard	38	9.28.10.1., 9.30.10.1., 9.31.2.3
11-GP-5Ma(1978)	Hardboard, for Exterior Cladding	39	9.28.10.1.
CAN2-12.1-M79	Glass, Safety, Tempered or Laminated	39	9.6.5.2., 9.7.4.1.
CAN2-12.2-M76	Glass, Sheet, Flat, Clear	40	9.7.4.1.
CAN2-12.3-M76	Glass, Polished Plate or Float, Flat, Clear	40	9.7.4.1.

* Not referenced in NBC, but in O.I.H.C. Code and may be of interest.

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CANADIAN GENERAL STANDARDS BOARD (Continued)			
CAN2-12.8-M76	Insulating Glass Units	41	9.7.3.1.
CAN2-12.11-M76	Glass, Wired, Safety	41	9.6.5.2., 9.10.14.5.
CAN2-12.12-M79	Glazing, Sheets, Plastic, Safety	42	*
19-GP-5M(1976)	Sealing Compound, One Component, Acrylic Base, Solvent Curing	43	9.28.4.3.
19-GP-9Ma(1978)	Sealing Compound, One Component, Silicone Base, Chemical Curing	43	9.28.4.3., 9.30.13.4.
19-GP-13M(1976)	Sealing Compound, One Component, Polysulphide Base, Chemical Curing	43	9.28.4.3.
19-GP-14M(1976)	Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing	44	9.28.4.3.
19-GP-16M(1977)	Sealing Compound, One Component, Polyurethane Base, Chemical Curing	45	9.28.4.3.
19-GP-24M(1977)	Sealing Compound, Multi-Component, Chemical Curing	45	9.28.4.3.
34-GP-22M(1976)	Pipe, Asbestos-Cement, Drain	46	9.14.3.1.
37-GP-2M(1976)	Asphalt, Emulsified, Mineral Colloid Type, Unfilled, for Dampproofing and for Roof Coatings	46	9.13.2.1.
37-GP-3M(1976)	Application of Emulsified Asphalts for Dampproofing or Waterproofing	47	9.13.1.6.
37-GP-4M(1976)	Cement, Lap, Cutback, Asphalt, Fibrated, for Asphalt Roofing	48	9.27.2.1.
37-GP-5M(1976)	Cement, Plastic, Cutback Asphalt	48	9.27.2.1.
37-GP-6M(1976)	Asphalt, Cutback, Unfilled, for Dampproofing	48	9.13.2.1.
37-GP-8M(1976)	Asphalt, Cutback, Filled, for Roof Coating	48	9.27.2.1.
37-GP-9M(1976)	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing	49	9.27.2.1.
37-GP-12M(1976)	Application of Unfilled Cutback Asphalt for Dampproofing	49	9.13.1.6.
37-GP-16M(1976)	Asphalt, Cutback, Filled, for Dampproofing and Waterproofing	49	9.13.2.1.
37-GP-18M(1976)	Tar, Cutback, Unfilled for Dampproofing	50	9.13.2.1.

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<u>CANADIAN GENERAL STANDARDS BOARD</u> (Continued)			
37-GP-21M(1976)	Tar, Cutback, Fibrated, for Roof Coating	50	9.27.2.1.
37-GP-22M(1976)	Application of Unfilled Cutback Tar Foundation Coating for Dampproofing	50	9.13.1.6.
37-GP-50M(1978)	Asphalt, Rubberized, Hot-Applied, for Roofing and Waterproofing	51	*
37-GP-51M(1979)	Application of Rubberized Asphalt, Hot Applied, for Roofing and Waterproofing	51	*
37-GP-54M(1979)	Roofing and Waterproofing Membrane, Sheet-Applied, Flexible, Polyvinyl Chloride	52	*
37-GP-55M(1979)	Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane	53	*
41-GP-6M(1976)	Sheets, Thermosetting Polyester Plastics, Glass-Fibre Reinforced	53	9.27.2.1.
41-GP-24M(1976)	Siding, Soffits and Fascia, Rigid Vinyl	54	9.28.13.1.
41-GP-29M(1976)	Tubing, Plastic, Corrugated, Drainage	55	9.14.3.1.
51-GP-20M(1978)	Thermal Insulation, Expanded Polystyrene	55	9.26.3.2., 9.26.3.3.
51-GP-21M(1978)	Thermal Insulation, Urethane and Isocyanurate, Unfaced	56	9.26.3.3.
CAN2-51.32-M77	Sheathing, Membrane, Breather Type	57	9.20.15.1., 9.23.17.1., 9.27.2.1.
CAN2-51.33-M80 (M77)	Vapor Barrier, Sheet, for Use in (Above-Grade) Building Construction	57	9.26.3.3.
51-GP-60M(1979)	Thermal Insulation, Cellular Fibre, Loose Fill	58	*
63-GP-3M(1976)	Windows, Extruded Aluminum, Vertical and Horizontal Sliding, Standard Duty	58	9.7.3.1.
63-GP-5M(1976)	Windows, Steel, Vertical and Horizontal Sliding, Standard Duty	59	9.7.3.1.
82-GP-1M(1977)	Doors, Glass, Aluminum Frame, Sliding, Standard-Duty	59	9.6.4.2.

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<u>CANADIAN GENERAL STANDARDS BOARD (Continued)</u>			
93-GP-1M(1978)	Sheet, Aluminum Alloy, Prefinished, Residential	60	9.28.12.4.
93-GP-2M(1978)	Siding, Soffits and Fascia, Aluminum, Prefinished, Residential	60	9.28.12.3.
93-GP-3M(1978)	Sheet, Steel, Galvanized, Prefinished, Residential	61	9.28.12.2.
93-GP-4M(1978)	Siding, Soffits and Fascia, Steel, Galvanized, Prefinished, Residential	61	9.28.12.1.
115-GP-1(1974)	Columns, Adjustable, Metal	62	9.17.3.6.
<u>AMERICAN SOCIETY FOR TESTING AND MATERIALS</u>			
A525-80a (79)	Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements	63	9.3.3.2.
C4-62(1975)	Clay Drain Tile	63	9.14.3.1.
C64-72(1977)	Refractories for Incinerators and Boilers	63	9.21.3.3.
C315-78c 78b	Clay Flue Linings	63	9.21.3.2.
C412-79 (78)	Concrete Drain Tile	64	9.14.3.1.
C444-79 (77)	Perforated Concrete Pipe	65	9.14.3.1.
C700-78a	Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated	65	9.14.3.1.
D1194-72(1977)	Bearing Capacity of Soil for Static Load on Spread Footings	66	9.4.7.1.
E90-75	Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions	66	9.11.1.1.
E336-77	Measurement of Airborne Sound Insulation in Buildings	66	9.11.1.1.
<u>CANADIAN GAS ASSOCIATION (CAN 1)</u>			
CAN1-B149.1-1978	Installation Code for Natural Gas Burning Appliances and Equipment	67	9.21.1.4., 9.21.5.2., 9.34.2.3., 9.34.3.6.

* Not referenced in NBC, but in O.I.H.C. Code and may be of interest.

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<u>CANADIAN GAS ASSOCIATION (CAN 1) (Continued)</u>			
CAN1-B149.2-1978	Installation Code for Propane Burning Appliances and Equipment	67	9.21.1.4., 9.21.5.2., 9.34.2.3., 9.34.3.6.
<u>UNDERWRITERS LABORATORIES OF CANADA</u>			
CAN4-S114-M80 (78)	Standard Method of Test for Determination of Non-Combustibility in Building Materials	68	1.3.2.
S531-1978	Standard for Smoke Alarms	68	9.10.19.1.
CAN4-S604-78	Standard for Factory-Built Type A Chimneys	69	9.21.1.3.
S610-1979 (1978)	Factory-Built Fireplaces	70	9.22.8.1.
S611-1979	Factory-Built Free-Standing Fireplaces	71	9.22.8.1.
<u>ELECTRICAL SAFETY CODE OF ONTARIO/CANADIAN ELECTRICAL CODE</u>		72	9.35.1.1.*
<u>CANADIAN PLUMBING CODE</u>		72	*
<u>ONTARIO WATER RESOURCES ACT</u>		73	*

* Not referenced in NBC, but in O.I.H.C. Code and may be of interest.

SUMMARIES OF STANDARDS

CANADIAN STANDARDS ASSOCIATION (CAN 3*)

*Note:

As part of the co-ordination of voluntary standardization in Canada commenced in 1970 by the Standards Council of Canada, certain of the best-known and most active standards-writing organizations were accredited by the Standards Council. Standards produced by these organizations, using approved procedures, are recognized as "National Standards" of Canada. To co-ordinate the identification of standards, prefixes are now assigned to the numbering of the standards produced by the accredited organizations as follows:

- CAN 1 - Canadian Gas Association
- CAN 2 - Canadian General Standards Board
- CAN 3 - Canadian Standards Association
- CAN 4 - Underwriters Laboratories of Canada

The prefixes are being added to the standards numbers when the standards are revised and recognized as National Standards. For example:

	<u>Old Numbering</u>	<u>New Numbering</u>
Canadian Gas Association	B149.1-1978	CAN1-B149.1-1978
Canadian General Standards Board	12-GP-1M(1979)	CAN2-12.1-M79
Canadian Standards Association	A23.1-M1977	CAN3-A23.1-M77
Underwriters Laboratories Of Canada	S604-78	CAN4-S604-78

Note: An "M" in the numbering of a Standard indicates that the Standard is now a metric version.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

CAN3-A5-M77

PORTLAND CEMENTS

This 76 page Standard covers the chemical and physical requirements for Portland cement.

The Standard cover 5 types of Portland cement as follows:

Name	Type
Normal Portland Cement	10
Moderate Portland Cement*	20
High Early-Strength Portland Cement	30
Low heat of Hydration Portland Cement*	40
Sulphate Resistant Portland Cement	50

Type 10 "Normal Portland Cement" is used for general purposes and residential construction. See summary of CAN3-A23.1-M77 for the uses of the other Portland cements.

The Standard requires that the manufacturer shall perform all the specified tests on the Portland cement before shipment. Additional testing by the purchaser is optional.

Bags or other containers are marked with the name of the manufacturer, cement type and weight of contents.

*Moderate with respect to sulphate-resistance and "heat of hydration" (the curing** of concrete, particularly in large sections, generates heat; moderate heat of hydration speeds curing and helps protect against freezing; low heat is desirable for mass concrete and in very hot weather).

**See Glossary for definition.

CAN3-A8-M77

MASONRY CEMENT

This 25 page Standard covers the chemical and physical requirements for cement prepared specifically for use in masonry mortars.* It recognizes 2 types as follows:

Type H - Masonry cement for general use in masonry construction; and

Type L - Lower strength masonry cement for use in masonry construction where high strength mortar is not required.

Bags and other containers are marked with the name and brand of the manufacturer, cement type and weight of contents.

*Masonry cement is also sold under other names -- Mortar Cement, Mortar Mix (unsanded), Masons Cement, Brick Cement, etc.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

CAN3-A23.1-M77 CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION

This 131 page Standard covers concrete materials to be used and methods to be followed for manufacturing, transporting, placing, finishing, curing,** protecting and accepting concrete.

Included are guides for selecting suitable concrete mixes for various purposes. Portland cement is required to conform to CAN3-A5-M77, the five types of which are used as follows:

CEMENT NAME	CEMENT TYPE	USE
Normal	10	For use in general concrete construction when the special properties of the other types are not required.
Moderate*	20	For use in general concrete construction exposed to moderate sulphate action, or when moderate heat of hydration* is required.
High early strength	30	For use when high early strength is required.
Low heat of hydration	40	For use when low heat of hydration* is required.
Sulphate-resistant	50	For use when high sulphate-resistance is required.

The Standard includes a listing of standards governing the use of admixtures, which are special materials added to the concrete to obtain various special properties. It also covers the materials, design, construction and inspection of formwork; concrete sampling and testing procedures; reinforcing materials and their fabrication and placement; field precast concrete operations and storage requirements for all materials.

*Moderate with respect to sulphate-resistance and "heat of hydration" (the curing** of concrete, particularly in large sections, generates heat; moderate heat of hydration speeds curing and helps to protect against freezing; low heat is desirable for mass concrete and in very hot weather).

**See Glossary for definition.

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CAN3-A23.2-M77 METHODS OF TEST FOR CONCRETE

This 120 page Standard covers the main methods of testing hardened and freshly mixed concrete and concrete materials as specified in CSA Standard CAN3-A23.1, "Concrete Materials and Methods of Concrete Construction", and CSA Standard CAN3-A23.4, "Precast Concrete -- Materials and Construction".

The Standard describes tests to measure the following:

- suitability of aggregates* and water;
- ability of the hardened concrete to withstand the effects of freezing and thawing;
- amount of 'slump' - that is, the amount of water in relation to the amount of cement and aggregate* in freshly mixed concrete (this affects the workability of the fresh concrete and the amount of shrinkage in hardening concrete)
- strengths of hardened concrete; and
- amount of air contained in air-entrained* concrete.

*See Glossary for definition.

CAN3-A23.3-M77 CODE FOR THE DESIGN OF CONCRETE STRUCTURES FOR BUILDINGS

This 131 page Standard applies to the structural design of buildings of reinforced concrete. It covers the design of reinforced concrete for beams, columns, floor slabs, exterior basement walls, foundation walls and footings.

A82.1-M1977 BURNED CLAY BRICK

This 13 page Standard covers the requirements for bricks made from clay, shale, fire clay or mixtures of these, for use in brick masonry. Details are included such as cored (vertical) holes, frogs (recessed panels in tops of bricks), compressive strength, maximum water absorption, maximum permissible variations in size and warping, and acceptable limits of chipping of faces which will be exposed.

Clay bricks are classified in the following types:

- Type I - Brick suitable for general use in facing masonry exposed to the weather; and
- Type II - Brick intended for use as backup (behind face brick) or interior facing masonry. They are not suitable for exposure to the weather or repeated freezing and thawing in a moist area.

The desired colour and texture of brick is normally established by choosing a sample of the long faces of not less than four bricks. The Standard requires that the texture and colour range of the surfaces of the bricks which will be exposed when in place shall have the same general colour and texture as this sample.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

CAN3-A82.2-M78 METHODS OF SAMPLING AND TESTING BRICK

This 24 page Standard covers procedures for the sampling and testing of masonry brick for such requirements as size and warping, compressive strength, absorption of water, effect of freezing-thawing, and efflorescence*.

*See Glossary for definition.

A82.3-M1978 CALCIUM SILICATE (SAND-LIME) BUILDING BRICK

This eight-page Standard covers the requirements for bricks made principally from sand and lime, for use in brick masonry. It includes such requirements as strength and maximum permissible variation in dimensions.

These bricks are classified as follows:

- Grade SW - Brick intended for use where exposed to temperatures below freezing in the presence of moisture; and
- Grade MW - Brick intended for use where exposed to temperatures below freezing, but unlikely to be saturated with water.

A82.27-M1977 GYPSUM BOARD PRODUCTS

This 16 page Standard covers gypsum lath for plastering and gypsum board for a finish for walls, ceilings and partitions. The Standard defines the permissible variations in dimensions, the types of edges and the requirements for the cores (gypsum layer between paper face layers) and surface finishes of the various types of gypsum board.

The main types of gypsum board are:

- (a) Vinyl-Faced Gypsum Wallboard - this has a decorative vinyl film on the face side;
- (b) Water-Resistant Gypsum Wallboard - for use in bathtub and shower areas as a finish or base for adhesively applied wall tile;
- (c) Gypsum Backing Board - for use as a backing for further gypsum wallboard, acoustical tile, etc.; and
- (d) Gypsum Sheathing - a gypsum board for use as an exterior sheathing over which a suitable exterior finish, such as aluminum siding, is applied.

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A82.42-1950

QUICKLIME FOR STRUCTURAL PURPOSES

This nine-page Standard covers all forms of quicklime (such as crushed lime, granular lime, ground lime, lump lime, pebble lime and pulverized lime) used for structural purposes.

The Standard includes requirements for the chemical composition of the quicklime. In an appendix it gives guidelines for the slaking of lime (combining water with the lime to form lime putty) and the subsequent preparation for use in mason's mortar or plaster coats.

A82.43-1950

HYDRATED LIME FOR MASONRY PURPOSES

This eight-page Standard covers normal hydrated lime which, after mixing with water, is suitable for use in mortar. It may also be used for the scratch coat or brown coat of plaster, for stucco and for addition to Portland cement concrete.

A82.44-1950

NORMAL FINISHING HYDRATED LIME

This eight-page Standard covers one type of finishing hydrated lime: Type N - 'normal finishing hydrated lime'. It is suitable, after mixing with water, for use in the scratch, brown and finish coats of plaster, for stucco, for mortar, and as an addition to Portland cement concrete.

A82.56-M1976

AGGREGATE FOR MASONRY MORTAR

This eight-page Standard covers the requirements for materials used as aggregate* for masonry mortar including the size limits of the aggregate by percentage of fine and coarse particles; the maximum amount of undesirable substances which may be included; and the minimum acceptable compressive strength* of the aggregate.

*See Glossary for definition.

A93-1965

VENTS FOR BUILDINGS

This 13 page Standard covers screened, rainproof vents for use in ventilating spaces in buildings.

Vents are supplied in the following types:

Type A - for installation on vertical surfaces;

Type B - for installation on sloping surfaces;

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- Type C - for installation on roof ridges;
- Type D - for installation on horizontal roof surfaces; and
- Type E - for installation on the underside of eaves or overhangs of roofs.

All vents are marked with the manufacturer's name or trademark, the type and the actual ventilating area of the vent.

A101-M1977

MINERAL FIBRE THERMAL BUILDING INSULATION

This 23 page Standard states minimum requirements for the various types of mineral fibre* insulation currently available and intended for use in houses and other heated buildings.

The Standard covers the following types of mineral fibre insulation:

- Type IA - Preformed⁽¹⁾, without membrane, intended for friction fit* between studs or joists;
- Type IB - Preformed, with a vapour barrier membrane⁽²⁾ on one side;
- Type IC - Preformed, with a vapour barrier membrane on one side and with a vapour permeable membrane⁽³⁾ on the other side;
- Type ID - Preformed, with additional or alternate membranes for increased resistance or added resistance to fire, or to air or heat flow;
- Type II - Pouring insulation, consisting of loose mineral fibres, suitable for application by hand; and
- Type III - Blowing insulation, consisting of loose mineral fibres, suitable for application by being blown through a hose by air pressure.

Mineral fibre insulation is supplied in packages marked with the type and the name of the manufacturer or trademark. Packages of Type I insulation are also marked to show the thermal resistance RSI(R)* for the thickness of the insulation they contain, as well as the dimensions and area covered by the contents. Packages of Type I insulation having vapour barrier membranes are also marked to show the type of vapour barrier.

Packages of Types II & III insulation are marked to indicate the minimum thickness in millimeters required to obtain thermal resistances RSI(R)* of 1.4(8), 2.1(12), 2.8(16), 3.5(20), 4.2(24) and 4.9(28), also to indicate the weight of contents and area covered at the various thicknesses.

Notes to Standard A101:

- (1) "Preformed" means in the form of batts, blankets or rolls.

*See Glossary for definition

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- (2) 'Vapour barrier membrane' means the sheet material attached to the side of the insulation intended to face the inside of the heated building to provide resistance to the passage of water vapour. Vapour barriers are of two types: Type 1 is intended for use in residences; insulation having a Type 1 vapour barrier is so marked. Type 2 is unmarked.
- (3) 'Vapour permeable membrane' means the sheet material enclosing the two long edges and/or the face of the batt opposite the vapour barrier membrane and which does not provide resistance to the passage of water vapour.

A123.1-M1979

ASPHALT SHINGLES SURFACED WITH MINERAL GRANULES

This 14 page Standard covers asphalt roofing in shingle form. The shingles are made of roofing felt saturated* and coated with asphalt, and surfaced on the upper side with mineral granules.

The Standard includes the requirements for the shingles such as size, weight and flexibility. The Standard requires the weight of the portion of the shingle which will be exposed to the weather to be not less than 4.06 kg/m² (0.94 psf); for roofs requiring 2 thicknesses of shingles this would be a minimum of 8.12 kg/m² or approximately 190 pounds per 100 sq. ft., and for roofs requiring 3 thicknesses of shingles, 12.18 kg/m² or approximately 280 pounds per 100 sq. ft.

Each package of shingles is marked with the brand or name of the manufacturer or distributor, the quantity, style, type and colour. Directions for application are in at least every sixth package.

An appendix lists types of shingles which are covered by the Standard. Other types, also meeting the requirements of the Standard, may be available even though they are not in this list.

The types listed in the appendix are:

- (a) Self-Sealing Shingles are made with strips or spots of asphalt adhesive which, if it is not too cold or damp, or they are not oxidized, or contaminated with dust, etc., will adhere to the next row of shingles.
- (b) Low-Slope Shingles, intended for use on slopes less than 1:3 (18.5°) down to 1:6 (9.5°). Packages contain guidelines for the application of adhesive onto which the next row of shingles is laid.
- (c) Interlocking Shingles are those that are shaped so that some part of the lower or butt edge may be locked into, or inserted under, a part of the next row.
- (d) Individual Shingles may be applied in different, recognized methods with exposed corners fastened with staples, clips or adhesive. They may also be used for capping hips and ridges of roofs.

*See Glossary for definition.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

A123.2-M1979

ASPHALT COATED ROOFING SHEETS

This 13 page Standard covers sheets of asphalt saturated* roofing felt, coated on one or both faces with asphalt and surfaced with mineral matter of various particle sizes. All types are packaged in rolls. Packages are marked to show the name of the product and manufacturer and the area of the roll.

The types covered are:

- (a) Type M, Mineral Surface Roofing - A sheet of asphalt saturated* felt, coated on both sides with asphalt, and surfaced with mineral granules on the entire weather (top) side, except that one edge, not more than 102 mm (4") wide, may be left bare of granules and may be either asphalt coated or uncoated to lap under the next sheet;
- (b) Type MC, Wide Selvage Roofing - Similar to Type M, but surfaced on the weather side with mineral granules for half of the width, less 25 mm (1");
- (c) Type S, Smooth Surface Roofing - A sheet of asphalt saturated* felt, coated on both sides with asphalt, and surfaced on both sides with fine mineral matter;
- (d) Type CF, Coated Base Sheet - A sheet of asphalt saturated* felt, coated on one or both sides with asphalt and surfaced with fine mineral matter.

*See Glossary for definition.

A123.3-M1979

ASPHALT OR TAR SATURATED ROOFING FELT

This 12 page Standard covers roofing felt saturated* with asphalt or tar, with or without perforations (small holes or slots), for use in waterproofing systems and in the construction of built-up roofing* using either asphalt or coal tar. Both types are packaged in rolls. Packages are marked to show the name of the manufacturer and the coverage or area of the roll.

The types covered are:

- (a) Roofing felt, made of animal, vegetable or mineral fibres saturated* with asphalt or coal tar; and
- (b) Roofing felt, made of asbestos fibres saturated* with asphalt.

*See Glossary for definitions.

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A123.4-M1979

BITUMEN FOR USE IN CONSTRUCTION OF BUILT-UP ROOF COVERINGS AND DAMPPROOFING AND WATERPROOFING SYSTEMS

This 14 page Standard covers bitumen* intended for use in the construction of built-up roofs* of various types and slopes and in dampproofing and waterproofing systems. Bitumen is supplied in bulk, or packaged in containers marked with the name or brand of the manufacturer or distributor, the type of bitumen and the gross and net weight of the contents.

The following types are covered by this Standard (where slopes are indicated they are offered as a guide only):

(a) **Asphalts:**

- Type 1 - is for use on built-up roofs* with slopes not more than 1:16 (3.5°); and for use as dampproofing and waterproofing below ground level, provided that the surface of the dampproofing or waterproofing will not reach a temperature higher than 25°C (80°F);
- Type 2 - is for use on built-up roofs* with slopes greater than 1:16 (3.5°) and less than 1:8 (7°) or for use as dampproofing and waterproofing above ground level provided that the surface of the dampproofing or waterproofing will not reach a temperature higher than 52°C (125°F);
- Type 3 - is for use on built-up roofs* with slopes at least 1:8 (7°) but less than 1:2 (26°); or for use as dampproofing and waterproofing above ground level on vertical surfaces exposed to direct sunlight or elsewhere where the surface of the dampproofing or waterproofing may reach a temperature higher than 52°C (125°F);

(b) **Coal Tar Pitches:**

- Type A - is for use on built-up roofs* with slopes less than 1:24 (2.5°) or for use as dampproofing and waterproofing above ground level provided that the surface of the dampproofing or waterproofing will not reach a temperature higher than 52°C (125°F);
- Type B - is for use as dampproofing and waterproofing below ground level provided that the surface of the dampproofing or waterproofing will not reach a temperature higher than 25°C (80°F).

Note: When asphalts covered by this Standard are used for dampproofing or waterproofing the recommended way of applying them is specified in CGSB Standard 37-GP-37M, "Application of Hot Asphalt for Dampproofing or Waterproofing".

An appendix recommends that, when bitumens* are used over a primer, the primer should conform to one of the following CGSB Standards:

- (a) 37-GP-9M "Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing or Waterproofing"; or

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- (b) 37-GP-32M, "Primer, Coal Tar, for Coal Tar Roofing, Dampproofing or Waterproofing".

*See Glossary for definitions.

A123.17-1963**

ASHPHALT-SATURATED FELTED GLASS-FIBRE MAT FOR USE IN CONSTRUCTION OF BUILT-UP ROOFS

This seven-page Standard covers felted glass-fibre mat (a sheet of glass fibres bonded together with a resin material) saturated* with asphalt for use in construction of built-up roofs*. It describes the requirements for the glass-fibre mat, the asphalt and the finished mat.

Glass-fibre mat is supplied in the following types:

- Type I - Ply Sheet*;
Type II - Base (bottom) Sheet; and
Type III - Combined Base Sheet (has an absorbent sheet of paper laminated to it to prevent penetration of asphalt).

The glass-fibre mat is supplied in rolls, packaged in cartons or paper and marked with the name or brand of the manufacturer or distributor, the type, weight and approximate area of contents.

*See Glossary for definition.

**Written in error in Code as "A123.17-1953"

A126.1-1977

VINYL-ASBESTOS FLOOR TILE

This 32 page Standard covers the requirements for vinyl-asbestos floor tile, including dimensions, squareness, flexibility and resistance to solvents*, indentation* and curling.

Vinyl-asbestos floor tile is supplied in thicknesses of 1.6, 2.0 and 3.2 mm (1/16", 0.80" and 1/8") and the following types:

- Type A - Plain and Mottled Tile (the colour of the plain tiles and the random colours of the mottled tiles extend for the full tile thickness); and
Type B - Surface Design Tile (The pattern of contrasting colours is in the surface of these tiles which are not suitable for use in heavy foot-traffic areas).

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Containers are marked with the name of the manufacturer or distributor, the type, size, thickness, pattern, colours, number of tiles and area covered.

*See Glossary for definition.

A126.3-1972

SHEET VINYL FLOORING PRODUCTS

This 13 page Standard covers the requirements for sheet vinyl flooring including dimensions, flexibility, resistance to solvents* and indentation*, and conditions for use.

Sheet vinyl flooring is supplied in the following types:

- Type 1 - has a clear, vinyl wearing surface and is available in widths of 1.83, 2.74 and 3.65 m (6', 9' and 12') and thicknesses of 1.52 and 1.65 mm (0.060" and 0.065")
- Type 2 - has a pigmented (coloured), vinyl wearing surface and is available in a 1.83 m (6') width and thicknesses of 1.52, 1.65 and 2.16 mm (0.060", 0.065" and 0.085").

Both types and the thicknesses are suitable for residential use.

Either type may be supplied with one of the following backing materials making them suitable for use in certain areas, as follows:

Backing Material	Description of Backing Material	Areas of Use
Organic*	Organic fibres, with or without a resin saturant*	Suspended floors only
Inorganic*	Inorganic fibres saturated* with an alkali-resistant and moisture-resistant material	Suspended, on-grade or below-grade floors.*
Filled* Vinyl	Filled*, vinyl resins	Suspended and on-grade floors only*
Vinyl Foam	Vinyl foam, including a strengthening fibre component	Suspended, on-grade or below-grade floors*

Containers or rolls of this flooring are marked with the name of the manufacturer and/or distributor, the type, thickness, pattern, colour and coverage of contents.

*See Glossary for definition.

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A145-1959

RUBBER FLOOR TILE

This seven-page Standard covers the requirements for rubber floor tile including the hardness, gloss and materials used in its manufacture.

The standard size of this tile is 230 x 230 mm (9" x 9") in thicknesses of 2, 3 and 8 mm (0.080", 1/8" and 3/10").

Rubber tile may be applied to concrete floors in contact with the earth provided that special adhesive recommended by the tile manufacturer is used.

Packages are marked with the name of the manufacturer, the tile size, thickness, colour and quantity contained.

A146-1965

LINOLEUM PRODUCTS

This 11 page Standard covers the requirements for linoleum flooring in tile or sheet form including dimensions, flexibility, resistance to indentation* and the materials used in its manufacture.

Linoleum flooring is supplied in thicknesses ranging from 1.65 to 4.5 mm (0.065" to 0.177"), the "domestic gauge*" being 2 mm (0.080").

Packages are marked with linoleum thickness, colour and quantity contained.

*See Glossary for definition.

A165.1-M1977

CONCRETE MASONRY UNITS

This 33 page Standard applies to concrete blocks made from a mixture of Portland cement, water and mineral aggregate*, with or without the addition of other materials, and includes minimum strength requirements and permissible variations in dimensions.

Concrete blocks are classified in this Standard by a 'four-facet' system⁽¹⁾. The 'facets' are defined as follows:

First facet - The first facet, one letter, defines a hollow or solid block; hollow blocks are designated H and solid blocks S;

Second facet - The second facet, a number, defines the minimum compressive strength* of the unit.⁽²⁾

Third facet - The third facet, a letter, defines the density (weight) and maximum water absorption of the unit. Four letters are used: A, B, C & N. The 'A' Class having the highest density and least water absorption and the 'N' Class having no established limits for either.

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Fourth facet - The fourth facet, a letter, defines the moisture content at the time of shipment in relation to the shrinkage characteristics of the block. Two letters are used: M & O. The 'O' is used where the moisture content has not been established at the time of manufacture. Shrinkage of concrete blocks is not normally a serious problem in residential construction, therefore either the 'M' or the 'O' blocks are suitable for this purpose.

An appendix contains some guidelines regarding the properties, availability and use of concrete masonry units.

(1) An example of this 'four-facet' classification is "H/7.0/C/O" or "H/1000/C/O" which means a Hollow concrete block with a compressive strength of 7.0 MPa (1000 psi), a density (Weight) less than 1 700 kg/m³ (105 pounds per cubic foot) and an undefined moisture content at the time of shipment.

(2) Concrete masonry units which have a minimum compressive strength* of 7 MPa (1,000 psi) are considered suitable for exterior use, including foundations and basements; typical masonry units made in Canada have a minimum compression strength of 7 MPa (1000 psi) for hollow units and 12.5 MPa (1800 psi) for solid units.

*See Glossary for definition.

A165.2-M1977

CONCRETE BRICK MASONRY UNITS

This seven-page Standard applies to concrete building bricks and similar solid units made from a mixture of Portland cement, water and suitable aggregates*, with or without the addition of other materials, and includes minimum compressive strength* requirements and permissible variations in dimensions.

Concrete bricks are supplied in two types:

- Type I - Brick suitable for use in facing masonry exposed to the weather; and
- Type II - Brick intended for use as backup (behind facing bricks) or interior facing masonry and not suitable for exposure to the weather.

Notes: (1) Both types may be ordered with a specific moisture content at time of shipment.

(2) Type I is also available in three compressive strengths*, classified as follows:

Type I-3	-	minimum 15MPa (2,200 psi)
Type I-4	-	minimum 25MPa (3,800 psi)
Type I-5	-	minimum 30MPa (4,500 psi)

All are suitable for houses.

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Bricks with small chips, maximum 12 mm (1/2"), are permissible provided that they do not exceed 5% of any one shipment.

The Standard states that the front face or faces of concrete bricks to be used in exposed walls is to match the colour and texture of an approval sample consisting of the long faces of not less than four bricks.

*See Glossary for definition.

A165.3-M1977

PREFACED CONCRETE MASONRY UNITS

This eight-page Standard covers the requirements for concrete masonry units (blocks or bricks) manufactured with the surfaces which will be exposed to view covered with a special facing made up of a binder and a filler or cement and having a gloss, semi-gloss or matte finish. The basic units to which the finish is applied conform to A165.1-M1977 or A165.2-M1977. The Standard covers such requirements as surface gloss, bond strength of facing material to the masonry unit and resistance to staining, to cracking and to freezing and thawing.

A165.4-M1977

AUTOCCLAVED CELLULAR UNITS

This 10 page Standard applies to solid autoclaved cellular* concrete masonry units made of Portland cement and/or lime (slaked or unslaked), finely ground silica sand and/or other acceptable materials, and cured in an autoclave (a pressure tank) by high-pressure steam.

These units are supplied in the following grades:

Grade	Minimum compressive strength of individual unit, MPa (psi)	Minimum width of unit, mm (in.)	
		non-loadbearing	loadbearing
1	1.6 (240) (use not permitted by the Code).	75 (3)	-
2	2.4 (350)	50 (2)	150 (6)
3	4.3 (625)	50 (2)	150 (6)
4	5.0 (725)	50 (2)	150 (6)

The requirements covered by this Standard include the materials to be used, the method of curing* and permissible variations in density (weight) and dimensions.

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The shrinkage of one of these units on drying may vary from about 0.02% to about 0.07% but normally should not exceed 0.10%.

*See Glossary for definition

A247-M1978

INSULATING FIBREBOARD

This 11 page Standard provides the minimum requirements for insulating fibreboard manufactured from wood or other vegetable fibre. It includes required widths, lengths, thicknesses and strengths. For interior use the boards may be supplied unfinished or painted. Roof boards and sheathing are made in layers, bonded together with a water-resistant adhesive.

Insulating fibreboard is supplied in the following types:

- Type I - Roof Board;
- Type II - Sheathing; and
- Type III - Interior Boards:
 - (a) Building board (sound-deadening) for interior finish;
 - (b) Ceiling tile;
 - (c) Lay-in panel for suspended ceilings.

Packages of insulating fibreboard meeting this Standard are marked with the manufacturer's name or brand, type and thickness.

CAN3-A266.1-M78 AIR-ENTRAINING ADMIXTURES FOR CONCRETE

This 19 page Standard covers the requirements for air-entraining* admixtures for use in Portland cement concrete.

Admixture containers or packages are marked with the brand name, manufacturer's name or trade mark and the quantity of the contents.

Information on the use of these admixtures is contained in CAN3-A266.4, "Guidelines for the Use of Admixtures in Concrete".

*See Glossary for definition.

CAN3-A266.2-M78 CHEMICAL ADMIXTURES FOR CONCRETE

This 23 page Standard applies to water-reducing strength-increasing admixtures, set-retarding admixtures, accelerating admixtures, and strength-increasing admixtures. It covers material requirements and information regarding use to be supplied by the manufacturer.

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This Standard does not include requirements for several other types of chemical admixtures, such as accelerating water-reducing, non-chloride accelerating admixtures, and strength-increasing accelerating admixtures.

The following types of admixtures are covered by this Standard:

(a) **Water-Reducing Strength-Increasing Admixtures:**

Type WN - Normal Setting - An admixture that increases the strength of concrete primarily as a result of reducing the water required but has little effect upon the initial set of concrete;

Type WR - Set Retarding - An admixture that increases the strength of concrete, primarily as a result of reducing the water required and slows the initial set of concrete;

(b) **Set-Retarding Admixtures:**

Type R - An admixture that moderately slows the initial set of concrete;

Type RX - An admixture that produces considerable slowing of the initial set of concrete;

(c) **Accelerating Admixtures:**

Type AC - A chloride type admixture that accelerates the initial set and early strength development of concrete;

(d) **Strength-Increasing Admixtures:**

Type SN - Normal Setting - An admixture that increases the strength of concrete but has little effect upon the water required or the initial set of concrete;

Type SR - Set Retarding - An admixture that increases the strength of concrete and slows the initial set of concrete but has little effect upon the water required.

Admixture containers or packages are marked with the manufacturer's name or trademark, the type or types and the quantity of the contents.

Information on the use of these admixtures is contained in CAN3-A266.4 "Guidelines for the Use of Admixtures in Concrete".

B51-1975

CODE FOR THE CONSTRUCTION AND INSPECTION OF BOILERS AND PRESSURE VESSELS

This 20 page Code applies to all boilers, pressure vessels (these include hot water tanks), as well as pressure fittings and piping, as required by the Ontario Boiler and Pressure Vessel Act.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

The Code lists the standards governing the design, construction, installation, operation, inspection, testing and repair of boilers, pressure vessels, pressure fittings and piping and requires the registration and acceptance of the design of all such items.

B111-1974

WIRE NAILS, SPIKES AND STAPLES

This 34 page Standard covers recommended lengths, gauges* and other requirements for the various kinds of nails, spikes and staples commonly used in building construction. These include steel, copper and aluminum nails, hot-galvanized, cement-coated and other finishes, and guidelines for intended uses.

*See Glossary for definition.

B127.2-M1977

COMPONENTS FOR USE IN ASBESTOS CEMENT BUILDING SEWER SYSTEMS

This 13 page Standard covers asbestos cement* pipe, couplings and fittings for use in building sewer systems, and includes requirements for material, workmanship, dimensions, bending strength, crushing strength and joint tightness.

Pipe made to this Standard meets the requirements of CGSB Standard 34-GP-23M "Pipe, asbestos-cement, sewer, house connection" and is classified as follows:

- (a) Class 1500, 2400 or 3300 in accordance with the resistance to crushing which the pipe must have; and
- (b) Type A - for use where moderately aggressive** water or water and soil of moderate sulphate content are expected to come into contact with the pipe; or
Type B - for use where highly aggressive** water or water and soil of high sulphate content are expected to come into contact with the pipe.

The Standard contains a guide for determining the type of pipe to be used under various soil conditions.

Pipe markings include size, class, year of manufacture and "A/C Sewer". Coupling markings include size, class and year of manufacture. Rubber jointing rings are marked to show size and year of manufacture.

*See Glossary for definition.

**Water containing liquids which are harmful to asbestos-cement.

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B131.1-1969

THICKNESS DESIGN OF CAST-IRON PIPE

This 78 page Standard covers methods for deciding the thicknesses required for cast-iron pipe to meet different internal and external pressures. The Standard is divided into four major sections:

1. Thickness tables for standard conditions;
2. General procedure for deciding upon required pipe thicknesses;
3. Design theory and methods for deciding upon pipe thicknesses, earth loads, and truck loads for both standard and special conditions; and
4. Design procedure for a special installations when pipe must be carried on supports, up to 6 m (20') apart, either aboveground or underground.

B131.5-1976

CAST-IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS, FOR WATER OR OTHER LIQUIDS

This 18 page Standard covers 75 mm (3") through 610 mm (24") cast-iron pipe, cast by spinning in metal molds, for water or other liquids. Characteristics of such pipe with push-on joints, mechanical joints and bell-and-spigot joints are given in tables. This Standard may also be used for pipe with other types of joints. Selection Tables are provided for deciding upon the required thicknesses of pipe under various laying conditions (such as in flat-bottom trenches or on sand or gravel)

B131.9-1978

GRAY-IRON AND DUCTILE-IRON FITTINGS, 3-INCH THROUGH 48-INCH FOR WATER AND OTHER LIQUIDS

This 45 page Standard covers 75 mm (3") through 1.5 m (48") gray-iron and/or ductile-iron* fittings to be used with gray-iron or ductile-iron pipe for water and other liquids. Specifications for fittings with mechanical joints and flange joints are listed in tables. This Standard may also be used for fittings with push-on joints or such other joints as may be agreed upon at the time of purchase.

*Gray-iron and ductile-iron are two types of cast iron.

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B137.1-1970

POLYETHYLENE PIPE FOR COLD WATER SERVICES

This 16 page Standard covers polyethylene pipe and tubing, and plastic insert fittings for use with ID (internal diameter) sized polyethylene pipe, primarily for use in potable* cold water supply services.

This Standard includes requirements for material, workmanship, dimensions, and resistance to internal pressure and to cracking or splitting. Methods of marking to indicate compliance with this Standard are also included. Marking includes pipe size, "B137.1", classification series number, and the word "Potable" or letter "P".

Pipe and tubing classifications are:

- (a) Pipe: Series 50, 75, 100, 125 and 160
- (b) Tubing: Series 160

(The Series number is the maximum working pressure in psi for that pipe when used with cold water)

*See Glossary for definition.

B137.3-M1981

RIGID POLY (VINYL CHLORIDE) (PVC) PIPE FOR PRESSURE APPLICATIONS

This 20 page Standard covers rigid polyvinyl chloride (PVC) pipe and fittings intended for use in pressure applications such as water mains, water service piping, etc. Fittings include threaded and socket types and plastic-to-metal types. This pipe is not suitable for use in potable* water supply services.

This Standard includes requirements for materials, workmanship, dimensions, solvent cement, and pipe and fitting markings, which include classification number, "B137.3", pressure rating, and pipe size.

Pipe classifications are:

- (a) IPS Schedule 40, 80;
- (b) IPS SDR (Series) 41(100), 32.5(125), 26(160); 21(200), 17(250);
- (c) IPS DR 25, 18, 14;
- (d) CI DR 25, 18, 14.

(The pipe Series number in brackets is the maximum working pressure in psi for that pipe when used with cold water.)

*See Glossary for definition.

CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

B137.7-1976

POLYBUTYLENE PIPE FOR COLD WATER USAGE

This 14 page Standard covers polybutylene pipe and tubing for potable* cold water usage and includes requirements for material, workmanship, dimensions, and resistance to internal pressure. Pipe markings include pipe size, "B137.7", classification number, pressure rating and the word "Potable*" or letter "P".

Pipe and tubing classifications are:

- (a) Pipe: Series 100, 160, 200 and 250
- (b) Tubing: Series 160

(The Series number is the maximum working pressure in psi for that pipe when used with cold water).

*See Glossary for definition.

B139-1976

INSTALLATION CODE FOR OIL BURNING EQUIPMENT

This 89 page Installation Code covers requirements for the installation of, alteration of, or addition to oil burning equipment including oil storage tanks, flue pipes and controls.

The Installation Code also covers clearances required around the equipment, and venting and air supply.

The Installation Code requires that only oil burning equipment which is approved by the authority having jurisdiction is installed; that the installation of, alteration of, or addition to oil burning equipment is made only by mechanics experienced in such services; and that such work is carried out in accordance with the manufacturer's instructions and is acceptable to the authority having jurisdiction.

B181.2-1973

POLY (VINYL CHLORIDE) DRAIN, WASTE AND VENT PIPE AND PIPE FITTINGS

This 27 page Standard covers polyvinyl chloride (PVC) pipe and pipe fittings primarily for use in drainage, waste, and vent systems inside buildings, and for use as drains and sewers. In addition requirements for PVC closet (toilet) flanges and factory assembled expansion joints are included.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

This Standard includes requirements for material, workmanship, dimensions, strength, chemical resistance, water resistance, solvent*-cement, expansion joints and closet flanges.

Only solvent-cements and primers recommended by pipe and fittings manufacturers are to be used. Containers of solvent-cement and primers are labelled with the name of the manufacturer, type of material, recommended procedure for use and safety procedures normally required for solvents* of this type.

Pipe and pipe fittings are marked with the manufacturer's name or trademark, and the symbol PVC. Pipe is additionally marked with size and "DWV* PIPE".

Expansion joints are marked with the manufacturer's name or trademark, the symbol PVC, size of pipe with which it is to be used, the words "DWV* Expansion Joint", intended direction of flow and "Type I" or "Type II". Types are as follows:

- Type I - a joint providing at least 75 mm (3") of travel; and
- Type II - a joint providing at least 200 mm (8") of travel.

Backwater valves are classified as follows:

- Type I - for use in horizontal pipe runs to floor drains, sewers, holding tanks, etc.;
- Type II - for use as a part of a floor drain; and
- Type III - for use in vertical piping such as in a holding tank.

Note: installation instructions are provided with each backwater valve.

*See Glossary for definition.

B181.4-1976

POLYETHYLENE (PE) DRAIN, WASTE, AND VENT PIPE AND PIPE FITTINGS

This 13 page Standard covers polyethylene pipe and pipe fittings for use in drainage, waste, and vent systems inside buildings, and for use as sewers. These requirements apply to pipe and fittings which are intended to be joined by heat using the joining equipment supplied by the manufacturer.

This Standard is not intended to cover the use of plastic pipe and fittings from different manufacturers but does allow for special fittings for joining pipes from different manufacturers, provided the method of joining is other than heat.

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The Standard includes requirements for materials, dimensions, pressure and expansion joints. An appendix provides recommendations for heat joining of polyethylene pipe and fittings and recommended methods for underground and aboveground installation of polyethylene pipe.

Pipe and fittings are marked with the manufacturer's name or trademark, the size and the symbols "PE 3 DWV" or "PE III DWV". (PE means "Polyethylene"; 3, or III, is the type of polyethylene; DWV means "Drain, waste and vent").

B182.1-M1977

PLASTIC DRAIN AND SEWER PIPE AND PIPE FITTINGS

This 30 page Standard describes requirements for material (which includes Acrylonitrile-Butadiene-Styrene (ABS) and Polyvinyl Chloride (PVC)), workmanship, dimensions, strengths, and joint tightness for the following:

- (a) Plastic drain and sewer pipe and plastic pipe fittings;
- (b) Single-walled, non-corrugated*, perforated plastic pipe and fittings; and
- (c) Solvent* cement.

Note: The following Standard CSA B182.11 covers the recommended practice for the installation of this pipe and fittings.

Plastic pipe and fittings made to this Standard are suitable for non-pressure drainage of sewage and other liquid wastes in the following applications:

- (a) Sewers and storm and building drainage systems;
- (b) Leaching* system piping for septic tank installations;
- (c) House connections to septic tanks; and
- (d) Footing and foundation drains (use the perforated pipe)

Pipe fittings are marked with the manufacturer's name or trademark, type of material and "B182.1". Pipe is similarly marked and also is marked with pipe size and the word "sewer" (or "égout"). Solvent* containers are labelled with manufacturer's name or trademark, type of material, "B182.1", "sewer" (or "égout"), recommended procedures for use and safety procedures normally required for solvents of this type.

*See Glossary for definition.

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B182.11-1967

RECOMMENDED PRACTICE FOR THE INSTALLATION OF PLASTIC DRAIN AND SEWER PIPE AND PIPE FITTINGS

This 14 page document provides recommendations for the installation of plastic drain and sewer systems. Included are procedures for the unloading, inspection and storage of pipes, fittings and cements, and their assembly.

Recommended practices for trenching, testing and repair of these systems are also included.

Requirements for materials, strengths and dimensions of pipe, fittings and solvent*-cements are contained in the previous Standard CSA B182.1.

Note: Solvent-cement is flammable and should not be stored or used near fire or flame; its fumes should not be inhaled and prolonged contact with skin should be avoided.

*See Glossary for definition.

B228.1-1968

PIPES, DUCTS, AND FITTINGS FOR RESIDENTIAL TYPE AIR CONDITIONING SYSTEMS

This 22 page Standard applies to pipes, ducts and fittings for use in residential air conditioning systems (winter heating, summer cooling or year round). These systems are those in which the capacity of the heating unit in the system is not more than 44 kW (150,000 Btu per hour).

The Standard gives the thicknesses required for galvanized sheet steel, sheet aluminum and tin plate (but see the Table in the Building Code for thicknesses required by the Code). The Standard also gives the dimensions required for flue pipes, round and square ducts, elbows, angles, tees, plenum chambers and other items and fittings. It also gives requirements for stiffening of ducts and the relative sizes of fittings connecting to ducts or flue pipes.

C22.1-1978

CANADIAN ELECTRICAL CODE, PART I: SAFETY STANDARDS FOR ELECTRICAL INSTALLATIONS

This 498 page Code covers all electrical work and electrical equipment operating or intended to operate at all voltages in electrical installations for residences and other buildings.

See also Summary of "Electrical Safety Code of Ontario" on page 72.

CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

C309-1977

**PERFORMANCE REQUIREMENTS FOR GLASS-LINED STORAGE TANKS FOR
HOUSEHOLD HOT WATER SERVICE**

This 26 page Standard covers the requirements for the metal tank, the glass-lining bonded to the inside of the tank and the cathodic protection* of the tank walls.

The tanks which are covered by this Standard are those which are 610 mm (24") in diameter or less; designed to operate at a maximum pressure of 1 MPa (150 psi); and which have the water heated by not more than:

- (a) Electric - Single element, 4,500 watts;
- (b) Electric - double element, 4,500 watts upper, 4,500 watts lower with a 'flip-flop' service (alternate operation of each element);
- (c) Oil - 2.85 litres (0.75 U.S. gallons) per hour
- (d) Gas-fired- 22 kW (75,000 Btu per hour)

Tanks meeting this Standard are marked with the manufacturer's name or trademark, the month and year of manufacture and the number of this standard: "C309".

*This is a special fitting installed inside the tank to protect the tank walls against rust/corrosion. It is designed to be easily removable for replacement when it is worn out. Information on the probable life of this fitting should be provided by or obtained from the manufacturer.

G40.21-M1978

STRUCTURAL QUALITY STEELS

This 23 page Standard covers structural quality steel plates, shapes, hollow sections, sheet piling and bars for general construction and engineering purposes.

Structural steel is supplied in the following types:

- Type G - General Construction Steel: meets minimum strength requirements but is not suitable for welding at the site;
- Type W - Weldable Steel: Suitable for use where low temperature toughness of weld is not a prime consideration;
- Type T - Weldable Steel: as Type W, but suitable for use where low temperature toughness of weld is a prime consideration;
- Types R & A - Two types of Corrosion-Resistant Structural Steels; and

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Type Q - Specially Heat Treated Steel Plate: for special purposes.

These types are further classified by grades according to their strength levels, ranging from Grade 230 G (Grade 33 G) to Grade 700 Q (Grade 100 Q), where the grade number represents the strength of the steel in MPa (ksi) and the grade letter represents the type of steel. Not all steels are available in all grades.

Structural steel supplied against this Standard is marked (on each piece or on one piece of each bundled shipment) to show the steel type and grade, also the producer's name, brand or tradename. Marking may be by a colour or two colours painted on one end of a piece; the marking for Grade 300 W (Grade 44 W) is green in one or two colours, with no other colour marked.

HC7.6-1968

SEAMLESS COPPER WATER TUBE, DRAINAGE TUBE (DWV*), AND HYDRONIC* HEATING TUBE (TYPE 'H')

This 13 page Standard covers copper tube (pipe) suitable for general plumbing purposes, underground water services, hot water heating purposes; drainage such as soil, waste and vent piping; and for similar purposes for fluids and gases. This copper tube is used with solder, flared or compression type fittings.

The Standard covers the requirements for the copper; tensile strengths; tolerances* for tube sizes and weights; and resistances to internal pressure.

Copper tube is supplied in four types according to the thickness of the tube walls: Types K, L, M and DWV*. The dimensions of all the types are given in a Table, Type K having the thickest wall and Type DWV the thinnest. A fifth type, Type H, is for hot water heating purposes and comes in three sizes only, each with its own wall thickness.

All types are available in straight lengths and Types K and L are also available in coils.

Types K and L in coils are supplied in annealed* temper only; in straight lengths they are available in either annealed temper or drawn* temper. Types M, DWV and H are supplied in drawn temper only.

Annealed temper tube is suitable for use with flared or compression fittings. It is also suitable for use with solder type fittings, provided that the tube ends are rounded and sized.

Drawn temper tube is suitable for use with solder type fittings. Types K and L tube, in the drawn temper, are also suitable for use with certain types of compression fittings.

Copper tube is marked at intervals along its length with the type and the manufacturer's name or trademark. Except when supplied in coils, copper tube is also marked continuously with colour marking as follows:

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

Type K - Green
Type L - Blue
Type M - Red
Type DWV - Yellow
Type H - White

*See Glossary for definition.

CAN3-086-M80

CODE FOR THE ENGINEERING DESIGN OF WOOD

This 139 page Standard provides technical information to assist in designing for the use of structurally graded* lumber, glued-laminated timber, plywood, piling, pole-type construction, metal plate joints for trusses and other major fastenings.

This Standard is intended for use in the design of buildings or other structures, or structural elements made from wood.

*See Glossary for definition.

0115-1967

HARDWOOD PLYWOOD

This 23 page Standard covers the requirements for hardwood plywood, including commonly available sizes and thicknesses.

Hardwood plywood is supplied in the following grades and types:

(a) Grades:

Grade Name	Veneer* Type		Grade Name Abbreviation
	Face	Back	
Good Two Sides	Good Grade	Good Grade	G2S
Good One Side Sound One Side	Good Grade	Sound Grade	G/S0
Good One Side	Good Grade	Backing Grade	G1S
Sound Two Sides	Sound Grade	Sound Grade	S02S
Sound One Side	Sound Grade	Backing Grade	S01S

The three types of veneer* used in the plywood grades are as follows:

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Good Grade) Both of these veneer types are free of open
) - defects (knots, holes or splits) although both
) have patches (very small, unnoticeable ones in
) the Good Grade); the Good Grade is
 Sound Grade) the higher quality and more suitable for a
 clear, varnish type of finish.

Backing Grade - is a veneer type which permits knots, holes and
 splits.

Note: An "Architectural Grade" is also available. This grade is specially selected from the Good Grade with variations from the standard grade as requested by the purchaser. No requirements for this grade are given in the Standard.

(b) **Types:**

The difference between the following three types of hardwood plywood is the kind of adhesive used for bonding the plies* together.

- Type I
(Exterior) - used for exterior or other severe conditions of exposure;
- Type II
(Interior) - used in interior construction, being sufficiently water-resistant to withstand reasonably high humidities and occasional damp conditions; and
- Type III
(Dry Bond) - used only under continuously dry conditions.

Each bundle of plywood is marked with the manufacturer's name or trademark, the kind of wood, the grade and the type of adhesive. In addition, hardwood plywood panels are marked with two colours to indicate the grade of the two face veneers, as follows:

- | | | |
|---------|---|-------|
| Good | - | Red |
| Sound | - | Blue |
| Backing | - | Black |

*See Glossary for definition.

0118.1-1980

WESTERN RED CEDAR SHINGLES, HANDSPLIT WESTERN RED CEDAR SHAKES,
AND MACHINE-GROOVED SHAKES

This 28 page Standard applies to shingles* and handsplit shakes* manufactured from Western Red Cedar and used for roofs and walls. The Standard covers sizes, tolerances* and the limitations on defects (such as knots and holes).

Western Red Cedar shingles and shakes are classified as follows:

CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

(a) Shingles

- No. 1 Grade (Blue Label)
- No. 2 Grade (Red Label)
- No. 3 Grade (Black Label)
- No. 4 Grade (Green Label)

Differences between the four grades include angle of grain, extent of sapwood, knots and other visual defects, tolerance* in shingle length (No. 1 Grade is the finest).

(b) Shakes

Handsplit-and-Resawn Shakes are tapered and have a split face and a sawn back;

Taper-Split Shakes have two split faces and a natural, shingle-like taper; and

Straight-Split Shakes have two split faces and are approximately the same thickness throughout.

(c) Remanufactured Shingles and Shakes

Rebutted-Rejointed Shingles are made in Grades 1 or 2. They are Grade 1 or 2 shingles machined to have parallel edges and squared corners;

Machine-Grooved Shakes are made from Grade 1 rebutted-rejointed shingles, one face receiving grain-like grooves; and

Sanded Shingles are made from Grade 1 rebutted-rejointed shingles, one face machine-sanded from the butt to near the tip.

Shingles are in three standard lengths 400, 500 and 600 mm (16", 18" and 24"); in random widths from minimum 65 or 100 mm (2 1/2" or 4") to maximum 350 mm (14"); and with butt thicknesses from 10 to 13 mm (0.40" to 0.50"). Standard widths and thicknesses depend upon shingle grade and length.

Shakes are in two standard lengths 500 and 600 mm (18" and 24"), in random widths from minimum 100 mm (4") to maximum 350 mm (14") and with butt thicknesses from 9 to 32 mm (3/8" to 1 1/4"). Standard thicknesses depend upon shake type and length.

Shingles and shakes are packaged in bundles. The approximate quantity in each bundle according to the various types and grades, as well as the area covered, is stated in the Standard. All bundles are marked to show sizes and grades.

Recommendations for the use of shingles and shakes on roofs and walls, as well as recommendations for preservative treatment, are contained in an appendix to the Standard.

*See Glossary for definition.

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0121-M1978

DOUGLAS FIR PLYWOOD

This 40 page Standard covers the requirements for Douglas Fir plywood including commonly available sizes and thicknesses, number and thickness of plies* for plywood of various thicknesses, plywood grades and specialty panels.

The adhesive used for bonding plies of all Douglas Fir plywood is a waterproof exterior type, suitable for exposure to extreme conditions of moisture and temperature.

Douglas fir plywood is supplied with three types of face veneer* summarized as follows:

- A Veneer - has a firm, smoothly cut, solid surface with inlaid patches to replace defects, but no open defects; and
- B & C Veneers - permit open defects (knot holes, pitch pockets, splits) and other defects in varying degrees.

Douglas Fir plywood is supplied in the following grades:

Plywood Grades	Veneer Types		Abbreviated Grade Marks
	Face	Back	
<u>Sanded Grades</u>			
Good Two Side	A	A	Good 2S G2S
Good One Side	A	C	Good 1S G1S
<u>Unsanded Grades</u>			
Select - Tight Face	B(1)	C	Select TF Sel TF
Select	B	C	Select
Sheathing	C	C	SHG
<u>Overlaid Grades</u> ⁽²⁾			
High Density Overlaid 30/30	B(1)	B(1)	HD Overlay 30/30 ⁽³⁾ HDO 30/30
Medium Density Overlaid Two Sides	C(1)	C(1)	MD Overlay 2S MDO 2S
Medium Density Overlaid One Side	C(1)	C	MD Overlay 1S MDO 1S

Notes

- (1) Permissible openings are filled.
- (2) This is plywood overlaid with resin-saturated* sheets on one or both faces; it is suitable for a high quality paint finish or for use unpainted.
- (3) 30/30 denotes weight of overlay, in kg/100m², each face.

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Douglas Fir plywood is also available in specialty panels with special face coatings or overlays, grooving, etc. The Standard does not cover these special face treatments or their bonding to the plywood.

All panels are marked to show the manufacturer, the bond type ("EXTERIOR"), the kind of plywood ("DFP" for Douglas Fir Plywood), the number of this Standard and the grade in full name or abbreviated as shown in the Table.

*See Glossary for definition.

0132.1-M1977

WOOD WINDOWS

This 33 page Standard describes requirements for materials, construction, and performance of wood windows.

These requirements cover: quality of lumber used; minimum acceptable thicknesses; types of jointing and fastening; ease of operation; operating and locking hardware; weatherstripping; resistance of the window to the passage of air or water; designing of the window to allow for the use of screens and storm sash, removable double-glazing or factory-sealed, double-glazing units; preservative treatment, including re-treatment of parts subsequently cut or bored; and requirements for glazing.

0132.2-M1977

WOOD DOORS

This 33 page Standard covers tolerances*, types of doors, standard sizes of doors and of glazed panels in doors, materials, adhesives, construction, grading of veneers and plywood facings, and testing methods. It describes requirements for wood doors of the following construction:

- (a) Flush doors (normal, smooth-faced doors)
 - (i) Solid Core (filled with built-up wood or wood particle board)
 - (ii) Hollow Core (filled with strips of wood to support the faces but with spaces between the strips. Interior doors may have strips made of insulation board)
- (b) Stile and Rail*
- (c) Moulded Skin (hard-pressed fibreboard*; for interior use only).

Doors are classified in two types:

- (a) Interior type; or
- (b) Exterior type.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

The Standard recommends that Exterior doors for residential use should be the flush, hollow core type or stile and rail type.

*See Glossary for definition.

0141-1970

SOFTWOOD LUMBER

This 49 page Standard covers the classifications and sizes of softwood* lumber for yard, structural, and shop use. It provides a common basis of understanding for the classification, measurement, grading and grade-marking* of rough and dressed* sizes of various items of lumber.

Softwood lumber conforming to this Standard is classified according to the use, extent of manufacture and size. Classifications most likely to be used for residential construction are as follows:

Use Classifications:

- (a) Yard Lumber - Lumber of those grades and sizes, which is generally intended for ordinary construction and general building purposes; and
- (b) Structural Lumber - Lumber that is 50 mm (2") or more in nominal* thickness and width for use as structural or framing members.

Manufacturing Classifications:

- (a) Rough Lumber - Lumber which has not been dressed* but which has been sawed, edged, and trimmed at least to the extent of showing saw marks or other marks made in the conversion of logs to lumber on the four long surfaces of each piece for its overall length;
- (b) Dressed* Lumber - Lumber that has been dressed by a planing machine (for smoothness of surface and uniformity of size) on one side (S1S), two sides (S2S), one edge (S1E), two edges (S2E), or a combination of sides and edges (S1S1E, S1S2E, S2S1E, S4S); and
- (c) Worked Lumber - Lumber which, in addition to being dressed*, has been matched or shiplapped as follows:
 - (i) Matched Lumber. Lumber that has been worked with a tongue on one edge of each piece and a groove on the opposite edge to provide a close tongue-and-groove joint when fitting two pieces together; when end matched, the tongue and groove are worked on the ends also;
 - (ii) Shiplapped Lumber. Lumber that has been worked or rabbeted on both edges of each piece to provide a close-lapped joint when fitting two pieces together.

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CANADIAN STANDARDS ASSOCIATION (CAN 3) (Continued)

Size Classifications:

Nominal* Size:

- (a) Boards - Lumber less than 50 mm (2") in nominal* thickness and 50 mm (2") or more in nominal width. Boards less than 150 mm (6") in nominal width may be classified as strips;
- (b) Dimension Lumber - Lumber 50 mm (2") or more, but less than 125 mm (5") in nominal thickness, and 50 mm (2") or more in nominal width. Dimension lumber may be further classified as framing, joists, planks, rafters, studs, etc.; and
- (c) Timbers - Lumber 125 mm (5") or more nominally in least dimension. Timber may be further classified as beams, stringers, posts, caps, sills, girders, purlins, etc.

Rough Dry** Size: The minimum rough dry thickness of finish, common boards, and dimension lumber of size 25 mm (1") or more nominal* thickness shall be not less than 3 mm (1/8") thicker than the corresponding minimum finished dry thickness, except that 20 per cent of a shipment may be not less than 2 mm (3/32") inch thicker than the corresponding minimum-finished dry thickness. The minimum rough dry widths of finish, common strip, boards, and dimension lumber shall be not less than 3 mm (1/8") wider than the corresponding minimum-finished dry width.

Dressed* Sizes: Dressed sizes of lumber equal or exceed minimum dimensions which are given in tables in the Standard.

Grading Rules*

The grading of lumber is based on either a visual inspection of each piece and the judgement of the grader or on the results of a method of mechanically determining the strength of structural lumber. Grading rules establish a maximum of 5 per cent below grade as a reasonable variation between graders.

Yard Lumber Grades:

The grading of yard lumber is based upon the uses for which the particular grade is designed and is applied to each kind with reference to its size and length when graded without consideration to further manufacture. On the basis of quality, the basic grade classifications of yard lumber are as follows:

- (a) Select - Lumber of good appearance and finishing qualities which is:
 - (1) Suitable for natural finishes:
 - (i) Practically clear*;
 - (ii) Generally clear and of high quality; and
 - (2) Suitable for paint finishes:
 - (i) Adapted to high-quality paint finishes;
 - (ii) Intermediate between high-finishing grades and common grades;
- (b) Common - Lumber which is suitable for general construction and utility purposes as follows:

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- (1) For standard construction use;
 - (i) Suitable for better type construction purposes;
 - (ii) Well adapted for good standard construction;
 - (iii) Designed for low-cost temporary construction; and
- (2) For less exacting construction purposes;
 - (i) Low quality;
 - (ii) Lowest recognized grade must be usable.

*See Glossary for definition.

**"Rough Dry" means before dressing and at the moisture content stated in the Standard.

0151-M1978

CANADIAN SOFTWOOD PLYWOOD

This 41 page Standard covers plywood made with softwoods such as Spruce, Hemlock and White Pine, as listed in the Standard.

All the requirements stated in this Standard, including grades, grade names and marking, are the same as those stated in 0121-M1978, except for the types of wood used for the plywood.

0153-M1980

POPLAR PLYWOOD

This 39 page Standard covers the requirements for Poplar plywood, including commonly available sizes and thicknesses, the number and thickness of plies* for plywood of various thicknesses, glue types, plywood grades and specialty panels.

Poplar plywood is supplied with six types of face veneer* as follows: A, B, BB, Industrial, Select and C. Only "C" has open defects (knot holes, pitch pockets, splits).

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Poplar plywood is supplied in the following grades:

Plywood Grades	Veneer Types		Abbreviated Grade marks
	Face	Back	
Sanded Grades (Exterior or Interior Glue)			
A - A	A	A	A/A
A - B	A	B	A/B
A - BB	A	BB	A/BB
A - Industrial	A	IND	A/IND.
A - Utility	A	C ⁽¹⁾	A/UT
A - C	A	C	A/C
B - B	B	B	B/B
B - BB	B	BB	B/BB
B - Industrial	B	IND	B/IND.
B - Utility	B	C ⁽¹⁾	B/UT
B - C	B	C	B/C
BB - BB	BB	BB	BB/BB
BB - Industrial	BB	IND	BB/IND.
BB - Utility	BB	C ⁽¹⁾	BB/UT
BB - C	BB	C	BB/C
Industrial - Two Sides	IND	IND	IND.2S
Industrial - Utility	IND	C ⁽¹⁾	IND./UT
Industrial - One Side	IND	C	IND.1S
Utility - two sides	C ⁽¹⁾	C ⁽¹⁾	UT 2S
Utility - one side	C ⁽¹⁾	C	UT 1S
Sheathing Grades (Exterior Bond Only)			
Select Sheathing	SEL.	C	SEL/SHTG
Standard Sheathing	C	C	STD/SHTG
Overlaid Grades (2) (Exterior Bond only)			
High Density Overlaid	SEL	SEL	HDO 60/60
Medium Density Overlaid	C ⁽¹⁾	C ⁽¹⁾	MDO 2S
Two Sides			
Medium Density Overlaid	C ⁽¹⁾	C	MDO 1S
One Side			
NOTES: (1) Permissible openings are filled (2) Plywood overlaid with resin-saturated* sheets on one or both faces; suitable for a high quality paint finish or for use unpainted.			

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Poplar plywood is also available in specialty panels with special face treatments of coatings or overlays, grooving, etc. The Standard does not cover these special face treatments or their bonding to the plywood.

All panels made with exterior glues are marked "EXTERIOR" and with the grade name in full or abbreviated as shown in the Table above.

Sheathing grades and Overlaid grades are, in addition, marked with the manufacturer's name or trademark, the number of this Standard and the kind of plywood ("PP" for Poplar plywood).

*See Glossary for definition.

0177-1977

QUALIFICATION CODE FOR MANUFACTURERS OF STRUCTURAL GLUED-LAMINATED TIMBER

This 31 page Standard provides a means for establishing the suitability of a plant's personnel, equipment, and procedures to manufacture structural glued-laminated* timber in accordance with CSA 0122, "Structural Glued-Laminated Timber".

This Standard covers qualification of shop manufacturers of laminated structural timber pressure-glued by the use of clamps or means other than nailing. It does not certify the laminated timbers so produced.

Structural glued-laminated timber cannot easily be tested except in a laboratory. Therefore, quality control of manufacture is required to ensure that the finished product will have the qualities required when designing according to CSA 086-M8, "Code for the Engineering Design of Wood".

The CSA issues Certificates of Qualification to manufacturing plants meeting the requirements of this Standard. Certificates are in two classes: Class I for plants qualified in the manufacture of Interior Grade materials and Class X for plants qualified in the manufacture of Exterior Grade materials.

A label indicating that the manufacturing plant is certified by CSA may be applied to the finished product at the option of the manufacturer.

*See Glossary for definition.

CAN3-0188.1-M78 INTERIOR MAT-FORMED WOOD PARTICLEBOARD

This 18 page Standard applies to all mat-formed wood particleboards* manufactured with binders which are at least moisture-resistant.

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Interior particleboard is classified into eleven grades, each having different dimensional and material requirements. The following grades apply to residential construction:

- Grade G - Interior wall cladding;
- Grade F - Interior wall sheathing, which may be used for interior wall cladding if Grade G is not available;
- Grade E - Flooring underlayment; and
- Grade H - Cabinets and vanities (Grade R is an alternative for this).

All panels of interior particleboard are marked with the manufacturer's name or trademark and "CSA 0188.1-M INTERIOR". They are also marked with triple letters of the grade: G is GGG, F is FFF, etc.

*Note: 'Mat-formed wood particleboards' are made of wood particles and fibres mixed with a resin binder, compressed to a desired density and cured under heat and pressure. Not to be confused with 'extruded particle board'.

CAN3-0188.2-M78 WAFERBOARD

This 15 page Standard applies to a type of board made from wood particles of a specific size and shape (wafer*) bonded with a waterproof, resin binder.

Waferboard is supplied in two grades, Grades P1 and Grade P2, differing only in allowable tolerances** of thickness, Grade P2 having the smaller tolerance.

All waferboard panels are marked with the manufacturer's name or trademark, "CSA 0188.2-M", "EXTERIOR BOND" (or "EXT. BOND") and the grade.

*NOTE: 'Wafers' in appearance look like small pieces of thin wood. Waferboard panels are made with these wood 'wafers', but no wood fibres. The wafers are mixed with a resin binder, compressed to a desired density and cured under heat and pressure.

**See Glossary for definition.

S307-M1980

LOAD TEST PROCEDURE FOR WOOD ROOF TRUSSES FOR HOUSES AND SMALL BUILDINGS

This 17 page Standard describes a method for testing wood roof trusses, which are intended for use in residences and small buildings, to see if they are strong enough to take their design loads.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2*)

*See page 1 for definition.

10-GP-3M(1976) MORTAR, REFRACTORY, AIR SETTING

This three-page Standard applies to a type of mortar which will withstand high temperatures and is for use in laying up fireclay brick.

Refractory mortar is supplied in the following classifications:

- Type 1 - Wet. This mortar is supplied ready for application by trowel, or, if mixed with water, is suitable for dipping bricks.
- Type 2 - Dry, for mixing with water, as for ordinary mortar.
- Class A - Super Duty, for use with higher than normal temperatures.
- Class B - High Duty. This class is satisfactory for residential construction.

11-GP-3M(1976) HARDBOARD

This seven-page Standard applies to panels made of fibres (usually wood), compressed under heat. It lists the available thicknesses of the various types of hardboard and also the special requirements for panels for exterior use.

This hardboard is supplied in the following types:

- Type 1 - Standard Hardboard - is as manufactured at the end of the hot pressing;
- Type 2 - Tempered Hardboard - is Standard Hardboard which has been further treated with such materials as oils and/or resins to make it stronger, harder and more resistant to wear and water;
- Type 3 - Service Hardboard - is generally same as Standard Hardboard but not as strong;
- Type 4 - Tempered Service Hardboard - is Service Hardboard which has been treated to make it stronger, harder and more resistant to wear and water; and
- Type 5 - Medium Density Hardboard - is generally same as Standard Hardboard but in thicker panels of medium weight and strength for ease of working and nailing.

Packages of hardboard are marked with the manufacturer's name or trademark, the type, thickness, size and quantity contained.

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11-GP-5Ma(1978) **HARDBOARD, FOR EXTERIOR CLADDING**

This five-page standard applies to unfinished hardboard as well as to factory-finished hardboard which is for use as exterior siding. It also covers the non-rusting fasteners and supports for installation. The hardboard meets the requirements for exterior hardboard stated for types 1, 2, or 5 in Standard 11-GP-3M.

Unfinished and finished hardboard is available in 3 styles and finished hardboard is available with 3 finishes. These are as follows:

- Style 1 - Vertical Panels, plain, patterned and/or grooved
- Style 2 - Horizontal Strips, plain or patterned; and
- Style 3 - Soffit and Fascia Facings, plain or patterned.
- Finish FlS - Finish coated on one side;
- Finish PlS - Prime coated on one side; and
- Finish StlS - Stain coated on one side.

Packages of hardboard are to be marked with the supplier's name, the style, finish, colour, the number of this standard and the coverage of the contents.

Finishes FlS and StlS are available with selected colours and Finish FlS also with selected gloss.

CAN2-12.1-M79 **GLASS, SAFETY, TEMPERED OR LAMINATED**

This 13 page Standard applies to glass that has been tempered* or combined with other materials to reduce the risk of injury by glass fragments when the glass is broken. For residential purposes it is primarily used for patio doors, shower and bathtub doors and enclosures.

Safety glass is classified as follows:

(a) **Types:**

Type 1 - Laminated glass, two or more sheets of glass held together by a layer or layers of clear plastic material;

Type 2 - Tempered glass, treated so that when broken the entire piece breaks into small, sugar-like pieces.

(b) **Classes:**

Class A - Sheet glass: ordinary glass for windows, etc.

Class B - Plate or float glass: usually thicker glass of higher quality.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

(c) Categories:

Category I - Safety Glass withstanding a specified test impact (205 J kinetic energy/152 foot-pounds)

Category II - Safety glass withstanding a specified, heavier test impact (540 J kinetic energy/400 foot-pounds)

Safety glass meeting the requirements of the Standard are permanently marked with the manufacturer's name or trademark and "CAN 2-12" if it meets the requirements of both Categories or "CAN 2-12.1-1" if it meets the requirements of Category I only.

*See Glossary for definition.

CAN2-12.2-M76

GLASS, SHEET, FLAT, CLEAR

This four-page Standard applies to sheet glass generally used for ordinary glazing, mirrors and similar purposes, and covers such requirements as thickness, tolerances*, squareness and acceptable visible defects. Sheet glass is supplied in the following qualities:

- AA - Special Selected Quality
- A - Selected Quality
- B - Ordinary Quality

Sheet glass is normally available in A and B qualities. The difference is mainly the distance at which defects are visible, about 1 m (3') for A and 3 m (10') for B, and the viewing angle at which waves, etc., in the glass are visible, 45° for A and 90° for B.

*See Glossary for definition.

CAN2-12.3-M76

GLASS, POLISHED PLATE OR FLOAT, FLAT, CLEAR

This six-page Standard applies to higher quality glass of the polished plate type, usually used for larger panels or mirrors, produced by grinding and polishing or by floating the molten glass on molten metal. It covers such requirements as thickness, tolerances* and acceptable visible defects.

Glass of these types is supplied in the following 3 qualities: Silvering Quality, Mirror Glazing (Selected Glazing) Quality and Glazing Quality. The Standard describes the defects allowed in each quality.

*See Glossary for definition.

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CAN2-12.8-M76

INSULATING GLASS UNITS

This 15 page Standard applies to factory-sealed, double-glazed or triple-glazed units composed of two or three sheets of glass separated to provide sealed air space(s), for use in windows and doors.

The Standard covers the requirements for materials, performance and testing.

Each unit is permanently marked on the glass or the separator with the manufacturer's name or trademark and the year of manufacture.

The federal government has a program under which glass units of various manufacturers are qualified against this Standard. Information on this program may be obtained from: The Qualification Panel for Windows, Canadian General Standards Board, Ottawa, Ontario, K1A 1G6.

CAN2-12.11-M76

GLASS, WIRED, SAFETY

This three-page Standard applies to glass in which a layer of wire mesh is completely embedded and which is primarily used in skylights or in general glazing where fire protection, security or safety are important. The Standard covers glass thicknesses and tolerances*, acceptable defects, impact resistance and other test requirements.

This glass is classified as follows:

(a) **Types:**

- Type 1 - Polished both sides
- Type 2 - Figured (allows light but not clear view)

(b) **Wire Mesh Styles:**

- Style 1 - Diamond
- Style 2 - Hexagonal (six sided)
- Style 3 - Square
- Style 4 - Rectangular

*See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

CAN2-12.12-M79 GLAZING, SHEETS, PLASTIC, SAFETY

This five-page Standard applies to flat, rigid, plastic sheeting for use as a safe type of glazing material. The Standard covers requirements for resistance to the effects of weather and aging, ease of cutting and acceptable, visible defects.

The plastic sheets are supplied in two categories:

- (a) Category I - Plastic sheeting withstanding a specified test impact (205 J kinetic energy/152 foot-pounds); and
- (b) Category II - Plastic sheeting withstanding a specified, heavier test impact (540 J kinetic energy/400 foot-pounds).

Plastic sheet meeting the requirements of this Standard are permanently marked with the manufacturer's name or trademark and "CAN2-12.12" if it meets the requirements of both Categories or "CAN2-12.12-1" if it meets the requirements of Category I only.

19-GP-5M(1976) SEALING COMPOUND, ONE COMPONENT, ACRYLIC BASE, SOLVENT CURING

This three-page Standard applies to a one-component* compound suitable for interior or exterior use for general caulking, joint-sealing or glazing and with masonry, metal, wood or glass. The Standard covers such requirements as storage life, colour, stability, tack-free time, extrudability**, adhesion, and resistance to sagging or flowing before hardening.

This compound may be used for sealing joints with movements up to plus or minus 7 1/2 % but is not suitable for foot-traffic areas or horizontal deck-type joints or for joints which may be immersed in water for long periods of time.

NOTES:

- (1) Containers are marked to show the manufacturer's name and address, the name and colour of the compound, the number of this standard, date of manufacture and instructions for use and storage.
- (2) The federal government has a programme for qualifying products against this Standard and information may be obtained by writing to: The Qualification Panel for Joint Sealants, The Department of Public Works, Ottawa, Ontario, K1A 0M2.
- (3) This compound has a limited storage life.
- (4) It should be applied only when the air temperature is between 5° and 30 °C (40° and 85 °F) and to clear and dry surfaces.

*"One-component" means that the sealant is supplied ready for use, without mixing. It cures by evaporation of a solvent.

**See Glossary for definition.

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19-GP-9Ma(1978) SEALING COMPOUND, ONE COMPONENT, SILICONE BASE, CHEMICAL CURING

This six-page Standard applies to a one-component* compound suitable for interior or exterior use for general caulking, joint-sealing or glazing and with masonry, metal, wood or glass. The Standard covers such requirements as storage life, colour stability, tack-free time, extrudability**, adhesion and resistance to sagging or flowing before hardening.

The compound is supplied in the following types:

- Type 1 - for joints with movement up to plus or minus 25%; and
- Type 2 - for expansion joints with movement up to plus or minus 40%;

This compound is not suitable for foot-traffic areas.

NOTES:

- (1) & (2) as for 19-GP-5M, Notes (1) and (2), but container marking includes type of compound.
- (3) This compound has a limited storage life.
- (4) For best results this compound should be applied when the air temperature is between 5° and 30°C (40° and 85°F) but it may be applied at temperatures between -30° and 40°C (-20° and 100°F) and always to clean and dry surfaces.

*"One-component" means that the sealant is supplied ready for use, without mixing. It cures to a rubber-like solid by chemical action, without evaporation of a solvent.

**See Glossary for definition.

19-GP-13M(1976) SEALING COMPOUND, ONE COMPONENT, POLYSULPHIDE BASE, CHEMICAL CURING

This three-page Standard applies to a one-component* compound suitable for interior or exterior use for general caulking, joint-sealing or glazing and with concrete, masonry metal, wood or glass. The Standard covers such requirements as storage life, staining of concrete or masonry, colour stability, tack-free time, extrudability**, adhesion and resistance to sagging or flowing before hardening.

This compound may be used for sealing joints with movements up to plus or minus 20% and for joints which will be continuously immersed in water.

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NOTES:

- (1) & (2) as for 19-GP-5M, Notes (1) & (2).
- (3) This compound has a limited storage life.
- (4) This compound should be applied only when the air temperature is between 5° and 30 °C (40° and 85°F) and to clean and dry surfaces.

*"One-Component" means that the sealant is supplied ready for use, without mixing. It cures to a rubber-like solid by chemical action, without evaporation of a solvent.

**See Glossary for definition.

19-GP-14M(1976) SEALING COMPOUND, ONE COMPONENT, BUTYL-POLYISOBUTYLENE POLYMER BASE, SOLVENT CURING

This three-page Standard applies to a one-component* compound suitable for interior or exterior use for general caulking, joint-sealing or glazing and with masonry, metal, wood or glass. The Standard covers such requirements as storage life, freedom from odour, colour stability, tack-free time, extrudability**, adhesion and resistance to sagging or flowing before hardening.

This compound may be used for sealing joints with movements up to plus or minus 5% but is not suitable for joints in foot-traffic areas or joints that may be immersed in water.

NOTES:

- (1) & (2), as for 19-GP-5M, Notes (1) & (2).
- (3) This compound has a limited storage life.
- (4) This compound should be applied only when the air temperature is between 5° and 30 °C (40° and 85°F) and to clean and dry surfaces.

*"One-component" means that the sealant is supplied ready for use, without mixing. It cures by evaporation of a solvent.

**See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

19-GP-16M(1977) **SEALING COMPOUND, ONE COMPONENT, POLYURETHANE BASE, CHEMICAL CURING**

This five-page Standard applies to a one-component* compound suitable for interior or exterior use for general caulking or joint-sealing and with concrete, masonry, metal, wood or glass. The Standard covers such requirements as storage life, staining of concrete or masonry, colour stability, tack-free time, extrudability**, adhesion and resistance to sagging or flowing before hardening.

This compound may be used for sealing joints with movements up to plus or minus 20% and for joints that may be continuously immersed in water.

The compound is supplied in the following types:

- Type 1 - A self-levelling compound for application in horizontal joints; and
- Type 2 - a non-sag compound for application in vertical joints.

NOTES:

- (1) & (2) as for 19-GP-5M, Notes (1) & (2) but container marking includes type of compound.
- (3) This compound has a limited storage life.
- (4) This compound should be applied only when the air temperature is between 5° and 30°C (40° and 85°F) and to clean and dry surfaces.

*"One-component" means that the sealant is supplied ready for use, without mixing. It cures to a rubber-like solid by chemical action, without evaporation of a solvent.

**See Glossary for definition.

19-GP-24M(1977) **SEALING COMPOUND, MULTI-COMPONENT, CHEMICAL CURING**

This five-page Standard applies to a multi-component* compound suitable for interior or exterior use for general caulking or joint-sealing and with concrete, masonry, metal, glass (Class A only) or wood. The Standard covers such requirements as storage life, staining of concrete or masonry, colour stability, tack-free time, extrudability**, adhesion and resistance to sagging or flowing before hardening.

This compound may be used for sealing joints with movements up to plus or minus 25% and for joints that may be continuously immersed in water.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

The compound is supplied in the following types and classes:

- Type 1 - a self-levelling compound for application in horizontal joints; and
- Type 2 - a non-sag compound for application in vertical joints.
- Class A - glazing (suitable for use for window glazing); and
- Class B - non-glazing (not suitable for use for window glazing).

NOTES:

- (1) & (2) as for 19-GP-5M, Notes (1) & (2) but container markings include type and class of compound.
- (3) This compound has a limited storage life.
- (4) It should be applied only when the air temperature is between 5° and 30°C (40° and 85°F) and to clean and dry surfaces.

*"Multi-component" means that the compound is supplied in separate components which must be properly mixed together before application. It cures to a rubber-like solid by chemical action, without evaporation of a solvent.

**See Glossary for definition.

34-GP-22M(1976) PIPE, ASBESTOS-CEMENT, DRAIN

This four-page Standard applies to non-perforated asbestos-cement drain and waste system pipe supplied in two types, either of which are suitable for foundation drainage if laid with open, butt joints. Type 2 pipe withstands a greater crushing pressure than Type 1 pipe.

37-GP-2M(1976) ASPHALT, EMULSIFIED*, MINERAL COLLOID TYPE, UNFILLED, FOR DAMPROOFING, AND FOR ROOF COATINGS**

This material is intended for use as sprayed, troweled or brushed-on coatings for dampproofing** and waterproofing** concrete or masonry surfaces, and for built-up roofs** and other roof surfaces.

The six-page Standard covers requirements for the material and refers to 37-GP-10M for recommended procedures for application for dampproofing or waterproofing.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

Containers are marked to show: Manufacturer's name and address, name of material, CGSB Standard Number, date of manufacture and instructions for use.

*"Emulsified" asphalt means that it contains water (approximately 50%) and therefore must be protected from freezing during storage, application and curing.

**See Glossary for definition.

37-GP-3M(1976)

APPLICATION OF EMULSIFIED ASPHALTS FOR DAMPPROOFING OR WATERPROOFING

This three-page Standard describes the procedures recommended for application of emulsified* asphalts covered by CGSB 37-GP-1M and CGSB 37-GP-2M, for footings, concrete or masonry foundation walls and concrete floors on ground.

Masonry is first to be coated with cement mortar and the finished dampproofing** or waterproofing** is to be protected with fibreboard or other suitable material before backfilling** the excavation.

Dampproofing of foundation walls consists of an asphalt priming coat and one asphalt finishing coat.

Waterproofing of footings, foundation walls or floors on ground consists of an asphalt priming coat and two more plies** of glass fibre embedded in and coated with asphalt. A guide to the number of plies on foundation walls and footings is as follows:

<u>Depth below ground level</u>	<u>Number of plies**</u>
3m (10')	2
6m (20')	3
9m (30')	4

It is essential that reinforcing plies of glass fibre are used in the waterproofing of footings, walls and floors.

*"Emulsified" asphalt means that it contains water (approximately 50%) and therefore must be protected from freezing during storage, application and curing.

**See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

37-GP-4M(1976) CEMENT, LAP, CUTBACK, ASPHALT, FIBRATED, FOR ASPHALT ROOFING

This material is intended for use as the adhesive in the cold application* of asphalt roofings, either smooth or surfaced with mineral granules.

The four-page Standard covers requirements for the material and refers to 37-GP-3M for recommended procedures for application.

Containers are marked to show manufacturer's name and address, name of material, "GGSB 37-GP-2M", date of manufacture and instructions for use.

*"Cold application" means that the asphalt is not heated before application, as it is in the more familiar method.

37-GP-5M(1976) CEMENT, PLASTIC, CUTBACK ASPHALT

This material is intended for use as a general utility cement for filling and sealing joints in masonry, wood or metal building construction, sealing and coating flashings, embedding glass and repairing leaks and cracks of all types.

The four-page Standard covers requirements for the material and refers to 37-GP-11M for recommended procedures for application.

Containers are marked as described for 37-GP-4M.

37-GP-6M(1976) ASPHALT, CUTBACK, UNFILLED*, FOR DAMPPROOFING

This material is intended for use as a sprayed or brushed-on coating for dampproofing* below-grade concrete or masonry surfaces

The three-page Standard covers requirements for the material and refers to 37-GP-12M for recommended procedures for application.

Containers are marked as described for 37-GP-4M.

*See Glossary for definition

37-GP-8M(1976) ASPHALT, CUTBACK, FILLED*, FOR ROOF COATING

This material is intended for use as a sprayed or brushed-on coating for asphalt built-up roofs* and other roof surfaces.

The three-page Standard covers the requirements for the material and refers to 37-GP-14M for recommended procedures for application

Containers are marked as described for 37-GP-4M.

*See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

37-GP-9M(1976) PRIMER, ASPHALT, UNFILLED*, FOR ASPHALT ROOFING, DAMPPROOFING AND WATERPROOFING

This material is intended for priming surfaces, where necessary, prior to application of roofing, dampproofing* or waterproofing*.

The three-page Standard covers the requirements for the material and refers to 37-GP-15M for recommended procedures for application

Containers are marked as described for 37-GP-4M.

*See Glossary for definition

37-GP-12M(1976) APPLICATION OF UNFILLED* CUTBACK ASPHALT FOR DAMPPROOFING

This two-page Standard describes the procedures recommended for application of unfilled cutback asphalt covered by CGSB 37-GP-6M for dampproofing* masonry and concrete foundation walls below grade, and concrete floors.

The Standard recommends the application of the dampproofing in two coats, except at temperatures below 4°C (40°F) when an asphalt prime coat and one finish coat of asphalt should be applied. It recommends that coats should be dry before backfilling* excavations or pouring upper floor slabs.

Note: If warming of the asphalt is considered necessary the Standard recommends the use of warm water or overnight storage in a warm place; it warns against the use of fire or open flame, or warming the asphalt above 37°C (100°F).

*See Glossary for definition.

37-GP-16M(1976) ASPHALT, CUTBACK, FILLED*, FOR DAMPPROOFING AND WATERPROOFING

This four-page Standard covers the requirements for the material and refers to 37-GP-36M for recommended procedures for application

This material is intended for use by brush or spray for dampproofing* and waterproofing* masonry and concrete walls below grade*, and concrete floors.

Containers are marked as described for 37-GP-4M.

Note: When this material is used for waterproofing concrete floors where the level of the water in the ground is, or may become higher than the concrete floor the Standard recommends that a drainage system should be installed under the floor.

*See Glossary for definition.

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37-GP-18M(1976) TAR, CUTBACK, UNFILLED*, FOR DAMPPROOFING*

This three-page Standard covers the requirements for the material and refers to 37-GP-22M for recommended procedures for application

This material is intended for use as a sprayed or brushed-on coating for dampproofing below-grade* masonry surfaces.

Containers are marked as described for 37-GP-4M.

*See Glossary for definition.

37-GP-21M(1976) TAR, CUTBACK, FIBRATED*, FOR ROOF COATING

This four-page Standard covers the requirements for the material and refers to 37-GP-25M for recommended procedures for application

This material is intended for use as a sprayed or brushed-on coating for coal tar built-up roofs*. It is primarily used to extend the life of tar roofing and should not be used on asphalt roofs.

Containers are marked as described for 37-GP-4M.

*See Glossary for definition.

37-GP-22M(1976) APPLICATION OF UNFILLED* CUTBACK TAR FOUNDATION COATING FOR DAMPPROOFING

This two-page Standard describes procedures recommended for application of tar coating covered by CGSB 37-GP-18M, in dampproofing* masonry and concrete foundation walls below grade*.

This dampproofing is applied in two coats or one primer and one finish coat as described for 37-GP-12M.

Note: The Standard recommends that any necessary warming of the tar is carried out as described for 37-GP-12M; it also warns against smoking, fires or open flames near opened containers or freshly applied tar.

*See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

37-GP-50M(1978) ASPHALT, RUBBERIZED, HOT-APPLIED, FOR ROOFING AND WATERPROOFING*

This 20 page Standard covers the requirements for the material and refers to 37-GP-51M for recommendations for surface preparation and application of the material.

This material is suitable for application by squeegee, trowel or other means and in areas where it will be protected in service from sunlight and traffic.

The containers are marked as described in 37-GP-4M.

*See Glossary for definition.

37-GP-51M(1979) APPLICATION OF RUBBERIZED ASPHALT, HOT APPLIED, FOR ROOFING AND WATERPROOFING

This 22 page Standard describes the recommended procedures for applying 37-GP-50M rubberized asphalt for new construction only and in areas where it will be protected as soon as possible from sunlight and traffic.

Typical applications include roofing systems, highway bridge decks*, parking garages, tunnels, foundation walls, reflective pools, planters and cavity walls*. When applied to roofs, this material is usually protected by roofing gravel or paving stones.

The Standard describes:

- (a) procedures for applying rubberized asphalt to concrete roof decks* or roofs with plywood or gypsum board covering; also for the waterproofing* of vertical or horizontal concrete surfaces;
- (b) cleaning and preparation of all surfaces including the necessary priming of concrete (primer: 37-GP-9M);
- (c) the repair and/or treatment of cracks more than 1.5 mm (1/64") wide and the special treatment of all moving joints (shown in detail drawings in the Standard);
- (d) flashings* at the meeting of horizontal and vertical surfaces, at eaves, vent pipes and drains (all shown in detail drawings in the Standard);
- (e) the special equipment required for heating this material.

*See Glossary for definitions.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

37-GP-54M(1979) ROOFING AND WATERPROOFING MEMBRANE, SHEET-APPLIED, FLEXIBLE, POLYVINYL CHLORIDE

This eight-page Standard covers the requirements for polyvinyl chloride sheet, primarily for use as a roofing material.

The sheet is supplied in the following types and classes:

(a) Types:

- | | | |
|--------|---|---|
| Type 1 | - | Unreinforced sheet (approximately 1.0mm (0.04")); and |
| Type 2 | - | Reinforced sheet (approximately 1.2mm (0.05")). |

(b) Classes:

- | | | |
|---------|---|--|
| Class A | - | Unexposed roofing sheet (generally used for new construction or re-roofing); |
| Class B | - | Exposed roofing sheet (generally used for new construction or re-roofing); |
| Class C | - | Waterproofing* sheet (generally used on parking and recreation roof decks, tunnel linings and under top soil); and |
| Class D | - | Flashing* sheet (only used for flashings and for joining asphalt surfaces with polyvinyl chloride sheets). |

This material is intended for use with welded joints and may be laid loose or attached to the roof deck. Recommended procedures for application are described in 37-GP-55M.

Containers are marked with the manufacturer's name and trade mark, types and classes, CGSB Standard No., coverage and weight of contents.

*See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

37-GP-55M(1979) APPLICATION OF SHEET APPLIED FLEXIBLE POLYVINYL CHLORIDE ROOFING MEMBRANE

This three-page Standard describes procedures recommended for application of polyvinyl chloride sheet membrane covered by CGSB 37-GP-54M, for roofing and new construction and for re-roofing.

The Standard covers the requirements for applying the sheet material to roof decks* by three methods: loose laid, fully adhered and mechanically fixed. The choice of method depends upon the anticipated amount of uplift caused by wind. The methods of adhering or mechanically fastening the sheet are to be those recommended by the manufacturer of the sheet.

The Standard also covers the extent of lapping of sheets, the welding of the joints by hot air or solvent* and also the application of the sheet for flashings*.

*See Glossary for definition.

41-GP-6M(1976) SHEETS, THERMOSETTING* POLYESTER PLASTICS, GLASS-FIBRE REINFORCED

This five-page Standard applies to flat and corrugated* glass-fibre reinforced sheets or panels made from polyester plastics, intended for structural and decorative purposes.

These sheets are available in the following types and grades:

- Type 1 - General Purpose; and
- Type 2 - Flame Spread Rated*
 - (a) Flame spread 25 or less,
 - (b) Flame spread 30 to 50,
 - (c) Flame spread 55 to 75,
 - (d) Flame spread 80 to 150.
- Grade A - Without surface protection; and
- Grade B - With surface protection (such as surface mat, special resin surfacing, plastic film). Surface protection greatly increases resistance to the effects of the weather.

Sheets are also available with the following:

- (a) Various Colours and Finishes:
 - (1) Smooth both sides,
 - (2) Crinkle finish both sides,
 - (3) Smooth one side and crinkle finish the other.
- (b) Shapes:
 - (1) Flat,
 - (2) Corrugated*, lengthwise,
 - (3) Corrugated, across the width of the sheet.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

(c) Sizes:

Up to 1500 mm (60") wide in flat sheets, 1350 mm (54") wide in corrugated sheets and in any length which can be shipped or handled.

(d) Thicknesses:

From 0.50mm (1/64") to 4.00mm (5/32").

(e) 'Area Density' (weight of material):

From 500 to 5 000 g/m² (1.5 oz/square foot to 1 pound/square foot).

Packages are marked with the type, grade, colour, thickness and area density.

*See Glossary for definition.

41-GP-24M(1976) SIDING, SOFFITS AND FASCIA, RIGID VINYL

This eight-page Standard applies to siding*, soffit* and fascia* panels made from vinyl (polyvinyl chloride) for use on the exterior of residences and small buildings. It also covers non-rusting fasteners and supports for installation.

The Standard covers the requirements for impact resistance and low-temperature flexibility for this material. In addition, it states certain design requirements, such as concealed fasteners, allowance for necessary movement between panels, ventilation of the space behind the panels and resistance to the passage of water.

The federal government has a programme for qualifying material against this Standard. Information may be obtained from: The Qualifying Panel for Cladding and Siding, Construction Materials Board, Department of National Defence, Ottawa, Ontario, K1A 0K2.

Packages of this material are marked with the supplier's name, the colour, and the coverage (of siding) of the contents.

*See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

41-GP-29M(1976) TUBING, PLASTIC, CORRUGATED, DRAINAGE

This 13 page Standard covers corrugated* plastic tubing and fittings suitable for land drainage and for foundation drainage.

The types covered are:

- Type 1 - Nonperforated tubing;
- Type 2 - Perforated tubing (suitable for foundation drainage); and
- Type 3 - Tubing with special perforations for purposes other than land drainage.

Tubing is marked to show the manufacturer's name or trademark, type, diameter, CGSB Standard number, date of manufacture and the size and location of the perforations in Type 2 tubing.

*See Glossary for definitions.

51-GP-20M(1978) THERMAL INSULATION, EXPANDED POLYSTYRENE

This six-page Standard applies to expanded polystyrene insulation, in pipe covering shapes as well as in boards, for use where the surface temperature of the insulation will not be more than 75°C (170°F).

This insulation is supplied in four types, the main characteristics of which are as follows:

	Type			
	1	2	3	4
Minimum compressive Strength* kPa (psi)	55 (8)	110 (16)	170 (25)	210 (30)
Minimum Thermal Resistance RSI(R)*	0.65 (3.7)	0.70 (4.0)	0.74 (4.2)	0.85 (4.8)
Maximum Water Vapour Transmission* ng/Pa.s.m ² (Perms)	250 (2.9)	160 (1.8)	60 (0.7)	60 (0.7)

For each of the four types of insulation, the table in the Standard also lists other strengths (such as tension); maximum acceptable change in the dimensions of the insulation under various temperatures; and maximum allowable absorption of water.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

The Standard also requires that the insulation shall have no objectionable odour; shall have a maximum flame spread rating* of 25; shall not exceed stated tolerances* in the dimensions of boards and pipe coverings; and shall be marked (on boards only) with the number of this Standard, the manufacturer's name or trade mark and the type number.

The federal government has a programme for qualifying products against this Standard and information may be obtained by writing to: The Chairman, The Qualification Panel for Thermal Insulation Materials, The Canadian General Standards Board, Department of Supply and Services, Ottawa, Ontario, K1A 1G6.

*See Glossary for definition.

51-GP-21M(1978) THERMAL INSULATION, URETHANE AND ISOCYANURATE, UNFACED

This seven-page Standard applies to cellular* urethane or isocyanurate insulation in boards for use where the surface temperature of the insulation will not be more than 80°C (176°F) for the urethane and 110°C (230°F) for the isocyanurate.

This insulation is supplied in four types, the main characteristics of which are as follows:

	Urethane		Isocyanurate	
	Type 1	Type 2	Type 3	Type 4
Minimum Compressive strength* kPa (psi)	165	225	515	160
Minimum Thermal Resistance RSI(R)* - Initially	1.25 (7.1)	1.25 (7.1)	1.25 (7.1)	1.17 (6.7)
- When Aged	0.97 (5.5)	1.05 (6.0)	1.05 (6.0)	0.90 (5.1)
Maximum Water Vapour* Transmission ng/Pa.s.m ² (Perms)	115 (1.3)	115 (1.3)	145 (1.7)	170 (2.0)

For each of the four types of insulation, the table in the Standard also lists other strengths (such as tension); maximum acceptable change in the dimensions of the insulation under various temperatures; and maximum allowable absorption of water.

CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

This insulation is also supplied in the following classes:

Class 1 - flame spread rating* of 0-25.

Class 2 - flame spread rating of 25-100

Class 3 - flame spread rating of over 100

This Standard also requires that the insulation shall have no objectionable odour; shall not exceed stated tolerances* in dimensions; and shall be marked with the number of this Standard, the manufacturer's name or trade mark, the type number and the flame spread rating.

The federal government has a programme for qualifying products against this Standard and information may be obtained by writing to: The Chairman, The Qualification Panel for Thermal Insulation Materials, The Canadian General Standards Board, Department of Supply and Services, Ottawa, Ontario, K1A 1G6.

*See Glossary for definition.

CAN2-51.32-M77 SHEATHING, MEMBRANE, BREATHER TYPE

This two-page Standard covers the requirements of a single ply* or laminated sheathing material, which may be coated, impregnated or perforated and is intended for use on the outside of heated buildings, under the external finish, as a secondary protective covering against the entry of wind and moisture. This sheathing material permits water vapour to breathe to the exterior to minimize condensation.

Sheathing material meeting this Standard is supplied in packages marked with the type of material and the number of this Standard.

*See Glossary for definition.

CAN2-51.33-M80 VAPOR BARRIER, SHEET, FOR USE IN BUILDING CONSTRUCTION

This five-page Standard covers the requirements for sheet materials suitable for use in controlling the movement of water vapour through building construction.

This material is supplied in the following types:

Type 1 - Intended primarily for use in residences where a high resistance to the passage of water vapour is required; and

Type 2 - Intended primarily for use in residences in which high, wintertime humidity conditions are not anticipated.

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These materials are packaged in rolls, each in one piece of material, and marked with the manufacturer's name or trademark, the number of this Standard, the type of material, its width, length, area and, if made entirely of plastic film, the average thickness.

Note: These materials are not intended for use under concrete slabs or as ground cover in crawl spaces. The Building Code requires that Type 1 material shall be used in residences.

51-GP-60M(1979) THERMAL INSULATION, CELLULAR FIBRE, LOOSE FILL

This 23 page Standard applies to wood-fibre, loose insulation suitable for use on the inside of buildings. It is available in two types, one type is suitable for pouring by hand and the other type for blowing through a hose by special equipment. Some of this insulation is manufactured to be applied by either method.

The minimum requirement for this insulation is that 75 mm (3") shall provide a thermal resistance of RSI 1.9(R10)*.

Containers (or the bills of sale) are to be marked to show the manufacturer's name, the date of manufacture, where manufactured in Canada or the name of the importer, the type (pouring or blowing), the number of this Standard, the weight of the contents and a table showing the following:

- (a) the minimum thickness required to provide various thermal resistances RSI(R)*;
- (b) the maximum area that the contents of the container will cover at each of these thicknesses; and
- (c) the weight of the insulation at each of these thickness, over a stated area.

*See Glossary for definition.

63-GP-3M(1976) WINDOWS, EXTRUDED ALUMINUM, VERTICAL AND HORIZONTAL SLIDING, STANDARD DUTY

This 27 page Standard covers windows having aluminum sashes and aluminum or wood main frames, primarily for residential construction.

The following window types are available under this Standard:

- (a) Type 1 - Vertical Sliding; and
Type 2 - Horizontal Sliding.
- (b) Class A - Aluminum Main Frame; and
Class B - Wood Main Frame.

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- (c) Style 1 - Channel Glazing; and
 Style 2 - Laid-in Glazing.
- (d) Level A - Resistance to wind, normally up to 20
 storeys; and
 Level B - Higher resistance to wind.
- (e) Grade 1 - For Multi-Storey Residential Use (enables
 opening of Sashes to be limited to 100 mm
 (4")); and
 Grade 2 - For other than Multi-Storey Residential Use.

The Standard includes recommended window sizes and requirements for: materials, finishes, assembly and installation; ease of operation and operating and locking hardware; weatherstripping; resistance of the window to the passage of air or water; provision for screens and for thermal breaks* in double-windows or windows with factory-sealed double-glazing units; coatings applied to aluminum in contact with masonry, stucco or plaster; glazing and glazing compounds.

*See Glossary for definition.

63-GP-5M(1976) WINDOWS, STEEL, VERTICAL AND HORIZONTAL SLIDING, STANDARD DUTY

This 23 page Standard covers windows having steel sashes and steel or wood main frames, primarily for residential construction.

The window types, classes, styles, levels and grades are the same as those listed for aluminum windows in 63-GP-3M.

The Standard includes recommended window sizes and requirements all as listed for aluminum windows in CGSB 63-GP-3M, except that no isolation coating is required for steel in contact with masonry or plaster.

82-GP-1M(1977) DOORS, GLASS, ALUMINUM FRAME, SLIDING, STANDARD-DUTY

Doors manufactured to meet this Standard are intended primarily for residential construction.

This 22 page Standard covers minimum thicknesses of aluminum used in frames and door members; performance requirements of the assembled door and frame, including resistance to the passage of air or water; hardware and fasteners; glass and glazing including minimum thicknesses and recommended sizes of tempered* glass; screens; weatherstripping; thermal break*; assembly; ease of operation; drainage; finishes; coatings to be applied to aluminum in contact with masonry, stucco or plaster; provision to be made for cleaning and recommendations for installation.

*See Glossary for definition.

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

93-GP-1M(1978) SHEET, ALUMINUM ALLOY, PREFINISHED, RESIDENTIAL

This six-page Standard applies to aluminum sheet with a factory-applied enamel finish coating, intended for use as exterior siding*, as well as roll-formed windows, gutters, etc., for residences.

It is supplied in various colours and in the following types and classes:

- Type 1 Postforming sheet - this is normally used when sharp bends are required; and
- Type 2 Non-postforming sheet - this is satisfactory for flat or corrugated* panels.
- Class F1S - Finish Coated one side; and
- Class F2S - Finish Coated Both Sides.

*See Glossary for definition.

93-GP-2M(1978) SIDING, SOFFITS AND FASCIA, ALUMINUM, PREFINISHED, RESIDENTIAL

This six-page Standard applies to aluminum siding*, soffits* and fascia*, with a factory-applied enamel finish coating, for residences and light commercial buildings. It also covers the non-rusting fasteners and supports for installation. The siding, soffits and fascia, trim, etc., are made from coated sheet aluminum conforming to Standard 93-GP-1M.

The Standard provides certain design requirements such as concealed fasteners, allowance for necessary movement between panels, ventilation of the space behind the panels, and resistance to the passage of water.

Aluminum siding, soffits and fascia are supplied in the following types and classes:

- Type HU - Horizontal Siding - unbacked;
- Type HB - Horizontal Siding - backed (factory bonded to the panel);
- Type VU - Vertical Siding - unbacked; and
- Type SF - Soffit and fascia facings, and all exposed trim - unbacked.
- Class 1 - Plain; and
- Class 2 - Patterned.

The minimum thickness of aluminum for Type HB and SF components is 0.48mm (0.019") and for Type HU and VU components 0.60mm

INTERPRETATION :

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

(0.024"). The minimum thickness of the backing material is 6.4mm (1/4") when made of polyurethane and 9.5mm (3/8") when made of wood fibreboard or polystyrene.

Packages of siding and components are marked to show the supplier's name, the type and class, colour, kind of backing (if any) and quantity.

It is recommended that this siding should be ordered complete with all components and sealants to ensure that colours match and that if different metals are supplied they will not be of the kinds which corrode if brought together under wet or damp conditions.

*See Glossary for definition.

93-GP-3M(1978) SHEET, STEEL, GALVANIZED, PREFINISHED, RESIDENTIAL

This five-page Standard applies to zinc-coated (galvanized) steel sheet with a factory-applied finish coating, intended for use as exterior siding, as well as roll-formed windows, gutters, etc., for residences.

It is supplied in various colours and in the following classes:

- Class F1S - Finish coated one side; and
- Class F2S - Finish coated both sides.

93-GP-4M(1978) SIDING, SOFFITS AND FASCIA, STEEL, GALVANIZED, PREFINISHED, RESIDENTIAL

This six-page Standard applies to steel siding*, soffits* and fascia*, with a factory-applied finish coating, for residences and light commercial buildings. It also covers the fasteners and supports for installation, which shall be galvanized or otherwise suitable. The siding, soffits and fascia, trim, etc., are made of prefinished, galvanized steel sheet conforming to Standard 93-GP-3M.

The Standard provides certain design requirements such as concealed fasteners, allowance for necessary movement between panels, ventilation of the space behind the panels, and resistance to the passage of water.

Steel siding, soffits and fascia are supplied in the following types and classes:

- Types - Horizontal Siding
- Vertical Siding
- Soffit and Fascia Facings, and all exposed trim

INTERPRETATION :

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CANADIAN GENERAL STANDARDS BOARD (CAN 2) (Continued)

- Classes - Plain
- Patterned

The minimum thickness of galvanized steel sheet is 0.38mm (0.015"). The minimum thickness of the backing material (if used) is 6.4 mm (1/4") when made of polyurethane and 9.5 mm (3/8") when made of wood fibreboard* or polystyrene.

The minimum thickness of backing material (if any), the markings of packages and the recommendations for ordering are all as stated for 93-GP-2M.

*See Glossary for definition.

115-GP-1(1974)

COLUMNS, ADJUSTABLE, METAL

This four-page Standard covers adjustable pipe columns, fitted with steel bearing plates, primarily used for supporting basement ceiling beams in residential construction.

These columns have a maximum outside diameter of 85mm (3 3/8") (to permit use in 50mm x 100mm (2" x 4") frame walls) and are supplied in the following types:

- Type 1 - Columns having a telescopic, double tube with an adjustable screw and a support pin; and
Type 2 - Columns having a single tube with an adjustable screw.

Columns are labelled to show the manufacturer's name and address, CGSB Standard Number, maximum extension and maximum allowable load

INTERPRETATION :

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AMERICAN SOCIETY FOR TESTING AND MATERIALS

A525-80a

**STEEL SHEET, ZINC-COATED (GALVANIZED) BY THE HOT-DIP PROCESS,
GENERAL REQUIREMENTS**

This 10 page Standard covers the general requirements for steel sheet in coils and cut lengths, zinc-coated (galvanized) by the hot-dip process.

Coating designations are "G" for "galvanized", producing the characteristic spangled appearance, and "A" for "alloyed", producing a dull, gray appearance.

When a number follows the coating designation letter, as in the "G90" coating designation referred to in the Building Code, the "90" refers to the weight of zinc coating in ounces per square foot of the total covering of both faces of the steel sheet.

C4-62(1975)

CLAY DRAIN TILE

This seven-page Standard covers drain tile made from clay, shale, fire clay, or mixtures thereof, and baked at suitable temperatures

Clay drain tile is supplied in three classes, depending upon the ability of the tile to withstand crushing from earth pressures:

- (a) Standard drain tile (satisfactory for foundation drainage);
- (b) Extra-quality drain tile; and
- (c) Heavy-duty drain tile.

Tiles covered by this Standard are available in sizes ranging from 100mm to 380mm (4" to 15") diameters for Standard Class and 100mm to 760 mm (4" to 30") diameters for the other two classes. Crushing strengths are listed in a Table in the Standard.

C64-72(1977)

REFRACTORIES FOR INCINERATORS & BOILERS

This seven-page Standard covers the requirements for "refractories" (bricks, special shapes and refractory materials that can be cast in various shapes) that may be used in construction where specially high resistance to heat is required (such as lining of chimneys or fireplaces).

C315-78C

CLAY FLUE LININGS

This three-page Standard covers clay flue linings which are intended for the interior lining of masonry chimneys. It covers the requirements for the clay or shale materials, for the manufacture of the lining and for the tolerances* allowed in the dimensions of the linings. It sets no requirement for their temperature resistance.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (continued)

Flue linings are available in rectangular, round or oval shapes and in lengths up to 1.2 m (4').

Flue linings are manufactured with the following dimensions:

- Rectangular - Eleven sizes, having outside dimensions from 90 x 190 mm (3 1/2" x 7 1/2") with wall thickness of 16 mm (5/8") to 590 x 590 mm (23 1/2" x 23 1/2") with wall thickness of 41 mm (1 5/8").
- Round - Twelve sizes, having inside diameters from 150 mm (6") with wall thickness of 16 mm (5/8") to 900 mm (36") with wall thickness of 64 mm (2 1/2").
- Oval - Ten sizes, having outside dimensions from 215 x 325 mm (8 1/2" x 12 3/4") with wall thickness of 19 mm (3/4") to 525 x 525 mm (21" x 21") with wall thickness of 32 mm (1 1/4").

Flue linings are marked with the manufacturer's name, brand or trade mark.

*See Glossary for definition.

CONCRETE DRAIN TILE

This seven-page Standard covers concrete drain tiles with inside diameters from 100 to 900 mm (4" to 36"). The Standard includes requirements for the allowable tolerances* in the dimensions of the tiles and for the materials used in their manufacture.

This tile is manufactured in the following four classes:

Standard-Quality Concrete Drain Tile is intended for land drainage of ordinary soils when the tiles are laid in trenches which are not unusually deep or wide⁽¹⁾. This quality of drain tile is not recommended for use with inside diameters more than 300 mm (12").

Extra-Quality Concrete Drain Tile is intended for land drainage of ordinary soils where the tiles are laid in trenches of considerable depth or width⁽²⁾.

Heavy-Duty Extra-Quality Concrete Drain Tile is intended for land drainage of ordinary soils where the tiles are laid in trenches of large depths or widths⁽³⁾.

Special-Quality Concrete Drain Tile is intended for land drainage where the soil, the soil water or the drainage water is highly acid or contains unusual quantities of soil sulphates* and where tiles are laid in trenches of considerable depth or width⁽⁴⁾.

The Standard includes tables listing crushing strengths, water absorption, wall thickness and allowable tolerances of inside diameters.

*See glossary for definition.

INTERPRETATION :

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C412-79

AMERICAN SOCIETY FOR TESTING AND MATERIALS (continued)

Notes to C412:

- (1) These tiles will safely resist a load of 10 kN per metre of tile (700 lbs. per foot).
- (2) These tiles will safely resist a load of 14.5 kN per metre of tile (1,100 lbs. per foot) for small diameter tiles to 31.5 kN (2,160 lbs) for the largest diameter tiles.
- (3) These tiles will safely resist a load of 17.0 kN per metre of tile (1,170 lbs. per foot) for small diameter tiles to 59.0 kN (4,050 lbs) for the largest diameter tiles.
- (4) These tiles will safely resist a load of 16.0 kN per metre of tile (1,100 lbs per foot) for small diameter tiles to 35.0 kN (2,400 lbs) for the largest diameter tiles.

C444-79

PERFORATED CONCRETE PIPE

This three-page Standard covers perforated concrete pipe in two types, Type 1 with circular perforations and Type 2 with slotted perforations, either of which are suitable for foundation drainage

C700-78a

VITRIFIED CLAY PIPE, EXTRA STRENGTH, STANDARD STRENGTH AND PERFORATED

This five-page Standard covers clay pipe made from clay, shale, fire clay, or mixtures thereof, baked to suitable temperatures. The pipe may be glazed or unglazed and is supplied in two classes, depending upon the ability of the pipe to withstand crushing:

- (a) Standard strength; and
- (b) Extra Strength.

Both classes of pipe can be supplied solid or perforated. Perforated, standard strength pipe is suitable for foundation drainage.

All pipe meeting this Standard is marked with the initials or name of the manufacturer and location of plant. Extra Strength pipe is also marked "Extra Strength" or "ES"; Standard Strength pipe has no additional marking.

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (continued)

D1194-72(1977) BEARING CAPACITY OF SOIL FOR STATIC LOAD ON SPREAD FOOTINGS

This three-page Standard describes the method for estimating the bearing capacity of soil by measuring the settlement of steel plates placed on the soil and loaded with varying weights.

The bearing capacity of the soil is calculated on the basis of the area of a square or circular steel plate and the amount of weight on the steel plate which the soil is capable of resisting.

E90-75 LABORATORY MEASUREMENT OF AIRBORNE SOUND TRANSMISSION LOSS OF BUILDING PARTITIONS

This 13 page Standard describes the method to be used for measuring the airborne sound transmission loss of 'building partitions' such as walls of all kinds, floor-ceiling assemblies, doors, and other space-dividing elements.

The method is designed to be carried out in a laboratory and the result indicates the probable effectiveness of a 'building partition' to resist the passage of airborne sound from one side of the partition to the other. It is to be noted that any openings or gaps in or around the 'building partition' will significantly reduce its effectiveness as a sound barrier.

E336-77 MEASUREMENT OF AIRBORNE SOUND INSULATION IN BUILDINGS

This 20 page Standard describes the method for evaluating the sound-insulating capability of a 'partition' installed in a building. The word 'partition' is used here to mean any kind of wall or floor-ceiling assembly or any other similar barrier which separates two rooms, but does not necessarily completely enclose either of them.

This method is designed to be carried out in the building where the 'partition' is installed. An annex to the Standard describes how the method may also be used as a standard method for measuring the amount by which noise is reduced between two joining rooms, either side-by-side or one over the other.

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CANADIAN GAS ASSOCIATION (CAN 1*)

*See page 1 for definition.

CAN1-B149.1-1978 INSTALLATION CODE FOR NATURAL GAS BURNING APPLIANCES AND EQUIPMENT

This 161 page Installation Code contains the minimum requirements for the installation of:

- (a) appliances, equipment, components and accessories where gas is to be used for fuel purposes; and
- (b) piping and tubing systems extending from the termination of the utility installation.

This Installation Code applies when any of the following gases or mixtures of gas are used: natural gas, manufactured gas, or mixtures of propane gas and air. It does not apply to: utility pipeline distribution; marine or pipeline terminals; or natural gas used with oxygen for welding or cutting operations.

CAN1-B149.2-1978 INSTALLATION CODE FOR PROPANE BURNING APPLIANCES AND EQUIPMENT

This 237 page Installation Code contains the minimum requirements for the installation of appliances, equipment, components, accessories and containers where propane is to be used for fuel purposes.

It also applies where some other liquified petroleum gases, such as butane, are used. These other gases are listed in the Installation Code. It does not apply to: utility pipeline distribution; marine or pipeline terminals; or propane used on boats.

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UNDERWRITERS LABORATORIES OF CANADA (CAN 4*)

*See page 1 for definition.

CAN4-S114-M80 STANDARD METHOD OF TEST FOR DETERMINATION OF NON-COMBUSTIBILITY IN BUILDING MATERIALS

This seven-page Standard describes the method for carrying out tests, in a laboratory, on building materials to find out the extent to which they are capable of burning, and to establish (for Building Code purposes) whether they are "combustible" or "non-combustible".

S531-1978 STANDARD FOR SMOKE ALARMS

This 64 page Standard covers the requirements for smoke alarms, rated at 120 volts or less, intended for use in ordinary indoor locations.

The smoke alarms covered by this Standard are self-contained units, including a smoke-chamber and air alarm-sounding appliance, operated by a battery or by connecting to a power supply. They may be single alarm units or alarm units which may be connected together so that all will sound if any one is activated.

The alarm units should have a "ULC" (Underwriters Laboratories of Canada) label indicating that they meet the requirements of this Standard. Such units will also be marked with at least the following information:

- (a) Name of manufacturer or distributor;
- (b) Model number;
- (c) Electrical rating;
- (d) Correct mounting position, if the unit is intended to be mounted in a definite position;
- (e) Maximum rating of any fuses (if applicable);
- (f) Reference to an installation wiring diagram (if applicable);
- (g) A warning for a unit which employs a radioactive material; and
- (h) Identification of spare lamps or batteries.

Each smoke alarm unit is to be provided with installation instructions containing at least the following information:

- (a) Typical installation drawings for the unit(s) indicating recommended locations and wiring methods. Locations where smoke alarm installations are not recommended shall also be included;

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UNDERWRITERS LABORATORIES OF CANADA (CAN 4) (continued)

- (b) Description of the operation, testing, and proper maintenance procedures for the unit(s);
- (c) Replacement parts, such as lamps or batteries, shall be identified in the instructions by a part number, manufacturer's model number, or the equivalent, and information included as to where an owner can obtain the part;
- (d) An indication that the device shall not be installed in locations where the normal temperatures exceed 38°C (100°F);
- (e) The manufacturer shall suggest in the instructions that a family escape plan be established by the home-owner and/or reference be made to available published information on the subject.

CAN4-S604-78

STANDARD FOR FACTORY-BUILT TYPE A CHIMNEYS

This 44 page Standard applies to Factory-Built Type 'A' Chimneys which do not require field fabrication. They are for use with gas, liquid and solid-fuel-fired residential appliances and building heating equipment, where the flue-gas temperatures do not exceed 540°C (1000°F). They are intended for installation in accordance with the National Building Code of Canada, the Installation Code for Oil Burning Equipment (CSA B139), and the Installation Code for Natural Gas Burning Appliances and Equipment (CAN1-B149.1). They are intended for installation inside or outside of buildings to provide an essentially vertical passageway for conveying flue gases to the outside from the above-described appliances.

Each chimney component and support assembly is marked to indicate:

- (a) The manufacturer's name and address;
- (b) Model or type number;
- (c) Minimum clearance to combustible construction;
- (d) The type of fuel for which it is intended to be used; and
- (e) That the chimney is for connection to appliances normally producing flue gases of 540°C (1000°F) or less.
- (f) Parts intended for exterior installation are marked "SUITABLE FOR EXTERIOR INSTALLATION."

Each chimney is to be provided with installation instructions, which are to be illustrated and to include at least the following information:

- (a) Kind of heating appliances which may be connected to factory-built chimneys;
- (b) Any limitations with respect to installation and use, such as maximum height, the joining of two or more parts to make a safe assembly, etc;

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UNDERWRITERS LABORATORIES OF CANADA (CAN 4) (continued)

- (c) Height of a chimney above a roof and minimum distance from walls or other buildings;
- (d) The use of rain caps;
- (e) The framing of openings in ceilings and floors to provide firestopping* in joist areas and the installation of firestop-spacer assemblies;
- (f) The framing of openings in roofs to provide for support and attachment of roof assemblies; and
- (g) The step-by-step process for installing the chimney.

*See glossary for definition.

S610-1978

FACTORY-BUILT FIREPLACES

This 77 page Standard is in two parts.

Part A covers factory-built fireplaces intended for use in buildings. These fireplaces are only intended for use with factory-built chimneys and their associated parts, they are not intended for use with masonry chimneys.

Part B covers factory-built fireplaces intended for use in mobile homes.

Fireplaces, chimneys, and hearth extensions are intended for installation in accordance with the Standard for Chimneys, Fireplaces, and Venting Systems (NFPA 211-1977), published by the National Fire Protection Association.

'Part A' fireplaces and their components are marked with at least the following information:

- (a) The manufacturer's name;
- (b) The model number of the fireplace;
- (c) The part number or name; and
- (d) The minimum clearance to combustible* construction (see also Articles 22.8.2 and 22.8.3 in the Building Code).

'Part A' fireplaces are provided with illustrated installation instructions containing at least the following information:

- (a) The step-by-step process for installation; and
- (b) The methods and precautions concerning the enclosure of the fireplace and its parts by walls, partitions, and other structures, including the placement and maximum widths of mantels and framing of fireplace openings.

*See glossary for definition.

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UNDERWRITERS LABORATORIES OF CANADA (CAN 4) (continued)

S611-1979

FACTORY-BUILT FREE-STANDING FIREPLACES

This 37 page Standard is in two parts.

Part A covers factory-built fireplaces which are free-standing (meaning they are not built into walls) and intended for use in buildings. These fireplaces are intended for use with Type A factory-built chimneys covered by Standard CAN4-S604-78, or masonry chimneys.

Part B covers factory-built free-standing fireplaces intended for use in mobile homes.

These fireplaces are intended for installation in accordance with the Standard for Chimneys, Fireplaces and Venting Systems (NFPA 211-1977), published by the National Fire Protection Association.

'Part A' fireplaces are marked with at least the following information:

- (a) The manufacturer's name;
- (b) The minimum clearance to combustible* construction (see also Articles 22.8.2 and 22.8.3 in the Building Code);
- (c) If provided with detachable legs, a warning that the fireplace must be installed with the legs provided.

'Part A' fireplaces are provided with illustrated installation instructions containing at least the following information:

- (a) The step-by-step process for installation;
- (b) The size, minimum height and type of chimney to which the fireplace is to be connected; and
- (c) Any limitations regarding the installation and minimum installation clearances.

*See Glossary for definition.

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ELECTRICAL SAFETY CODE OF ONTARIO/CANADIAN ELECTRICAL CODE

This Safety Code consists of the Canadian Electrical Code Parts I, II and III (published as CSA Standards 22.1, 22.2 and 22.3**), together with the "Ontario Supplement" published by Ontario Hydro and containing amendments to these parts of the Canadian Electrical Code.

For residences, this Safety Code covers such electrical work as the following:

- Overhead and underground electrical supply systems from the community electrical distribution system to the building.
- Type and capacity of main service entrance equipment (electrical service panelboard* with main fused switch, circuit breakers* and connectors)
- The allowable number of electrical circuits* and allowable number and type of electrical outlets (lighting fixtures and/or wall receptables) for each electrical circuit.
- The type of wiring, electrical grounding and fire detectors.
- The method of installation of this equipment to ensure a safe and adequate electrical service.

*See Glossary for definition.

** These CSA Standards titles are as follows:

- CSA C22.1, "Canadian Electrical Code, Part I - Safety Standards for Electrical Installations"
- CSA C22.2, "Canadian Electrical Code, Part II - Definitions and General Requirements"
- CSA C22.3, "Canadian Electrical Code, Part III - Overhead Systems and Underground Systems"

CANADIAN PLUMBING CODE

This 120 page Code sets out the requirements for a plumbing system within a dwelling, depending upon the extent and type of plumbing services provided within or supplied to the dwelling from the exterior. It also sets the minimum standards for piping and other plumbing materials and fixtures, if they are installed in the dwelling.

Copies of the Plumbing Code may be obtained by writing to: The Associate Committee on the National Building Code, The National Research Council of Canada, Ottawa, Ontario, K1A 0R6.

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ONTARIO WATER RESOURCES ACT

Section 40 of this Act states that no contractor, house-owner or any other person is permitted to perform boring or drilling of a water well in the Province of Ontario unless approved by the Ontario Ministry of the Environment.

Application forms for a license to perform such work, or copies of the Act, may be obtained by writing to:

The Environmental Approvals Branch,
The Ministry of the Environment,
135, St. Clair Avenue West,
Toronto, Ontario
M4V 1P5

There is a fee required for the license (\$10 at the present time).

Normally, if a contractor is employed to drill a well, he will obtain the license.

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G L O S S A R Y

This is a list and an explanation of the technical words and construction terms used in the Summaries of the Standards.

AGGREGATE	Any coarse, hard material such as gravel, broken stone or sand. Gravel is usually called coarse aggregate and sand fine aggregate. Coarse and fine aggregates are mixed with cement and water to form concrete; fine aggregate is mixed with cement and water to form mortar for masonry.
AIR-ENTRAINED CONCRETE	The addition of an air-entraining material in the concrete mix causes minute air bubbles in the finished concrete. This provides protection against surface flaking and crumbling caused by freezing-thawing or by the use of de-icing salts.
ANNEALED	Annealing is a process of heating followed by cooling. Copper tubing is annealed to give it the best combination of strength and ability to be bent and to be flared for jointing.
ASBESTOS CEMENT	A fire-resisting weatherproof building material made from Portland Cement and asbestos fibres. It is manufactured in various forms such as plain sheets, corrugated sheets, shingles, pipes, etc. It can also be used in grout to patch fireboxes of wood stoves or heaters.
BITUMENS	Flammable, adhesive materials which are highly waterproof. In the construction industry the word applies equally to asphalt (which comes from the manufacturing of petroleum and is also found in its natural state in some countries) or pitch (which comes from coal and is also known as "coal tar pitch"). The latter must be heated to become fluid so it can be applied.
BUILT-UP ROOF	A roof covering consisting of layers of roofing felt or glass-fibre mat, laid in and covered with pitch or asphalt (see 'Bitumens'). The top is finished with crushed stone, gravel or a cap sheet. Generally used on flat or low-pitch roofs.
CAVITY WALL	A masonry wall constructed of two separate thicknesses (wythes) with a minimum 50 mm (2") cavity between and tied together by metal ties or bonding units. (See Drawing No. 20.13.6).
CELLULAR CONCRETE OR CELLULAR INSULATION	Material which is manufactured in such a way that it contains many, small air bubbles. This reduces its weight, increases its resistance to the transmission of heat.

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G L O S S A R Y (Continued)

CIRCUIT (ELECTRICAL)	A continuous conducting path through which electrical current flows, which includes controls, wiring, outlets, lighting fixtures, appliances, etc.
CIRCUIT BREAKER	An automatic mechanical device which serves the same purpose as a fuse, i.e. to prevent overheating in an electrical circuit by cutting off the electrical current when overloading occurs.
CLEAR LUMBER	Lumber which is free, or practically free, of knots or other visible defects.
COMBUSTIBLE CONSTRUCTION	Within the range of temperatures that may occur in a building either normally or under fire conditions, materials are classified, for the purpose of the Building Code, as 'combustible' or 'non-combustible'. 'Combustible' materials are materials which fail to meet the requirements of CAN4-S114-M80 "Standard Method of Test for Determination of Non-Combustibility in Building Materials". 'Combustible' construction means construction which uses such materials.
COMPRESSIVE STRENGTH	A measurement of the amount of resistance to crushing or pressure provided by materials such as concrete, brick, other masonry, mortar, or even soft materials such as insulation.
CORRUGATED	Sheet materials formed with several, parallel ridges (usually "S" shaped) to increase stiffness.
CURING	The continuous action which takes place between cement and water during the hardening of concrete <u>OR</u> the keeping of proper temperatures and moisture conditions to ensure that this action occurs properly.
DAMPPROOFING	The process of coating the outside of a foundation wall with a special material (such as asphalt) to resist the passage of moisture through the wall. (See also Drawing No. 13.5.1 and "Waterproofing"). Also, material used to resist the passage of moisture through concrete walls and floors, and from masonry to wood.
DECK (ROOF)	The flat, horizontal portion of a roof; the basic, structural surface of a roof.
DRAWN/DRAWING	A process for manufacturing items, such as metal wires and tubing, by drawing the material through holes or between rollers, with or without heating.

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G L O S S A R Y (Continued)

DRESSED LUMBER	Pieces of lumber which are planed on one or more sides.
DWV	Means 'drainage, waste and vent' and is applied to piping.
EFFLORESCENCE	A white, fleecy deposit on the face of masonry caused by salts in the bricks or mortar. The salt is dissolved by moisture and carried to the surface and left there when the moisture evaporates.
EXTRUDABILITY	The ease and the smoothness with which a caulking material flows from its container.
FASCIA, FASCIA-BOARD	A finish member around the face of eaves and roof projections.
FIBREBOARD, (HARD-PRESSED)	A material manufactured of compressed wood fibres and used for exterior wall siding, door facings, etc. Sometimes called hardboard or composition board.
FILLED	Means that the item or material contains asbestos or other minerals for reinforcement, or to make the material easier to apply, or to replace some of the more costly materials in making up the required size of the item or material.
FIRE STOP	A draft-tight barrier within or between construction assemblies that acts to slow down the passage of smoke and flame.
FLAME SPREAD RATING	A classification indicating the speed at which flame spreads on the surface of a material, or an assembly of materials, when measured in accordance with a standard fire test.
FLASHING	Sheet metal or other material used in roof and wall construction to shed water.
FRICTION FIT INSULATION	Thermal insulation which is held securely within the building frame by friction without additional fastening.

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G L O S S A R Y (Continued)

GAUGE	A standard for measuring; e.g. diameter of nails or wire, thickness of metal sheets, etc. The higher the number, the thinner the material, e.g. 16 ga. (1/16") is thicker than 20 ga. (1/20").
GLUED-LAMINATED	Structural glued-laminated timber is made up of two or more layers of wood of various lengths, joined together with adhesives under high temperature and pressure with the grain of all layers approximately parallel.
GRADE (LUMBER)	To separate lumber into different established classifications depending upon its suitability for different uses. A classification of lumber.
GRADE (GROUND LEVEL)	The level of the ground surface around the foundation wall.
HYDRONIC	Hydronic heating means hot water (or other liquid) heating, which is the circulation of hot water through a system of pipes and radiators (heat transforming devices) by gravity or by a circulating pump.
INDENTATION	A dent or a depression, such as a chair-leg makes in a floor covering material.
INORGANIC	Anything which is not organic (see 'organic').
LEACHING	"Leaching system piping" means the system of pipes in a septic tank installation which finally distributes and discharges the water into the ground.
MINERAL FIBRE	A material used for insulating buildings and produced by sending a blast of steam through molten slag or rock; common types now in use include rock wool, glass wool and slag wool.
NOMINAL	The size or thickness by which a material is known and sold, but which differs slightly from the actual size or thickness.

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G L O S S A R Y (Continued)

ORGANIC	Having the physical elements of plants or animals; e.g. something which is or was a part of a plant or animal.
PANELBOARD	A central place for controlling a number of electrical circuits (see definition) by means of fuses or circuit breakers (see definition), usually contained in a metal cabinet installed on a basement wall. Switches are sometimes added to control each circuit.
PLY/PLIES	Used to denote the number of thicknesses of building paper, roofing felt, or in plywood, the thicknesses of wood veneer; as three-ply, five-ply, etc.
POTABLE	Potable water is water which is safe for people to drink.
RSI/R	A measurement of the resistance to the passage of heat provided by a material, such as insulation, or by an assembly of materials, such as an exterior wall. RSI is the metric version, R is Imperial. The higher the number, the better the insulation value.
SATURATED/ SATURANT	Completely soaked, or filled to the greatest possible extent with a fluid. A "saturant" is the fluid used to "saturate" another material.
SHAKE	A shingle (see definition) split, not sawn, from a block of wood and used for roofing and siding.
SHINGLE	A relatively thin and small unit of roofing laid in overlapping layers as a roof covering or as siding. Wood shingles are sawn from a block of wood and are tapered.
SIDING	In wood-frame construction, the material other than masonry or stucco used as an outside wall covering, e.g. wood, vinyl, metal
SOFFIT	The underside of parts of a building, such as staircases, roof overhangs, beams, etc.
SOFTWOOD	The wood produced by one of the groups of trees that in most cases have needles; e.g. the conifers or evergreens. The term has no relation to the actual hardness of the wood.

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G L O S S A R Y (Continued)

SOLVENT	A liquid which is able to permanently or temporarily dissolve another material or to weaken it.
STILE AND RAIL DOOR	A door constructed with vertical and horizontal framing members, and having the spaces between filled with glass or wooden panels. The vertical members are stiles and the horizontal members are the rails.
TEMPERED GLASS	Specially strengthened glass which, after manufacture, has been heated to just below the melting point and suddenly cooled. This produces forces within the glass so that, when broken, the entire sheet of glass breaks into small, harmless, sugar-like pieces.
THERMAL BREAK	The separation of a door or window frame into an inner and an outer frame, connected by an insulation material. This reduces the passage of cold from the outer frame into the building, reducing condensation and loss of heat.
TOLERANCE(S)	The allowable variation(s) in the dimensions or weights of materials and items, which result(s) from the manufacturing or assembly process. The Standards state the maximum allowable tolerances.
UNFILLED	Means an item or material which does not contain any "fillers" (see "filled").
VENEER (WOOD)	A thin sheet or layer of wood, of uniform thickness, applied to the face of another material such as solid wood or plywood.
WATERPROOFING	The method of sealing off foundation walls or concrete floors laid on earth to prevent the passage of water, usually under pressure, into the building. It is usually made up of coatings of asphalt applied to the surface alternately with several layers of asphalt-saturated felts (see also Drawing No. 13.4.1 and "dampproofing" and "saturated").
WATER VAPOUR TRANSMISSION	A measurement of the rate at which a material will allow water vapour to pass through it.

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